UNIVERSITY OF WEST FLORIDA
PROGRAM IN CLINICAL LABORATORY SCIENCES
SELF-STUDY REPORT

SUBMITTED TO
NATIONAL ACCREDITING AGENCY
FOR CLINICAL LABORATORY SCIENCES
(NAACLS)

OCTOBER 27, 2006

Please Note
Program Title Change

Effective fall semester 2006, the name of the University of West Florida Medical Technology Program is changed to Program in Clinical Laboratory Sciences.

NAACLS has been informed of this change in July 2006.

These changes are reflected in UWF Catalog 2006-2007.

Accordingly, throughout this self study the new title is used for the Program; and students and graduates of the Program are referred to as clinical laboratory science majors and clinical laboratory scientists respectively. Occasionally the name is abbreviated as CLS Program.

Thank you.

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Sponsoring Institution
Program Fact Sheet

Program Level: BS; MT /CLS (Medical Technology /Clinical Laboratory Sciences)

Institution: University of West Florida

Address: 11000 University Parkway

City: Pensacola

State, Zip Code: Florida, 32514

Agencies that accredit the institution (e.g., JCAHO for hospitals; regional academic associations for colleges; CAP, AABB, FDA, etc. for laboratories):

Southern Association of Colleges and Schools (SACS)

Administrative officer of the organizational unit in which the program is located:

Name: Jane Halonen, PhD **Title:** Dean, College of Arts & Sciences

Program Director:

Name: Swarna Krothapalli **Credentials:** MS, MT (ASCP)

Number of students per class: **20** **Number of classes:** 1

Clinical affiliates:

INSTITUTION	CITY/STATE	ACCREDITED
Baptist Hospital	Pensacola, FL	JCAHO, CAP, AABB
Bay Medical Center	Panama City, FL	JCAHO, CAP, AABB
Fort Walton Beach Medical Center	Fort Walton Beach, FL	JCAHO, CAP, AABB
Shands at Univ of Florida	Gainesville, FL	JCAHO, CAP, AABB
Shands at AGH	Gainesville, FL	JCAHO, CAP, AABB
Shands Jacksonville	Jacksonville, FL	JCAHO, CAP, AABB
West Florida Hospital	Pensacola, FL	JCAHO, CAP, AABB

Brief Description and Organization of the Program

The University of West Florida (UWF) Program in Clinical Laboratory Sciences was initiated in 1969, two years after the University officially opened its doors to student enrollment as an upper level two year institution. The first class of students graduated in 1971. For the past thirty five years the program has been continuously in an active status, graduating over 450 students. Until 1986 the program was operated on a 3+1 basis, in which the students completed 3 years of general education and prerequisite science courses and applied for entry into a hospital based NAACLS accredited training program. The University was the academic affiliate for five hospitals; each with a CAHEA/NAACLS accredited School of Medical Technology. Upon completion of the 12 month training in an affiliate hospital the student was awarded a B.S. degree in Medical Technology by the University.

In 1986, at the request of the affiliate hospitals, the University assumed full responsibility for NAACLS accreditation of the program and the local hospitals agreed to serve as the clinical affiliates, providing the capstone clinical laboratory practicum to the students. The clinical curriculum was redesigned into a university based clinical laboratory science program in which the student receives didactic instruction supported by student laboratories on campus for 3 semesters followed by two semesters (seven months) of clinical rotation at one of the clinical affiliates.

History of Accreditation and other Program Reviews

During 1985-86 the UWF program operated under an initial accreditation by a transfer of sponsorship from Sacred Heart Hospital.

In 1988 the program was reaccredited by CAHEA for a period of five years through a self study/site survey process conducted by NAACLS.

In 1992-93 the program was reviewed by NAACLS and received reaccreditation from CAHEA for a period of seven years. Effective July 1994 UWF=s program was formally accredited by NAACLS through a transfer of accreditation from CAHEA.

In the ensuing three years other hospitals joined the UWF program as clinical affiliates. These are: West Florida Regional Medical Center in Pensacola, Fort Walton Beach Medical Center in Fort Walton Beach (45 miles from Pensacola), and Bay Medical Center in Panama City (100 miles from Pensacola).

In 1999-2000 the Program was reviewed by NAACLS and was awarded renewal of accreditation for a second 7 year cycle.

During 2004-2005 Shands Health Care System in Gainesville, Florida sought partnership with University of West Florida Program in Clinical Laboratory Sciences and beginning January 2006 students are placed for clinical rotations in laboratories of Shands Hospitals in Gainesville and Jacksonville.

The University of West Florida=s Medical Technology Program has a long history, much experience and a reputation for high quality. Over the years the program has gained recognition for its excellence in preparing medical technology students for employment as well as advanced degrees. Since 1986 the program has been reviewed not only by NAACLS (1988 and 1993 and 2000), but also by the State University System of Florida (Board of Regents Program Review) in 1987, 1996 and 2000. Following are excerpts from these reviews:

1987, State of Florida Board of Regents= Program Review Report

AWithin the last two years, this program which was operated as a 3+1 type has been changed to a university based Medical Technology Program of the 2+2 type. The affiliated hospitals have been much better satisfied with this arrangement and are in high praise of the quality of students and the preparation which these students bring to the clinical activities. The curriculum which has been in operation under the 2+2 program is sound. With the long-standing reputation of the Biology Department for quality programs, the Medical Technology Program enjoys a fine reputation.@

1988, NAACLS Review Report

AThe UWF Medical Technology Program seems well organized and quite thorough. The document (self study) reflects a pride in the program and a genuine concern for the student.@

ANew program has made adequate beginning with limited number of faculty. Faculty very hard working and well intentioned. Will develop into good program if given appropriate support and resources. Students have strong basic science background and lots of flexibility in the completion of these requirements. Highly motivated faculty. Excellent clinical facilities and strong support from area medical community and staff at clinical affiliates.

1993, NAACLS Review Report

AThe MT Program at UWF is thoroughly described in the self study. It appears that the program is well organized and well run. The program appears to produce well qualified graduates. The program strengths identified include: 1) solid curriculum, 2) dedicated clinical education coordinators and instructors, and 3) support/advisement given to students by the faculty.@

AThe Medical Technology Program at The University of West Florida is a well organized and well run program, producing well qualified graduates. This is an excellent program with potential growth which needs continual support and encouragement. There is an excellent community support and absorption of graduates. This program provides a vital service to the community. Committed academic and clinical faculty; outstanding, strong clinical affiliate support; support from the Department Chair and College Dean.@

1996, State of Florida Board of Regents= Program Review Report

AThis review of the Medical Technology Program established at the University of West Florida reveals a well designed and structured curriculum being administered and taught by a dedicated and committed faculty. The program enjoys strong University administrative support at all levels. In addition, the program has very strong ties and support from the area clinical facilities and professional agencies. The community and the region perceive the graduates of this program who are subsequently employed in area health care facilities make a very strong contribution to the health and well-being of its citizens. A major strength of the program is the dedicated leadership of the Program Director. The Program is accredited by both national and state agencies.@

2000 NAACLS Review Report

"Program appears to be well designed and administered, with students able to perform well on certification exams as well as ability to find employment".
"Areas of Strength: Dedicated Faculty, strong administrative support, well equipped campus instructional laboratory, supportive clinical sites, tremendous community support for the program".
No deficiencies or concerns were found and the Program received accreditation renewal for a period of seven years

2000 State of Florida Board of Regents= Program Review Report

In 1999-2000 Medical Technology Program was one of the six programs selected for review as part of the pilot process for the State University System's (SUS) new program review methodology. The Program Review Report which was received in spring 2001 listed the following strengths of the Program:
"Through each cycle of evaluation, the Medical Technology Program was recognized for its quality and emerged as a strong academic unit with an excellent curriculum and coordination of student services. The program's physical, personnel, financial, instructional and computer technology resources were significantly enhanced. In 1999-2000 there was a dedicated student laboratory that was furnished with the latest in instructional technology devices. This lab was used for classroom lecture periods as well. Computer technology was incorporated into the curriculum.

There were new personnel positions and positive curriculum changes. Positive and significant changes resulted from program evaluation. For example, course sequence and instruction in clinical microbiology were significantly modified following comments and recommendations made by students, education coordinators and faculty.

Support from UWF clinical affiliates, as well as from personnel in non-affiliate health care facilities, remained strong as ever. The program received support and assistance from almost all the clinical laboratories in the region in various ways. UWF alumni occupied not only a majority of staff positions, but also were working in positions of management and supervision all across Northwest Florida".

Over the years the program has strived to incrementally enhance its resources and improve the services provided to students and to the community. While doing so we have also been preparing for the current program review by NAACLS (in academic year 2006-2007). Special emphasis was placed on recommendations made by the various consultants who reviewed the program in most recent reviews. Fortunately, we have been able to follow up and act upon their recommendations in readiness for the current program review by NAACLS. These will be described in the following pages, in appropriate sections of the self study.

With rare exceptions, UWF's Program in Clinical Laboratory Sciences has a 100% pass rate in external examinations taken by its graduates. UWF=s graduates constitute a major portion of the workforce in the clinical laboratories of Northwest Florida (Florida Panhandle). Three of the five laboratory managers at the clinical affiliates are UWF graduates. Many other alumni are employed in a variety of workplaces: in research labs, pharmaceutical industry, crime labs, public health labs and so on. Our graduates are known not only for their academic strengths but also for their professional skills and attributes. Such an effective outcome from this educational program is possible only due to the excellent clinical laboratories which we are fortunate to have in this area. The University and its clinical affiliates maintain an extraordinarily close association, resulting in a strong support of the program and sustained interest in students= training from the clinical instructors and program officials at the hospitals.

THE UNIVERSITY OF WEST FLORIDA
Program in Clinical Laboratory Sciences
Organizational Placement

President
John Cavanaugh, Ph.D.

Provost
Sandra Flake, Ph.D.

Dean
College of Business

Dean, College of Arts & Sciences
Jane Halonen, Ph.D.

Dean
College of Professional Studies

Director, School of Allied Health & Life Sciences
and
Chair, Department of Biology
George Stewart, Ph.D.

Faculty & Staff
Program in Clinical Laboratory Sciences

Swarna Krothapalli, M.S. MT (ASCP)
Associate Professor & Program Director

Kristina Behan, Ph.D. MT (ASCP)
Associate Professor

Sherman Bonomelli, M.S.
Assistant in Medical Technology

Steve J Smith, M.D.
Visiting Assistant Professor &
Clinical Site-Coordinator

Susan Strasinger, D.A
Adjunct Professor

Victoria Dubose
Office Administrator

Faculty
Department of Biology
Wayne Bennett, Ph.D.
William Peterson, Ph.D.
Hui- Min Chung, Ph.D.
David Davis, M.S.
Theodore Fox, Ph.D.
Barbara Genthner, Ph.D.
Wade Jeffrey, Ph.D.
Joe Lepo, Ph.D.
Christopher Pomory, Ph.D.
K. Ranga Rao, Ph.D.
Karen Pritchard, Ph.D.
Phillip Ryals, Ph.D.
Venkat Sharma, Ph.D
Richard Snyder, Ph.D.
Melanie Sutton, Ph.D.
Peggy Winter, Ph.D.

Academic Advisor –Biology
Steve Celestial

I. SPONSORSHIP

Standard 1

A. Relationship between the University and Clinical Affiliates

Currently the University of West Florida Clinical Laboratory Sciences Program is affiliated with eight hospitals: 1) Baptist Hospital, Pensacola, 2) Sacred Heart Hospital, Pensacola, 3) West Florida Hospital, Pensacola, 4) Fort Walton Beach Medical Center, Fort Walton Beach, 5) Bay Medical Center, Panama City, 6) Shands at University of Florida , Gainesville, 7) Shands AGH, Gainesville and 8) Shands Jacksonville. In 1986 Baptist and Sacred Heart Hospitals became affiliates for the university-based program (prior to 1986 each maintained a CAHEA accredited School of Medical Technology at the baccalaureate level, with UWF as their academic affiliate). West Florida Hospital became an affiliate in 1990, Fort Walton Beach Medical Center in 1994, Bay Medical Center in 1996 and Shands Health Care System Hospitals in 2006.

Since the beginning and continuing at present, the relationship between the University and its clinical affiliates has been excellent. Since the previous self study report (1999-2000) clinical laboratory personnel shortages have become critical. Our clinical affiliates are very eager to support the CLS Program at UWF and serve as partners in students' training. They have also enhanced student recruitment activities and related marketing strategies to promote the profession of clinical laboratory sciences. Even though during the past 10 years the staffing patterns at each affiliate laboratory have become much leaner, the clinical instructors and program officials at each hospital are deeply committed to the education of our students and to the well being of the program. In an era when several university-based CLS programs were experiencing difficulties in finding supportive clinical sites, UWF program has been fortunate to have excellent support from its clinical affiliates.

Our Program's communication with clinical affiliates and coordination of student clinical rotations at hospital laboratories is excellent. In 1995 the University took a significant step to enable the university-based program faculty to be in daily touch with the students and education coordinators at the hospitals by hiring a part -time faculty to be entirely in charge of clinical -site-coordination. The advent of electronic communication and universal use of E-mail by students as well as program officials at the hospitals made it possible to be in frequent communication even with the distant sites.

While students are at the hospitals, the Clinical Site Coordinator visits each local hospital once a week or more as needed to meet with the Education Coordinator and the students on a one to one basis. Each student has an appointment of 15 to 30 minutes to review his/her progress and discuss any problems. During these visits the Clinical Site Coordinator provides counseling, answers questions, and monitors the student's performance in written and practical exams. He consults with the bench instructors and departmental supervisors regarding student's performance in the affective domains and provides counseling and/or encouragement to each student as needed. He assists the students with registration for the required courses at the University, with application procedures for the national exams and state license, and facilitates special projects such as student seminars and journal club presentations.

The clinical sites at Fort Walton Beach and Panama City which are outside Pensacola, but in the panhandle of Florida, are visited on a biweekly/monthly schedule. Communication with the 3 Shands hospitals, which are at a distance of 6-8 hours drive from Pensacola, is done mainly by electronic means. However, in the future (when ever students are placed in the hospital) we plan to visit these hospitals at least once each semester. The Clinical Site Coordinator holds the primary responsibility for all aspects of the clinical rotations of the students and is in a frequent and on-going communication with the affiliate hospital laboratories.

During the weekly or biweekly communication the faculty member also consults with the on-site Education Coordinator, supervisors and senior technologists about any changes in instrumentation, procedures, policies and curriculum improvements. Very often the affiliate laboratory personnel give the University faculty member abnormal slides, specimens, case studies, expired reagents, and downgraded instruments for use in student laboratories.

Each clinical affiliate holds the responsibility for providing advanced training and practice in methodologies for all major areas commonly performed in a modern clinical laboratory, practices of quality management, laboratory administration, supervision, safety, and problem solving. Students also receive instruction in the use and evaluation of laboratory information systems and practices of professional conduct. They acquire and practice skills which are needed for effective communication with nurses, physicians, and other health care professionals. The hospital laboratory provides the student with on-the-job training above and beyond the classroom and didactic instruction given at the University.

Each clinical affiliate has a designated Education Coordinator who is in charge of students and their clinical rotations while at the hospital. The Education Coordinator: 1) communicates with the University's Clinical Site Coordinator on a regular basis 2) provides student orientation to the hospital /laboratory when they begin clinical rotations 3) oversees that each student=s rotations among various departments are smoothly progressing 4) arranges for timely administration and grading of exams 5) maintains student records and assures that the activities assigned to the students in the clinical setting are entirely educational in nature and scope.

In addition to the regular communication by the Clinical Site Coordinator, there is continuous and ongoing communication between the University faculty and the laboratory personnel at the clinical affiliates. There is frequent electronic communication between the students, the Program Director, the faculty and the clinical education coordinators to answer questions, solve problems, remind students of deadlines, etc. Education Coordinators from all the affiliates and the University faculty meet at least once each semester. A major agenda item for this faculty meeting in the spring is the selection of students for the clinical year. In the fall semester the faculty meet to review the results and student scores of external examinations, and to discuss any modifications needed in the upcoming clinical rotations in January. Also in the fall meeting affiliation agreements are reviewed and the process of renewal is initiated.

Overall there exists a long standing and the most effective symbiosis between the University of West Florida Clinical Laboratory Sciences Program and its clinical affiliates. All the parties in this joint effort share a common interest in the excellence of education and training provided to students. The Community leaders have a common goal in maintaining this Program as a vital source of national Board certified / State of Florida licensed clinical laboratory scientists to serve the local/ regional/ state and national needs for qualified laboratory personnel. This partnership is highly beneficial to this community of Northwest Florida, which is endowed with a strong health care industry, with several hospitals and clinical laboratories offering state of the art preventative, diagnostic and treatment services. In this region there is an ever expanding need for qualified clinical laboratory scientists on a continuing basis and UWF's CLS Program is the chief source of employees for the region.

Standard 1

B. List of Accreditors for the University and the Clinical Affiliates

University of West Florida -Accreditations

The University of West Florida is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award associate, bachelor's, master's, specialist, and Doctor of Education degrees. Individuals who wish to contact the Commission on Colleges pertaining to the accreditation status of the University may write the Commission at 1886 Southern Lane, Decatur, Georgia 30033-4097, or call at (404) 679-4501. In addition, specific colleges and programs are nationally accredited by the agencies indicated below.

Teacher and school administrator preparation programs have also been reviewed and approved by Florida Department of Education.

UWF Colleges and Programs	Accrediting Agency	Level of Degree
College of Business	The Association to Advance Collegiate Schools of Business (AACSB)	B.S., B.A. M.Acc., M.B.A
College of Professional Studies M.Ed. Professional Education/ Teacher Education Programs)	National Council for Accreditation of Teacher Education (NCATE)	B.A., M.A., Ed.S., Ed.D.
Chemistry	American Chemical Society (ACS)	B.S.
Computer Engineering (UWF/UF Joint Program)	Accreditation Board for Engineering & Technology (ABET)	B.S.
Electrical Engineering (UWF/UF Joint Program)	Accreditation Board for Engineering & Technology (ABET)	B.S.
Health, Leisure, and Exercise Science/Athletic Training	Commission on Accreditation of Allied Health Education Programs (CAAHEP)	B.S.
Medical Technology (Clinical Laboratory Sciences)	National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)	B.S.
Music	National Association of Schools of Music (NASM)	B.A.
Nursing	Commission on Collegiate Nursing Education (CCNE)	B.S.N
Psychology (Counseling & Industrial Accreditation Organizational Programs)	Masters in Psychology Accreditation Council (MPAC)	M.A.
Social Work	Council on Social Work Education	B.A

ACCREDITORS FOR EACH CLINICAL AFFILIATE

Baptist Hospital	**JCAHO**	**AHCA- State of FL**	**CAP**	**AABB**
Hospital	**X**	**X**		
Clinical Laboratory			**X**	
Immunohematology/Bloodbank				**X**
Bay Medical Center				
Hospital	**X**	**X**		
Clinical Laboratory			**X**	
Immunohematology/Bloodbank				**X**
Fort Walton Beach Medical Center				
Hospital	**X**	**X**		
Clinical Laboratory			**X**	
Immunohematology				**X**
Sacred Heart Hospital				
Hospital	**X**	**X**		
Clinical Laboratory			**X**	
Immunohematology				**X**
West Florida Hospital				
Hospital	**X**	**X**		
Clinical Laboratory			**X**	
Immunohematology				**X**
Shands –University of Florida				
Hospital	X	**X**		
Clinical Laboratory			**X**	
Immunohematology / Bloodbank				**X**
Shands -AGH				
Hospital	X	**X**		
Clinical Laboratory			**X**	
Immunohematology / Bloodbank				**X**
Shands - Jacksonville				
Hospital	X	**X**		
Clinical Laboratory			**X**	
Immunohematology / Bloodbank				**X**

STANDARD 1

C. Information for Each Clinical Affiliate

The following information for each of the clinical affiliates is submitted in an Appendix (a separate ring binder)

- Clinical Facility Fact Sheet
- Signed, current Affiliation Agreement
- Capital (major) equipment utilized fro student instruction
- Facility specific required Textbooks
- Access to periodicals
- Instructional Resources
- Objectives and evaluations utilized exclusively by the facility
- Rules and Policies unique to the facility that govern student behavior

STANDARD 2

A. A Brief Description of the Sponsoring Institution

University of West Florida (UWF) is one of the 11 public institutions of higher learning in the State of Florida (www.uwf.edu).

In 1955, the Florida Legislature authorized the State Board of Education to locate a state university in Escambia County and funds were allocated for the development of the University of West Florida. A tract of 1000 acres of rolling hills and natural woodland along the banks of Escambia River was designated as the site for the University.

Ground was broken on April 16, 1965, and in the same year the Chambered Nautilus was adopted as the official UWF emblem. UWF became the sixth state university of the State University System of Florida, which today consists of eleven institutions of higher learning.

The first students began classes in the fall of 1967, and the first commencement exercises were held in June 1968 where 58 students received degrees. In 1969, the university undergraduate programs were accredited by Southern Association of College (SACS) and the first master's degree programs were established.

In fall 2005 the enrollment head count was 9655 and the number of degrees awarded in 2005-2006 was 2335. The academic programs are offered and administered by three colleges: College of Arts and Sciences, College of Business and College of Professional Studies.

UWF offers over 115 majors and tracks for a baccalaureate degree, including Clinical Laboratory Sciences and Nursing. Graduate programs at the Masters level are offered in 45 + majors and tracks. The College of Professional Studies offers two Education Specialist degrees and a Doctor of Education degree in Curriculum & Instruction. In collaboration with University of Florida in Gainesville, UWF offers BS degree programs in Electrical Engineering and Computer Engineering.

Though it is primarily an undergraduate institution, UWF has significant components of research, funded by external grants and contracts. However, UWF is well known for its undergraduate programs with small class sizes, personal attention from faculty, excellent advising services and for its location in the serene and beautiful setting of Northwest Florida.

UWF's mission statement is: "to empower each individual we serve with knowledge and opportunity to contribute responsibly and creatively to a complex world." As a regional public university it also strives to meet the needs of the Northwest Florida, the state of Florida, and the nation through research, creative activities and public service. The Clinical Laboratory Sciences Program serves as a shining example of this commitment to meet the region=s need for well educated and qualified clinical laboratory personnel. For the past 36 years, through the most challenging times of rapid change and growth in the health care industry, the University has maintained this program, modifying and improving it according to the national standards and

regional needs.

B. The Department of Biology

Since 1969 the Clinical Laboratory Sciences Program (formerly Medical Technology) has been one of the academic programs offered by the Biology Department. Currently there are 16 regular, full-time faculty members in Biology, in addition to several adjuncts and graduate teaching assistants. The department offers B.S. degrees in three disciplines: Biology, Marine Biology, and Clinical Laboratory Sciences. Students seeking a degree in Biology may choose a track in General Biology, Pre professional, Microbiology, Molecular Biology, or Plant Science.

Dr George Stewart is the Chairperson of the Department of Biology. The Biology department has a master's program and a strong research component in its programs and offerings. The following Biology Faculty members teach the biology prerequisites taken by Clinical Laboratory Sciences majors:

Lower Division courses:

Chris Pomory -	Gen Zoology
David Davis-	Cell Biology
Karen Pritchard-	Human Physiology, Anatomy & Physiology I & II

Upper Division Courses:

Barbara Genthner -	General Microbiology
Venkat Sharma-	Immunology
Hui-Min Chung -	Genetics
Philip Ryals -	Biochemistry
Steve Smith-	Pathophysiology

Biochemistry, Microbiology, Immunology, Pathophysiology and Genetics are prerequisite upper-level biology courses for CLS students. These courses are also part of the curriculum for various biology tracks. Biology majors who take these courses have a better appreciation of the emerging fields of biotechnology and are ideal candidates for the CLS Program. Since these faculty members understand the nature and value of the clinical laboratory sciences, they strongly support the program, its faculty and students. CLS students take 31 semester hours of prerequisite courses from the Biology Department, 12 at lower division and 19 at upper level. The overall strength of the curriculum in the UWF CLS Program is derived not only from the excellence of its clinical courses but also from the strong foundations laid by these biology courses.

The Center for Environmental Diagnostics and Bioremediation (CEDB) is a research center affiliated with Biology. The primary mission of the CEDB is research focused on diagnosis and remediation of environmental problems. The areas of investigation include microbiology, microbial genetics, molecular biology, environmental toxicology and other related fields. CLS students find not only part- time employment in this center's research labs but also opportunities for undergraduate research experience and postgraduate education.

Being part of the Biology Department has a second major advantage. Frequently biology graduates enter the clinical year of the CLS Program on a 4+1 basis. Especially due to a large number of common courses, the crossover from a Biology track to a CLS major is possible with the least amount of additional course work requirements. Over the years the Biology Department has been a significant source of majors for the CLS Program.

Biology, Clinical Laboratory Sciences and the department of Chemistry are located in the major science building (Building 58). Biology is the largest of all the science departments, with excellent facilities, equipment, and support services for teaching the science laboratories. The building has a central scientific supplies stockroom with a manager serving the instructional needs of the student teaching labs of Biology, Chemistry and CLS Program. Thus, in many ways the Department of Biology provides strength, support and quality to the Clinical Laboratory Sciences Program.

C. School of Allied Health and Life Sciences

Health care providers are major employers in Northwest Florida and health care industry is rapidly growing at an amazing pace. Facing acute shortages in health care personnel the health care community is seeking partnerships with the University and urging the University to develop new health professions related education programs. As a result, UWF has begun a major drive towards this goal by enhancing the Nursing Program to offer Bachelor's, Masters and a Ph.D. program.

In recent years the Biology Department, CLS Program and the Nursing Department have been clustered together as the Division of Life and Health Sciences in the College of Arts & Sciences under the leadership of Dr. George Stewart. During the past five years several health sciences related certificate and degree programs have been developed, including an on-line Master's in Public Health. Addition of several other health related programs is in planning, including Pharmacy (Pharm D). More recently, the name of this division was changed to School of Allied Health and Life Sciences. Information on these programs may be found at: http://www.uwf.edu/sahls/

D. The Department of Chemistry

CLS majors take 16 semester hours of chemistry courses as prerequisites for selection into clinical year. The department is located in the same science building as Biology and CLS program, sharing a common stock room for science laboratory supplies and other related support services. Since a majority of CLS majors pass through a 4 semester sequence of chemistry courses, the chemistry department's faculty are closely involved in and provide much support for the CLS Program. They give feedback to the Program faculty regarding student success, failure, progression and other matters related to student retention. They write letters of recommendation for selection into clinical year and, as needed, provide input /advice regarding the effectiveness of the CLS program.

Standard 3

Responsibilities Assumed by the University

As a sponsoring institution, University of West Florida assumes the primary responsibility for funding and operation of the program. The university holds the responsibility for maintaining NAACLS accreditation and for maintaining an 'approved training program' status with the Board of Clinical Laboratory Personnel of the state of Florida. The university holds the responsibility for curriculum planning, selection of course content, direct instruction in university-based clinical courses with labs and coordination of supervised clinical education and evaluation in hospital based instruction.

The sponsoring institution receives and processes applications for and grants a B.S. degree in clinical laboratory sciences which requires a total credit of 126-127 semester hours. It holds the responsibility for appropriate admission policies and procedures for selection of students into the institution, as well as into the clinical year of the Program.

The university employs three (3) full-time and one half-time faculties, and an adjunct faculty member to teach the university-based clinical laboratory science courses and coordinate the clinical rotations at the hospitals. The university-based faculty is also responsible for planning, development and coordination of the curriculum implementation in the hospital-based courses. The program is also staffed with a full-time office administrator who provides support services to the faculty, students and hospital education coordinators.

One of the university-based faculty members is appointed as the Program Director who is primarily responsible for development, operation and supervision of all aspects of the Clinical Laboratory Sciences Program.

The clinical year curriculum constitutes 51 semester hours of the total degree program. The university-based faculty teaches 11 senior undergraduate level courses with a total credit of 31 semester hours, providing didactic instruction in all the major practice areas in a modern clinical laboratory. They also develop, update and provide curricular frameworks (objectives, reading and practical assignments, exam schedules, evaluation forms for affective domain, etc.) for the hospital-based courses (6 courses spread over 2 semesters with a total credit of 20 semester hours). They write, update, and maintain the numerous exams taken by students while they are in hospital rotations. Through telephone and electronic communications they maintain frequent and ongoing dialogue with the education coordinators and clinical instructors at the hospitals. They are also responsible for engaging the students in special projects, student seminars, journal club, and review sessions at the end of clinical rotations. They assist the students in application and preparation for national certification exams.

The university maintains affiliation agreements with the clinical sites and ensures that they are current and signed.

UWF provides liability insurance for students in the clinical year of the CLS Program. UWF also ensures that prior to beginning their clinical rotations at the hospitals the students meet all the requirements such as background checks, health and immunization standards, State of Florida Trainee License.

In addition to instruction and evaluation of students in the clinical year, the university faculty carry out the functions of recruitment, academic advisement, and degree planning for the clinical laboratory science majors in the freshman, sophomore and junior years of the program. They visit junior colleges to provide articulation and assistance to transfer students in planning pre-clinical year course work. They attend high schools and middle schools to inform students about the profession and UWF's program in Clinical Laboratory Sciences.

The University also maintains an advisory committee composed of individuals in the community who have expertise/interest in health professions related education programs. The committee meets once a year and /or as needed to provide input and advice regarding the current relevancy and effectiveness of the program.

In summary, as the sponsoring institution, UWF assumes the responsibility for funding, operation, accreditation, curriculum design and implementation, quality of instruction, students= learning outcomes, and for the overall effectiveness of the program.

Standard 3A

Policies and Procedures to Assure that Assigned Activities in the Clinical Setting Are Educational

While students are in clinical rotations, the clinical-site-coordinator visits the hospitals on a regular basis. Currently Dr. Steve Smith is the program's designated the clinical-site-coordinator. The primary assignment of this faculty member is to be in charge of all activities related to hospital rotations. He visits each local hospital once per week and visits the hospitals in Fort Walton Beach and Panama City on an approximately monthly basis. Our newest clinical affiliates, which are at a distance of 6-8 driving hours are visited once each semester, most of the communication being done via E mail and telephone.

During these visits / communications each student is met with in a private session to discuss the student=s performance and progress during the previous week. The student=s grade in the latest weekly exam is discussed and grade conflict, if any, is resolved. As the situation warrants, the student is commended or counseled /encouraged to improve the grade. If the grade is below C (73%) the student is given a warning. In consultation with the clinical instructors and the education coordinator, the student=s performance in the laboratory work and affective domain is assessed and appropriate counseling or warning is given to the student. The clinical coordinator documents concerns of students and clinical personnel and actions taken or needed whenever appropriate.

During the site visits the faculty member consults with section supervisors and technologists to ensure that the student's activities are education and not service oriented. Teaching technologists provide input regarding changes needed in the curriculum, learning objectives, incorporation of new instrumentation and methodologies, and so on. Clinical instructors usually give suggestions on how to improve clinical rotations, written and practical exams, and other aspects of students= learning.

The University faculty and education coordinators from the hospital laboratories meet at least twice (once in each the fall and spring semesters) during each academic year. On occasion they meet also during the summer semester. One of the major strengths of this program is the complete participation and involvement of the program officials from clinical affiliates in all matters related to curriculum, quality of the student's preparation for the job market and maintaining the program=s reputation for excellence in clinical laboratory science education.

The University program officials work very closely with the hospital laboratory personnel to ensure that student's= activities are entirely educational and conducive to acquiring entry level competencies as a clinical laboratory scientist. Phlebotomy is taught as a unit of instruction according to a set of objectives established to acquire proficiency and provide periodic review. It is well understood and accepted by our clinical affiliates that the students are to be taught according to the prescribed learning objectives. Once the students acquire proficiency in a given area, they are provided maximum possible opportunity to practice as medical technologists, under direct supervision. The affiliation agreements include a clause that assigned activities in clinical setting should be educational, based on established student learning outcomes and student should not be engaged in service activities of the laboratory.

Standard 3B: Communication with Affiliates

Describe how the Program communicates with affiliates for exchange of information and coordination.

The Program communicates with clinical affiliates through personal visits, telephone, e-mails and through regular meetings between the University-based program faculty and the hospital-based Education Coordinators. The program has a dedicated faculty member who is in charge of communication and coordination with the clinical sites (Dr.Steve Smith).

The Clinical-Site-Coordinator visits the three local hospitals in Pensacola on a weekly basis and the two hospitals in Northwest Florida are visited on a monthly basis. Communication with the distant sites is done mostly through telephone calls and e-mails. The Shands hospitals which are at a distance of 6-8 hours by driving are visited less frequently (may be once per semester). The Shands affiliations are new and so far we had only one student placed at each of the three Shands hospitals for the first time in 2006. Since all of the students and the Education Coordinators have e-mail connections frequent communication and correspondence was maintained even with the distant sites.

While students are at the hospitals, the Clinical Site Coordinator, either through personal visits or through telephone conversations communicates with the students and the Education Coordinators on a one to one basis. During these conversations student's progress is reviewed and any problems developed during the past week are discussed and resolved. The Clinical- Site-Coordinator provides counseling, answers questions, and monitors the student's performance in written and practical exams. He consults with the bench instructors and departmental supervisors regarding student's performance in the affective domains and provides counseling and/or encouragement to each student as needed. He assists the students with registration for the required courses at the University, with application procedures for the national exams and state license, and facilitates special projects such as student seminars and journal club presentations.

The Clinical-Site-Coordinator also consults with the on-site Education Coordinator, supervisors and senior technologists about any changes in instrumentation, procedures, policies and curriculum improvements. Dr. Smith keeps the Program Director informed of any impending changes at the clinical affiliates which may affect the students' training.

In addition to the regular communication by the Clinical Site Coordinator, there is continuous and on-going communication between the University faculty and the laboratory personnel at the clinical affiliates. There is frequent electronic communication between the students, the Program Director, the faculty and the clinical education coordinators to answer questions, solve problems, remind students of deadlines, etc. Education Coordinators from the affiliates and the University faculty meet at least once each semester. A major agenda item for this faculty meeting in the spring is the selection of students for the clinical year. In the fall semester the faculty meets to review the results and student scores of external examinations, and to discuss any modifications needed in the upcoming clinical rotations in January. Also in the fall meeting affiliation agreements are reviewed and the process of renewal is initiated.

Standard 3B: Communication with Clinical Affiliates-Documentation

Following are samples/excerpts of letters, e-mails, meeting agendas and minutes of faculty meetings.

7-6-2006

To: Education Coordinators
Rosina, Joey, Marcia, Esther, Susan, Myra, Abby and Jim

Hello Everyone,

Hope you are doing well and having a good summer.
I am doing well, however very busy with the self study preparation, among other things.
At last, after all the considerations and negotiations, we finalized the list of clinical-site assignments in January 2007.
Steve may have given you this information by now. I just wanted to say hello and send you the complete list. We have 13 students.
Only one student agreed to go to Gainesville. No student assigned to Shands Jacksonville
We may have a larger class next year, but it is not easy to predict how many will materialize for the class of 2007-2008. Will try to call you soon,

Swarna
Swarna Krothapalli, MS; MT (ASCP)
Associate Professor & Program Director
Clinical Laboratory Sciences

MEMORANDUM
February 1, 2006

TO: Education Coordinators / Selection Committee Members
Rosina Cunningham, Baptist Hospital
Susan Adams, Bay Medical Center
Esther Scott, Fort Walton Beach Medical Center
Valerie Tomlinson, Sacred Heart Hospital
Marsha Dumas, West Florida Regional Medical Center

FROM: Dr. J. Steve Smith, Clinical Site Coordinator, Medical Technology Program

SUBJECT: Student Selection Interviews for Clinical Year 2006-2007

Spring classes have started and there are 12 students submitting applications for the Clinical Year of the Medical Technology Program. A meeting has been scheduled for the Selection Committee
to conduct interviews on:

Date: Thursday, March 30, 2006
Time: 9:00 - 4:00 PM
Place: UWF - Bldg 58

I will circulate the student files among the Selection Committee members. They include the student application, letters of recommendation, and their transcripts.

I hope this date is convenient for everyone and you will be able to attend. Please let me know if there are any conflicts. I look forward to seeing you.

Enclosed are the parking permits.
You should park in the faculty and staff parking lot **U.**
A schedule of the student interviews is attached.

SELECTION COMMITTEE MEETING MINUTES
Thursday, March 30, 2006
Attendance:

Rosina Cunningham, Baptist Hospital
Esther Scott, Fort Walton Beach Medical Center
Valerie Tomlinson, Sacred Heart Hospital
Marsha Dumas, West Florida Regional Medical Center
Sherman Bonomelli, Faculty
Dr. Steve Smith, Faculty

Students Interviewed:

Cindy Anttila
Johane Augustin
Derek Cockerhan
Christine Engle
Lily Getachew
Jennifer Marks
Jessica Marshall
Linh Nguyen
Nicole Perez
Tiffany Peterson
Michelle Ryanczak
Katie Saunders
Christi Thompson

Recommendation:

All students be admitted to the Medical Technology Program 06-07

8 DECEMBER 2005

UWF MEDICAL TECHNOLOGY PROGRAM
EDUCATION COORDINATORS MEETING
INTRODUCTION

Attendance

Rosina Cunningham	Baptist Hospital
Susan Adams	Bay Medical Center (a)
Esther Scott	Fort Walton Beach Medical Center
Valerie Tomlinson	Sacred Heart Hospital
Marsha Dumas	West Florida Hospital

Swarna Krothapalli
Kris Behan
Sherman Bonomelli
Steve Smith

AFFILIATION AGREEMENTS: Status Update

REVIEW OF HOSPITAL ROTATION 2004-2005
Discussion of Student Evaluation Forms (scale 0-5)
Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5
Narrative Evaluations

University Lecture & Laboratory (Strengths and Weaknesses)
Blood bank well structured; Lectures thorough
Do whole semester on Blood bank
Stylish presentation in Micro and Chemistry
Less historic information; more real world
Use new technology in lab; need new equipment; need more space
Need cell washers
Less emphasis on old techniques
Structure Micro with greater emphasis on unknowns; more hands on Micro
Coagulation and Serology too short due to hurricane

Narrative Evaluations (continued)
Hospital (Clinical) Rotation (Strengths and Weaknesses)
Really felt prepared for rotation
Overall very helpful
Sometimes grading on rotations was too subjective
Some exams need revision
Chemistry at Baptist, so busy, little hands on, sometimes an attitude
Need more visits to FWB (felt like red-headed step-children)

Kudos:
Micro and Heme at Baptist
Lou Ann at WFH
Ken at SHH
Blood bank and Micro at FWB
All at Bay

Enrichment Activities
Northwest Florida Blood Center:
- Informative
- Could be half day

Journal Club:
- Helpful
- Tedious
- Informative

Student Seminars...
- Enjoyed
- Helpful
- Stressful

Overall
- "Thank you"

PREPARATION FOR HOSPITAL ROTATION 2005-2006

Clinical Site Assignments
- Amendments

Hospital Orientation for Students.... Dates
- West Florida Medical
- SHH
- Baptist Medical
- Bay Medical
- Ft Walton Medical

Ft Walton Medical Supplementary Assignments
- Serology 1 (Baptist)
- Special Chem 6 (Baptist)

Student Folders for Hospital Rotation
- Student Information Forms
- Trainee Licenses
- Health Forms and Insurance
- Certification for HIV, Medical Errors, OSHA, State Regulations
- NEW Background Checks

Education Coordinators Folders
- Updated Examinations
- Student Schedules (Rotations, NWF BloodBank, Journal Club, Seminars)

Hospital Rotation Manual
- Additions/Deletions

Topics of Discussion -

1. Introduction of new education coordinator, Marsha Dumas
2. New hospital sites, Gainesville (Shands) and Jacksonville
3. All graduates passed their board exams!!
4. Flow Cytometry rotation at Baptist and Sacred Heart Hospital
5. Site visit (review) will be in 2007
6. Next meeting scheduled for March 2006

Discussions and Actions to be taken:

Phlebotomy training will be enhanced to the extent possible on campus and in the clinical rotations under the guidance of the education coordinators and phlebotomy supervisors

Faculty will make efforts to procure funds from administration to purchase needed equipment

On campus Diagnostic Microbiology laboratory exercises will be enhanced to include more training in the identification of unknown organisms

Student seminar format will remain the same but students will be asked to choose a specific topic from an overall list in the major lab areas.

Background Checks will be implemented for the next years applicants.

Dr. Steve Smith

From: Swarna Krothapalli [mailto:skrothap@uwf.edu]
Sent: Thursday, **December 01, 2005** 1:04 PM
To: Marcia.dumas@hcahealthcare.com
Cc: J Smith
Subject:

Dear Marcia,
I just received official notification from Joan that Fran retired and you will be taking her place. Our education coordinators play a significant role in ensuring the success of our students in clinical rotations. So I am delighted to have you in this position. I, the students and our faculty welcome you as a faculty Associate in the program. I am looking forward to seeing you on Dec 8.
To follow up on this matter I need to do the following:
1. Inform NAACLS, our accreditation agency, about the change in education coordinator
2. Send a request to our Provost, for your appointment as an honorary Faculty Associate in the program.
So, I request that you send me a copy of your resume as soon as possible. You may bring it with you next week, Thanks

Swarna

May 23, 2005

Myra Urso, BS MT (ASCP), Med
J.H Thomas Memorial Transfusion Service
Shand's at AGH
801 SW 2nd Ave
Gainesville, FL 32601-6298

Dear Myra,

I am sending enclosed an original signed copy of our affiliation agreement. I am also sending enclosed a page showing the clinical site assignments for the current class.

Also enclosed is a sample of clinical rotation schedule, just to give you an idea of how many weeks the student spends in each department.

Students will take an exam each week and the grades are recorded on the enclosed grade reporting form. This form also shows how the student's performance in these exams is converted into a letter grade to be reported to the University Registrar, at the end of clinical rotations.

This is just for your information. I will send all the necessary documents in sorted files at a later date. Looking forward to working with you.

Sincerely,

Swarna Krothapalli, MS, MT (ASCP)
Associate Professor and Program Director

April 12, 2005

To: Ken Smith, Sacred heart Hospital
Eileen Mueller, Baptist Hospital
Greg Bruning, West Florida Hospital

Dear Ken, Eileen and Greg,

Thank you for giving the UWF Medical Technology students a demonstration of the Hematology Blood Cell Counter's operating principles and applications. I heard from the students that they received an excellent presentation. They were very much impressed with the interest you have shown in advancing their knowledge in hematology. They certainly appreciated your warm welcome and your generosity in sharing your expertise with them.

I am writing to express my appreciation of your kindness in donating your precious time during a busy work schedule for the benefit of educating our younger generation of medical technologists. Even though my work at the University does not leave much time for me to have any quality time at the hospital laboratory, I have always taken strength from the abundance of goodwill and cooperation I receive from colleagues such as yourself, which in turn enables me to do what I like to do best-teaching and training medical technology students. For this I am very grateful. Wishing you all the best,
Sincerely

Swarna Krothapalli, MS; MT (ASCP)
Associate Professor & Program Director

March 10, 2005....Spring Education Coordinators Meeting

Attendance: Rosina Cunningham, Baptist Hospital
Esther Scott, Fort Walton Beach Medical Center
Valerie Tomlinson, Sacred Heart Hospital
Fran McMillan, West Florida Regional Medical Center
Dr. Kristina Behan
Dr. Steve Smith

Interviews:

Sharon Worth	Megan Rigsby
Bethany Phillips	Nicholas Rogers
Jerri Sutherland	Jamila Chevalier
Jorge Salgado	Samantha Morgan
Tabitha Erickson	Bethany Counselman
Mary Gimenez	Jennifer Bemis
Katie Herbermann	Christina Roberts
Kristina Martin	Helaynne Silva

Recommendations:
All 16 students be accepted to the Medical Technology Program.
Clinical Rotation will begin in January 2006.

MEMORANDUM

February 4, 2005....Spring Education Coordinators Meeting

TO: Education Coordinators / Selection Committee Members
Rosina Cunningham, Baptist Hospital
Susan Adams, Bay Medical Center
Esther Scott, Fort Walton Beach Medical Center
Valerie Tomlinson, Sacred Heart Hospital
Fran McMillan, West Florida Regional Medical Center

FROM: Dr. J. Steve Smith, Clinical Site Coordinator, Medical Technology Program

SUBJECT: Student Selection Interviews for Clinical Year 2005-2006

Spring classes have started and there are twelve students submitting applications for the Clinical Year of the Medical Technology Program. A meeting has been scheduled for the Selection Committee to conduct interviews on:

Date: Thursday, March 10, 2005
Time: 9:00 - 4:00 PM
Place: UWF - Bldg 58 Room 14

I will circulate the student files among the Selection Committee members between February 15 and March 1. It will include the student application, letters of recommendation, and their transcripts.

I hope this date is convenient for everyone and you will be able to attend. Please let me know if there are any conflicts. I look forward to seeing you.

Enclosed are the parking permits.
You should park in the faculty and staff parking lot **#46**

January 18, 2005

Mary J. Montgomery
Chief Operations Officer
Bay Medical Center
PO BOX 2515
Panama City FL 32401

Dear Ms. Montgomery,

It is a pleasure and a privilege for me to write a letter of evaluation regarding our affiliation with Bay Medical Center's Clinical Laboratory. As you may know, prior to graduation, our students are placed at an affiliate hospital laboratory for 28 weeks of clinical rotations for hands-on training in laboratory methods. The Hospital training is the student's capstone experience to complete his/her preparation for becoming a certified and licensed Medical Technologist.

University of West Florida Medical Technology Program has been affiliated with Bay Medical Center in this capacity since 1996. Since then, each year, 1-2 students were trained at Bay Medical Center. All of these students received an excellent training and passed the national certification exams with good scores. While we lost touch with a couple of graduates, a majority of these students are successfully employed in the profession of clinical laboratory sciences.

According to our faculty experience, as well as the feed back we receive from our students/graduates, the clinical laboratory at Bay Medical Clinical Center is an excellent teaching facility for our students. The laboratory is modern and up-to-date in offering a spectrum of laboratory services in all areas currently offered at laboratories of comparable size and level across the nation. Our students are well equipped with basic entry level skills to function as clinical laboratory scientists and to advance their careers in the future. BMC's clinical laboratory is well organized, well operated and is well recognized for the quality of the laboratory services provided for patient care at BMC.

The laboratory manager, Mr. Richard Pressly and the education coordinator in charge of our students during their internship at BMC, Ms. Susan Adams demonstrate a high degree of professionalism in our dealings with them as one of our clinical affiliates. In addition, they promote and promulgate an environment of caring, concern and encouragement to the students. The entire staff of the laboratory at BMC shows a remarkable level of kindness and interest in the welfare of the students under their apprenticeship that it is immeasurable, in the final analysis, as a valuable asset to our Program.

Sincerely,

Swarna Krothapalli, MS, MT (ASCP)
Associate professor & Program Director
Medical Technology Program
University of West Florida

17 DECEMBER 2004

EDUCATION COORDINATORS MEETING
UWF MEDICAL TECHNOLOGY PROGRAM
INTRODUCTION
Attendance

Rosina Cunningham	Baptist Hospital
Susan Adams	Bay Medical Center
Esther Scott	Fort Walton Beach Medical Center
Valerie Tomlinson	Sacred Heart Hospital
Frances McMillan	West Florida Hospital

Swarna Krothapalli
Kris Behan
Sherman Bonomelli
Steve Smith

AFFILIATION AGREEMENTS
Update Status

REVIEW OF HOSPITAL ROTATION 2003-2004
Discussion of Student Evaluation Forms (scale 0-5)
Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5
Narrative Evaluations
University Lecture & Laboratory (Strengths and Weaknesses)
Chemistry may need a different approach (better textbook and lectures could follow textbook more tightly)
Focus more on the current, up to date items, less on the ways of the past
Less emphasis on rare disease
Shorten lectures, more laboratory
Labs excellent
Some labs were not very helpful...too long (too much wasted time)
A good move was bringing automation in for chemistry
More focus on blood bank and multiple antibodies
Molecular techniques and materials should be more heavily emphasized
Chemistry and microbiology, visual aids and different methods of learning great

Narrative Evaluations (continued)
Hospital (Clinical) Rotation (Strengths and Weaknesses)
All techs went out of their way to help
Some OK, some not

Loving and caring people at Bay
Baptist was awesome
Couldn't be more pleased with hospital rotation
Sometimes workplace too busy, over tasked. Only a few assisting students
Gossip should not be displayed in front of student if they expect student to display a level of professionalism
Cumulative exam not accurate or up to date

Enrichment Activities

NWBC...
Useful to see daily activities
Not useful, not really organized
Change of scenery but didn't do anything applicable there
Poor planning for students
Good
Nice to see the faces behind the products

Journal Club..
Program could go on without it
Helpful
Prepared us for the seminar

Student Seminars...
Very useful
Helpful
Stressful, but helpful
Not enough points were given for the amount of time and effort
Nice change
Practicing public speaking is always helpful

Overall

"Thank you"

PREPARATION FOR HOSPITAL ROTATION 2004-2005

Clinical Site Assignments
Amendments

Hospital Orientation for Students....
West Florida Medical
SHH
Baptist Medical
Bay Medical
Ft Walton Medical

Ft Walton Medical Supplementary Assignments
Serology 1 (Baptist)
Special Chem 6 (Baptist)
Parasitology (deleted)

Student Folders for Hospital Rotation
Student Information Forms
Trainee Licenses

Health Forms and Insurance
Certification for HIV, Medical Errors, OSHA, State Regulations

Education Coordinators Folders

Updated Examinations
Clinical Chemistry Examinations 1-7

Hospital Rotation Manual

Additions/Deletions

Lab Practicals

ADDITIONS /CHANGES/MODIFICATIONS

OTHER

Student Schedules for NWBC, Journal Club, Seminar,
Visits by Clinical Site Coordinator
Next Meeting - Spring Selection - March/April 05

Topics of Discussion -

1. All graduates passed their board exams
2. Flow Cytometry rotation at Baptist and Sacred Heart Hospital will be arranged in the schedule
3. Hospital Computers will be recalled except Bay Medical and WFH
4. Dr. Behan thanked all education coordinators for their donations to the program
5. Site visit (review) will be in 2007
6. Affiliation agreements will be done in 2005 and 2006. Revisions will be reviewed by UWF General Counsel.
7. The program enrollment has increased and we are seeking new clinical sites
8. Next meeting scheduled for March 17 and 18, 2005

Discussions and Actions to be Taken:

Increase exposure to Flow Cytometry
Hospital specialists will be included in the Hematology lecture schedule (invited as guest lecturers).
Hospital Computers are to be recalled from all hospitals.
(Computers will be surveyed. All students have their own home computer systems)
(Review material is available in the form of web sites and CD's)
All staff should maintain material and preview requirements to be completed for Site Visit
New affiliations have been proposed with Shands Hospitals in Gainesville and Jacksonville
Next meeting scheduled for March 17th 2005

Spring Education Coordinators Meeting…
March 11, 2004

Attendance: Rosina Cunningham, Baptist Hospital
Esther Scott, Fort Walton Beach Medical Center
Stephen Gampher, Sacred Heart Hospital
Fran McMillan, West Florida Regional Medical Center
Sherman Bonomelli
Dr. Smith

Students Interviews: 13 students were interviewed

Recommendations: All the students interviewed be accepted to the Medical Technology

MEMORANDUM
February 3, 2004....Spring Education Coordinators Meeting

TO: Education Coordinators / Selection Committee Members
Rosina Cunningham, Baptist Hospital
Susan Adams, Bay Medical Center
Esther Scott, Fort Walton Beach Medical Center
Stephen Gampher, Sacred Heart Hospital
Fran McMillan, West Florida Regional Medical Center

FROM: Dr. J. Steve Smith, Clinical Site Coordinator, Medical Technology Program

SUBJECT: Student Selection Interviews for Clinical Year 2004-2005

Spring classes have started and there are twelve students submitting applications for the Clinical Year of the Medical Technology Program. A meeting has been scheduled for the Selection Committee to conduct interviews on:

Date: Thursday, March 11, 2004
Time: 9:00 - 4:00 PM
Place: UWF - Bldg 58 Room 14

I will circulate the student files among the Selection Committee members between February 15 and March 11. It will include the student application, letters of recommendation, and their transcripts.

I hope this date is convenient for everyone and you will be able to attend. Please let me know if there are any conflicts. I look forward to seeing you.
Enclosed are the parking permits.
You should park in the faculty and staff parking lot **#46**

AGENDA
EDUCATION COORDINATORS MEETING
UWF MEDICAL TECHNOLOGY PROGRAM
10 DECEMBER 2003

INTRODUCTION

Attendance

Rosina Cunningham	Baptist Hospital
Susan Adams	Bay Medical Center
Esther Scott	Fort Walton Beach Medical Center
Stephen Gampher	Sacred Heart Hospital
Frances McMillan	West Florida Hospital
Swarna Krothapalli	
Kris Behan	
Sherman Bonomelli	
Steve Smith	

AFFILIATION AGREEMENTS

Update Status

REVIEW OF HOSPITAL ROTATION 2002-2003

Discussion of Student Evaluation Forms

Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5

Narrative Evaluations

- Didactic lectures...
  - Too long
- Laboratory...
  - Explain more tests that pertain to hospital
  - Instruments and reagents several times did not work
  - More up to date methods and equipment
- Clinical rotation
  - Update Chemistry study questions
  - Make questions based on textbooks that are required and used in class
- Enrichment Activities
  - NWBC...Suggest half day rotation
  - Journal Club... Not enough time to prepare
  - Student Seminars...Enjoyed the experience
- Overall
  - “Excellent program”
  - “Really enjoyed

PREPARATION FOR HOSPITAL ROTATION 2003-2004

Clinical Site Assignments

Amendments

Hospital Orientation for Students....

West Florida
SHH
Baptist

Ft Walton Beach Supplementary Assignments

Serology
Special Chem
Parasitology

Student Folders for Hospital Rotation

Student Information Forms
Trainee Licenses
Health Forms and Insurance
Certification for HIV, Medical Errors, OSHA, State Regulations

Education Coordinators Folders

Updated Examinations

Clinical Chemistry #6 and #7
Microbiology #1 and #6
Blood Bank #2

Updated Answer Sheets

Clinical Chemistry #2-#5
Microbiology #5

Hospital Rotation Manual

Additions/Deletions

Lab Practicals

CHANGES/MODIFICATIONS

Other Topics of Discussion:

Student Schedules for NWFBC, Journal Club, Seminars distributed
Schedule of visits by Clinical Site Coordinator distributed

Per Student requests, Microbiology and Chemistry Examinations updated
Next Meeting - Spring Selection - April 2004

Date: Wed, 28 Mar 2001 15:48:18
To: RCA0713@aol.com, arams41@aol.com, Scott.esther@hcahealthcare.com, jcaraway@shhpens.org, fmcmillan@uwf.edu
From: Swarna Krothapalli skrothap@mail.uwf.edu

To: Esther, Fran, Joey, Regina, and Susan,

Dear Colleagues,
I am happy to inform you that Ms. Kristina Jackson Behan has accepted our offer of a tenure track faculty position as an Assistant Professor in the Medical Technology Program. She will join the Program/Department on Aug 8, 2001. Her primary duties will be to teach MLS courses in Clinical Chemistry; Diagnostic Microbiology and related subjects in the clinical year curriculum.

Kris is a certified medical technologist with about 20 years of experience in the clinical laboratories. Currently she is finishing up her Ph.D at Carnegie Mellon University in the Department of Molecular, Cell and Developmental Biology. Expected graduation -May 2001.
I ask that you join me in extending Kris a warm welcome, congratulations & best wishes.

Thank you,
Swarna

June 25, 2001

TO: Education Coordinators, UWF Medical Technology Program

Regina Castor -	Baptist Hospital
Susan Adams-	Bay Medical Center
Esther Scott -	Fort Walton Beach Medical Center
Steven Gampher-	Sacred Heart Hospital
Frances McMillan-	West Florida Hospital

FROM: Swarna Krothapalli
Program Director, Medical Technology
UWF

Attached is a list students in the graduating class of 2002 and their clinical rotation assignments, which are scheduled to begin on January 7, 2002. This list reflects two changes from the assignments which were discussed and approved in our meeting in March 2001.

1. One of the students interviewed, Mr. David Benham, dropped out of this class due to personal circumstances
2. Another student, Ms. Ruth Olavarria recently relocated her residence from Niceville area to Pensacola. So, though she was originally assigned to FWBMC we have changed her assignment to WFH, in David's place

Today the students are informed of their assignments. We do not ask them necessarily to contact their respective education coordinator immediately, but would like to facilitate communication if so desired by either party. So they were given your telephone number and E mail along with their assignment. You may hear from at least some of them.

I hope the summer is going well for you. We are looking forward to the arrival of our new faculty member, Kris Behan. She is expected to be in Pensacola around July 18-20. I would like to schedule a faculty/education coordinator's luncheon meeting on **Friday September 14, 2001, 12N,** on campus. We will send you a reminder closer to the date. But if you have any conflict with that date please let me or Fran, (our office assistant) know as soon as possible.

Thank you for your assistance in student training and maintenance of excellence in this Program

University of West Florida-Medical Technology Program
Class of 2001-2002 Clinical Rotation Assignments
January - July 2002

Bay Medical Center Panama City	Barbara Piard	Ms. Susan Adams, B.S; MT (ASCP) (850)747-6943 arams41@aol.com
Baptist Hospital Pensacola	Theresa Gard Merita Hrlovic Vicki Mayo	Ms. Regina Castor, B.S; MT (ASCP) 434-4868 Rca0713@aol.com
Fort Walton Beach Medical Center Fort Walton Beach	Margaret Murray	Ms. Esther Scott B.S; MT (ASCP) (850) 863-7669 EstherScott@hcahealthcare.com
Sacred Heart Hospital Pensacola	Tammy Bardin Chong Culbertson Ron Quijano	Mr. Steven Gampher B.S; MT (ASCP) 416-623 email
West Florida Hospital Pensacola	Angel Chen Ruth Olavarria Dawn Tucker	Ms. Frances McMillan, B.S; MTASCP) 494-5580 Fmcmillan@uwf.edu

9/13/2000

TO: Education Coordinators
Mr. Joey Caraway, SHH
Ms. Regina Castor, BH
Ms. Martha Lowe, BMC
Ms. Fran McMillan, WFRMC
Ms. Esther Scott, FWBMC.

From: Swarna Krothapalli, Program Director
Medical Technology, UWF

I am sending enclosed a list of students with their hospital assignments for clinical rotations beginning in January 2001. I also wanted to summarize and keep everyone informed of the recent changes and events in progress during fall 2000. Hope you all had a good summer and are ready to tackle the challenges of the remaining months of the year 2000.

1. Dr. Mark Bowman resigned and left the University. We were fortunate to find adjuncts to teach his courses during summer and fall 2000.

    - Dr. William Korzun, Program Director at Univ of S. Alabama taught MLS 4625- Clinical Chemistry I ; during Summer 2000
    - Steven Gampher (SHH); and Jim Shaddock(Gulf Breeze Hos) are team teaching the course MLS 4630 - Clinical Chemistry II during the first block of Fall 2000
    - Dr. Susan Strasinger will be teaching the course -Urinalysis & Body Fluids I ; during the second block of Fall 2000; as an adjunct
    - I am currently looking for an adjunct to teach MLS 4460 - Diag Micro I; in Spring 2001; for the next class of students. Please let me know if you know of any interested candidates

2. Dr. Susan Strasinger resigned as the Clinical Site Coordinator. As you all know she has been a great asset to our program for the past 5 years and her day to day involvement and contributions will be missed. However the good news is that she will be around and will be serving as an adjunct and a resource person for the program in the future.
3. Dr. Steve Smith has accepted the offer to take over Sue's position as the person in charge of students' clinical rotations at our affiliate hospitals. I would like to extend a hearty welcome to Steve from all of us. He is fully engaged in preparing for the upcoming clinical rotations and will be in touch with you, as needed, during this fall semester. I know he has been in touch with some of you and plans to visit every one ASAP. Please send him the rotation schedule, faculty roster and other material to be updated for the hospital rotation manual. Also please send the signed affiliation agreements as soon as possible. So far we received these from SHH and WFRMC.

4. Mamie Turner announced her intention to retire in January 2001. Ms. Fran MacMillan is appointed as the new education coordinator at WFRMC. I am pleased to note that she also is very enthusiastic about helping the students and be involved in the training program. Welcome to Fran. Steve and Fran will be working and learning together this year. I will do my best to help them both in their initiation into the Program.

5. Biology department has a new Chairperson, Dr. George Stewart, who took charge on Aug 8, 2000. As you may remember, he replaced (late) Dr. John Riehm as the Chairperson. I am looking forward to working with Dr. Stewart and to bring him over for a tour of each hospital laboratory as soon as possible. I will contact you.

6. We have advertised the faculty position vacancy in September issue of 'Laboratory Medicine' and it will also appear in two issues of 'Advance' in October. I am enclosing a copy of the ad for your information and posting in your lab. We are hoping to fill the position by May 2001. We left it open for a candidate to join in August 2001, if necessary, in which case I will have to find adjunct/s to teach Clinical Chemistry I in Summer 2001.

7. Our freshman enrollment is on the rise and there also seems to be an increase in inquiries from interested students. We have a total of 80 + students who declared Med Tech as major at UWF, This is a significant increase from the total of 45-50 majors in recent years. Of course it is a slow process to bring each student into the clinical year of the Program.

   I am fully aware the difficulties you are experiencing in finding or retaining qualified laboratory personnel. I would like to assure you that we are doing every thing possible to attract and retain good students into the Program, and appreciate all your cooperation and support in these efforts.

8. We received information from NAACLS that our Program has been recommended for a 7 year accreditation, until October 2007. We are waiting for approval by NAACLS Board of Directors and the final letter of accreditation renewal. Thank you for your help during the reaccreditation process in 1999-2000

9. In collaboration with Bay Medical Center in Panama City we are offering a day-long C.E program on November 4, 2000, at Bay Medical Center. In a few days the flyer will be mailed. Please post, publicize and encourage people to attend. I hope we will have a good response.

That is all for now. I will be in touch. Let me know what is happening at your laboratory. Thank you.

CC: Med Tech Faculty

II. RESOURCES

Standard 4

Description of Personnel Resources

The program has adequate personnel resources to meet the instructional, advising, coordinating and administrative needs of the program. The program currently has the following personnel resources:

Name	Title/ Rank	Term of Appointment
1. Swarna Krothapalli	Associate Professor & Program Director	12 month, full- time, tenured
2. Kristina Behan	Associate Professor	12 month, full- time, tenured
3. Sherman Bonomelli	Assistant (Lab Instructor)	12 month, full-time, non-tenure
4. Steve Smith	Visiting Asst Professor & Clinical Site Coordinator	12 month, half-time, non-tenure
5. Susan Strasinger	Adjunct Professor	Part time, Summer Semester or as needed

The Number of Students Admitted per Year:
During the past 7 years the number of declared majors varied from 80 to 100, occasionally hovering around 60-80. Currently the head count of our advisees is the rise again, nearing 100. These students are in the pipeline of freshman, sophomore, junior and senior levels. The senior year of the degree program (the clinical year) is approved as a 'Limited Access Program" by the Florida State University System. The program is permitted to limit the clinical year class to 20 students per year through a departmental selection process conducted between junior and senior years. Between 2001 and 2006 the clinical year class size ranged from 10 -16, with the highest number in 2005-2006.

Admission Date/s:
Admission to the university as a clinical laboratory science major is open, students being admitted for fall, spring or summer semester of a given year**.** Selection of students into the clinical year of the program always is conducted during the spring semester, from those students who have completed the required preclinical courses and other graduation requirements. Application deadline is February 1, and the selection process is completed by April 1 each year. Only one class is selected per year.

Instructor/Student Ratios

University-Based Courses
The student/faculty ratio in the university-based courses is usually 10:1 to 15:1 in lecture sessions. In student laboratories there are always two instructors, the primary faculty member in charge of the course and the laboratory assistant / bench instructor. Overall, the student / faculty ratio is low, and so far and never exceeded 20:1. University-based MLS (Medical Laboratory Science) courses are also open to biology and chemistry majors who may take them as electives towards their degrees.

Special permission from the instructor is required to register in the MLS courses. Clinical Laboratory science majors are given priority for enrollment in MLS courses. Non majors are given permission to take these courses provided they have completed the prerequisite courses and the cap for enrollment (20) is not exceeded. During the past 7 years the enrollment in these courses is as follows:

COURSE	Limit	2001	2002	2003	2004	2005	2006
MLS 4305 Hematology I	20	12	11	10	12	17	13
MLS 4460 Diagnostic Microbiology I	20	12	14	11	14	17	14
MLS 4334 Hemostasis & Thrombosis	20	11	10	13	12	16	13
MLS 4462 Medical Microbiology	20	11	10	16	16	20	14
MLS 4625 Clinical Chemistry I	20	10	9	12	12	16	13
MLS 4705 Special Clinical Topics	20	11	10	10	12	17	13
MLS 4550 Immunohematology I	20	10	9	9	12	16	13
MLS 4505 Serology	20	10	9	9	12	16	13
MLS 4630 Clinical Chemistry II	20	10	9	9	12	16	13
MLS 4220 Urinalysis & Body Fluids 1	20	10	10	10	12	16	13

Number of Students in Clinical (Hospital) Rotations

Student/faculty ratio in clinical rotations is always 1:1. Each year the senior class of students is divided into groups of two to four, based on the size of the class. Students from the Fort Walton Beach area (45 miles from campus) and students from the Panama City area (100 miles from campus) are assigned to those hospitals based on their residence and distance to travel to the clinical site. Gainesville and Jacksonville (Shands Health care System hospitals) are about 6 and 8 hours driving distance from Pensacola respectively. These are our newest affiliations and 3 students were placed in these hospitals for the first time in January 2006. The rest of the students are randomly assigned to one of the three local hospitals. Following is a distribution of students at the hospitals in the past six years and in 2007:

Hospital	2001	2002	2003	2004	2005	2006	2007
Bay Medical Center	1	1	1	1	1	1	1
Baptist Hospital	1	2	3	2	3	3	4
Fort Walton Beach Medical Center	1	1	1	1	2	2	1
Sacred Heart Hospital	2	3	2	3	3	4	3
West Florida Hospital	1	3	2	3	3	3	3
Shands -Univ of FL	-	-	-	-	-	1	1
Shands -AGH	-	-	-	-	-	1	-
Shands -Jacksinville	-	-	-	-	-	1	-

Most often the clinical laboratory assignments are made as one student per section / per clinical instructor. Occasionally, when we have a larger class and 4 or more students are placed at one clinical site, there may be an overlap of two students in a given section, one student beginning the rotation and the other student in the final week of rotation. In such a case the students are working at different stations under the supervision and/or the instruction of different instructors. In any event, the student/instructor ratio in clinical rotations never exceeds 2:1.

Hospital Rotation Schedules

Beginning:	First week in January
Ending:	Last week of July
Duration:	29 weeks
Time:	7:00 a.m. to 3:30 p.m. (Variable)

Rotation	**Number of Weeks**
Hematology/Coagulation/Urinalysis	6
Clinical Microbiology	5
TB/Mycology/Parasitology	2
Immunohematology	4
Serology	2
General Chemistry	5
Special Chemistry	2
Phlebotomy	1
Miscellaneous/Makeup Week	1
Total number of weeks	29

A sample form of hospital clinical rotations is included page 382. Generally the same schedule format is used at all the hospitals. However, changes are made as needed to accommodate the individual needs of a student or changes in staffing/work schedules of a hospital laboratory. UWF students are not given training assignments during evening, night or weekend shifts.

Standard 5A1: Program Director - Faculty Fact Sheet

Name: Swarna Krothapalli

Position: Program Director

Employed by: University of West Florida

Title: Associate Professor & Program Director

Proportion of time in: Teaching 50 % Administration 50 % Clinical Services 0 %

EDUCATION	INSTITUTION	FIELD OF STUDY	DEGREE	YEAR
Undergraduate	Andhra Christian College, India	Zoology and Chemistry	B.S.	1960
Graduate	Andhra University, India	Biology	M.S.	1962
Other (Specify)	University of West Florida	Medical Technology	B.S.	1977

Certified by: ASCP-BOR Certification #: 115847 Year Certified: 1977

Experience (List current position first):

INSTITUTION/CITY/STATE	POSITION	YEARS
University of West Florida, Pensacola, FL	Associate Professor & Program Director	1999-present
University of West Florida, Pensacola, FL	Assistant Professor & Program Director	1986 - 1999
Baptist Hospital, Pensacola, FL	Program Director, School of Medical Technology	1979 -1985
Baptist Hospital, Pensacola, FL	Staff Medical Technologist	1977 - 1979
Tulane University Medical School , NO, LA	Research Assistant	1967 -19 68
Andhra University, Waltair, India	Instructor - Biology	1962 - 1965

List principal functions in the education program:
See Program Director Position Description on next page

List continuing education activities during the past three years:

TITLE	SPONSOR	DATE
See Curriculum Vitae - Program Director Holds a Sate of Florida License as a Supervisor. Must have 24 hrs of CE / 2years to maintain license.		

Standard 5A2: Program Director - Position Description

The responsibilities of the current Program Director fall into these general areas: administration, teaching, academic advisement, service (to the University/community/profession).

1. Administration:

The Program Director is responsible for organization, administration, periodic review, planning, development, evaluation and general effectiveness of the program. Program Director:

- performs and /or participates in all the activities required of a department head at UWF: academic planning, annual evaluations, class schedules, hiring faculty and staff, annual reports, and so on.
- prepares annual budget and informs the upper administration of immediate and long range needs of the program.
- is primarily responsible for curriculum development, implementation and supervision of its general effectiveness both at the university and clinical affiliates.
- maintains correspondence with the external (accrediting, certifying and licensing) agencies to obtain, maintain and modify the approved status of the program.
- prepares self study reports and other documents required by these agencies in order to comply with the essentials for accreditation and licensure.
- corresponds with clinical affiliates to coordinate, evaluate and revise clinical rotations, and maintain affiliation agreements.
- receives and responds to inquiries from prospective students.
- recruits students through visits to high schools and junior colleges.
- prepares recruitment materials.

2. Teaching

The Program Director teaches the following university-based clinical lab science courses, which constitute approximately 50% of the clinical curriculum

Semester	Course	Credit Hrs	Contact Hrs
Spring	MLS 4305 & 4305L Hematology I/Lab	4	6
Summer	MLS 4334 & 4334L Hemostasis & Thrombosis/Lab	2	3
Fall	MLS 4550 & MLS4550L Immunohematology /Lab	4	8
Fall	MLS 4505 & 4505L Serology/Lab	2	3

A few years ago developed and taught an elective course, designed as an introductory course for prospective majors

	MLS 4931 Advances in Bio Medical Technology	1-2	1-2

In recent years this course is taught by the Clinical –Site-Coordinator, Dr. Steve Smith.

The Program Director is also responsible for the following causes taught at the affiliate hospitals. These responsibilities include curriculum development, i.e., preparing objectives, reading and practical assignments, writing exams, evaluation forms, checklists, etc. Since the hiring of the Clinical Site Coordinator, some of these duties have been delegated to this faculty member.

Semester	**Course**	**Credit Hrs**	**Contact Hrs**
Spring	MLS 4822L Hematology II	5	8
Summer	MLS 4825L Immunohematology II	5	8

After completion of the graduating students' hospital rotations, during the last week of July, the Program Director offers review sessions in Hematology, Immunohematology and Hemostasis. These review sessions are part of a debriefing/review week organized and implemented by the clinical-site-coordinator, to prepare the students for national certification examinations.

3. **Academic Advisement**

The Program Director responds to student inquiries. She is the primary academic advisor and has extensive responsibilities in providing academic advisement to a majority of the enrolled majors, to students entering the university, to prospective students at community colleges and high schools and special students. Academic advisement includes transcript evaluation, explaining the prerequisites, preparing a degree plan, offering assistance in course scheduling and registration, graduation and job placement. To facilitate advisement, the Program Director is available to students on general registration days, during regular office hours and as needed during the pre-registration weeks.

4. **Service**

The Program Director's responsibilities also include serving on the departmental, college, university and professional committees or organizations, providing service to contribute to the University's mission and goals. The Program Director is also responsible for providing and participating in professional continuing education programs both as a means of professional self-development and also to fulfill the contractual agreement with the affiliate hospitals to provide a minimum of five contact hours of continuing education programs per year to the clinical lab scientists in the region.

Standard 5A3: Curriculum Vitae of the Program Director

CURRICULUM VITAE

Name:	Swarna Krothapalli
Home Address:	1054 Stillbrook Road Pensacola, FL 32514 (850) 477-7642
Work:	
Telephone:	(850) 474-2988
Fax:	(850) 474-2749
E-Mail:	skrothap@uwf.edu
Date of Birth:	December 3, 1942
Marital Status:	Married, two children
Husband:	Dr. Ranga Rao Krothapalli Professor of Biology, University Research Professor & Director of CEDB, University of West Florida
Children:	Padma (born 1966) and Krishna (born 1968)
Citizenship:	United States
Current Position:	Associate Professor & Program Director Clinical Laboratory Sciences University of West Florida 11000 University Parkway Pensacola, FL 32514

Education

B.Sc. (Zoology- Major; Minors in Chemistry and Botany) 1960
Andhra University, Waltair, India.

M.Sc. (Zoology) 1962
Andhra University, Waltair, India

B.S. (Medical Technology) 1977
University of West Florida, Pensacola, FL

Clinical Laboratory Training 1976-77
Baptist Hospital School of Medical Technology, Pensacola, FL

Board Certification

American Society of Clinical Pathologists (ASCP) Board of Registry-MT (Medical Technologist), 1977

Professional License: State of Florida

Licensed as a Technologist in Microbiology, Chemistry, Immunohematology & Serology
Licensed as a Supervisor in Hematology

Employment

1999-Present: Associate Professor & Program Director, Clinical Laboratory Sciences Program, University of West Florida
1990-1999: Assistant Professor and Program Director, Medical Technology, University of West Florida
1995-1996: Acting Chairperson, Nursing Department, University of West Florida
1987-1990: Program Director, Medical Technology, University of West Florida
1986-1987: Associate Professor and Program Director, Medical Technology, University of West Florida
1979-1985: Education Coordinator, Baptist Hospital, School of Medical Technology
1979- 986: Faculty Associate, Department of Biology, University of West Florida
8/85–12/85: Medical Technologist, Sacred Heart Hospital, Pensacola, Florida
3/85- 8/85: Medical Technologist, West Florida Regional Medical Center
1977-1979: Rotating Staff Technologist, Baptist Hospital Clinical Lab, PNS, FL
1967-1968: Research Assistant, Cardio-Pulmonary Physiology, Tulane University School of Medicine, New Orleans, Louisiana
1962 - 1966: Research Scholar and Instructor in Biology, Andhra University, Waltair, India

Membership in Professional Societies

American Society for Clinical Pathology
American Society for Clinical Laboratory Sciences
American Association of Blood Banks
Northwest Florida Laboratory Association

Membership in Honor Societies

Phi Kappa Phi

Courses Taken in Management and Education

EDF 5450 Educational Measurement and Evaluation, University of West Florida, Sp 1981
ACC 3001 Accounting Principles and Control, University of West Florida, Fall 1981
GEB 5835 Dynamics of Business Management, University of West Florida, Spring 1982
EDG 6251 Advanced Curriculum Development, University of West Florida, Fall 1982
MAN 5902 Readings in Organization and Management, University of West Florida, Sp 1983
MAR 5129 Readings in Marketing Organization, University of West Florida, Spring 1983
Management Development 1, Baptist Hospital, October 4 - November 29, 1983
Instructional Systems Development - Naval Education and Training NAS, PNS, January 1984

Experience in Program/ Curriculum Development

University of West Florida's Clinical Laboratory Sciences program (named as the Medical Technology Program at the time) became a university-based program in 1986. I was hired as the first Program Director and was given the charge of developing a university based clinical laboratory sciences curriculum and obtaining NAACLS accreditation.

During 1986-87 I designed and implemented the university-based clinical laboratory science curriculum for a B.S. degree in Medical Technology. I designed the curriculum, wrote course descriptions, developed the lectures and corresponding student laboratories in clinical laboratory sciences at the University.

I procured funds and purchased basic clinical laboratory equipment for courses in Hematology, Hemostasis, Clinical Chemistry, Diagnostic Microbiology and Serology/ Immunology. For the past twenty (20) years I have been responsible for the program operation, maintenance of accreditation, periodic revision, update and maintenance of high quality in the clinical year curriculum.

The curriculum includes 51 semester hours credit towards the degree; spanning over a period of five semesters. Instruction during the first three semesters is given on campus; while the last two semesters are spent in clinical rotations at a hospital. Thus the clinical curriculum is divided into 2 sequential phases: 1. University-based and 2. Hospital-based.

It has proven to be a very effective curriculum as evidenced by high pass rate in external examinations and employers' satisfaction with the performance of UWF graduates.

Experience in Teaching

I have an extensive experience in teaching clinical laboratory science courses, conducting and supervising clinical laboratory learning experiences, and evaluating student achievement.
Developed and taught the following courses, which constitute approximately 50% of the clinical year curriculum for clinical laboratory science students. My areas of expertise include: Hematology, Hemostasis & Thrombosis, Immunohematology, and Serology.

Course		Credit	Contact	Offered at
MLS 3310	Intro to Medical Technology	2	2	UWF
MLS 4931	Adv. in Bio Medical Technology	1	1	UWF
MLS 4460	Diagnostic Microbiology I / Lab	4	6	UWF
MLS 4550	Immunohematology I / Lab	4	7	UWF
MLS 4505	Serology/Lab	2	4	UWF
MLS 4305	Hematology I/Lab	4	6	UWF
MLS 4334	Hemostasis & Thrombosis/Lab	4	8	UWF
MLS 4822L	Hematology II	2	3	Hospitals
MLS 4823L	Immunohematology II	4	8	Hospitals

Hospital-based courses are primarily clinical rotations. As part of the University faculty unit and as the Program Director, I hold the responsibility for coordination of all activities related to clinical rotations; such as special lectures, student seminars, review sessions, special projects, and exams. While at hospitals, students are given a total of 29 (1 per week) weekly exams, in addition to practical exams and unknowns

UWF Program's Performance under my Direction

During the past 20 years, 200+ students graduated from the UWF's program. We have a near 100% pass rate on the national certification and state licensure exams. Mean P scores of our program in all the subject areas are at a level equal to or above the national mean scores. According to the program performance report released by ASCP-Board of Registry each year, UWF's program is among the top 15% of all the programs (based on student scores). Graduates of the UWF's Program are highly successful in job performance and career development, as indicated by periodic surveys of employers and graduates.

Experience in Academic Advisement

I have an extensive experience in providing academic advisement and mentoring current and prospective students in the Clinical Laboratory Sciences Program. Especially well versed in areas of transcript evaluation, preparation of degree plans, career counseling, personal counseling, assisting in application processes for national board certification / state license / job placement, advisement for entry into graduate schools and in serving as a resource person for career development of graduates.

Experience in Academic Administration and Program Accreditation

27 years of experience as the Program Director of a NAACLS accredited, baccalaureate level clinical laboratory sciences program, of which 6 years of experience is in a hospital-based program and 21 years in a university-based program.

Since 1986 to present, I served as the program Director of University of West Florida's Clinical Laboratory Sciences program. During these years I have developed as an effective educator and an administrator in clinical laboratory sciences education.
As the first and continuing Director of this university-based program I have:

- Acquired knowledge of education methods and current accreditation and certification procedures.
- Played a significant role in enrollment increases from 19 students in 1986 to sustained growth levels; varying between 85-100 majors in recent years.
- Increased the number of clinical affiliates from two (1986) to five (1998) to eight (8) in 2006. Maintained excellent relationships and received strong support from clinical affiliates.
- Prepared self-study reports and presented the program to site-surveyors with highly successful outcomes in:
  1986 - Initial accreditation of the university-based program received for 2 years (From November 1986 to November 1988).
  1987 State of Florida Board of Regents Review of UWF Medical Technology Program. Received a highly favorable review.

1988 - NAACLS Accreditation renewed for 5 years, 1988 to 1993.

1993 - NAACLS Accreditation renewed for 7 years. Only programs with no deficiencies in the previous cycle and a history of stability and proven quality receive 7 years of reaccreditation.

1995 - Submitted a formal proposal to Board of Regents regarding the continuation of the Nursing Program at UWF.

1996 - State of Florida Board of Regents Review. Received an excellent report in recognition of stability and high quality of the program.

2000- NAACLS Self Study and Site-Visit for program accreditation renewal
Prepared for and successfully concluded a NAACLS Site-Visit
Received NAACLS Accreditation renewal for 7 years, until 2007

1986 to Present: experience in all areas of academic administration including, but not limited to academic planning, development, organization, administration, budget, periodic review, and assessment of the general effectiveness of the Clinical Laboratory Sciences Program. Established a community based UWF Clinical Laboratory Sciences Program Advisory Committee and sustained continued interest and support from the community.

Scientific Publications and Presentations

- Nagabhushanam R., and Swarnamayee T., Neurosecretory cells in the central nervous system of Vaginulus sp. (Gastropoda: pulmonata). J. Anim. Morphol. Physiol., 10: 171-173 (1963).
- Nagabhushanam R., and Swarnamayee T., Neurosecretory cells in the central nervous system of Ariophanta ligulata. Nucleus, 7: 67-70 (1964).
- Krothapalli, Swarna and Renner, M.A., Infrequently reported fungi as causes of disease, two case reports: Osteomyelitis associated with a new species of Scedosporium; Phaeohypomycosis caused by Bipolaris spicifera. Paper presented at Alabama State Society of Medical Technology, (1987).
- Krothapalli, Swarna and Patel, Sailesh: Antiphospholipid Antibody Syndrome, ASCP Tech Sample, (2004): PP 51-56
- Krothapalli, Swarna: Florida Laws and Rules Pertaining to Clinical Laboratory Sciences Training Programs, ASCP Tech Sample (2005)

Continuing Education Courses and Seminars Presented

- "Calcium and Phosphorous Metabolism and Laboratory Evaluation of Associated Disorders." Presented to the Northwest Florida Laboratory Association, April 22, 1987.
- "Practical Aspects of Blood Group Systems - MNSs System." Florida Association of Blood Banks - Traveling workshop, April 9, 1988.
- "Causes of Clinical Hypertension and Laboratory Evaluation of a Hypertensive Patient." Northwest Florida Laboratory Association Monthly Meeting, April 26, 1988.
- "Commercial Coagulation Factors" Florida Association of Blood Banks Workshop: Transfusion Therapy: Today and Tomorrow, February 18, 1989.

- "Description of HIV Infection and AIDS." Northwest Florida Laboratory Association Seminar on HIV/AIDS: A course for Health Care Professionals. Pensacola Hilton. April 8, 1989.
- "Virology and Immunology of Human Immunodeficiency Virus and AIDS Testing." UWF Medical Technology Program's Continuing Education Workshop, June 10, 1989.
- "Prenatal Studies Case 4, HDN Cases 8 & 9." 1990 Florida Association of Blood Banks Workshop on Challenging Antibodies Studies Encountered. March 3, 1990.
- "Clinical Laboratory and Radiology." Northwest Florida Society of Radiologic Technologists continuing Education Program. Baptist Hospital, Pensacola. May 16, 1990.
- "Biochemistry of Factor-VIII Molecule Complex and Laboratory Evaluation of Related Disorders." Northwest Florida Laboratory Association and UWF Medical Technology Program's Continuing Education Presentation. May 31, 1990.
- "Description of HIV Infection and Immunology of AIDS." UWF Medical Technology Program's Continuing Education Course in Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome. June 9, 1990.
- "Hematology and Coagulation." American Association of Medical Transcriptionists Continuing Education Program in Interpretation of Hematology and Clinical Chemistry Laboratory Tests. Baptist Hospital, Pensacola. July 14, 1990.
- "Resolution of D^u Status in the Neonatal Period When the Direct Antiglobulin Test is Positive." Presented during 1991 Technical Workshop - Florida Association of Blood Banks - April 20, 1991, at West Florida Regional Medical Center.
- "Evaluation of Fetomaternal Hemorrhage." Presented during 1991 Technical Workshop - Florida Association of Blood Banks - April 20, 1991, at West Florida Regional Medical Center.
- "Description of HIV and Immune Response in HIV Infection." Topic presented during the seminar " A Course in Human Immunodeficiency virus and Acquired Immunodeficiency Syndrome," July 16, 1991, at University of West Florida.
- "Recombinant Human Erythropoietin," Presented during Northwest Florida Laboratory Association, 1991, Fall Convention, September 18, 1991, at the Pensacola Hilton.
- "Thalassemias and Related Disorders," Topic presented during UWF Medical Technology Program Spring Seminar; May 9, 1992.
- "Hypercoagulation and Thrombosis," Lecture given during Northwest Florida Laboratory Association Annual Convention, October 15, 1992.
- "HIV/AIDS update" UWF Spring Seminar May 21, 1994.
- Workshop on OSHA Regulation for Blood Borne Pathogens, Feb 10 and Mar 8, 1994, UWF.
- Fundamentals of Immunohematology - Science Seminar for Superior Students - March 1996.
- Clinical Laboratory Personnel Standards; Past, Present and Future; to Clinical Laboratory Management Association local Chapter, August 1996.

- Developed a new course titled “Advances in Bio Medical Technology” with topics related to the latest developments in diagnosis and treatment. Presented this course in spring 1997 and spring and fall 1998.
- Update on Board of Clinical Laboratory Personnel Rules and Regulations - Presented at Northwest Florida Laboratory Association Annual convention, February 1997.
- “Leukemias: Classification and Diagnosis”: UWF Science Seminar for Superior Students, March 1998.
- “Health Care Issues in State of Florida” - Invited panel member at the Annual meeting of Florida Coalition of Clinical Laboratory Professions, April 1998.
- “Clinical Findings and Laboratory Evaluation of Autoimmune Diseases”: Northwest Florida Laboratory Association Annual Convention 2002.
- “Clinical Diagnosis of Antiphospholipid Antibody Syndrome”: Northwest Florida Laboratory Association Annual Meeting, Feb 26- March 1, 2003.
- “Update on Laboratory Monitoring of HIV/AIDS Patients”: A day in Continuing Education in Clinical Laboratory Sciences, Oct 11, 2003.
- “Role of Complement in Immunity & Complement Deficiency Related Disorders”; Northwest Florida Laboratory Association Annual Convention, 2005.
- “von Willebrand Factor Cleaving Protease in Thrombotic Thrombocytopenic Purpura”: UWF -A day in Continuing Education in Clinical Laboratory Sciences, Oct 11, 2005.
- Hereditary Hemochromatosis and other Iron Overload Disorders”: Northwest Florida Laboratory Association Annual Convention, 2006.
-

Research and Equipment Support

Associate Investigator, “Development of Bioindicators for Fish Health," Cooperative agreement with Environmental Protection Agency, 5/1/90-4/30/93 (budget, $325,000). Additionally EPA has provided in support of this project a Beckman Synchron CX5 Clinical Analyzer ($115,000), which enabled me to examine the potential use of blood chemistry profiles in the diagnoses of fish health.

Awards and Honors

1993 - UWF/Gabor Award for Excellence in Teaching and Advisement.
1994 - Outstanding Teaching and Advising Award, UWF.
1994- Received Award of Tenure>
1995 - Teaching Incentive Program Award, UWF.
1999- Teaching Incentive Program Award, UWF.
1999- Promotion to Associate Professor Rank, UWF.

Peer Reviewer, NAACLS Program Accreditation

Has experience as a peer reviewer for accreditation of medical technology programs. as volunteer for the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Reviewed self study or conducted site visits for the following programs:

- Self-study review report for the Medical Technology Program at the University of Arizona, Tucson. October 1988.
- Site Visit and review of MLT-C program at USAF Regional Hospital in Elgin AFB (Valpariso). April 1989.

- Self-study report for the Medical Technology program at the St. Peter's Medical Center, New Brunswick, NJ. June 1990.
- Site Visit and review of Medical Technology Program at Malcolm Grow - USAF Medical Center, Andrews Air Force Base, MD. February 1991. Served as Team Coordinator.
- Site Visit for Review of Medical Technology Program at Baptist Medical Center. Montgomery, AL. April 1991. Served as Team Coordinator.
- Site Visit for Review of Medical Technology Program at Austin Peay State University, Clarksville, TN. September 1991. Served as Team Member.
- Site Visit for Review of Medical Technology Program at Rush-Presbyterian St. Luke's Medical Center, Chicago, IL. November 18 and 19, 1993.
- NAACLS Self Study Review - CLS/MT Program at SUNY Health Sciences Center at Syracuse, New York, August 1997.
- NAACLS Self Study Review - CLS/MT program at Inter American University, Puerto Rico, March 1998.
- NAACLS Self Study Review - CLS/MT program at Marshall University, Huntington, West Virginia, September 1998.
- NAACLS Site-Visit: University of Texas El Paso Medical Technology Program, September 1999; Team coordinator.
- NAACLS Self Study Review-Medical Technology Program at Fitchburg State College, Fitchburg, MA, September 2000.
- NAACLS Site-Visit: CLS Program at Quinnipiac University , Hamden, CT, April 2001

Service to State of Florida/ Board of Clinical Laboratory Personnel

1992-1994: Appointed by the Governor of Florida as a charter Member of the Board of Clinical Laboratory Personnel, and was reappointed for a 4 year second term, 1994-1998.
Elected as Chairperson, Board of Clinical Laboratory Personnel, 1996, 1997, and 1998.

I have had the honor and privilege of being appointed as a charter member of the "Board of Clinical Laboratory Personnel", established by the Florida Legislature in 1992. As a Board member for 6 years and as the chairperson during the last three years of my service, I was instrumental in raising the personnel standards and the quality of clinical laboratory services in the State of Florida. I was also successful in launching a statewide effort to revise the statute (Ch. 483 FS) to improve the personnel qualifications and make other improvements in the scope of practice of clinical laboratory personnel in State of Florida.

As a result of my efforts and leadership, medical technologists can now obtain State of Florida license through endorsement of their national board certification (ASCP or NCA or other approved Board certification) without having to take additional examinations given by the State.

Professional Service at National Level

- Member, Task Force for "Unification in Medical Technology Education," 1988 - 1992, American Society for Clinical Laboratory Sciences.
- Member, Task Force for "Recruitment in Medical Technology," 1988 - Present, American Society of Clinical Pathologists.

- Secretary - Florida Division of American Society for Clinical Laboratory Sciences, 1991 - 1992.
- Panelist - National Science Foundation Review of Grant Proposals, 1994.

1.

Service to the State, University and the Community

State Level Service

1998-Present: Member, Common Prereqisites Faculty Discipline Committee for Medical Laboratory Sciences

2005-present: State of Florida Common Course Numbering System: currently serving as the Faculty Discipline Coordinator for Clinical Laboratory Sciences

Biology Department:

Undergraduate Program Committee (1986-1987)
Library Committee (1987-1989)
Student Recruitment Committee (1986-1987)
Faculty Search Committee (1995)
Curriculum Committee (1996-1997)
Search Committee for Chairperson of Biology (1999-2000)

Clinical Laboratory Sciences Program:

Curriculum Committees for Hematology/Coagulation, Immunohematology, and Serology
Selection Committee for clinical year class
Faculty Search Committees, 1986, 1993, 1996
Medical Technology Program Advisory Committee 1997- Present
Search Committee for Medical Technology Office Assistant 1997, 2000
Chair of the Medical Technology Faculty Search Committee 2000-2001

University/College Level Committees:

CAS - Division of Life & Health Sciences Advisory Committee 2000-present
Health Related Programs Committee (1988 - 1995)
Biohazard Material Safety Review Committee (1988 - present)
Animal Care and Use Committee (1990 - 1995)
Member, College of Science and Technology Council (1992)
Marshall, College of Science and Technology (1993 - 1995)
TIP Awards Committee (1994)
Member, UWF Faculty Senate (December 1994 - 1996)
TIP Awards Committee (1995)
Committee for Faculty Awards for Excellence in Undergraduate Teaching and Advising (1995)
UWF Faculty Senate (1995-1996)
UWF Nursing Advisory Committee (1996 - 1998)
HIV/AIDS Committee (1999-present)
Selection Committee for Gabor Awards For Excellence (2000, 2001)
CAS- Division of Life and Health Sciences Advisory Committee (2002- Present)

Special Service to the University:

In 1995, in response to a special request made by the UWF administration, I accepted a charge to revive the then discontinued UWF Nursing Program. During 1995 and 1996 I assumed full responsibility for rebuilding the Nursing Program. Served as Acting Chair during this period and put the program back on track. Designed and supervised the renovation of new space for the program in Bldg 77, hired a chairperson, faculty and staff; advised students, designed a prototype for a weekend program, and obtained alumni and community support through formation of an Advisory Committee for the Nursing Program. I relinquished this position to the new faculty member who was appointed as chairperson, under whose leadership the program subsequently regained its accreditation and laid foundation for development of a 4 year Nursing Program at UWF. I am proud to be instrumental in sustaining and rebuilding the Nursing program through a difficult period and retain this educational opportunity at UWF for future generations of students.

Service to the Region:

President, Northwest Florida Laboratory Association (1982, 1983)
Anemia Screening Program, Festival on the Green, UWF Campus, spring 1987
Presented a Medical Technology Booth in:
Escambia County School Career Fairs, 1988, 1989, 1990
Santa Rosa County School Career Fair, 1988
Judge, Walton County Science Fair, 1987
Judge, Regional Science Talent Search, PJC, 1987, 1988
Judge, Science Fair Projects, Pensacola High School, 1989
Judge, West Panhandle Regional Science and Engineering Fair, Annual Event 1990
U.S. Air Force, Assisted in recruitment of medical laboratory personnel (1986-present);
Certificate of recognition awarded 11/20/90
Chairperson, Planning Committee, EYH (Expand Your Horizons) Conference, March 1991.
Judge, Brown Barge Middle School Science Fair, January, 1991
Judge, West Panhandle Regional Science and Engineering Fair, March, 1991
Judge, West Panhandle Regional Science and Engineering Fair, March, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003. 2004, 2005, 2006
Member, Advisory Board for Academy of Health Professions, Pensacola High School
Organized and presented 3-5 work shops in medical technology to high school students each year

Continuing Education

Title	Sponsor	Date	No. Hrs
Northwest Florida Laboratory Association Annual Meeting		**2/6/2000**	**8**
XOsteoporosis-Everything You Wanted to know But Afraid to Ask			
XMeeting the CAP Checklist :Requirements of Point of Care Testing			
XRapid Laboratory Diagnosis of Herpes Virus Infection			
XMedical Ethics in the Laboratory			
XTransfusion Medicine Update			
XFirst and Second Trimester Prenatal Screening			
XY2K & Beyond - The Changing Role of Laboratories			
X2000 HIV/AIDS Update for Health care Professional			
2000 Fall Seminar UWF Clinical Lab Sciences program		**11/4 2000**	**7.0**
XEstablishing Heparin Response Curve in Coagulation Laboratory			
XAn Update on Point of Care Testing With a Special			
XReference to Accu- Chek HQ System			
XBody Fluid Cytology Related to Pathology			
XLaboratory Diagnosis of Acute Coronary Syndromes			
XCase Studies in Hematology With Emphasis on Peripheral Blood Smear			
XTracking Resistance in the U.S Today			
XThe Laboratory Evaluation Of A Sick Infant			
American Association of Blood Banks		**1/10/2001**	**1.5**
Changes in the 20th Edition of Standards -Focus On Blood Centers			
Northwest Florida Laboratory Association 2201 Convention		**2/2001**	**11.0**
XPrognostic Indicators			
X2001 HIV/AIDS Update			
XMarket Assessment -Practical Tools For Determining Outreach Revenue			
XViral Load and Prognosis in Patients Infected with HIV			
XAABB Convention Update			
XMolecular Genetics of Cystic Fibrosis			
XLaboratory Automation And Its Effects On Clinical Lab			
2001 Fall Seminar UWF-Clinical Lab Sciences program		**10/272001**	**7.0**
XHIV/AIDS Update			
XArboviruses			
XInfectious DiseasesTesting in Blood Bank; Current & Future			
XFlow Cytometry: Principles, Applications and Case Studies			
XParasite Derived Advances in Biomedicine			
XMolecular Biology Techniques in clinical Lab: PCR and Beyond			
XDo I have to go back to this job tomorrow			

Title/Sponsor	**Date**	**No of Hrs**

CLMA& ASCP 2002 Conference & Exhibition 6/**2002** **5.5**
XCompeting for talent - Recruitment and Retention Strategies
XFilling the pipe with Future Students

2002 Fall Seminar UWF Clinical Lab Sciencse Program **11/2002** **7.0**
XElevated Bilirubin in an asymptomatic 34 year old female :
A case study on Primary Sclerosing Cholangitis
XEncephalitis: West Nile Virus
XNovel Technologies for Molecular Testing
XOverview of current Infection Control Precautions and Regulations
XLaboratory and Legal Aspects of Bioterrorism
XHypercoagulability: Diagnosis and management
XClinical Laboratory: Compliance with State & Federal Regulations

2003 Fall Seminar UWF Clinical Lab Sciences Program **10/2003** **7.0**
XUpdate on Laboratory Monitoring of HIV/AIDS Patients
XCausative Agents and Antimicrobial Treatment for sinus infections
XWest Nile Virus: Biology and Diagnosis
XMonitoring Bone Loss with Bone Markers
XAnalysis of Clinical lab Process : Creating a Lean Lab
XNormoglycemia: The Paradigm Shifts
XLeukemia /Lymphoma Case Studies

Northwest Florida laboratory Association Annual Seminar: **3/2004** **15.0**
XThrombosis & Thrombophilia
XBlood Transfusion: Reducing the Risk
(Including Bacterial detection of Platelet Components)
XProBNP & Congestive Heart Failure
XBlood Bank Automation
XFISH–Catch the Energy and Release the Potential
XLab Advantage–The Advantage for You
XWomen's Health
XRed Cells & Other cells : Responding to Patient Need
(Including Sickle Cell Disease)
XRisk Management and Patient Safety
XHIV/AIDS Update 2004
XLaboratory aspects of Breast & Cervical Cancer
XKnowing the Benefits of an Exclusionary D-Dimer
XFlorida Laws & Rules

Spnsor/Title	**Date**	**No of Hrs**
Clinical Laboratory Educator's Conference	**2/2005**	**15.0**

X Best Practices in Online Teaching: An E-Learning Pedagogy Workshop
XEducating for the 21st Century
XDialogue between Managers and CLS Educators on Job Required Skills
XFeeling cheated? Academic Integrity among CLS Students
XImplementing Molecular Techniques Content into the CLS curricula
XCurriculum Dynamics; what is in and what is Out in Hema
and Clinical Chemistry
XTeaching Hematology with Pizzaz
XTeaching Techniques to promote Student Responsibility for Learning
XUsing the Grading Process for Grades, Student Learning,
XSelf Improvement, and Departmental Action
XDepartmental Assessment: Viable, Feasible, and Useful for Departmental Needs
X

Northwest Florida Laboratory Association Convention	**3/2005**	**9.0**

X2005 HIV/AIDS Update
XClassification and Monitoring of Molar Pregnancy
XBlood Bank Case Studies Using Gel Technology
XInfectious and Non-infectious Risks of Transfusion
other than HIV & Viral Hepatitis
XNeonatal Transfusion Issues
XDelayed Hemolytic Transfusion Reaction –A Case Study
XAutomation in Clinical Lab –Considerations
and Criteria for Decision Making
XClinical Findings and Laboratory Diagnosis of Rat-Bite Fever-A Case Study.
X

UWF CE Seminar	**10/2005**	**7.0**

XLaboratory Classification and Monitoring of Hydatiform Mole
XAn Overview of Organ Donation
XHIV/AIDS Update
XSolid Phase Testing From the Bench to Automation
XCalibration Verification- The New Linearity
XDisease Management & the Laboratory -A Focus on Thrombosis
XPOC: Keeping Pace with Clinical Demands
while Keeping Control of Quality Results

Northwest Florida Laboratory Association Meeting **4/2006** **8.0**

XThe Clinical Significance of pH in Pleural Fluid Testing
XDifferentiation of Meningitis from Encephalitis & Some of the Different Causes
XGoing Lean in the Laboratory
XCurrent Topics in Transfusion & Transplantation Medicine
XLab Automation- What Processes Should You Automate

UWF Workshops in Quality Excellence Improvement (QEP) **2005-2006** **6.0**

XWriting Assessable Student Learning Outcomes or Course Syllabi –UWF
XQEP Departmental Liaison Meeting- UWF
XRubrics for Grading and Assessment Workshop

Standard 5A4:

Document the faculty appointment for the program director at each affiliated academic institution

Not Applicable to This Program

Standard 5B1: Advisory Committee Members

UWF Clinical Laboratory Sciences Program –Advisory Committee Members

1. **Bob Arnold, BS, MT (ASCP)**
   Clinical Laboratory Manager
   Gulf Breeze Hospital, Gulf Breeze

2. **Tiffany Peterson, President**,
   UWF Clinical Laboratory Sciences Program Student Association

3. **James A. Brady, MS**
   Head, Department of Biological Sciences
   Pensacola Junior College

4. **Joey Caraway, BS, MT (ASCP)**
   Technologist, Core Laboratory
   UWF Education Coordinator
   Sacred Heart Hospital, Pensacola

5. **Jeff Chicola, MD**
   Clerkship Director of Surgery
   Clinical Assistant Professor
   FSU College of Medicine
   Pensacola Regional Campus

6. **Magda Clanton, BS, MT (ASCP)**
   Crime Lab Analyst Supervisor
   Florida Department of Law Enforcement
   Pensacola

7. **Rosina C. Turner, BS, MT (ASCP)**
   Microbiology Technologist &
   UWF Education Coordinator
   Baptist Hospital, Pensacola

8. **Frances Duncan, MS,**
   Professor, Biology Department
   Pensacola Junior College

9. **Marcia Dumas, BS, MT (ASCP)**
   Hematology Laboratory Supervisor
   West Florida Hospital, Pensacola

10. **Stephen Gampher, BS, MT (ASCP)**
Laboratory Coordinator
Sacred Heart Hospital, Pensacola

11. **Leah Gillis, Ph.D.**
Biological Scientist IV
Florida Department of Health
Bureau of Laboratories, Pensacola

12. **Denise Jamison, B.S., M.T, Ed.S**
Gifted Studies Coordinator & Instructor
Warrington Middle School, Pensacola

13. **Kay Keigley, BS**
Teacher, Academy of Health Sciences
Pensacola High School

14. **Norman McFadden, MD**
Pathologist
West Florida Hospital, Pensacola

15. **Candy Robinson, BS, MT (ASCP)**
Lab Director
Baptist Medical Park, Pensacola

16 **Scott Robertson, BS, MT (ASCP)**
Technical Director
Northwest Florida Blood Center
Pensacola

17. **Esther Scott, BS, MT (ASCP)**
Clinical Chemist & Education Coordinator
Laboratory, Fort Walton Beach Medical Center

18. **Laine Sheppard, MD**
Medical Director, Health Service Center
University of West Florida

19. **Joan Simmons, MBA, BS, MT (ASCP)**
Administrative Director, Clinical Laboratory
West Florida Hospital, Pensacola

20. **Diane Small, BS, MT (ASCP)**
Laboratory Manager
Fort Walton Beach Medical Center
Fort Walton Beach

21. **Brenda Smudde, BS, MT (ASCP)**

Laboratory Manager
Santa Rosa Medical Center, Milton

22. **Susan Strasinger, DA, BS, MT (ASCP)**
Faculty Associate
UWF Clinical Laboratory Sciences Program

23. **Melanie Styles, BS, MT (ASCP)**
Laboratory Manager, Jay Hospital
Jay, Florida

24. **Valerie Tomlinson BS, CLS (NCA)**
Medical Technologist
Clinical Laboratory
Veteran's Outpatient Clinic
Pensacola

25. **Joyce Trawicki, MBA, BS, MT (ASCP)**
Administrative Director, Clinical Laboratory
Sacred Heart Hospital, Pensacola

26. **Jan Very, BS, MT (ASCP)**
Microbiology, SHH Laboratory
President, Northwest Florida Laboratory Association

27 **Thomas Westcott, PhD**
Asst Dean, College of Arts & Sciences
Director, Advising Center
University of West Florida

28. **Candy Zuleger, MS**
Laboratory Director
Trinity DNA Solutions
Milton

<u>UWF Administration</u>

John C. Cavanaugh, Ph.D
President

Sandra Flake, Ph.D
Provost

Jane Halonen, Ph.D
Dean, College of Arts and Sciences

George Stewart, Ph.D
Biology Chairperson & Director, School of Allied Health & Life Sciences
College of Arts & Sciences

Clinical Laboratory Sciences Program Faculty and Staff
Swarna Krothapalli, MS, MT (ASCP)
Associate Professor & Program Director

Kristina Behan, Ph.D, MT (ASCP)
Associate Professor

Sherman Bonomelli, MS
Assistant in Clinical Laboratory Sciences

J. Steve Smith, MD
Visiting Assistant Professor & Clinical Site Coordinator

Victoria Dubose
Office Administrator
CLS program, UWF

Relationship of the Advisory Committee Members to the Program:

Members of the advisory committee are drawn from the following professional groups:
Clinical laboratory managers/directors in the region
Pathologist /s from local Hospital/s
Education coordinators from our clinical affiliates
Educators from local community colleges / high schools
Physicians from the community, including clinical director of the UWF Health Center
Practicing clinical laboratory scientists / UWF Program Alumni
University Advising Center Director / other University employees

Standard 5B2: Responsibilities of the Advisory Committee

Purpose:
To provide advice and support to UWF administration and program officials regarding all matters related to the operation such as curriculum, recruitment, public relations, fund raising, continuing education, adding new programs and effectiveness of the academic unit.

Membership*:* 25 - 30
Term: 2 years
Meetings: At least once per year, or as needed.

Responsibilities of the Advisory Committee:

X Give input regarding changes in the clinical laboratory environment and employment needs
X Review the boarder aspects of curriculum and advise the faculty about it's relevance to the current standards of practice
X Assess the effectiveness of the program through a review of external examination scores, employer surveys, student evaluations and other tangible evidence of students' performance.
X Discuss the strategies for recruitment and fund raising for scholarships
X Give input regarding the need for new programs in clinical laboratory and/or allied health sciences
X Facilitate opportunities for faculty to collaborate on research projects
X Provide a source of speakers for continuing education programs
X Provide a source of adjunct instructors for university courses
X Assist in faculty recruitment
X When appropriate, meet with accreditation site-survey team members

UWF-Clinical Laboratory Sciences Program
Advisory Committee Meeting
October 19, 2005, 5:30 pm
UWF Conference center Lounge

AGENDA

1. Welcome / Introductions — Swarna Krothapalli, Program Director

2. Welcome/Remarks from-
   UWF Administration — Dr. Sandra Flake, Provost
   Dr. Jane Halonen, Dean, CAS
   Dr. George Stewart, Director, DLHS

3. About the Program — Kristina Behan, Associate Professor
   CLS Program

4. Latest trends in Clinical Laboratory Medicine:
   Joan Simmons - West Florida Hospital
   Rosina Cunningham- Baptist Hospital
   Jan Very - Sacred Heart Hospital
   Karen Killam- Northwest Florida Blood Center
   Candy Zuleger - Trinity DNA Solutions

5. NWF Allied Health Medical Technology Education Consortium -
   Denise Jamison - Warrington Middle School

6. Open Forum: — General Discussion

8. Conclusion

Minutes of Advisory Committee Meeting
October 19, 2005

Meeting was called to order at 5:50pm

Introductions of all attendees

Mrs. K gave a brief update on program status. Explained contents of handouts.
Explained that once again the 2005 graduates had a 100% pass rate on board testing and that once again our students ranked above the national average. Announced the upcoming course changes and the program's change of name.

Dr. Flake thanked committee members for their support of the university and community.

Dr. Halonen explained the ALC and asked for feedback for future issues.

Dr. Stewart updated the committee on his allied health programs and their expansion.

Dr. Behan stated her plans on expanding the program and shared that the graduates from the last years had found jobs all around the country and Alaska. She explained the upcoming Molecular Diagnostic certificate program. She requested that all members fill out the survey provided and return their comments.

Joan Simmons explained the hospital changes and how many of West Florida Hospital laboratory employees were UWF graduates.

Rosina Cunningham brought us up to date on progress at Baptist Hospital

Valerie Tomlinson stated that Sacred Heart Hospital is steadily expanding and that they are becoming a reference hospital. They have a need with employees with Molecular Diagnostics experience.

Candy Zuleger explained the Trinity DNA Solutions that recently opened in Milton. This is first type of facility in our area.

Karen Killam explained their testing for HIV, HCV, West Nile Virus, Parvovirus and Jacobs.

Denise Jamison explained the program at Warrington Middle School and the need to begin offering medical education to students in this age bracket.

Mrs. Krothapalli announced the affiliation between UWF and Shands Health Care System

Meeting ended at 7:00pm.

UWF Medical Technology Program
Advisory Committee Meeting October 19, 2005

SURVEY

Dear Advisory Committee Members:

The goals of the Medical Technology Program include the following:

- To maintain a nationally accredited program of excellence and provide a sound educational opportunity for students who seek a career in clinical laboratory sciences and/or biomedical technology.
- To provide continuing education programs in medical laboratory sciences and service as a source of academic information to the general public.

Please help us to improve our program my answering the following questions. Leave the completed survey in the meeting room this evening. Thank you for your comments.

1. How well do you feel the UWF program is servicing the needs of the health care industry in Pensacola? Please include suggestions for improvement.

In terms of the number of graduates
In terms of curriculum content
In terms of continuing education

2. What other academic program in the clinical laboratory related fields would you suggest for development, based on regional or national needs? (e.g., Histology, Cytology, Molecular Diagnostics, etc.)

3. We currently sponsor a CE event once per year in Ft. Walton Beach, and our faculty present seminars at the Northwest Florida Laboratory Association Annual Convention. How better can we serve the continuing education needs of the clinical laboratory profession in the region?
   (e.g. Topics, media, venue, timing, etc – include your preferred method for earning CE credits)

4. What career paths are available for clinical laboratory sciences graduates aside from the conventional Med Tech to Supervisor route? (e.g. in your hospital, in your experience, compared to your MT classmates)

5. What Master's level degree programs would advance the career of a laboratory professional? (e.g. in your hospital, in your experience)

6. What recruitment/retention strategies can you recommend?

2004 Advisory Committee Meeting was cancelled due to Hurricane Ivan

University of West Florida-Clinical Laboratory Sciences Program
Advisory Committee Meeting
November 13, 2003, 5:00 pm
UWF Conference Center Lounge

Welcome and Introductions.....Swarna Krothapalli, Program Director

Brief Update on the State of the Program.....Swarna Krothapalli

Welcome and Comments
From UWF Administrators..... Dr. John Cavanaugh
President, UWF

Dr. George Stewart,
Chairperson, Dept of Biology
&
Director, Division of Life & Health Sciences
College of Arts & Sciences

Comments from the Program Faculty: Dr. Kristina Behan
Dr. Steve Smith
Mr. Sherman Bonomelli

Medical Technology Student Association: ..... Ms. Mary Barrentine, President

Open Forum:
Remarks / Comments / Questions from: .....Advisory Committee Members

Conclusion .....Swarna Krothapalli

University of West Florida Medical Technology Program
Advisory Committee Meeting
November 13, 2003
Minutes of the Meeting

Present:

John C. Cavanaugh,	Kay Keigley
George Stewart	Magda Clanton
Swarna Krothapalli	Jan Very
Kristina Behan	Frances McMillan
J. Steve Smith	Leah Gillis
Sherman Bonomelli	Laine Sheppard
Frances Duncan	Stephen Gampher
James Brady	Mary Barrentine
Esther Scott	Rosina Cunningham
Diane Small	Regina Castor
Sue Strasinger	Brenda Smudde
Joyce Trawicki	Fran Connolly

Mrs. Krothapalli called the meeting to order at 5: 25 Pm and requested the members to introduce themselves. She then presented a brief report on the issues and activities related to the Program. Following topics were addressed:

- In 2002 NAACLS standards the previous requirement for a medical advisor is deleted and a new requirement for each Program to have a broad community based advisory committee
- 2003 - Program Performance Reports from the certification agencies. Highlights include a 100% student pass rate and the significantly high scores in all areas , which are well above the national means
- The program's annual event, A Day of Continuing Education in Clinical Laboratory Sciences, was offered in Fort Walton Beach on October 11, 2003. The Program was well received and a modest amount of money was raised which will be used as a seed fund towards the cost of future CE program offerings.
- The enrollment in the Medical Technology program is on the rise. However, we need to continue our recruitment efforts since the job outlook for graduates is excellent
- ASCP 2002 - Wage and Vacancy survey Report, which offered the latest information on salaries and vacancies in the job market, is presented. The shortage of qualified people continues and the salaries are going up
- Special thanks to Northwest Florida Laboratory Association Board of Directors for their support of the program and the 3-4 scholarships that they provide to our students each year
- Mrs. Krothapalli also acknowledged that one of our seniors received a sizeable scholarship from Florida Society of Clinical Laboratory Science (FSCLS) this summer.

Mrs. Krothapalli introduced Dr. Cavanaugh, UEF President, and thanked him for taking the time out of his busy schedule to join us. Dr. Cavanaugh complimented the success of the program and spoke of the necessity for such programs of distinction and excellence. He shared information regarding

several new programs now being offered by the University, such as the Certificate in Health Care Ethics, Certificate in Medical Informatics, and a partnership between UWF and OWCC in the Nursing Program. He also stated that plans are underway for a partnership between UWF and Auburn University to establish a Pharm D, 3 + 2 degree program.

Dr. Stewart offered greetings and comments from Dr. Halonen, the Dean of College of Arts & Sciences who was unable to attend the meeting due to an out of town engagement. She conveyed her support of the program stating that the job security made this a very good program for the students upon graduation. She extended her appreciation of the education coordinators.

Dr. Stewart then brought the members up-to-date with the developments in the Division of Health & Life Sciences. The Certification for Health Care Ethics has proven to be very successful. Plans are underway to establish the following degrees and certificate programs, a M.S. in Public Health, Certificate in Infectious Diseases, Certificate in Environmental Health and a B.S. in Health Sciences.

Dr. Behan discussed the need for individuals with advanced training in Diagnostic Molecular Biology in the clinical laboratories. She plans to gather statistics and input from the committee to do a feasibility study for the creation of a certificate program in Molecular Diagnostics. Leah Gillis expressed her support for this idea, and offered the use of molecular biology laboratory equipment. She invited UWF faculty to visit the public health laboratory in Pensacola.

Magda Clanton reiterated her support for development of a training program in diagnostic molecular biology and offered the possibility of internships at FDLE laboratory.

Dr. Steve Smith thanked the education coordinators for their time and assistance in training the UWF students. He stated that the next class would be beginning their clinical rotations on Jan 5, 2004.

Mr. Sherman Bonomelli informed the committee about the computer and other technology updates in the medical technology teaching laboratories on UWF campus He also discussed the possibility of offering continuing education programs for medical technologists on-line. He asked for input and invited the committee members to participate in this project.

Mary Barrentine, President of Medical Technology Students Association, informed the committee about the various student association activities during 2003 and planned projects by students during the coming year.

Dr. Susan Strasinger, Generalist Associate Editor for ASCP Tech Sample, invited the committee members to submit article for publication in Tech Sample - 2005. ASCP offers a remuneration of $500.00 for authors whose articles are accepted for publication.

Jan Very, President of Northwest Laboratory Association announced that the 2004 annual convention is scheduled for March 24 -27 2004, at Pensacola Civic Center.

In conclusion Mrs. Krothapalli thanked the members for their interest and support of the UWF Medical Technology Program and the meeting was adjourned at 6:45P.M.

Standard 6
List of Major Didactic and Clinical Faculty for Each Discipline

1. University-based Didactic Faculty:

Discipline/Courses	**Faculty**
Hematology/Lab Hemostasis & Thrombosis/Lab Immunohematology/Lab Serology/Lab	Swarna Krothapalli, MS, MT (ASCP) Associate Professor and Program Director
Diagnostic Microbiology/Lab Clinical Chemistry I and II/Labs Molecular Diagnostics /Lab Urinalysis & Body Fluids/Lab	Kristina Behan, PhD, MT (ASCP) Associate Professor
Medical Microbiology/Lab	Sue Strasinger, DA, MT (ASCP) Adjunct Instructor
Instruction in the university-based student laboratories and instruction in Lab Safety, Computer Technology and Phlebotomy	Sherman Bonomelli, MS Assistant Instructor –CLS Program
Special Clinical Topics (Lab Management and Supervision Educational Methodologies, State /Federal/CAP Regulations)	J. Steve Smith, MD Visiting Assistant Professor & Clinical- Site-Coordinator

2. Major Clinical Faculty:

BAPTIST HOSPITAL

Education Coordinator	Rosina Cunningham, BA, MT (ASCP) Supervisor, Microbiology
Hematology	Cynthia Weaver, BS, MT (ASCP) (Senior Technologist) Lynn Stamps, BS, MT (ASCP) (Flow Cytometry)
Clinical Chemistry Special Chemistry & Immunodiagnostics	Faith Carter, BS, (Sp Chemistry) Debra Hall, BS, MT (ASCP) (Sp Chemistry) Mildred Bou Hernandez; BS; MT (ASCP) Susan Calhoun, BS, MT (Florida) (Senior Technologist)
Microbiology	Tracy Cox, BS, MT (ASCP) Janice Palmer, BS, MT (ASCP) Grace Agatep, BS, MT (ASCP) Merita Bodin, BS, MT (ASCP)
Blood Bank	Regina Castor, BS, MT (ASCP), SBB (Supervisor) Lee Ann Kirby, BS, MT (ASCP)

BAY MEDICAL CENTER

Education Coordinator	Susan Adams, BS, MT (ASCP), Chemistry
Hematology/Core Lab	Diane Houser, BA, MT (ASCP) (Supervisor) Felecia Reed, AS, MLT (FL)
Clinical Chemistry	Susan Adams, BS, MT (ASCP)
Microbiology	Christie Exum, BS, MT (ASCP) (Supervisor)
Blood Bank	Christine Storck, BS, MT (ASCP) (Supervisor) Jill Barronton, BS, MT (ASCP) Sheryl Songer, FL Licensed Technologist
Serology/Immunology	Felecia Reed, AS, MLT (FL)

FORT WALTON BEACH MEDICAL CENTER

Education Coordinator	Esther Scott, BS, MT (ASCP) - Chemistry
Hematology	Sallie Brown, MT (AAB) Pat Schlau, MT (ASCP)
Rotating /Generalist	Tania Knowles, BS, MT (ASCP) Karen Murphy, BS, MT (ASCP) Susan Poolis MT (ASCP)
Clinical Chemistry/Serology	Esther Scott, MT (ASCP) David Arnold, USAF, FL licensed
Microbiology	Stephen R Posell, AS, FL Licensed Elizabeth Dyar, Microbiologist (State of Florida) Sally Stamm, MLT (ASCP)
Blood Bank	Anthony Guess, MT (ASCP) Beth Beason, MT (ASCP)

SACRED HEART HOSPITAL

Education Coordinator	Joey Caraway BS, MT (ASCP)
Microbiology	Elsa Williams, MT (ASCP) Kerra Cowan, MT (ASCP) Jill McVay, MT (ASCP)
Hematology	Pamela Venus, MT (ASCP) Margaret Stone, MT (ASCP)
Clinical Chemistry/Core Lab	Jacquelyn Jones, MT (ASCP) Tim Brock, MT (ASCP) Mary Kaiser, MT (ASCP) Dale Schmeidler, MT (ASCP) Yi-Chi Chen, MT (ASCP) Anthony Parker, MT (ASCP) Oanh Dang, MT (ASCP)
Blood Bank	Janice Brown, MT (ASCP) R. Ann Bacher, MT (ASCP), SBB

WEST FLORIDA HOSPITAL

Education Coordinator	Marcia Dumas, BS, MT (ASCP)
Hematology/Core Lab	Greg Breuning, BS, MT (ASCP) Michael Murphy, BS; MT (ASCP) Carla Warren, BS, MT (ASCP) James Fogal, BS, MT (ASCP)
Clinical Chemistry / Special Chemistry	Rita Casey, BS, MT (ASCP) Bonnie Bomhoff, BS, MT (ASCP) Deborah Reese, BS, MT (ASCP)
Microbiology/ Serology	Janet Nichol, MS, MT (ASCP), DLM (ASCP), CLS (NCA) CLDIR (NCA), Supervisor Vicky Judah, BA, MBA, MT (ASCP) Brigitte Keith, BS, MT(ASCP) Tuyet Pham, BS, MT (ASCP) Teresa Reed, BS, MT (ASCP) Sheryl Sanderson, BS, MT (ASCP) Dawn Thiery, MT (ASCP)
Blood Bank	Patricia Collins, MS, MT (ASCP) Supervisor LuAnn Franklin, MT (ASCP)

SHANDS at AGH

Education Coordinator	Myra Urso, BS, MEd; MT (ASCP) Supervisor –Blood Bank
Hematology/Core Lab	Tommy V Jensen, BA, MHA, FL Licensed Supervisor -Core Lab Paula Mitchell, BHS, MT (ASCP)
Chemistry/ Core Lab	Steven Ward, BS, FL Licensed Tammy Armstrong –Cray, AS, MLT (ASCP) Gail Buckland, AS, MLT (ASCP)
Microbiology	Microbiology Work is sent out to Shands -UF Students rotate through Shands -UF for Micro
Bloodbank	Jane Vickroy, BS, MT (ASCP) Alida Chan, BS, MT (ASCP)

SHANDS at UF

Education Coordinator	Abby Estilong, BS, MT (ASCP)
Hematology/Core Lab	Joseph W. Simpkins, MT (ASCP) Antonio Ruth, MT (Florida Licensed)
Chemistry/Sp Chemistry	Beth DiBiasio, MT (ASCP, NCA)
Microbiology	Darla Gaskins, Microbiologist (Florida Licensed)
Bloodbank	Linda Orsini, BB (ASCP)
Phlebotomy	Julia Mills, MT (Florida Licensed)

SHANDS at JACKSONVILLE

Education Coordinator	James D Sigler, BS, MT (ASCP), CLS (NCA) Certified as Supervisor NCA and Florida
Hematology	Carolyn Brookins, AS, CLT (NCA)
Coagulation	Rolando Santiago, BS, MT (ASCP), CLS (NCA)
Core Lab	Laura Johansen, BS, M.Ed., MT (ASCP)
Chemistry	James D. Gustavson, BS, MT (ASCP)
Special Chemistry/ Immunochemistry	Maria Bana, BS, MT (ASCP)
Urinalysis	James L. Gutteridge, BA., MT (ASCP)
Microbiology	Yvette S. McCarter, Ph.D., DABMM Noel Gomez, M.Sc., CLS (NCA), MT (ASCP) Supervisor
Molecular Biology	Patricia Brandler, MS, MP (ASCP)
Bloodbank	Leslie Wheeler, MHA MT (ASC), SBB (ASCP)
Serology/Immunology	Anne Broadhurst, BS, NCA (CLS)

Standard 6A: Responsibilities of the Program Faculty

Program Director's teaching and administrative responsibilities were described in previous pages, in Standard 5A2.

Dr. Kristina Behan, **Associate Professor**, is the second regular, full-time tenured faculty member at the University. Following are her teaching responsibilities, with 3 hours per week lecture and 6 to 8 hours per week laboratory sessions in each of the courses. Spring and fall semesters are 16 weeks long and the summer semester is 12 weeks.

University-based Courses:

Semester	Course	SH Credit	Hrs/wk Contact
Spring	MLS 4460 Diagnostic Microbiology I	3	3
	MLS 4460L Diagnostic Microbiology I Lab	1	4
	MLS 3031 Intro to Medical Technology (elective)	2	2
Summer Term B (First 6 weeks)	MLS 4220 Urinalysis & Body Fluids I	2	1
	MLS 4220L Urinalysis & Body Fluids I Lab		3
Summer Term C (Last 6 Weeks)	MLS 4625 Clinical Chemistry I	2	2
	MLS 4625L Clinical Chemistry I Lab		4
Fall Term E (First 8 Weeks)	MLS 4620 Clinical Chemistry II	3	3
	MLS 4630 Clinical Chemistry II Lab		5
Fall Term E (Last 8 weeks)	MLS 4191 Molecular Diagnostics	3	3
	MLS 4191L Mol Diagnostics Lab		5

Responsibility for Hospital-based Courses:
This faculty member also has the responsibility for the hospital-based curriculum in the corresponding disciplines. For hospital-based courses there are no formal lectures or labs on a regular basis. The faculty member is responsible for parts of the curriculum including writing objective, reading and practical assignments, study questions and written examinations, updating the curriculum and clinical rotations according to the changes in instruments, methods and work patterns in the areas of Chemistry, Microbiology and Urinalysis/Body Fluids and Molecular Diagnostics. Since 1996 most of these functions are being done by the clinical site coordinator, but the primary assignment and responsibility of quality of curriculum in these subject areas rests with this faculty member.

Semester	Course	SH Credit	Hrs Contact
Spring	MLS 4820L Clinical Chemistry III	4	8
	MLS 4821L Diagnostic Microbiology II	4	8
Summer	MLS 4825L Urinalysis & Body Fluids II	2	3

Additional responsibilities of this faculty member are: academic advisement, recruitment, offering continuing education, and assisting the program director in administration/accreditation related functions.

Mr. Sherman Bonomelli is the non tenure earning, full-time 12 month faculty member holding the position, AAssistant in Clinical Laboratory Sciences". His responsibilities include:

- Co-instructor in student laboratories of the university-based clinical courses which are scheduled during the year as follows:

Semester	Course	Contact Hours/Week
Spring	MLS 4462L Diagnostic Microbiology I Lab	4
	MLS 4305L Hematology I Lab	3
Summer	MLS 4220L Urinalysis & Body Fluids I Lab	3
	MLS 4625L Clinical Chemistry I Lab	4
	MLS 4334L Hemostasis & Thrombosis Lab	3
	MLS 4462L Medical Microbiology Lab	4
Fall	MLS 4630L Clinical Chemistry II Lab	5
	MLS 4191L Molecular Diagnostics /Lab	5
	MLS 4550L Immunohematology I Lab	5
	MLS 4505L Serology Lab	3

- In collaboration with the primary faculty member, prepare/update the lab manual for each of the above clinical courses and place it on the D2L format for students.
- Assist students in practice/makeup laboratory work and phlebotomy procedures.
- Instruction in Phlebotomy, Lab Safety and Computer Technology.
- Overall management of the student laboratory complex to include: purchase, installation and maintenance of lab instruments and equipment; purchase, collection (from hospital labs) and inventory control of lab supplies and instructional materials; troubleshooting and problem solving in matters related to laboratory physical facilities.

- Identify and advise the Program Director of the needs for equipment, instruments, lab safety supplies, and instruction technology devices.
- Visit hospital laboratories to collect specimens, slides, expired reagents, test kits and other material useful for instruction in the student laboratories.
- Maintain the computers, lab instruments and other student lab facilities at the University.
- Prepare, purchase and install software tutorial programs in clinical laboratory science subjects for the student lab computers.
- Provide instruction in computer technology and one-on-one assistance to the students in the use of computer based curriculum and evaluation components.

Dr. Steve Smith is the part-time AVisiting Assistant Professor@ who is in charge of students while they are in clinical rotations (spring and summer semesters). This faculty member=s responsibilities are as follows:

- In consultation with the education coordinators, prepares clinical rotation schedules and student manuals for hospital rotations.
- Updates the evaluation forms, written exams and other materials used in clinical rotations.
- Conducts an orientation session before students leave campus for hospital-based clinical rotations
- Visits the local/ regional clinical sites on a regular basis to monitor students= progress, provide assistance and/or counseling as needed.
- Corresponds with students and education coordinator at distant clinical sites on a regular basis.
- Frequently consults with the education coordinators, clinical instructors and the laboratory managers at the clinical sites and apprizes the Program Director of the changes or new developments which may affect student training.
- Computes and reports the final grades for hospital-based courses.
- Summarizes the comments and/or suggestions made by students in their evaluation of clinical rotations and shares the findings in faculty meetings, leading the discussion for changes, if needed.
- Conducts an on-campus review week for graduating students, soon after they complete the hospital rotations.
- Conducts the admission procedures to select students into the clinical year of the program and ensures the students= compliance with requirements for clinical rotations such as: background checks, health and immunization records, obtaining St of Florida trainee license and so on.
- Conducts annual surveys of recent graduates and their employers to seek input regarding the program=s effectiveness in preparing students with entry level skills and knowledge. Summarizes the findings and assists the Program Director in utilizing the information to improve the program, as appropriate.
- Implements special projects such as student seminars, journal club presentations and make up weeks for students at the hospitals.
- Teaches the 1 credit hour seminar course, ASpecial Clinical Topics,@ to include the State mandated continuing education in HIV/AIDS and OSHA regulations for blood borne pathogens, Florida laws & rules. This is a required course for students in the clinical year prior to their being placed at the hospitals.

Dr. Sue Strasinger is the adjunct instructor who is currently teaching the course MLS 4462 Medical Microbiology. This is the only course in university-based clinical curriculum that is taught by an adjunct instructor. During the past 7 years this course has been taught by 3 different adjunct instructors. Topics covered in this course include medical parasitology, mycobacteriology, mycology and virology. This course has 4 SH of credit and 7 hours of classroom contact per week. The course is taught in the Summer semester each year and is required for students in the clinical year.

Responsibilities of the Education Coordinators at the Clinical Facilities

Each clinical affiliate has the responsibility for providing students with the hands-on job training beyond the didactic and student laboratory instruction received at the University. Students are to be given bench instruction and allowed maximal practice under the direct supervision of a clinical instructor. Learning activities are designed for the student to acquire proficiency in performing the test procedures, methods for quality control, instrument maintenance, and protocols to record and report results. The students are given opportunities to learn how to communicate with physicians, nurses and other health care personnel. Students are taught and evaluated in achievement of the objectives in affective domain such as attendance, punctuality, cleanliness and organization of work, professional appearance, collegiality, initiative, cooperation, reaction under stress, patient confidentiality, lab safety, and so on.

Each affiliate designates a clinical education coordinator who is in charge of the students while they are at the hospital. All the education coordinators are certified, licensed practicing medical technologists or supervisors.

Ms. Susan Adams, BS, MT (ASCP)	Bay Medical Center, Panama City
Ms. Rosina Turner, BS, MT (ASCP)	Baptist Hospital, Pensacola
Ms. Esther Scott, BS, MT (ASCP)	Fort Walton Beach Medical Center, FWB
Mr. Joey Caraway, BS, MT (ASCP)	Sacred Heart Hospital, Pensacola
Ms. Marcia Dumas, BS, MT (ASCP), M.Ed.	West Florida Hospital, Pensacola
Ms. Myra Urso, BS, MT (ASCP), MS	Shands AGH, Gainesville
Ms. Abby Estilong, BS, MT (ASCP), CLS (NCA)	Shands- Univ of Florida, Gainesville
Mr. James Sigler, BS, MT (ASCP, CLSup (NCA)	Shands Jacksonville

Education Coordinator's Responsibilities:

- Serve as a member of the selection committee for student's admission into the clinical year.
- Provide orientation of the students to the hospital and the laboratory.
- Supervise the students in clinical rotations and ensure that all of their activities in the clinical setting are educational.
- Assist in formulating policies and procedures for clinical rotations.
- Implement an orderly rotation of students among the various sections of the laboratory and appraise the University coordinator of any perceived or potential problems.
- Communicate with clinical instructors on a regular basis and ensure that each student is meeting the stated learning objectives, and using time effectively.
- Make sure that examinations are administered and grades are recorded according to schedule.

- Provide timely feedback to students and facilitate an opportunity to review the graded exam as soon as possible. Provide advisement or counseling as needed.
- Give and collect the evaluation forms to be completed by clinical instructors and students upon completion of a rotation.
- Maintain student files to include grade sheets, evaluation forms, disciplinary actions, incident reports, attendance records, health records and a copy of the Trainee License by the State of Florida, and other pertinent documentation.
- Serve as a liaison between the program director and laboratory/hospital administration in matters related to affiliation agreements.
- Provide documentation needed for NAACLS self study and State of Florida license.

Responsibilities of the Clinical Instructors at the Clinical Affiliates:

- Plan for the daily/weekly activities of the students according to the objectives and practical assignments established for each rotation.
- Teach the student all the pertinent procedures to operate instruments, to perform pre-analytical procedures, microscopy and manual procedures, quality control methods, to detect and correct errors, correlate results with findings in other sections of the laboratory, to record and report results, and in general to acquire entry level competencies as a clinical laboratory scientist .
- Once the student acquires proficiency in a given area, allow maximum practice and provide direct supervision while the student is practicing. Evaluate the student=s performance and determine the need for additional practice.
- Teach how to work with computerized laboratory information systems.
- Give blind specimens and check the accuracy of results. Give unknowns and practical exams.
- Complete the final evaluation and give input to the education coordinator regarding the student=s performance.
- Serve on the Curriculum Committees as subject matter experts to develop, evaluate and update curriculum in an area of instruction in which they are involved.
- Assist the program director in evaluating the program=s effectiveness.

Standard 6B. Evaluation of Faculty

University Faculty

Annual Evaluations:
Each year, in May, the faculty member submits an updated vita and a statement of contributions during the previous year along with supporting documentation. Based on the documentation and personal observations the Program Director prepares an annual evaluation of the faculty member=s performance during the previous academic year. The file is then forwarded to the Chairperson of the Biology Department and to the Dean of College of Arts and Sciences, in that order, each adding his or her own review report to the file. The tenure earning faculty is also given an evaluative statement of AProgress towards Tenure,@ and is further evaluated by the Provost of the University. The faculty member is given an opportunity to respond at each step of this process by adding a rebuttal to each evaluation, if deemed unfavorable by the faculty member.

The Program Director=s annual evaluation is done by the Chairperson and the Dean. Each department or faculty unit has a document on file titled AStandards and Criteria for Annual Evaluation, Promotion and Merit Pay.@ These are formulated by the faculty unit and approved by the administration according to the nature of the discipline, national standards and job assignments. Each individual faculty member=s evaluation is based on these criteria and job performance according to the letter of assignment given for each contract period. In general, the faculty are evaluated in areas of: 1) Teaching, 2) Academic Advisement, 3) Research/Scholarship/Creative Activities and, 4) Service to the University, the Community and the Profession. The Medical Technology Program Director and the Assistant Program Director are also evaluated in the category of AAdministration.@ Based on their performance, the faculty is ranked on a five point scale as Distinguished, Excellent, Good, Fair, or Poor in each category. An overall, cumulative rank is also given using the same scale. This ranking is used when determining annual merit pay. Excellence in teaching and tangible evidence of scholarship is required for award for tenure. A sustained record of distinguished teaching and peer recognized productivity in scholarship, creative activities or research are needed for promotion. Service to the University, the community, and/or to the profession is considered an added bonus in tenure/promotion decisions.

Evaluation by the Students:
At the end of each semester the faculty member is evaluated by the students using a standard evaluation form. This evaluation form was developed by the State University System, in cooperation with the Student Government Association, to evaluate the course content, course delivery, the faculty member's teaching skills and evaluation methods; at the end of each course offering. The University of West Florida has incorporated those criteria, which are common to all universities in the SUS, into a form combining additional criteria specific to this university. At the end of each course these evaluation forms are completed and submitted to the department office by a class representative. A summary of students' comments and ranking in each category is prepared and a copy is placed in the faculty member=s file and a copy given to the faculty member. The faculty member is required to submit these summaries as part of the documentation for the annual evaluation folder. Summaries of these student evaluations of the course and the instructor become part of a statewide public record and are available at the library of each institution.

Evaluation of Clinical Instructors at the Affiliates:
Each hospital has its own performance evaluation systems for its employees, focusing on the job performance, leadership qualities and demonstration of professional characteristics which are considered essential for the patient=s welfare and laboratory safety. They are not directly evaluated for their teaching skills or participation in students= training. However, students fill out evaluation forms at the end of each rotation and commend instructors who show exceptional interest in students. Students also give significant oral input regarding the quality of instruction in each department which makes it possible to identify the best instructors. While these factors may play a minor role in the education coordinators= appointments as well as the designation of teaching technologists, faculty evaluation is much less stringent at the clinical sites than at the University. It usually works out that only the best experienced and most education oriented individuals are willing to teach in each section of the laboratory. We are fortunate that most of our clinical instructors are experienced professionals who show a strong interest in training of students and are willing to take the additional responsibility of teaching a student in their very busy work schedules.

Faculty Fact Sheets

Faculty fact sheets and CV of the university- based faculty are given in the following pages.

Faculty Fact Sheets for major clinical (hospital-based) faculty in each discipline area at each clinical site are given in the Appendix (submitted as a separate folder), which includes all the other required information of each clinical affiliate.

Standard 6B: Completed Faculty Fact Sheets for Major Didactic Faculty

Faculty Fact Sheet

Name: Kristina Jackson Behan, PhD Position: Associate Professor

Employed by: University of West Florida Title: Assistant Program Director

Proportion of time in: Teaching 90 % Administration :10 % Clinical Services 0 %

EDUCATION	INSTITUTION	FIELD OF STUDY	DEGREE	YEAR
Undergraduate	East Stroudsburg University	Biology/Laboratory Medicine	B.S.	1979
Graduate	Carnegie Mellon University	Biological Sciences	PhD	2001
Other (Specify)	Jersey Shore Medical Center	Medical Technology	M.T.	1979

Certified by: ASCP Certification #: MT-01844332 Year Certified: 1979

Experience (List current position first):

INSTITUTION/CITY/STATE	POSITION	YEARS
University of West Florida, Program in Clinical Laboratory Sciences, Pensacola, FL	Associate Professor	5
Westmoreland Regional Hospital Laboratory, Greensburg, PA	Medical Technologist	5
Westmoreland Regional Hospital Laboratory, Greensburg, PA	Shift Supervisor	10
Bayshore Community Hospital, Holmdel, NJ	Medical Technologist	2
St. Peter's Medical Center, New Brunswick, NJ	Medical Technologist	1

List principal functions in the education program:

University instruction, classes taught: Diagnostic Microbiology I, Clinical Chemistry I, Clinical Chemistry II, Molecular Diagnostics, Urinalysis/Body Fluids, Introduction to Clinical Laboratory Sciences

Clinical Affiliates: responsible for curriculum/exams in Clinical Chemistry, Microbiology, and Urinalysis

List continuing education activities during the past three years:

Florida Coalition of Professional Laboratory Organizations, Inc., Orlando, FL May 4, 2006

- I Hope you dance – PEPFAR Initiative
- Regulatory Forum Florida Laws and Rules
- What's New with CAP (CAP Accreditation)
- Molecular Diagnostics, Past, Present and Future: Northwest Florida Laboratory Association, Pensacola, FL April 5, 2006
- POC Markers in the ED: Cardiac Risk Stratification: ASCP Tech Sample, LabQ and PACE CE Self Study 2005-2006
- Difficulties in Identifying Campylobacter in Blood Cultures
- Stenotrophomonas maltophilia in a postsurgical patient
- An Overview of the Florida Laws and Rules and How to Access the Information
- Laboratory Profile of Multiple Myeloma
- Alcaligenes xylosoxidans Sepsis in a Transplant Patient
- Stachybotrys: Implications in Sick Building Syndrome
- Focus: Gene-Based Diagnostics I: UWF/OWCC sponsored seminars, Ft. Walton Beach, FL October 22, 2005
- VonWillebrand's Factor Cleaving Protease in Thrombotic Thrombocytopenic Purpura
- Neonatal Transfusion Issues
- An Overview of Organ Donation
- Automation in Clinical Lab – Considerations and Criteria for Decision Making
- Clinical Findings and Laboratory Diagnosis of Rat Bite Fever – A case study
- Delayed Hemolytic Transfusion Reaction – A case study
- HIV/AIDS Update: Northwest Florida Laboratory Association, Pensacola, FL March 18, 2005
- 2005 HIV/AIDS Update
- DNA Technology in the Clinical Laboratory, Beaumont Hospital, Detroit Michigan, October 7-9, 2004
- 11.5 CE hours in various aspects of molecular diagnostics: UWF/OWCC sponsored seminars, Ft. Walton Beach, FL, October 11, 2003
- Causative Agents and Antimicrobial Treatment for Sinus Infections
- Update on Laboratory Monitoring of HIV/AIDS patients
- West Nile Virus: Biology and Diagnosis
- Monitoring Bone Loss with Bone Markers
- Leukemia/Lymphoma Case Studies: Laboratory Evaluation by Traditional and Molecular Methods; Northwest Florida Laboratory Association, Pensacola, FL March 25, 2004
- Red Cells and Other Cells: Responding to Patient Need (Including Sickle Cell Disease)
- Women's Health
- HIV/AIDS Update 2004
- Risk Management and Patient Safety: Powerful Communications Skills, Rockhurst University Continuing Education Center

CV

KRISTINA JACKSON BEHAN, PhD, MT(ASCP)
Associate Professor
University of West Florida
11000 University Parkway
Pensacola, FL 32514

Office Address

College of Arts and Sciences
Biology Department, Program in Clinical Laboratory Sciences
Division of Life and Health Sciences
Room 76A Building 58
(850) 474-3060
(850) 474-2749 (Fax)
e-mail: kbehan@uwf.edu
Web site: http://uwf.edu/medicaltechnology/

Home Address

4906 Laurel Oak Drive
Pace, FL 32571
(850) 995-1794

Education

Ph.D. in Biological Sciences, Carnegie Mellon University, Pittsburgh, PA. July 2001.
B.S. in Biology, East Stroudsburg University, East Stroudsburg, PA,
1979, *summa cum laude*. Departmental award for academic achievement.
M.T. Medical Technologist, Jersey Shore Medical Center School of Medical Technology, Neptune, NJ, 1979.
ASCP certified: American Society for Clinical Pathology, 1979.

Licensure

Clinical Laboratory Technologist, state of Florida, License #: TN 37721

Employment

- **University of West Florida**, Medical Technology Program, Department of Biology:
  Assistant Professor from August 2001- July 2006
  Associate Professor from August 2006 – present
- **Westmoreland Regional Hospital**, Greensburg, PA.
  - Shift Supervisor Laboratory 1987-1996. Responsible for overseeing operations of laboratory during the evening and night shifts, including the departments of Blood Bank, Clinical Chemistry, Hematology and Microbiology, Outpatient collections. Trained new employees, taught Medical Laboratory Technician students. Served as ad hoc College of American Pathologists (CAP) inspector.

    - Medical Technologist part time 1996-2001. Stepped down from supervisory position to attend graduate school full time. Generalist in Blood Bank, Hematology, Chemistry and Microbiology.
- **Bayshore Community Hospital**, Holmdel, NJ
    - Medical Technologist 1984 – 1986. Generalist.
- **St. Peter's Medical Center,** New Brunswick, NJ. .
    - Medical Technologist 1983 – 1984. Hematology
- **Jersey Shore Medical Center,** Neptune, NJ.
    - Medical Technologist 1979 – 1982. Chemistry, RIA, special chemistry. Taught Medical Technology students.

Awards

- Teaching Incentive Program – TIP award 2005, University of West Florida
- Editor's Choice Award, Tech Sample 2004, for the manuscript "Elevated Bilirubin Levels in an Asymptomatic 34-Year-Old Woman with Primary Sclerosing Cholangitis"

Professional Organizations

- American Society for Clinical Pathology
- American Society of Clinical Laboratory Science
- Florida Society of Clinical Laboratory Science
- Association for Molecular Pathology
- American Diabetes Association

Publications

Articles in Refereed Journals

- Learning Performance Characteristics with Style (Learning Style, that is). **K.J. Behan** 2005. *LabMedicine* 36:753-756.
- Screening for Diabetes: Sensitivity and Predictive Value of Risk Factor Total. **K.J. Behan** 2005. *Clinical Laboratory Science* 18:221-225.
- Alternative splicing removes an Ets interaction domain from Lozenge during Drosophila eye development. **K.J. Behan**, J. Fair, S. Singh, M. Bogwitz, T. Perry, V. Grubor, F. Cunningham, C.D. Nichols, T.L. Cheung, P. Batterham, J.A. Pollock. 2005. *Development, Genes and Evolution* 215:423-435.
- Normoglycemia May Encompass Two Subpopulations with Respect to Vascular Risk in Non-Obese Caucasian Women. **K.J. Behan** and R.W. Amin. 2005. *LabMedicine* 36: 2-7.
- Laboratory Classification and Monitoring of Molar Pregnancy, **K.J. Behan** and I. Bezovics. 2005 *Tech Sample* Generalist G-3, 13-18.
- Elevated Bilirubin Levels in an Asymptomatic 34-Year-Old Woman with Primary Sclerosing Cholangitis, **K.J. Behan**. 2004. *Tech Sample* Generalist GF-2, 8-11.

- Mutations in lozenge and D-Pax2 invoke ectopic patterned cell death in the developing Drosophila eye using distinct mechanisms. N.A. Siddall, **K.J. Behan**, J.R. Crew, T.L. Cheung, J.A. Fair, P Batterham and J.A. Pollock. 2003. *Development, Genes and Evolution* 213: 107-119.
- Yan regulates Lozenge during Drosophila eye development, **K.J. Behan**, C. D. Nichols, T. L. Cheung, A. Farlow, B. M. Hogan, P. Batterham, and J. A. Pollock 2002. *Development, Genes and Evolution* 212: (6):267-76.
- Primary Sclerosing Cholangitis: A Case Study with Lab Applications. **K.J. Behan** 1993. *Advance for Medical Laboratory Professionals* 5:8-9.
- Lab Tests Make Important Differences for M.S. Patients. **K.J. Behan** 1991. *Advance for Medical Laboratory Professionals* 3:20-21

Grants

University of West Florida Center for Teaching, Learning and Assessment. Quality Enhancement Plan Project Grant: "Integration of a discovery based project into a Biology course. Co-P.I. H.M. Chung and K.J. Behan. Project dates August 2005 to August 2006. Funded for $5,000.

American Society for Clinical Laboratory Sciences ASCLS: "Development and Testing of a Model for Utilization of FPG, WBC and LDL Values as Predictors of Risk for cardiovascular Disease in Normoglycemic Women". P.I. K.J.Behan. Project dates July 2004 to July 2005. Funded for $3,000.

University of West Florida Scholarly and Creative Activities Committee: "A Non-biased Biochemical Analysis of an Endogenous Population for Trends in Pre-Diabetes". P.I. K.J. Behan. Project dates April 2003 to January 2004. Funded for $2,000.

American Society for Clinical Laboratory Sciences ASCLS: "Standardization of Hemoglobin A1C: Effect of Patient Hemoglobin Concentration". P.I. K.J. Behan. Project dates July 2005 to July 2006. Not funded.

National Science Foundation, Course Curriculum and Laboratory Improvement (CCLI) Program. "Discovery-based laboratory experiences in contemporary biology". Co-P.I. H.M. Chung, K.J. Behan, P.E. Ryals, T.Fox. Project dates November 2004 to November 2005. $200,000. Not funded.

Presentations

- "FPG versus A1c: new caveats to an old problem". Northwest Florida Laboratory Association Convention, Pensacola, FL. April 5, 2006, and Florida Coalition of Professional Laboratory Organizations, May 5, 2006.
- "Laboratory Classification and Monitoring of Molar Pregnancy" UWF Biology Seminar Series March 11, 2005, and Northwest Florida Laboratory Association Convention May 19, 2005, A Day of Continuing Education, UWF/OWC Ft. Walton Beach Oct 22, 2005
- "The Golden Age of Laboratory Testing". Leisure Learning, UWF. April 3, 2006.

- "Normoglycemia May Encompass Two Subpopulations with Respect to Vascular Risk in Non-Obese Caucasian Women", UWF Math Departmental Seminar, December 3, 2004
- "Normoglycemia Defines Two Populations with Respect to Vascular Risk", UWF Biology Seminar Series, April 9, 2004.
- "Normoglycemia: the Paradigm Shifts" The Northwest Florida Laboratory Association Convention, March 25, 2004, Pensacola Civic Center, Pensacola, FL.
- Normoglycemia: the Paradigm Shifts" A Day of Continuing Education in Clinical Laboratory Sciences, October 11, 2003, UWF/OWCC Fort Walton Beach, FL
- "Type 2 Diabetes, The Rationale behind POCT" The Northwest Florida Laboratory Association Convention, February 27, 2003, Pensacola Civic Center, Pensacola, FL.
- "Elevated bilirubin in an Asymptomatic 34 year old female: A case study on Primary Sclerosing Cholangitis", A Day of Continuing Education in Clinical Laboratory Sciences, November 16, 2002, UWF/OWCC Fort Walton Beach, FL.
- "Molecular Biology Techniques in the Clinical Lab: PCR & Beyond", A Day of Continuing Education in Clinical Laboratory Sciences, October 27, 2001, UWF/OWCC Fort Walton Beach, FL.
- "Molecular Methods in Diagnostic Microbiology", The Northwest Florida laboratory Association 2002 Convention, March 1, 2002, Pensacola Civic Center, Pensacola, FL.

Abstracts

- The identification of genes upstream of lozenge in the developing eye. K.J. Behan, P.W. Keller, P. Batterham, J.A. Pollock. 41st Annual Drosophila Research Conference, Pittsburgh, PA. 2000.
- The identification of genes that interact with lozenge in Drosophila eye development. N.A. Siddall, K.J.Behan, S. Coutts, J.A. Pollock, P. Batterham. 41st Annual Drosophila Research Conference, Pittsburgh, PA. 2000.
- Mutations in lozenge and sparkling permit patterned cell death in the developing Drosophila eye. K.J. Behan, J. Crew, R. Selvaraju, P. Batterham, J. Pollock. 40th Annual Drosophila Research Conference, Bellevue, WA. 1999.
- Complex Complementation in lozenge may be influenced by a synapsis dependent, zeste independent mechanism. J. Pollock, C. Nichols, K.J. Behan, Z. Chen, F. Cunningham, J. Andrews, G. Pasquini, P. Batterham. 39th Annual Drosophila Research Conference, Washington, D.C. 1998.

Courses Taught

MLS 4625/MLS 4625L	Clinical Chemistry I and Laboratory (2001-2005)
MLS 4630/MLS 4630L	Clinical Chemistry II and Laboratory (2001-2005)
MLS 4820L	Clinical Chemistry III (2002-2005)
MLS 4460/MLS 4460L	Diagnostic Microbiology and Laboratory (2002-2005)
MLS 4821L	Diagnostic Microbiology II (2002-2005)
MLS 3031	Introduction to Medical Technology (2002-2005)
MLS 4825L	Urinalysis and Body Fluids II (2002-2005)
MLS 4905	Directed Studies (2003, 2004, 2005)

Public Service Activities

University Level

- Scholarly and Creative Activity Committee, 2004 – 2006
- Selection Committee for Who's Who among Students in American Universities and Colleges 2002
- Judge for 47th Annual West Florida Regional Science and Engineering Fair, February 4, 2002
- Assistant Marshal for Graduation Ceremonies for Fall 2002- 2005
- Member, Program Review Team for Health Education Program 2005

College Level

- Representative at Open House, Career Fair, Community College Articulation Day and Freshman Orientation 2001-2006

Department Level

- Faculty sponsor for the Medical Technology Student Association at UWF 2001-2005
- Search Committee for Instrument Maker, Biology Department 2003
- Medical Technology Program Selection Committee 2002-2003, 2005
- Faculty Search Committee member for Microbiologist, 2002-2003
- Medical Technology Program Advisory Committee 2002-2006
- Faculty Search Committee member for Biochemist, 2001-2002
- Special recruiting efforts – recruiting poster 2002-2004

Organizational Service

- Pensacola Junior College Program Review Team member for Pre-Medical Technology 2005
- Florida Society of Clinical Laboratory Sciences, Board member 2005
- ASCLS ad hoc reviewer for CLSI document C34-A2 Sweat Testing, approved guideline 2005

Other Professional Service

Westmoreland Regional Hospital

- Ad hoc laboratory inspector for College of American Pathologists, 1992-1996.
- Laboratory representative to interdisciplinary committee for Emergency Room quality improvement. 1994-1996.

Representative to Reference Laboratory Alliance, a collaborative effort of Pittsburgh hospitals to compete with the major commercial laboratories for the Blue Shield testing market. 1990s

Faculty Fact Sheet

Name: Sherman Bonomelli Position: Laboratory Instructor

Employed by: University of West Florida Title: Assistant in Medical Technology

Proportion of time in: Teaching 40 % Administration : 60 % Clinical Services: 0 %

EDUCATION	INSTITUTION	FIELD OF STUDY	DEGREE	YEAR
Undergraduate	UWF	Biology	B.S	1986
Graduate	UWF	Cellular & Molecular Biology	M.S.	1995
Other (Specify)				

Certified by: _____ Certification #: _____Year Certified: _____

Experience (List current position first):

INSTITUTION/CITY/STATE	POSITION	YEARS
University of West Florida	Laboratory Instructor	7
University of Florida/ Environmental Protection Agency	Research Associate	3
University of West Florida/Environmental Protection Agency	Research Associate	3

List principal functions in the education program:

- Lab instructor in all (10) of the university based clinical laboratory science courses and management of student clinical laboratory on campus
- Instructor for Phlebotomy
- Instructor for computer technology
- Instructor for laboratory safety

List continuing education activities during the past three years:

TITLE	SPONSOR	DATE
Continuing Education in Clinical Laboratory Sciences	University of West Florida CLS Program	Oct. 14, 2005
Continuing Education in Clinical Laboratory Sciences	Northwest Florida Laboratory Association	Mar. 24 -Mar. 26, 2004
Faculty Training in UWF Banner Project Training	UWF Purchasing Department	March, 2004
Continuing Education in Clinical Laboratory Sciences	University of West Florida CLS Program	Oct. 11, 2003

CV

SHERMAN L. BONOMELLI
4866 Cuerro Ct.
Pensacola, Florida 32526
(850) 455-4063

EDUCATION

- University of West Florida, M.S., Cellular and Molecular Biology (1995)
- University of West Florida, B.S., Biology (1986)
- U.S. Navy Hospital Corps School
- U.S. Navy Aviation Medicine School
- U.S. Navy Preventive Medicine School

QUALIFICATIONS

- Excellent analytical skills
- Goal-oriented
- Well-organized
- Very effective communicator
- Consistent record of growth and responsibility

EXPERIENCE

1999-Present: Assistant Instructor, Clinical Laboratory Sciences Program, University of West Florida

- Instructor for Phlebotomy
- Instructor for Hematology Laboratory
- Instructor for Diagnostic Microbiology Laboratory
- Instructor for Hemostasis & Thrombosis Laboratory
- Instructor for Clinical Chemistry I & II Laboratories
- Instructor for Medical Microbiology Laboratory
- Instructor for Immunohematology Laboratory
- Instructor for Serology Laboratory
- Instructor for Urinalysis & Body Fluids Laboratory
- Instructor for computer technology
- Instructor for laboratory safety

1996-1999: Instructor, Department of Biology, University of West Florida

- Instructor for Biochemistry Laboratory
- Instructor for Clinical Chemistry I & II
- Instructor for Hematology Laboratory
- Instructor for Diagnostic Microbiology Laboratory
- Independent research developing methodologies for the characterization of proteins from fish ovaries and developing oocytes
- Visiting Instructor, Medical Technology Program

1993-1995: Research Biologist, Interdisciplinary Center for Biotechnology, University of Florida

- Synthesized amino acid fragments of the egg protein vitellogenin from teleost fish.
- Synthesized amino acid fragment of fish antitumor protein P-53.
- Developed protocols to extract soluble and membrane bound proteins from fish liver.
- Developed protocol for isoelectric focusing and 2-D gel electrophoresis with fish serum and liver protein extracts.
- Developed quantitative enzyme-linked immunosorbent assay (ELISA) for measuring vitellogenin.
- Developed quantitative enzyme-linked immunosorbent assay (ELISA) for measuring concentrations of natural and synthetic estrogenic compounds in a flow-through systems.
- Examined physical and biochemical techniques for separation of protein to reduce protein loading densities of various fractions on 2-D PAGE gels.
- Processed fish and alligator tissues for chlorinated hydrocarbons and organochlorines insecticide chemical analysis.
- Carried out exposures of laboratory test animals, sheepshead minnow (*Cyprinodon variegatus*) to toxicants and other endocrine disruptors using proportional diluter flow-through system.
- Wrote S. O. P. (Standard Operating Procedures) for all protocols and techniques used.
- Wrote summary reports monthly. Maintain laboratory records, both handwritten and electronic for archival purpose.

1990-1993 : Research Associate, Department of Biology, University of West Florida

- Development and application of potential bioindicators to monitor the general health, tissue/organ function and damage, reproduction, growth, immunological competence and the tumorigenic process in marine life.
- Develop new assays which reflect growth, reproduction, immunological competence and tumorigenesis.
- Compare responses of animals exposed to single toxicants or mixtures of chemicals in the laboratory with those measurements in animals collected from chemically contaminated sites.
- Establish baseline biochemical, physiological and clinical measurements for unstressed animals and compare those values with animals collected from contaminated sites.
- Establish statistical techniques to determine statistically significant differences in spatial and temporal comparisons.

1989–1990: Biology Assistant, Technical Resources, Inc.; U.S. EPA, Environmental Research Laboratory

- Develop clinical chemistry techniques patterned after those used for human serum and plasma for the analysis of fish serum and plasma.
- Develop clinical type assays for hemolymph of crustaceans and mollusks.
- Develop silver stain methodology and standardize quantitation of gels using a densitometer.
- Conduct one-dimensional polyacrylamide gel electrophoresis of fish plasma.
- Isolate and identify aberrant proteins found in electrophoresis technique using HPLC techniques.

1986 – 1989: Research Assistant, Department of Biology, University of West Florida

- Developed and applied an enzyme-linked immunosorbent assay (ELISA) method for characterization of antisera to crustacean pigment dispersing hormones.
- Synthesized solid phase peptide using a modified Merrifield method.
- Purified synthetic and natural peptides using liquid chromatography methodologies, (gel filtration, ion exchange, partition chromatography, and reverse phase HPLC).

1962 – 1983 Hospital Corpsman/Preventive Medicine Technician, United States Navy

- Command Chief Petty Officer
- Supervised junior personnel within medical department
- Inspected food service facilities, performed communicable disease and potable water bacteriology investigations, and monitored insect and rodent control procedures.
- Performed clinical laboratory techniques...

SPECIAL SKILLS

- Operation and maintenance of HPLC instruments
- Operation and maintenance of ELISA Reader
- Operation and maintenance of Spectrophotometric instruments
- Operation and maintenance of Densitometer
- Operation and maintenance of Scintillation Counter
- Operation and maintenance of Gas Chromatography instruments
- Operation and maintenance of automated Peptide synthesizer
- Computer skills in varied software applications

CONTINUING EDUCATION

Continuing Education in Clinical Laboratory Sciences, Oct. 14, 2005, (7 Hours) Presented by University of West Florida Medical Technology Program, hosted at UWF, Fort Walton Beach Campus

Continuing Education in Clinical Laboratory Sciences, Mar. 24 -Mar. 26, 2004, sponsored by Northwest Florida Laboratory Association (NWFLA), Pensacola Florida Civic Center.

Faculty Training, March, 2004, in UWF Banner Project Training, 8 hour presented by Purchasing Department UWF.

Continuing Education in Clinical Laboratory Sciences, Oct. 11, 2003, (7 Hours) Presented by University of West Florida Medical Technology Program, hosted at UWF, Fort Walton Beach Campus.

Continuing Education in Clinical Laboratory Sciences, Nov. 16, 2002, (7 Hours) Presented by University of West Florida Medical Technology Program, hosted at UWF, Fort Walton Beach Campus.

Continuing Education in Clinical Laboratory Sciences, Feb. 26 - Mar. 1, 2003, sponsored by Northwest Florida Laboratory Association (NWFLA), Pensacola Florida Civic Center

NAACLS Accreditation Workshop, March 6, 2003 (4 Hours) New Orleans, LA.

Faculty Training, March 12 - 14, 2003, in Microsoft PowerPoint, 12 hour presented by ITS Department UWF.

Continuing Education in Clinical Laboratory Sciences, Oct. 27, 2001, (7 Hours) Presented by University of West Florida Medical Technology Program, hosted at UWF, Fort Walton Beach Campus.

Continuing Education in Clinical Laboratory Sciences, Feb. 27 - Mar. 2, 2002, sponsored by Northwest Florida Laboratory Association (NWFLA), Pensacola Florida Civic Center

Faculty Training, Summer 2001, in Prometheus, Web Based presentation of course material, 4 hour session presented by ITS Department UWF.

Continuing Education in Clinical Laboratory Sciences, Nov. 4, 2000,(7 Hours) Presented by University of West Florida, Medical Technology Program and Bay Medical Center, Panama City, Florida

Faculty WebCT Training, Summer 1999 (Five training sessions, four hours each):
Use of Forum, Class Mail, and Chat Functions
Use of File Manager and Calendar Functions, Student Management
Path Editor Overview, Path Configuration Options, Selective Release
Glossary, Index, and Reference Functions, Use of Student Evaluations

PUBLICATIONS

Bonomelli, S. L., Illustrations, *In:* Susan King Strasinger, Marjorie Schaub Di Lorenzo, The Phlebotomy Workbook 2nd edition, F.A. Davis, 2003.

Bonomelli, S. L., Illustrations, *In:* Susan King Strasinger, Marjorie Schaub Di Lorenzo, Urinalysis and Body Fluids ed. 4th , F.A. Davis, 2001.

Bonomelli, S. L., Illustrations, *In:* Marjorie Schaub Di Lorenzo, Susan King Strasinger, Blood Collection in Healthcare, F.A. Davis 2002

Bonomelli, S. L. 1995. Development of An Enzyme-Linked Immunosorbent Assay for the Characterization of Antisera to the Pigment Dispersing Hormones. University of West Florida, Master of Science Thesis

Bonomelli, S.L., Rao, K.R., and Riehm, J.P. 1988. Development and application of and ELISA for Crustacean β-PDH. *Am. Zool.* 28:117A.

Bonomelli, S.L., K. R. Rao, and J. P. Riehm. 1989. Preparation and evaluation of an antiserum for Crustacean α-PDH. *Am. Zool. 29:49A*

Denslow, N. D., L. C. Folmar, S. Bonomelli, S. Heppel and C. V. Sullivan. 1996. Development of Antibodies to teleost vitellogenins: potential biomarkers for environmental estrogens. *In*: Environmental Toxicology and Risk Assessment: Biomarkers and Risk Assessment, Vol. 5. ASTM STP 1306, D. A. Bengston and D. S. Hanschel, Eds. American Society for Testing and Materials, Philadelphia

Folmar, L. C., T. Moody, S. Bonomelli, J. Gibson. 1992. Annual cycle of blood chemistry measurements in striped mullet (*Mugil cephalus*) and pinfish (*Lagodon rhomboides*) from the Gulf of Mexico. *J. Fish Biol.* 41:9999

Folmar, L. C., S. Bonomelli, T. Moody, J. Gibson. 1993. The effects of short-term exposure to three chemicals on the blood chemistry of the pinfish (*Lagodon rhomboides*). *Ach. Environ. Contam. Toxicol. V.24:83-86*

Folmar, L. C., G. R. Gardner, J. Hickey, S. Bonomelli and T. Moody. 1993. Serum chemistry and histopathological evaluation of brown bullheads (*Ameriurus nebulosus*) from the Buffalo and Niagara Rivers. *Arch. Environ. Contam. Toxicol.* 25:298

Folmar. L. C., J. Harshbarger, P. C. Baumann, G. Gardner and S. Bonomelli. 1995. Pathological and serum chemistry profiles of brown bullheads (*Ameriurus nebulosus*) from the Black River, Ohio. *Bull. Environ. Contam. Toxicol.* 54:50

Folmar, L. C., N. D. Denslow, R. Wallace, G. LeFleur, S. Bonomelli and C. V. Sullivan. 1995. A highly conserved N-terminal sequence for vitellogenin with potential value to the biochemistry, molecular biology and pathology of vitellogenesis.

Denslow, Nancy D., Ming M. Chow, Leroy C. Folmar, Sherman L. Bonomelli, Scott A. Heppell and Craig V. Sullivan. 1995 Development of Antibodies to Teleost Vitellogenins: Potential Biomarkers for Environmental Estrogens. In: Environmental Toxicology and Risk Assessment: Biomarkers and Risk Assessment. Fifth Volume, ASTM STP 1306. D.A. Bengston and D.S. Henschel, Editors. American Society for Testing and Materials, Philadelphia, PA. 15 p. (ERL, GB 946).

Denslow, Nancy D., Majorie Chow, Ming M. Chow, **Sherman Bonomelli**, Leroy C. Folmar, Scott A. Heppell and Craig V. Sullivan. In press. Development of Biomarkers for Environmental Contaminants Affecting Fish. Environ. Toxicol. Chem. 20 p. (ERL, GB X866).

Denslow, Nancy D., Majorie Chow, Ming M. Chow, Sherman Bonomelli, Leroy C.Folmar, Scott A. Heppell and Craig V. Sullivan. In press. Development of Biomarkers for Environmental Contaminants Affecting Fish. Environ. Toxicol. Chem. 20 p. (ERL, GB X866). *J. Fish Biol.* 46:255

Rao, K. R., C. J. Mohrherr, S. L. Bonomelli, J. P. Riehm, and T. G. Kingan, 1991. Insect Neuropeptides influencing color change in insect and chromatophoral pigment movements in crustaceans. *In*: Julius J. Menn, Thomas J. Kelly, Edward P. Masler 9 eds. ACS Symposium series 453, Insect Neuropeptides: Chemistry, Biology, and Action. American Chemical Society, Washington, D.C.

Unny, S. K., Lewis, J. T., Brayton, B. H., White, D. W., and Bonomelli, S. L. 1988. Comparison of the immunogenicity of four group a streptococcal serotypes. *J. Histotech.* 11(4):231-240.

Faculty Fact Sheet

Name: J. Steve Smith Position: Clinical Site Coordinator & Instructor

Employed by: University of West Florida Title: Visiting Assistant Professor

Proportion of time in: Teaching 25% % Administration 0 % Clinical Services: 0%
Clinical Site - Coordination: 75%

EDUCATION	INSTITUTION	FIELD OF STUDY	DEGREE	YEAR
Undergraduate	Univ of Oklahoma	Biology/Preprofessional	B.S.	1965
Graduate	Univ of Oklahoma	Medicine	M.D.	1969
Other (Specify)				

Certified by: Diplomat of the American Board of Pediatrics Year: 1974
License: State of Oklahoma & Florida License #: 9248 Year: 1970 / 2000

Experience (List current position first):

INSTITUTION/CITY/STATE	POSITION	YEARS
University of West Florida- Clinical Laboratory Sciences Program	Clinical-Site- Coordinator	2000-2006
University of West Florida-Dept of Biology	Adjunct Faculty	2000-2006
United States Navy	Physician/Pediatrician	1969-1999

List principal functions in the education program:

Clinical Site Coordinator ; Provides oversight of clinical rotations at Hospital laboratories

Instructor: MLS 4705 Special Clinical Topics (major course)

Instructor : MLS 4931 Advances in Medical Technology (elective course)

List continuing education activities during the past three years:

TITLE	SPONSOR	DATE
Clinical Grand Rounds- CME Credit towards license as a physician	Sacred Heart Hospital, Pensacola	Weekly 30+ hours /year

CURRICULUM VITAE
JAY STEVEN SMITH M.D.

PERSONAL DATA

Date of Birth: March 17, 1943
Place of Birth: Oklahoma City, Okla.
Address: 4680 Scenic Court
Pensacola, Florida 32504
E-mail: jsmith1@uwf.edu

EDUCATION

Undergraduate 1961-1965	University of Oklahoma Norman, Oklahoma
Medical School 1965-1969	University of Oklahoma School of Medicine Oklahoma City, Oklahoma

POST GRADUATE TRAINING

Pediatric Internship	University of Utah Medical Center
July 1969-1970	Salt Lake City, Utah
Pediatric Residency	University of Oklahoma Medical Center
July 1970-1971	Oklahoma City, Oklahoma
Pediatric Residency	University of Utah Medical Center
July 1971-1972	Salt Lake City, Utah

PROFESSIONAL LICENSES AND BOARD CERTIFICATION

Oklahoma State Medical Licensure	1970-present
Diplomat of the American Board of Pediatrics	1974-present
Florida State Licensure	2000-2002

HOSPITAL APPOINTMENTS

Head, Pediatric Department, Naval Hospital Roosevelt Roads, Puerto Rico	July 1972-June 1975
Head, Pediatric Department, Naval Hospital Memphis, Tennessee	July 1975-June 1978
Head, Pediatric Department, Naval Hospital Oak Harbor, Washington	July 1978-June 1982
Head, Pediatric Department, Naval Hospital Patuxent River, Maryland	July 1982-June 1985
Head, Pediatric Department, Naval Hospital Orlando, Florida	July 1985-June 1990
Head, Pediatric Department, Naval Hospital Oak Harbor, Washington	July 1990-June 1995
Staff, Pediatric Department, Naval Hospital Pensacola, Florida	July 1995-Nov 1997

OTHER APPOINTMENTS

Commissioned United States Navy	1966
Director, Medical Services, Naval Hospital, Patuxent River	1984-1985
Chairman, Executive Committee Medical Staff, Naval Hospital, Orlando	1985-1987
Amphibious Task Force Surgeon, Marine Amphibious Group, Mediterranean	1988
Chairman, Executive Committee Medical Staff, Naval Hospital, Oak Harbor	1990-1994
Amphibious Task Force Surgeon, Marine Amphibious Group, Japan	1996
Retired from active duty United States Navy	1998

*Following retirement from active duty I became a full time caregiver for my invalid father for 2 years

OTHER ACADEMIC APPOINTMENTS

Adjunct Instructor (Pathophysiology) 1999-2006
Biology Department, University of West Florida
Visiting Instructor and Clinical Site Coordinator
Medical Technology Program, University of West Florida 2000-2006

MEMBERSHIP IN SOCIETIES

Fellow American Academy of Pediatrics

AWARDS

Navy Meritorious Service Award 1989, 1990, 1995
"Teacher of the Year" Award 1997
Naval Hospital Pensacola

TEACHING EXPERIENCE

Instructor for multiple education and training courses in Continuing Medical Education
Instructor in Advanced Cardiac Life Support (ACLS), Adult and Pediatric
Instructor in Pediatrics, Family Practice Residency Training Program, Pensacola

Adjunct instructor at University of West Florida
HSC 3550- Pathophysiology (1999-2006, Fall, Spring, and Summer Terms)
Medical Technology Program at University of West Florida
Clinical Site Coordinator and Instructor (2000-2006)
Instructor:
MLS4705 Special Clinical Topics (Summer Term 2002-2005)
MLS4931 Advances in Biomedical Technology (Spring Term 2005)

PUBLICATIONS

Smith, J.S. Rotavirus Diarrhea as a Cause of Metabolic Acidosis in a Toddler. *Tech Sample*. 2004
Smith, J.S. Hemoglobin SC Disease, Back Pain, and Medical Error. *Tech Sample*. 2005

Faculty Fact Sheet

Name: Susan Strasinger Position: Adjunct Faculty

Employed by: University of West Florida Title: Faculty Associate

Proportion of time in: Teaching 100 % Administration: 0% Clinical Services 0 %

EDUCATION	INSTITUTION	FIELD OF STUDY	DEGREE	YEAR
Undergraduate	Univ of Maine	Med Tech	BA	1961
Graduate	Virginia Tech	Education	MS	1973
Other (Specify)	Catholic Univ	Med Tech	DA	1983

Certified by: ASCP Certification #: MT 040226 Year Certified: 1961

Experience (List current position first):

INSTITUTION/CITY/STATE	POSITION	YEARS
University of West Florida	Faculty Associate	1996 to present
No. Virginia Community College	MLT Program Director	1972-1995
DeWitt Army Hospital	Chemistry/Micro supervisor	1966-1972
Bowman Gray Medical School	Renal Research Supervisor	1961-1965

List principal functions in the education program:

Teaching clinical lab courses as an adjunct, as needed by the Program. In recent years taught: MLS 4220 Urinalysis & Body Fuids1 , MLS 4462 Medical Microbiology, MLS 4505 Serology, MLS 3031 Introduction to Medical Technology

Served as the clinical –site coordinator from 1995-2001

CLS Program Advisory Committee Member

Assist in special projects, provide input regarding Program's effectiveness

List continuing education activities during the past three years:

TITLE	SPONSOR	DATE
ASCP Leadership Conference	ASCP	March 2006
Tech Sample/LabQ Project Editor	ASCP	2004 to present
Nebraska Annual CLS meeting	NSCLS	April 2006

CV

SUSAN KING STRASINGER

Faculty Associate & Adjunct Instructor
University of West Florida –CLS Program

CONTACT INFORMATION

28900 Perdido Beach Blvd. #2A
Orange Beach, Alabama 36561
Home Telephone (251) 980-6330
Email: suestrasinger@yahoo.com

EDUCATION

Doctorate of Arts. The Catholic University of America.
Major: Medical Technology
Dissertation: Clinical Analysis of Urine and Other Body Fluids
Master of Science. Virginia Polytechnic Institute.
Major: Vocational Technical Education
Bachelor of Arts. University of Maine.
Major: Medical Technology
Certification: MT (ASCP) #040226.

EXPERIENCE

Faculty Associate and Adjunct Instructor
University of West Florida, Pensacola, Florida,
Responsibilities: Participating in faculty activities, teaching classes and providing guest lectures as needed.

Adjunct Faculty
Pensacola Junior College, Pensacola, Florida,
Responsibilities: Coordination of the Phlebotomy Certificate Program

Visiting Assistant Professor
The University of West Florida, Pensacola, Florida
Responsibilities: Teaching and coordination of clinical rotations for the Medical Technology Program

Program Director Medical Laboratory Technician Program
Northern Virginia Community College, Annandale, Virginia 22003
Responsibilities: Development of the original MLT program and certificate programs in Phlebotomy, Histology and Medical Office Assisting, solicitation and coordination of clinical affiliates, hiring of faculty, acquisition and maintenance of accreditation, budgeting of allocated funds, student counseling, course development and teaching courses.

Supervisory Medical Technologist
DeWitt Army Hospital, Fort Belvoir, Virginia 22060
Responsibilities: Supervision of Clinical Chemistry, Special Chemistry and Microbiology sections, training of military personnel, development of new procedures, monitoring of quality control, evaluation of new instrumentation, maintaining instrumentation, ordering supplies and performing laboratory tests.
Part-time Medical Technologist
Alexandria Hospital, Alexandria, Virginia 22304
Responsibilities: Performance of general laboratory procedures during evening, night and weekend shifts.
Chief Technologist, Renal Research Laboratory
Bowman Gray School of Medicine, Winston Salem, North Carolina
Responsibilities: Developing renal dialysis procedures, assisting with renal dialysis, evaluating dialysis patients, developing special chemistry procedures and teaching basic laboratory procedures to interns and residents.
Night Laboratory Supervisor
North Carolina Baptist Hospital, Winston Salem, North Carolina
Responsibilities: Scheduling and training of personnel to perform emergency procedures during nights and weekends for a 600 bed hospital and performing general laboratory testing.

PUBLICATIONS

Strasinger, SK. Urinalysis and Body Fluids. F.A. Davis Company, Philadelphia, 1985, 1989, 1994, and Di Lorenzo 2001
Strasinger, SK and Di Lorenzo, MA. Phlebotomy Workbook. F.A. Davis Company, Philadelphia, 1996, 2003
Strasinger, SK and Di Lorenzo, MA, Skills for the Patient Care Technician. FA Davis Company, Philadelphia, 1999
Di Lorenzo, MA and Strasinger, SK. Blood Collection for Healthcare Professionals. F.A. Davis Company, Philadelphia, 2001

PROFESSIONAL ACTIVITIES

Chair, ASCP Board of Registry Joint Generalist Examination Committee, 1994 to 1996. Member, 1989 to 1993.
Evaluator of military and nontraditional allied health courses for the American Council on Education, 1978 to present.
ASCP Tech Sample Generalist coeditor, 2002 to 2004
ASCP Tech Sample coexecutive editor, 2004 to present
Contributor to Bayer Encyclopedia of Urinalysis
Manuscript reviewer for FA Davis publishers
Numerous urinalysis, body fluids and phlebotomy presentations
Virginia Educator of the Year, 1992

Standard 6C:
Ongoing Professional Development of Didactic and Clinical Faculty

Didactic faculty: the university-based program faculty are engaged in ongoing professional development to be effective and up-to-date in their instructional responsibilities as well as to fulfill the University=s and the Program's requirements for annual evaluation, merit pay, tenure and promotion. According to the University policies faculty from each department or unit develop a set of criteria which are appropriate for their discipline. The Clinical Laboratory Sciences program has established such criteria for faculty development and this document is included in the following pages.

Following are a few examples and documentation of ongoing professional development of the faculty:

Swarna Krothapalli, Associate Professor and Program Director is actively engaged in continuing education and professional development activities. A list of the continuing education programs she attended and presented during the past 5 years are listed in her CV, which is included in essential 5A3. She was awarded tenure in 1991 and was promoted to the rank of Associate Professor in 1998. She was also recognized for excellence in teaching and academic advisement through: Gabor Award for Excellence in 1993; Outstanding Undergraduate Advising and Teaching Award in 1994; and was twice selected by peer faculty committees for the Teaching Incentive Program Award (TIP Award) in 1995 and 1998. She was also recognized as a leader in the profession in the state of Florida, through the Governor=s appointment in 1992 as a charter member of the Board of Clinical Laboratory Personnel. She served on this licensing Board for six years (1992-98), the last three years as the Chairperson.

During the past 7 years this faculty member has attended several continuing education programs, including an ASCP meeting, Clinical Laboratory Educators' Conference, NAACLS accreditation workshop and several other local, regional and University sponsored CE programs. Through continuing education and faculty development activities she maintained her State of Florida license status as a technologist in all five areas and as a supervisor in Hematology. She organized and offered several CE-Seminars to practicing professionals in the region. She gave several CE presentations on topics in Hematology, Hemostasis, Immunohematology and Serology. Published 2 articles in ASCP Tech Sample: 2004-Antiphospholipid Antibody Syndrome and 2005: Florida Laws and Rules pertaining to Clinical Laboratory Sciences Training Programs. She attended several workshops offered by the University in areas of curriculum development, quality assessment, UWF's e-learning program and so on.

Ongoing Professional Development

Kristina Behan, Associate Professor and Assistant Program Director, earned tenure during her fifth year of employment at UWF. Her professional development activities have focused in three areas: maintaining a Florida license as a generalist in laboratory sciences, continuing education in Molecular Diagnostics and statistics, and development in the areas of Education and Advising. She has incorporated information from those workshops and seminars into her classes in Diagnostic Microbiology, Clinical Chemistry and Molecular Diagnostics. The following is a list of professional development activities outside of the University.

- Florida Coalition of Professional Laboratory Organizations, Orlando, Florida, 2006
- Northwest Florida Laboratory Association annual convention, Pensacola, Florida 2006, 2005, 2004, 2003, 2002
- DNA Technology in the Clinical Laboratory Conference (Beaumont Hospital, Michigan) in October 2004
- A Day of Continuing Education (UWF Medical Technology Program, Ft. Walton Beach, Florida), Fall 2005, 2003, 2002, 2001
- Understanding Standards in Accreditation, (NAACLS, New Orleans, Louisiana) March 6, 2003
- Clinical Laboratory Educator's Conference, New Orleans, Louisiana 2003
- American Society for Clinical Pathology Annual Conference, New Orleans, Louisiana June 2002

This is a list of professional development activities within the University

- Argo Advise Program, for Advisor development, in 2006
- Writing Assessable Student Learning Outcomes in 2005
- Biostatistics in 2005
- Training for Desire2Learn e-learning platform in 2004
- Training for Prometheus e-learning platform in 2003
- The Complete Professor series in 2001
- The Teaching Portfolio workshop in 2001

Dr. Behan has an active research program revolving around issues in Clinical Chemistry, and has published several articles in scholarly publications, such as LabMedicine, Clinical Laboratory Sciences and Tech Sample; these are listed in her CV. She has presented her research in several venues, locally and regionally. She has been invited to speak at the Northwest Florida Laboratory Association meeting for 5 years. She has received research grant money from UWF and ASCLS. She has also published on Education related matters, and has received grant money from UWF for a Quality Enhancement project to enhance student active learning in cooperation with Biology faculty. She received a Teaching Incentive Program (TIP) Award in 2005. She has developed a course in Molecular Diagnostics, which was recently added to the CLS curriculum, and proposed a Certificate Program in Molecular Diagnostics.

Ongoing Professional Development

Sherman Bonomelli, Assistant in Clinical laboratory Sciences program is a full-time, non-tenure earning faculty member of the unit. He is responsible for management and maintenance of the student laboratory complex and laboratory instruction in the campus-based clinical laboratory sciences courses. He is also responsible for the recruitment, marketing and out-reach activities related to the Program. He serves as the assistant instructor in the laboratory in ten university-based courses. Mr. Bonomelli is also in charge of instruction in phlebotomy, lab safety and computer technology.

Professional Development/Scholarship/Creative Activity

- Attended 4 hour Faculty Training on Prometheus presented by ITS Department UWF, 2001.
- Attended 7 hours of Continuing Education in Clinical Laboratory Sciences; presented by UWF CLS Program at UWF Fort Walton Beach Campus, 2001
- Attended 3 hours of Continuing Ed in Clinical Laboratory Sciences sponsored by Northwest Florida Laboratory Association (NWFLA), 2001
- Attended 12 hour Faculty Power Point Training presented by ITS Department UWF, 2002.
- Attended 7 hours of Continuing Ed, in Clinical Laboratory Sciences presented by UWF CLS Program at UWF Fort Walton Beach Campus, 2002
- Attended 3 hours of Continuing Education in Clinical Laboratory Sciences sponsored by Northwest Florida Laboratory Association (NWFLA), 2002
- Presented a CE Program titled "Bioterrorism: Smallpox" for the Northwest Florida Laboratory Association annual Convention, 2003
- Attended 3 hours of Continuing Ed in Clinical Laboratory Sciences sponsored by Northwest Florida Laboratory Association (NWFLA), 2003.
- NAACLS Accreditation Workshop, March 6 2003, New Orleans, LA.
- Attended 8 hour UWF Banner Project Training presented by Purchasing Department UWF, 2003
- Attended 7 hours of Continuing Education in Clinical Laboratory Sciences presented by UWF CLS Program at UWF Fort Walton Beach Campus, 2003.
- Attended 8 hour UWF Banner Project Training presented by Purchasing Department UWF, 2004
- Attended 3 hours of Continuing Education in Clinical Laboratory Sciences sponsored by Northwest Florida Laboratory Association (NWFLA), Pensacola Florida Civic Center, 2004
- Attended 8 hour UWF Banner Project Training presented by Purchasing Department UWF, 2005
- Attended 3 hours of Continuing Education in Clinical Laboratory Sciences sponsored by Northwest Florida Laboratory Association (NWFLA), 2005

- Attended 4 hour work shop on Writing Assessable Student Learning Outcomes, a program provided by the Center for University Teaching and Learning, University of West Florida, 2005

- Attended 7 hours of Continuing Ed, in Clinical Laboratory Sciences presented by UWF CLS Program at UWF Fort Walton Beach Campus, 2005

Ongoing Professional Development
J. Steve Smith M.D, Clinical Site Coordinator, Instructor

Continuing Education Credits

Pediatric Ground Rounds Sacred Heart Hospital
CME Hours for Biennium 2/1/2006-1/31/2008 as of 7/19/2006
Total Hours Completed for AMA Category I: 16
CME Hours for Biennium 2/1/2004-1/31/2006
Total Hours Completed for AMA Category I: 72

Adjunct Faculty

Biology Department
Instructor in Pathophysiology 1999-2006 (fall, spring, and summer semesters)

Guest Lecturer

Northwest Florida Laboratory Association
2006 Encephalitis
2005 Laboratory Evaluation of a "Nagging" Cough
2004 Zoonosis in Children
2003 Advances in Breast and Cervical Cancer

UWF Continuing Education
2005 HIV/AIDS
2004 HIV/AIDS

Published Articles

Tech Sample (Lab Q)
2004 Hemoglobin SC Disease
2003 Rotavirus Disease in Children

Textbook Review

Pathophysiology: Functional Alterations in Human Health
(Braun and Anderson, to be published 2007)

Ongoing Professional Development

Susan Strasinger, Faculty Associate and Adjunct Instructor, is an experienced clinical laboratory sciences educator who has published four textbooks in the field of clinical laboratory science. She is a nationally and internationally recognized author and a leader in the profession through her past service on the ASCP-Board of Registry and current service as co-project editor of the ASCP-LAB Q continuing education publication consisting of 18 exercises per year and a contributor to the College of American Pathologists competency evaluation program and the Bayer Encyclopedia of Urinalysis. She serves as an evaluator of health related programs for the American Council on Education's College Related Courses and Military Evaluation divisions and health related programs for the Distance Education Training Council.

This year she presented the workshop, "Body Fluid Cytology Related to Pathology" at the Nebraska Society of Clinical Laboratory Science State Meeting.

Publications:

Strasinger, S.K, Di Lorenzo, M.S. Urinalysis and Body Fluids, 4th Ed, 2001 (5th edition in progress). Additional publications in Spanish, Portuguese, and Chinese.

Strasinger, S.K., Di Lorenzo, M.S. The Phlebotomy Workbook, 2nd edition, 2003

Di Lorenzo, M.S., Strasinger, S.K. Blood Collection in Health Care, 2002

Strasinger, S.K., Di Lorenzo, M.S. Skills for the Patient Care Technician, 1999

Continuing Education and Professional Development of Clinical Faculty at the Affiliates:

The State of Florida requires that clinical laboratory personnel, to be employed in the state, must be licensed by the Board of Clinical Laboratory Personnel (BCLP), one of the professional regulation boards in Department of Health. Qualified applicants are licensed at one of the 4 levels of licensure: clinical laboratory director, supervisor, technologist, or a technician. The Board of Clinical Laboratory Personnel establishes the rules and regulations which govern all aspects of the licensing procedure. As part of the license renewal process the Board requires each licensee to demonstrate competency by submitting documentation of continuing education. The rule states that **Ain order to renew a clinical laboratory personnel license, a minimum of 24 contact hours of continuing education shall be earned during each biennium including a minimum of one contact hour for each of the categories in which the individual is licensed and one contact hour of continuing education on HIV/AIDS".** Directors and supervisors are required to obtain one contact hour of continuing education in administration and supervision. Applicants for initial licensure shall complete a one hour HIV/AIDS continuing education to include HIV immunology and epidemiology; the virus transmission, control and prevention; care and treatment of persons with HIV/AIDS; legal issues and policy development. In addition, the state also requires 1 hr CE in Florida Laws & Rules governing clinical laboratories & personnel; and 2 hours of CE in "Prevention of Medical Errors".

A licensee who does not complete the continuing education requirement or comply with a random audit request to submit documentation shall be disciplined for failure to complete the continuing education requirement. All clinical laboratory personnel are thus required to maintain documentation (certificates of attendance) during each biennium of the license period.

CE Broker

Recently State of Florida adapted a fully automated continuing education tracking system for compliance of this requirement by all licensed professionals in the state. Approved CE providers are required to input the data of participants' attendance, which is tracked by license numbers of the participants, into the CE Broker. For a subscription fee licensees have real-time online access to personalized continuing education transcripts, promoting proactive management of their continuing education. Now 100% compliance can be determined with a quick review of the online transcripts.

Clinical faculty at the affiliate hospital laboratories are all subject to and in compliance with the continuing education requirements of state of Florida. All of the clinical affiliates are accredited by JCAHO, and the labs are required to be incompliance with JCAHO requirements especially in areas of lab safety and infection control. All of the affiliate laboratories are accredited by CAP and are in compliance with CAP's professional development requirements. In accordance with the frequent changes in technology and instrumentation, the clinical instructors also frequently receive extensive training in the major instruments purchased or new procedures adopted by the laboratory.

DOCUMENT

THE UNIVERSITY OF WEST FLORIDA- PROGRAM IN CLINICAL LABORATORY SCIENCES

Criteria and Standards for Teaching, Creative / Scholarly Activities and Service for Annual Evaluation and Merit Pay Raise

Introduction

The primary function of the Program in Clinical Laboratory Sciences at the University of West Florida is to prepare students for working in diagnostic clinical laboratory medicine and in biomedical research laboratories. Clinical laboratory sciences are applied science, which have their origins in biology, chemistry, and medicine. The practice of the Profession requires a strong foundation in theoretical knowledge and practical skills to accurately perform various laboratory procedures designed for the clinical diagnosis and management of disease. The field of clinical laboratory sciences encompasses the investigative techniques employed in biological, medical and environmental research, which is often collectively referred to as biotechnology. The Clinical Laboratory Sciences Program Faculty strongly believes that our primary mission is to:

- Maintain NAACLS (national) accreditation and State of Florida Approval of the Program
- Provide an excellent curriculum and sustain a high rate of student success in national exams
- Provide the best academic advisement and support services to students
- Maintain enrollment through recruitment and retention efforts
- Maintain partnerships with local / regional health care providers
- Provide continuing education to practicing professionals in the field
- Provide service to the University, the Profession, and the Community

We believe that faculty evaluation should be directly linked to the work assignments, and assessment of quality should be based on the overall indicators of student success and programmatic excellence. A clinical laboratory sciences program housed in a university with no medical school provides very limited opportunities for faculty research in their fields of expertise. In addition, teaching and other work loads for faculty are much higher than what is considered normal for a regular faculty member in a traditional department such as Biology. The Program has only two full time regular faculty members, who are responsible for curriculum in nine (9) university-based, and five (5) hospital-based clinical courses, totaling for 51 semester hours of credit towards graduation. In addition to teaching, advising, recruiting, and coordinating with clinical affiliates, the faculty is required to be engaged in a variety of activities to keep the program in compliance with the NAACLS "Standards for Accredited Programs in Clinical laboratory Sciences".

For the reasons given above, CLS faculty believe that major emphasis in evaluation of program faculty should be placed on the quality of instruction and other essential programmatic activities; and that it is appropriate to define the scholarship and creative activities as those which enhance the quality of the program in preparing the graduates for employment, advancement in career, and/or graduate schools. Faculty should be required to maintain and upgrade their technical knowledge and skills in areas they teach and expectations for creation of new knowledge should be broadly defined to include these activities.

TEACHING

The faculty recognizes that excellence in teaching is the cornerstone of high quality program. While it is not possible to measure teaching effectiveness precisely in quantitative terms, to the extent possible the evaluation of teaching is based on criteria applied campus wide: summaries of student evaluations for the courses taught, comments and formal assessments provided by other faculty members, syllabi, examinations and other class materials which are provided by the faculty member for review.

Student Evaluations

The following calculations are carried out separately for each course taught during the year

1. Each question on the student evaluation form has 5 categories ranging from 1 to 5 in value (poor = 1; excellent = 5). The % of votes **(for example, 85% in the excellent category would be calculated by multiplying 5 x 0.85)** received for each category for each question is multiplied by the score for that category. The sum of these multiplications = the score for that question. The sum of the scores for all 19 questions = the evaluation score.

2. To adjust for the number of students taught, the evaluation score from #1 above is multiplied by the (# of students in the class ÷ 1000). The resulting number is added to the evaluation score in # 1 above. This is called the student number -adjusted evaluation score.

3. To adjust for course level: for a 1000 or 2000 level course take 10% of the evaluation score from # 1 ; for a 3000 0r 4000 level course take 8 % of the evaluation score from # 1 above; for a 5000 or a 6000 level course take 6% of the evaluation score from # 1 above. Take this course level-adjustment score and add to the student number -adjusted evaluation score from # 2 above. The resulting score adjusted for class size and class level will be your evaluation score for this course

The overall teaching evaluation score for the year will be the sum of the scores for all courses taught ÷ the # of courses taught for the year

Preparing a New Course

Lecture Only -	8 Pts
Lab Only -	4 Pts
Lecture and Lab -	12 Pts

Updating an Existing Course

Lecture Only -	1-3 Pts (1 point for "normal" annual updating; 2 points for major updating; 3 points for updating associated with a change in text book for the course)
Lab Only - 1 -	3 Pts (as above)
Lecture and Lab -	2-6 Pts as above)

Students' Performance on National Certification Exams

Program Mean Scaled Score above National Mean in Faculty Member's teaching areas:

1 area	2 points	
2 areas	4 points	
3 areas	6 points	
Student Pass rate:	100% Pass	5 Points
	90 -99 Pass	4 points
	80-90% Pass	3 points
	60-80% Pass	2 Points
	Below 60%	0 points

NAACLS Accreditation Renewal:

Full Accreditation award with no deficiencies and excellent Report: 10 points
Conditional Accreditation with Recommendations & progress report required: 5 points;

Teaching Awards;

Teaching Incentive Program Award (TIP)	5 points
Outstanding Undergraduate Teaching/Advising Award:	5 points
Outstanding Teacher Award (SGA):	5 points

Undergraduate Student Directed Study

5 points for the first 3 directed study undergraduate students
3 points for the 2nd 3 students
1 point for the 3rd 3 students

Academic Advisement

Assessment of effective academic advisement is based on the faculty member's availability for student counseling, the number of students receiving the advisement, assistance in preparing individualized degree plans, keeping up-to-date with students' progress or deficiencies in graduation requirements and the ability to communicate well with the students.

1 point for providing academic advisement on a regular basis for each group of 10 students.

Undergraduate Recruitment /Retention and Related Activities

Presentation of ½ day to 1 day workshop to high school or junior college students- 3 points- **a maximum of 6 points is allowable for this activity in a single year.**

Participating in Freshman Orientation/Open House - 1 Pt for attending or 2 Pts for active participation (speaking to students) - **maximum of 5 points allowable for this activity in a single year.**

Serving as a Sponsor for a Student Organization - 3 Pts for each year during which you serve in this capacity.

Participating in Student Recruitment/Retention Activities on campus - 1 Pt for each event - **a maximum of 5 points allowable for this activity in a single year.**

Participating in Student Recruitment/Retention Activities off campus - 2 pts for each event- **a maximum of 6 points allowable for this activity in a single year.**

Preparation of Course Materials

Preparation of Lecture Notes/Outlines Available to the Students through the Library, book store or on line- 3 points - **credit is given only for the year in which this activity is initially performed,** 1.5 points for major revision of printed materials.

Preparation of lab exercise outlines available to the students through the library, bookstore or on line - 2 points- **credit is only given for the year in which this activity is initially performed ;** 1-5 points for major revision of printed materials.

Preparation of a laboratory manual available to students through the library or on line - 7 points - **credit is given only for the year, in which this activity is initially performed,** 1.5 points for major revision of printed materials.

Other Teaching-Related Duties

Writing of letters of recommendation for students- 0.25 points per letter - **maximum allowable credit of 5 points for a given year**

Qualitative Assessment by the Program Director / Chair: 1 - 40 points

Range for Teaching:

Distinguished:	85 Pts or greater
Excellent:	75 Pts or greater
Good:	65 Pts or greater
Satisfactory:	55 Pts or greater
Unsatisfactory:	< 55 Pts

Research / Scholarly and Creative Activities

Writing of Accreditation Documents

NAACLS Self Study: Complete authorship -25 points
Contributions: 1 point for each segment (each Standard)

State of Florida Board of Regents Program Review - Self Study:
Complete authorship: 15 points
Segment contributions: percentage distribution according to the portion assigned / completed

Maintaining Professional License and / or participation in CE Programs:

0.5 points for each hour of participation; **maximum allowable per year -6 points**

Presentation of CE programs:

3 points for each 1 hour presentation

Development of a Formal Course, advanced level:

10 points allowable for the year in which the course is developed

Development of Distance learning programs:

A full course: 15 points
Program with 1-3 hours of CE credit: 5 points; allowable for the year in which the course is developed

Development of new and innovative curricula for the professional portion of the Degree Program; **such as articulation with AS MLT Programs or other health care programs:**

Proposal- 4 points
Development - 8 points
Implementation - 8 points

Development of recruitment strategies and materials resulting in enrollment increase and program enhancement:

5-20 points, based on the quality and effectiveness of the project

Publications

Peer-reviewed journal articles-

5 Pts for a research note and 10 Pts for each full article published, in press or accepted for publication in any journal in the field

Books

20 Pts for a completed book (published, or in press)

Chapters

10 pts for each chapter published, in press or accepted for publication

Book reviews

2 points for each published book review, including those solicited by a publisher

Non- peer reviewed reports

3 points for each non- peer reviewed report. For reports greater in length than 50 pages add 3 points for every 25 pages

ASCP Tech Sample

10 points for each article/case study published

Manuscript Reviews

1 pt for each manuscript reviewed for a local, regional or state journal
2 Pts for each manuscript reviewed for a national journal.
3 Pts for each manuscript reviewed for an international journal

Editorships

10 Pts for each professional journal editorship or
5 Pts for each newsletter editorship per year during your tenure as editor (credit is not given for manuscripts reviewed as part of your responsibilities as editor)

Grant Reviews

1 Pts for review of each grant at local, regional or state level.
2 Pts for review of each grant at federal or national level
5 Pts for service on a grant review panel at the local, regional or state level (0 Pts for review of grants as a member of that panel)
10 Pts for service on a grant review panel at the national or international level (0 Pts for review of grants as a member of that panel)

Grants & Contracts

2 Pts for in-house grant application; 5 Pts for funded in-house grant application.
3 Pts for state or regional private foundation or state grant application;
7.5 Pts for a funded grant or contract and 5 points for each year grant or contract is in force
5 Pts for each federal grant application or national private foundation; 15 Pts for a funded grant or contract, and 7.5 points for each year grant or contract is in force

If funded, for grants totaling > $100,000 add 5 Pts for the award year and 5 additional points for each year grant is in force; for grants totaling >$500,000 add 10 Pts for the award year and 10 pts for each year grant is in force; for grants totaling > $1,000,000 add 15 Pts for the award year and 15 Pts for each year grant is in force.

Presentations and Posters

2 Pts for each talk or poster at local, state or regional meetings in which you are listed as an author.
3 Pts for each talk or poster at national meeting in which you are listed as an author
4 Pts for each talk or poster at international meetings in which you are listed as an author.

Invited Seminars and Invited Participation in Workshops

3 Pts for a talk or other form of participation at a local, state or regional event.
4 Pts for a talk or other form of participation at a national event.
5 Pts for a talk or other form of participation at an international event.

Serving as a Scientific Consultant or Collaborator

Serving as an expert member on a Board of Directors, Governing Board, Task Force, Oversight Committee, or other type of committee that deals primarily with scientific issues - 2 Pts for membership; 2.5 Pts for chairmanship. ????? more points
Serving as a paid or unpaid consultant on scientific matters to a local, regional, state agency, business or organization - 3 Pts
Serving as a paid consultant on scientific matters to a national or international agency, business or organization-4 Pts
Collaborating in scientific matters on a project with a local, regional, or state agency, business, organization or institution - 1-4 Pts
Collaborating in scientific matters on a project with a national or international agency, business or organization - 1-6 Pts

Holding Office in Professional Societies

1 Pt for serving on a committee for a local, regional or state professional organization (2 Pts if chairing committee) for each year during which you remain on the committee.
2 Pts for serving on a committee for a national professional organization (3 Pts if chairing committee) for each year during which you remain on the committee.
3 Pts for serving on a committee for an international professional organization (4 Pts if chairing committee) for each year during which you remain on the committee.
3 Pts if serving as an elected or designated officer of a local, regional or state professional organization for each year of your tenure as officer.
4 Pts if serving as an elected or designated officer of a national professional organization for each year during your tenure as officer.
5 Pts if serving as an elected or designated officer of an international professional organization for each year during your tenure as officer.

Professional Awards

3 Pts if receiving an award from a local, state or regional professional organization.
4 Pts if receiving an award from a national professional organization.
5 Pts if receiving an award from an international professional organization.

Chairing Sessions at Meetings or Workshops

2 Pts for local, state or regional meeting or workshop.
3 Pts for national meeting or workshop.
4 Pts for international meeting or workshop

Student Training

2 Pts for each graduate student thesis committee served on; 1 point for each non thesis committee served on.

Qualitative Assessment by Program Director: 1-20 points

Range for Research/ Creative and Scholarly Activities:

Distinguished:	50 Pts or greater
Excellent:	40 Pts or greater
Good:	30 Pts or greater
Satisfactory:	20 Pts or greater
Unsatisfactory:	< 20 Pts

Specific permission of the Dean is required for a teaching load reduction based on research activity. Teaching load reductions for the current year will be based on the previous year's performance level. Newly hired tenure-track faculty will be extended a two year grace period for achieving this level of performance but must show clearly demonstrated progress toward reaching this level of performance during year 01 and must have achieved this level of performance during year 02 of the two year grace period.
Any faculty member choosing not to do research will be given a larger teaching load than the "minimum" of 3 courses and will have their performance judged on the basis of the criteria listed for Teaching and for Service

SERVICE

Service on Departmental Committees

5 Pts for each regular departmental committee (6 Pts for chairing such a committee);
7 Pts for each search committee (9 Pts for chairing such a committee).

Service on CAS committees

4 Pts for each committee on which you serve (5 Pts for chairing such a committee);
6 Pts for a CAS search committee (7 Pts for chairing such a committee)
5 points for serving on CAS Council (7 points for serving on CAS Council Executive Committee.

Service on University committees

5 Pts for each committee on which you serve (6 Pts for chairing such a committee);
7 Pts for service on a University search committee (8 Pts for chairing such a committee).

Service on Faculty Senate

7.5 Pts (10 Pts for serving as President of Faculty Senate)

Community Service

Membership on an off-campus committee that serves community interests- 3 Pts for membership; 4 Pts for chairing the committee

Engaging in documentable activities associated with a group related to church, school, scout, political, conservation, preservation, artistic, health, education or other areas of community interest - 1 to 10 Pts depending on documented level of involvement.

Qualitative Assessment by the Program Director: 1-15 points

Range for Service:

Distinguished:	30 Pts or greater
Excellent:	25 Pts or greater
Good:	20 Pts or greater
Satisfactory:	10 Pts or greater
Unsatisfactory:	< 10 Pts

** Note** because there may be some overlap between activities related to teaching, service and research, you may receive credit for such an activity only once in one of these three categories

Overall Score for Faculty Performance:

- The scores for research and service will be normalized before calculation of the overall score by multiplying the score for research by 2.2, and the score for service by 3.2.
- For faculty teaching 4 or more courses and choosing not to do research, the teaching score will be multiplied by 0.90 and the normalized service score will be multiplied by 0.10 *.
- For a faculty member teaching 3 courses, the teaching score will be multiplied by 0.65, the normalized research score by 0.25, and the normalized service score by 0.10.
- For a faculty member teaching 2 courses, the teaching score will be multiplied by 0.50, the normalized research score by 0.40 and the normalized service score by 0.10.
- The sum of the normalized and percent-effort adjusted scores for the three areas of activity (service and teaching only for faculty choosing not to be judged on research) will be the overall score and will be judged against the following standard:

Distinguished:	85
Excellent:	75
Good:	65
Satisfactory:	55
Unsatisfactory:	<55

*Note: The option of not engaging in research is unavailable to untenured, tenure-track faculty.

The Program Director and the faculty member will review and discuss the submitted material and the results of the evaluation form. The Program Director will write a letter of evaluation with a rating of distinguished, excellent, good, satisfactory, or unsatisfactory in each area being evaluated based on the results from the evaluation form and any added points for qualitative assessment, for which an explanation will be included. An overall evaluation is also provided based on the results from the evaluation form and the Program Director's qualitative assessment. The letter of evaluation, signed by the faculty member, is forwarded to the Chairperson of Biology for further evaluation. All quantitative data remain in the department.

Merit Pay Criteria Statement

Merit increases for Clinical Laboratory Sciences Program Faculty are recommended on the basis of annual evaluation of faculty members' performance in teaching, advisement, administration, scholarship, and service. Based on the Program Director's input, the Chairperson of the Biology makes such recommendation to the Dean of the College, who in turn makes recommendation to the Vice President. The faculty organization of Clinical Laboratory Sciences Program recommends that faculty members who receive a rating of "Good" or better on their annual evaluation be eligible for merit pay.

Adopted By the Medical Technology Program: 1/29/2002
Reviewed, revised and approved by the Program Faculty: 5/19/2006

PROGRAM IN CLINICAL LABORATORY SCIENCES
MINIMUM EXPECTATIONS FOR PROMOTION AND TENURE

The Clinical Laboratory Sciences Program supports the University's assertion that a candidate for tenure and promotion must demonstrate excellence in teaching, tangible evidence of scholarly productivity, and service to the University, the Profession and the Community. However the Program declares the privilege to define where a specific activity resides. The Program in Clinical Laboratory Sciences declares that the candidate for promotion and tenure within the Department must demonstrate expertise in areas under the aegis of the clinical laboratory sciences.

A. TEACHING

The faculty member must demonstrate competence in teaching while contributing to the instructional needs of the Program. The faculty member will develop and instruct lecture and laboratory courses in his /her areas of expertise, and assist at all levels of instruction in collegial atmosphere.

Tenure requires that the faculty member demonstrates a continuous record of excellence in teaching. A continuous excellent - distinguished record in teaching is required for promotion to associate professor. Distinguished teaching and a positive reputation within the University is required for promotion to professor.

B. RESEARCH AND CREATIVE ACTIVITIES

Candidates for tenure and promotion must carry out the following activities:

- Contribute to the discovery, application, integration and teaching of knowledge
- Publish in professional journals, books or monographs
- Secure intramural and extramural support to enhance teaching facilities , research projects and student recruitment
- Contribute to The University's goals on issues of regional, statewide, national, and international concerns

In addition to teaching, the Clinical Laboratory Sciences Program Faculty are heavily involved in activities related to the maintenance of national accreditation, state license, partnerships with clinical sites for student internships and the successful student outcomes in certification examinations. These accountability measures and responsibilities limit the time available to engage in original research and will be subsumed into the category of scholarly activity. These are listed in the "criteria and standards for annual evaluation".

Accordingly, the candidate for tenure:

- Must be an active member of the national professional organization/s in one's area of expertise and teaching; and be recognized within the discipline as an expert.

- This includes a minimum of 3 publications in the professional journals such as : Laboratory Medicine, Medical Laboratory Observer, Advance for Medical Laboratory Professionals, Clinical Laboratory Science (journal of the American Society for Clinical Laboratory Sciences); to name a few examples, published while the faculty member is employed at UWF
- When applicable, the candidate will make significant contributions to NAACLS accreditation renewal process of the Program, including authorship of a self study and preparing the Program for a site-visit by NAACLS reviewers.
- At least one proposal must be submitted for support from external funding agencies.
- Collaboration with other faculty within or outside the University, with tangible evidence of productivity in scholarship and creative activities will be taken into consideration for tenure award.
- Collaboration with biotechnology companies to test out new products, procedures or instruments, resulting in a publication or a data analysis report will be counted towards tenure.

The candidate for promotion to associate professor

- Must establish significant and tangible scholarship in one's area of expertise.
- The candidate's scholarly activity must be recognized by peers external to the University.
- At least one externally funded grant must be received
- The candidate must list at least five publications appearing in professional journals, published while employed at the University of West Florida

The candidate for promotion to the rank of a professor

- must make substantial and tangible contributions in scholarship and leadership in the area/s of expertise, as recognized by peers external to the University
- must list at least ten publications appearing in professional journals while employed at the University of West Florida

A candidate may be considered for tenure or promotion without having met all the criteria shown above. For example, the Medical Technology Program recognizes that "significant and /or substantial contributions" in one's area of expertise can be made in ways not specified above; and also that significant contributions in the area of expertise can result from one achievement derived from many years of study/effort.

C. SERVICE

- The candidate for tenure must show tangible evidence of service to the University, the Profession and the Community.
- Leadership in service to the department, college, and the University must be shown by the candidate for promotion to associate professor.
- The candidate for professor must demonstrate the ability to shoulder major responsibilities in service within and/or beyond the University

Adopted: 1/29/2002
Reviewed, revised and approved by the Program Faculty: 5/19/2006

PROGRAM IN CLINICAL LABORATORY SCIENCES
STATEMENT OF RESEARCH, SCHOLARSHIP and CREATIVE ACTIVITY

The Program supports and promotes the primary mission of the University of West Florida, which states that "all that we do or propose to do must serve the transmission, creation, application, and preservation of knowledge. To that end, our mission is to enhance and promote the educational, cultural, economic, and natural environments of the people and region we serve through quality teaching, research, scholarship, creative accomplishment, and service"

Within the scope of this University's mission statement and within its scope as a primarily undergraduate teaching program in applied fields of biology, chemistry and medicine; the Medical Technology Program defines the faculty activities in the area of scholarship and creative activities as follows:

- Development of innovative methods to introduce knowledge in the classroom
- Development of innovative technical curricula for clinical rotations
- Development of innovative articulation programs to provide education/career enhancement opportunities for clinical laboratory technicians (AS level)
- Successful preparation of accreditation documents, a process akin to peer recognition through grantsmanship
- Continuing education as demonstrated by attendance at professional workshops, clinical experiences and professional meetings
- Preparation and presentation of continuing education programs in formal settings such as workshops, seminars, teleconferences, and review courses
- Development and teaching of formal courses designed for the post graduate (practicing professional)
- Communication of new ideas, theories, and practical procedures in the field through written reports, essays, or newsletters
- Writing proposals, procuring grants, conducting original and/or applied research in one's area of expertise
- Publication of articles in peer reviewed journals and /or contributing to or writing textbooks and other instructional material
- Development of recruitment strategies and materials resulting in enrollment increase and program enhancement

Adopted 1/29/2002
Reviewed, revised and approved by the Program Faculty: 5/19/2006

15 pages of documents
Showing the front pages of tech sample
And other faculty publications

Standard 7: Description of Financial Resources

The financial resources are adequate to assure the continued operation of the program. July1 is the beginning of the fiscal year in Sate of Florida. Each year, during the spring semester, the Program Director submits a budget request for the next fiscal year. Budget allocations are made by the Dean of the College of Arts & Sciences, as soon as the College budget allocations are made by the Provost of the University, usually in July-September. Since the previous accreditation cycle the annual budget allocations made to the various accounts of the Clinical Laboratory Sciences Program are as follows:

Budget Allocation to the Program from College Funds:

Expense Account:	$ 11,000.00
Accreditation Account:	$ 2,050.00
Student Liability Insurance:	$ 336.00
Adjunct Account:	$ 4,306.00

Material and Supply Fees collected as part of the tuition fees from enrolled students ……. $ 4000.00 (approximately)

Total Operating Budget …… $ 21,692.00 (slightly variable year to year)
(Excluding faculty salaries/benefits)

In addition, depending upon the program's needs and the budget status of the College/University periodic, one-time allocations are made for instructional technology enhancement and for purchases of laboratory instruments/equipment /supplies.

Recently the Dean approved our request for $35,000.00 to purchase laboratory equipment and instructional materials such as Parasitology slides during the next 3 years (2006-2009). During the past 5 years Clinical Laboratory Sciences Program received an average of $5000.00 /year for maintenance and/or enhancement of quality of instruction in CLS courses.

New Major Equipment Purchases over last 5 years:

Year	Item	Cost
2001	Spot Insight Color camera	$ 385.00
2001	Sony H/R Color Camera & Power Supply	$ 955.20
2003	Point 180 Spectrophotometer (8 units)	$ 19,450.00
2004	Kodak DC290 Gel analyzer Unit	$ 2,724.25
2004	FBTIV88A Transilluminator	$ 888.62
2004	PCR Sprint thermal Cycler	$ 2,000.00
2004	C Plan 40x 0.65 Phase Objective	$ 1,875.00
2004	Mini Centrifuge	$ 195.68
2004	Westcor Macroduct Sweat Analyzer	$ 1,250.00
2004	Oxford Pipettes	$ 4625.00
2005	Class Room Computer upgrade	$ 17,000.00
2006	Ac-T 10 Hematology Analyzer	$ 9,000.00
2001-2006	**Total Value**	**$ 60,348.75**

During 2005-2006 twenty new computers were given to the CLS-Classroom / Laboratory Complex to replace the aging computers purchased in 1998-1999. Also this year new space was allocated to the Program to facilitate faculty research, in the form of a laboratory in Bldg 58, with approximately 600 sq ft.

In 2000-2001, the Program's request to fill the vacancy created by the departure of a tenure-track faculty member (responsible for teaching clinical chemistry, diagnostic microbiology and urinalysis/ body fluids) was promptly approved; and the position was filled following a national search. In August 2001 Dr. Kristina Behan joined the Program as a tenure-track assistant professor.

In January 2006 the staff member in charge of the Program's office functions retired. Request to fill the vacancy was promptly approved by the administration and in February 2006, Ms. Victoria Dubose joined the Program as the "Office Administrator".

In summary, the Clinical Laboratory Sciences Program has a strong support from UWF administration and the Program has adequate financial resources for continued operation. Enhancement monies given since the previous accreditation were well spent to maintain /improve the quality of instruction and of other services of the Program.

The next few pages show the following documents:

- A certified copy of the financial analysis of the Program's expenditures in the past five years.

  and

- A statement for continued financial support of the Program from the Dean of College of Arts & Sciences.

Controller’s statement

Controller's Statement

Clinical Laboratory Sciences Program
2006-2007 Expense Budget Allocations
(Excluding Salaries)

ITEM	AMOUNT
Expense Account	$ 15,000.00
Material & Supply (Lab) Fees	$ 4,000.00
Accreditation Annual Fee	$ 1,880.00
Student Liability Insurance	$ 250.00
Adjunct for Medical Microbiology	$ 4,306.00
Lab Equipment (Technology Needs)	$ 10,000.00

ADD HERE

Letter of Support from the DEAN (Administration)

Standard 8: Physical Resources

8A: Academic and Clinical Facilities

Classroom/Laboratories/Administrative Offices

The Clinical Laboratory Sciences Program is located in Building 58 along with the Biology and Chemistry departments. The space allocated to the program has a total area of approximately 3200 square feet, located on the first floor of the building. The CLS classroom / laboratory complex is right across the hallway from Program office and faculty offices. The Classroom /Laboratory Complex are equipped with lab safety equipment in compliance with the latest OSHA standards. The Classroom/Laboratory Complex is dedicated to the Program so that the students and faculty have unlimited access to the facilities, for instruction and practice by students beyond the regularly scheduled hours. Its proximity to the faculty / program offices makes it very effective and convenient for communication among the staff, faculty and students.

A breakdown of the space utilization is as follows:

Used As	Net Area Square Feet	Room
Program Office	200	079
Program Director's Office	193	081
Faculty Office I	100	077
Faculty Office II	113	076A
Faculty Office III	122	076B
Laboratory/Class Room	1,021	078
Laboratory/Prep room	598	072
Computer Lab/ Library	229	080
Research Laboratory	600	010

The Program Office is located in the front section of Room 79 which also houses the Department of Biology office. The staff of these two programs works closely together to cover day to day office functions and assist students. The main laboratory (Room 78) has 20 work stations for laboratory instruction and is also used as a classroom for lectures. The room is furnished with low tables, suitable for microscopy, immunohematology, and other sit down activities. There are two sinks with hot and cold water, and high counters are mounted along the walls for instrumentation. The room is equipped with a large blackboard, a projection screen, a multimedia lectern housing a computer, a projection system linked to the computer, a slide film video converter, ELMO document camera, a Pioneer laser disc player, and a video tape player. A Nikon Optiphot microscope equipped with a Sony Projection System video camera is also connected to the projection system. A Nikon Optiphot microscope equipped with a teaching head for dual viewing, two microscope storage cabinets with a total of 24 Leica binocular student microscopes and a phlebotomy chair are also available in this room.

One of the adjoining rooms in the laboratory complex (room 72) serves as a student laboratory as well as a prep room and storage area. It has 12 work stations with high counters for standup work in Clinical Chemistry, Coagulation, Microbiology and Molecular Diagnostics. There are two 55 cu.ft.

industrial size, and two 21 cu.ft. domestic size refrigerators connected to an emergency power supply. The room also contains two counter top 37E C microbiology incubators, one being a CO_2 incubator, and two bench top centrifuges. The room is also equipped with a sink with cold, hot and distilled water, and a Milli-Q water purification system for deionized water. Other salient equipment in this room includes a biological safety hood, a chemical hood, an eye wash station with shower, and a flammable materials cabinet.

The second adjoining room (Rm 80) to the main lab (Rm 78) serves as an overflow laboratory when we have larger classes. This room has 5 work stations, each with a computer / internet connectivity. In laboratory sessions the main lab will adequately accommodate up to 15 students and when we have more than 15 students this lab is used for routine class work. The computers in the classrooms have several programs installed for practical laboratory applications, tutorials, review materials and case studies. There is also a teaching table with an epi-fluorescent/light microscope that is used in serology, microbiology, urinalysis and hematology instruction. This room also serves as a reading room/library. Major journals and periodicals in clinical laboratory medicine received by CLS faculty are placed on racks and shelves in this room. The room has a combination lock providing security and access during evenings and weekends only to students in the clinical year of the program.

Safety Features

Each laboratory (Rms 78 and 72) is equipped with an eye wash and emergency decontamination shower station. Instructions for proper use are posted on the wall immediately adjacent to the shower and eye wash. Personal protective equipment (gloves, goggles, and lab coats), containers for disposal of sharp objects, and containers for disposal of biohazard materials are provided and maintained by the department. There is a 10 lb. carbon dioxide fire extinguisher mounted on the wall near the entrance to the lab. Students are thoroughly indoctrinated in the safe handling of body fluids and chemicals, proper procedures for use of the shower and eye wash stations, and proper use of the fire extinguisher at the first laboratory session of each course.

Material Safety Data Sheets (MSDS) for each of the chemicals used within the department are kept on file in the scientific stores stockroom.

Disposal of biological and chemical waste generated through laboratory experiments is contracted to a private company by the University.

Shared Facilities and Resources in Building 58

Stockroom for Scientific Lab Supplies

Building 58 has a common scientific supplies stock room which purchases, receives, stores and dispenses laboratory materials and supplies for student and research labs in building 58.

It is staffed by a laboratory manager and student assistants. The stock-room manager provides excellent support services to the faculty and graduate teaching assistants in conducting instruction and research in scientific labs. She maintains an inventory of consumable supplies for use in student labs; receives and distributes newly purchased equipment and supplies to the originators of those purchases, ensures compliance with OSHA standards pertaining to the scientific stockroom

functions and overall serves as a resource person for procurement of reagents, equipment and supplies. The storeroom serves the needs of all science programs in Building 58, and is funded off the top of the departmental budgets by the Dean from the college funds. Most consumable laboratory supplies needed for the CLS Program's student laboratories, including gloves, biohazard material disposal bags, sharp objects disposal containers and lab coats are obtained from this stockroom. Laboratory supplies and reagent kits which are specific to the CLS courses are bought from the program's expense account.

Utility Room - A community utility room with two steam autoclaves, automatic dish washer, clothes washer and dryer, and a deep sink, is shared by all laboratories.

Other shared facilities in the building include a large computer lab, walk-in controlled environmental chambers, a walk- in refrigerator, a photographic dark room, animal rooms, electron microscope, 2 floor-based copying machines and a wood/metal workshop with a full-time instrument maker/designer.

Clinical Affiliates

All of our clinical affiliates have excellent physical plant facilities to adequately accommodate student's training in each clinical rotation. The information of each clinical affiliate is provided in an Appendix to this self-study.

Building 58 - First Floor MAP

Standard 8B:
Capital (Major) Equipment and Supplies Utilized in Student Instruction

1. The University

A list of the clinical laboratory instruments purchased specifically for the program is included in the following pages. The quality and variety of this instrumentation is planned in such a way that it will 1) complement, but not duplicate, the instrumentation already available for student use, 2) provide a complete spectrum of most routinely performed procedures that can be simulated in laboratory exercises in a campus course setting, and 3) prepare the Medical Technology student to begin the hospital rotations with a foundation of sound knowledge and basic skills of clinical laboratory procedures upon which to build through advanced techniques and instrumentation.

Course /Subject area	Equipment	Number
Clinical Chemistry	Dade Behring Dimension ARX Chem Analyzer	1
	AVL 9180 Electrolyte Analyzer	1
	Triage Meter Plus (Biosite) Chemistry Analyzer	1
	Pointe 180 Spectrophotometer/Analyzer	8
	Wescor Macroduct Sweat Analyzer	1
	Beckman Electrophoresis Unit	6
	Beckman Appraise Densitometer	1
	Osmette S Automatic Osmometer	1
	SpectroMaster Spectrometer	5
	Toxi-Lab Drug Detection System	1
	Corning 3601 pH Meter	1
	Beckman DU 6408 Spectrophotometer	1
	Balance, Metler AE 100	3
	Balance, Metler Toledo	2
Hematology	Beckman/Coulter Ac*T 10 with Printer	1
	HemaTek - 1000 Automatic Slide Stainer	1
	Autocrit Microhematocrit Centrifuge	1
	IEC MB Microhematocrit Centrifuge	1
	StatSpin Cytofuge2 Centrifuge	1
	ISO-DATA 3E-1 Hematology centrifuge	1
	Mini Prep Slide Makers	2
	Tek Talley III Electronic Diff counters	6
	Nutators (Blood Mixers)	10
	Westergren Sedimentation Blood Rack	1 (10 Pk)
	5 Unit Differential Counters	14
	8 Unit Differential Counters	4
	Clay Adams Yankee Pipette Shakers	5
	Microhematocrit Tube Reader	2

Course /Subject Area	Equipment	Number
Hemostasis and Thrombosis	Fibrometers /heating blocks/Timer	2
	MLA 750 Coagulation Analyzer	1
	MLA 700 Coagulation Analyzer	1
Immunohematology	Sorvall Cell Washer 2	1
	Clay Adam Serofuge II centrifuge	12
	Serofuge 2002 Centrifuge	1
	Rh Typing Viewer	1
	Thermolyne Blood Bank- Dry Bath Incubators	12
	Bloodbank - Agglutination Viewers	22
Diagnostic Microbiology	Bench Top 37^0 C Precision Incubators	2
	CO_2 Bacteriological Incubator	1
	Laminar Flow Biological Safety- Cabinet /Hood	1
	Bacti-Cinerator Sterilizers	11
	Anaerobic Gas Pak Jars	4
	Colony Viewing Mirrors	4
Serology	Orbital Rotator	6
	ELISA Reader	1
Urinalysis / Body Fluids	Clinitek 100	1
	Clinitek 10	1
	Hand held Refractometer	3
	Cytofuge Centrifuge	1
Molecular Biology	Western Blot & Other Electrophoresis Techniques	
	Power Supply	1
	Horizontal Gel Apparatus	1
	Spot Insight Color Digital Camera	1
	Kodak DC290 1C Gel Imaging System	1
	DC290 Digital Camera SIS Class B	1
	Transilluminator	1
	PCR Sprint Thermal Cycler	1
	Stat Spin Centrifuge	1
General Lab Equipment	Eppendorf Microcentrifuge 5415 C	1
	Dynac II Angle Head Centrifuge	1
	Scientific Products MegaFuge 1.0	1
	Bench Top High Speed Centrifuge	1

General Lab Equipment	Iso-Data 3E Bench	
	Top High Speed Centrifuge	1
	Vortex Geni II Mixers	7
	Milli-Q Academic Millipore Water System	1
	Equatherm Water Baths	6
	IsoTemp Water Baths	5
	Fisher Isotemp Refrigerator	2
	20 Cu Ft Refrigerator/freezer	2
	Vortex Mixer	7
	SP Multi-Timer	2
	Timers, Hand held	22
	MLA Pipettes 10 µL, 20 µL ,50 µL, 100 µL, 200 µL, 500 µL, 10000 µL ……	12 each
	Oxford Pipettes 0.5-10 µL	10
	10-100 µL	5
	20-200 µL	5
	100-200 µL	10
Phlebotomy	Phlebotomy Manikin Arm	1
	Phlebotomy Chair	1
	Phlebotomy Supply Cabinet	1
Instructional Technology Equipment	Video Camera Equipped Microscope	
	Video Slide Converter	1
	Laser Disc Player	1
	Ceiling mounted Computer /Video Projection System	1
	Document Camera	1
	Nikon Optiphot Microscope equipped with a Sony EXWAVEHAD Digital Color Videocamera	1
	Panasonic Color Monitor	1
	Panasonic Video Recorder	1
	Panasonic Color Camera	1
	Nikon Optiphot Microscope with Transformer	1
	Nikon Optiphot Microscope with Dual Teaching Head	1
	Epi-fluorescence Microscope	1
	Leica Student Microscope	19
	Leica Student Microscope with Phase Contrast Objective	5
	Nikon SMZ 1 Dissecting Microscope	3
	Gateway Computers	20
	HP 2100 Printer	1

Requests for the following items are approved by the Dean and the items are

placed on purchase order, soon to be received in October 2006

Clinical Laboratory Sciences Program
Request for Funds to Purchase Technology Needs
July 21, 2006

Priority Items

	ITEM	COST	JUSTIFICATION
1.	Microplate Reader for ELISA Tests	$ 3,720.00	Instruction in MLS 4630 Clinical Chem II & MLS 4505 Serology
2.	Stained Microscopic Slides, Ova and Parasites 10 sets – 60 slides each	$ 4,064.00	Instruction in MLS 4462 Medical Microbiology
3.	Eppendorf Model 5418 Microcentrifuge	$ 1,400.00	Instruction in MLS 4192 Molecular Diagnostics
4.	Electrophoresis Power Supply	$ 555.00	for instruction in MLS 4191 Molecular Diagnostics Lab
5.	Venipuncture-Proneedle Protection Devices	$ 312.00	for Phlebotomy and Lab Safety
6.	Bayer Clinitek 50 Urine Analyzer	$ 830.00	Instruction in Course MLS 4320 UA/BF I
7.	New Phlebotomy Arm With Stand and Fluid Supply Bag	$ 565.00	Training in Phlebotomy
	Total Request- Estimated Cost	$ 11,446.00	

Major Equipment in each area at the Clinical Affiliates is submitted in the Appendix

Standard 8C: Accessibility of Information Resources to Students

Students in the CLS Program have access to information resources through the following channels:

1. University of West Florida Library resources
2. Required text books for MLS courses
3. Resource material available in faculty offices
4. WEB based resources

8C-1. University of West Florida Library Resources

General Information:
The University of West Florida Libraries includes three physical facilities: the John C. Pace Library (the Main library) and the Curriculum Materials Library on the Pensacola campus and a branch library at the Emerald Coast Campus in Fort Walton Beach. Hours of access for the various facilities vary from 88.5 hours per week at the main library to 69 hours per week at the Emerald Coast Library.

Total library staff number 16 professional librarians and 30 support staff. Each academic discipline is assigned a Reference Librarian to serve as a discipline specialist, providing library instruction and specific reference assistance for the students and faculty in that area. The Reference liaison for the CLS program is Caroline Thompson who has responsibility for the natural and physical sciences.

Students access the library collections of the University of West Florida through the library's website (http://library.uwf.edu/). Computers are located in all library facilities, and users with Internet connections may access the system from whatever computer is convenient to them. The online catalog provides access to electronic indexing and abstracting databases, including many which provide full-text journal articles and/or reference data. In addition, the library has access to full-text journals available from multiple providers including ScienceDirect (Elsevier), SpringerLink (Springer/Kluwer), Wiley Interscience Press, and Cambridge University Press. Over 40,000 full-text electronic books are available as well. Using their Nautilus or Argonet identification numbers, students and faculty may access all electronic resources at anytime from anyplace.

Funding:

Funding for the UWF Libraries has remained steady during the past five years. During this time, the library has shifted a significant number of its journal and reference indexing and database subscriptions from print to electronic formats, enhancing access by students regardless of the campus on which they take most of their classes. As a member of the State University System of Florida library consortium, UWF students and faculty enjoy access to a plethora of electronic resources which UWF, on its own, would otherwise be unable to afford.

Table 1: Library Materials Expenditures: 2001/02 to 2005/06

	2001-02	2002/03	2003/04	2004/05	2005/06
Books	$429,765	$352,807	$277,547	$432,280	$372,223
Serials	759,486	729,133	727,025	700,515	$801,736
Processing	140,750	118,060	114,090	107,205	$126,041
Total	$1,330,001	$1,200,000	$1,118,762	$1,240,000	$1,300,000

Using a formula developed by the University Library Committee, allocations for library expenditures are assigned to each college. The formula considers number of faculty, number of majors, number of degree programs, credit hours generated, and cost of materials for that discipline. The college deans then allocate available funds to their respective departments. Each department is held accountable, against these funds, for the cost of print or electronic single-title serial subscriptions specifically related to that department. If a title is included in an electronic package such as ScienceDirect (Elsevier), the cost is assigned to the Electronic Resources component of the budget. Book and media purchases may also be made from the departmental allocation.

Table 2: Library Materials Expenditures, Clinical Lab Sciences: 2001/02 to 2005/06

	2001-2002	2002-03	2003-04	2004-05	2005-06
BOOKS					
Clinical Lab Sciences direct	$451	$310	$411	$447	$1,499
Library Interdisciplinary (Est.)	$2,500	$2,500	$4,000	$5,500	$5,000
Reference (Est.)	$1,500	$1,500	$1,000	$1,500	$1,000
Total Books	$4,451	$4,310	$5,411	$7,447	$7,499
SERIALS					
Clinical Lab Sciences direct	$2,419	$2,692	$2,887	$2,932	$2,696
Library Interdisciplinary (Est.)	$800	$800	$800	$500	$500
Reference (Est.)	$3,000	$3,000	$2,500	$3,000	$2,500
Total Serials	$6,219	$6,492	$6,187	$6,432	$5,696
ELECTRONIC					
MTS Lab Training Library	N/A	$495	$595	$695	$795
Other electronic resources	$3,000	$4,500	$4,000	$7,000	$8,000
Total Electronics	$3,000	$4,995	$4,595	$7,695	$8,795
TOTAL	**$13,670**	**$15,797**	**$16,193**	**$21,574**	**$21,990**
% of Total Materials Budget	1.1%	1.3%	1.4%	1.7%	1.7%

Collections:

In general, UWF library collections are quite good for an institution the size and age of UWF with the selections available being particularly well-suited to the current curriculum. In the past five years, the library has been making the transition from print format to electronic format for those collections which are appropriate. Library holdings as of June 30, 2006:

710,560 volumes (includes both book and bound journal volumes)
41,640 electronic book titles
5,122 current serial subscriptions (see format types below)
1,849 current print serial subscriptions (single format)
1,914 current electronic serial subscriptions (single format)
1,290 current print and electronic serial subscriptions (both formats)

Attached is a sheet outlining the numbers and age of the book collection which supports the curriculum of Clinical Laboratory Sciences. Total holdings in the appropriate Library of Congress classifications (QP, QR, RA, RB) indicate that UWF holds approximately 7,737 titles with 5% of the collection having imprints within the most recent 10 years. Faculty have primary responsibility for ordering those materials needed to support their courses. In addition, the Acquisitions Librarian and the Reference Librarian serving as a liaison with the department order materials that they feel are relevant and appropriate for the collection.

Also attached are two lists of journals. One list provides a snapshot of major titles available through electronic journal packages or aggregators and the other list those titles to which the library has either print or electronic subscriptions. Prices are shown for the print subscriptions, but not for those which come as part of a package such as ScienceDirect (Elsevier) or Wiley Interscience. In addition to Elsevier and Wiley packages, the library also has access to full-text electronic journal packages from Oxford University Press, Blackwell, and Springer. All journal package costs are included in the table above as part of the "Other Electronic Resources" costs.

Students may access the journal literature through one of several indexing and abstracting resources. These include *CINAHL (Cumulative Index to Nursing and Allied Health Literature), Cambridge Scientific Abstracts, MedLine, ProQuest Nursing Journals, Wilson Science Complete* and *Health Reference Center Academic.* If the index does not provide full-text journal access, a utility (SFX) aids the researcher in determining whether full-text access might be available. This greatly enhances access for the researcher working from home or office.

The library also provides access to non-print media. In support of the CLS program, the library provides access to the web-based MTS Lab Training and Competency Assessment product. Students may access it from any location that provides Internet connectivity.

Access:

Because the Library recognizes that it cannot own everything that researchers need, it is an active participant in multiple resource-sharing networks which provide electronic transmission of interlibrary loan requests for books and journal articles, including OCLC (Online College Library Consortium) which provides access to over 15,000,000 items world-wide. UWF's library actively

partners with all of the State University System libraries in Florida, with the Florida community college libraries, and with 1,300 other libraries in the South and Southeast. The library uses commercial document delivery providers to quickly provide journal articles for UWF researchers when necessary. These include Copyright Clearance Center and the British Research Institute (BRI). The library also uses Ariel, a scanning and electronic transmission system which is used for receiving or sending journal articles or book chapters rapidly from one location to another. When received as an electronic file, journal articles can be provided direct to the requestor via e-mail.

Services

In an attempt to help library users navigate their way through the maze of print and electronic resources, the library provides a unique guide which coordinates access to both print and electronic resources, including a selective listing of the "best resources" available on the Internet for that discipline. The service is known as *ELi* or the *Electronic Library*. There are *ELi* pages for Medical Technology, Medicine and Nursing.

The Medical Technology *ELi* page http://library.uwf.edu/eli/Science/Medtech.shtml provides research strategies for users, guiding them to print resources for the discipline, as well as providing descriptions of, and links to, relevant databases, gateways, and Internet sites. Since *ELi* can be accessed via the Internet, users may use the pages from any location.

The library has also been responsive to the needs of those clients who prefer to work at home. In addition to being able to access databases and materials in full-text online, clients may also take advantage of all these online services:

- read electronic reserves of course-required readings (the library takes care of copyright issues)
- request Interlibrary Loan
- request Intercampus Loan (to/from the Emerald Coast Campus library)
- renew books
- submit a reference question for response
- request priority cataloging of an item which is on order
- suggest the purchase of a particular book or journal
- request that an item be recalled for use

In conclusion, current library collections and services appear to be adequate to address the information needs of students and faculty in the Clinical Laboratory Sciences program. The library has had adequate funding to purchase materials which have been requested by the faculty, and the state-wide university consortium has made it possible for UWF to provide extensive access to journal literature. As with all academic libraries, the UWF library continues to develop strategies to:

- leverage stagnant or diminishing dollars to assure access to the information resources of greatest benefit for students and faculty
- create effective teaching tools to develop information literacy competencies in students
- preserve and archive electronic content
- assure access for students and faculty regardless of geographic location

UWF Library Acquisitions in Clinical Laboratory Sciences 2001-2006

McPherson, RA, Henry's Clinical Diagnosis and management by Laboratory Methods, 21st Ed, Saunders, 2006
Burtis, CA: The Textbook of Clinical Chemistry & Molecular Diagnostics, 4th Ed, Elsevier Saunders, 2006
Winn, WC Jr, et al: Koneman's Color Atlas and Textbook of Diagnostic Microbiology, Lippincott, 2006
John, DT, Petri, WA: Markel and Voge's Medical Parasitology, 9th Ed, Elsevier Saunders, 2006
Kjeldsberg, CR: Practical Diagnosis of Hematological Disorders, ASCP Press, 2006
Wu, Alan HB: Tietz Clinical guide to Laboratory Tests, 4 th Ed, Elsevier Saunders, 2006
Rudmann, SV: Textbook of Blood Banking and Transfusion Medicine, 2nd Ed, Elsevier Saunders, 2005
Flynn, JC Jr: Procedures in Phlebotomy, 3rd Ed, Elsevier Saunders, 2005
Broxmeyer, HE: Cord Blood: Biology, Immunology, and Clinical Transplantation, Elsevier Saunders, 2005
Rudmann, SV: Textbook of Blood Banking and Transfusion Medicine, 2nd Ed, Saunders, 2005
Harmening, DM: Modern Blood Banking & Transfusion Practices, 5th Edition, F.A.Davis, 2005
Carr, JH, Rodak.B: Clinical Hematology Atlas; 2nd Ed; Elsevier Saunders, 2004
Cooke, RA, Stewart, BN: Colour Atlas of Anatomical Pathology; 3rd Ed; Churchill Livingston, 2004
Mahon, CR: Diagnostic Skills in Clinical Laboratory Science, McGraw-Hill, 2004
Carr, JH & Rodak, BF: Clinical Hematology Atlas, 2nd Ed, WB Saunders, 2004
Maciejko, JJ: Atherosclerosis Risk Factors, AACC Press, 2004
Reece, EA, Coustan, DR, Gabbe, SG: Diabetes in Women: Adolescence, Pregnancy, and Menopause, 3rd Ed, LWW, 2004
Hart, CA, Shears, P: Color Atlas of Medical Microbiology, 2nd Ed, Mosby, 2004
Sterk, PJ, Djukanovicl, R: An Atlas of Induced Sputum: an Aid for Research, Parthenon Pub, 2004
Brunzel, NA: Fundamentals of Urine and Body Fluid Analysis, 2nd Ed, Saunders, 2004
Osselaer, JC, Meeting Challenges of Blood Safety in the 21st Century, Pathogenic Inactivations, (Electronic Resource), Basel, 2004
Kaplan & Pesce: Clinical Chemistry: Theory, Analysis Correlation, 4th Ed, Mosby, 2003
Hoyer, JD, Kroft, SH: Color Atlas of Hemoglobin Disorders: A Compendium Based on Proficiency Testing, CAP, 2003
Turgeon, ML, Immunology and Serology in Laboratory Medicine, 3rd Ed, Mosby, 2003
Cowan, DF: Informatics for the Clinical Laboratory: A Practical Guide (Electronic Resource), Springer, 2003
Manual of Basic Techniques for a Health Laboratory (Electronic resource); 2nd Ed; World Health Organization, 2003
Stevens, C, Clinical Immunology and Serology: A Laboratory Perspective, 2nd Ed, F.A. Davis, 2003
Provan, A: ABC of Clinical Hematology (Internet), 2nd Ed, Net Library Inc, 2003
Schumann, BG, Friedmann, SK: Wet Urinalysis: Interpretations, Correlations and Implications, ASCP Press, 2003
Leventhal, Cheadle, RF: Medical Parasitology: A Self Instructional Text, F.A Davis, 2002

Harmening, DM: Clinical Hematology and Fundamentals of Hemostasis, 4th Edition, F.A. Davis, 2002
Beck, Susan: NCA Review for Clinical Laboratory Sciences, 4th Ed; LWW, 2002
Ciulla, AP, Buescher, G: Q & A Review for Medical Technology/the Clinical Laboratory Sciences, Prentice Hall, 2002
Lewondrowski, K: Clinical Chemsitry: Laboratory Management and Clinical Correlations, LWW, 2002
Haaheim, LR, Pattison, JR: A Practical Guide to Clinical Virology, (Electronic Resource), 2nd Ed, Wiley, 2002
Napi, AJ, Vass, EN: Parasites of Medical Importance, (Electronic Resource) Landes Bioscience, 2002
Galley, HF: Blood and Blood Transfusion, (Electronic Resource), BMJ Books, 2002
McClatchey, KD, Amin, HM: Clinical Laboratory Medicine: Self Assessment, 2nd Ed; LWW, 2002
Strasinger, SK, Di Lorenzo, MS: Urinalysis and Body Fluids, 4th Ed, F.A.Davis, 2001
Corbett, JV: Laboratory Tests and Diagnostic Procedures with Nursing Diagnoses, 3rd Ed, WB Saunders, 2001
Burtis, CA, Ashwood, ER: Tietz Fundamentals of Clinical Chemistry, 5th Ed, Saunders, 2001
Bishop, ML, et.al: Clinical Chemistry, Principles, Procedures & Correlations, 4th Ed, LWW, 2001
Keren, DF, McCoy, PJ: Flow Cytometry in Clinical Diagnosis, 3 rd Ed, ASCP Press, 2001
Lewis, SM, Bain, BJ: Dacie & Lewis Practical Hematology, 9th Ed, Churchill Livingston, 2001
Garcia, LS: Diagnostic Medical Parasitology, 4th Ed, ASM, 2001
Harr, RR: Clinical Laboratory Science Review, 2nd Ed; F.A. Davis; 2000
William, M: Clinical Chemistry, 4th Ed, Mosby, 2000
Bartlett, MA: Diagnostic Bacteriology: A Study Guide, F.A.Davis, 2000
Blaney, KD, Howard, PR: Basic and Applied Concepts of Immunohematology, Mosby, 2000
Adelman, MM, Cahill, EH: Atlas of Sperm Morphology, ASCP press, 1989

Page 2 : Title Counts of Holdings in Pace and FWB Libraries Combined

Page from material Sent by Helen Wiegersma July 28, 2006

Include Hard Copies Here

Page 1: **Clinical Laboratory Sciences Journal Access: UWF Libraries 2006**

Page from material Sent by Helen Wiegersma July 28, 2006

Standard 8C-2: Required Text Books

University-Based Courses

MLS 4305 & 4305L Hematology I /Lab

- Harmening, DM: Clinical Hematology and Fundamentals of Hemostasis, 4th Ed, F.A. Davis, 2002
- Carr, JH & Rodak BF: Clinical Hematology Atlas, 2nd Edition, Elsevier Saunders, 2004
- Strasinger, SK & Di Lorenzo, MS: The Phlebotomy Workbook, 2nd Ed, F.A.Davis, 2003

MLS 4460 & 4460L Diagnostic Microbiology I /Lab

- Mahon, C & Manuselis, G: Textbook of Diagnostic Microbiology, 2nd Ed, Elsevier Saunders, 2000

MLS 4334 & 4334L Hemostasis & Thrombosis / Lab

- Harmening, DM: Clinical Hematology and Fundamentals of Hemostasis, 4th Ed, F.A. Davis, 2002

MLS 4220 & 4220L Urinalysis & Body Fluids I

- Strasinger, SK & Di Lorenzo, MS: Urinalysis and Body Fluids, 4th Ed, F.A.Davis, 2001

MLS 4625 & 4625L Clinical Chemistry I /Lab

- Burtis, CA & Ashwood, ER: Tietz Fundamentals of Clinical Chemistry, 5th Ed, Elsevier Saunders, 2001
- Campbell, JB, & Campbell, JM: Laboratory Mathematics-Medical and Biological Applications, Elsevier Saunders, 1997

MLS 4462 & 4462L Medical Microbiology /Lab

- Leventhal, R & Cheadle, RF: Medical Parasitology; A Self –Instructional Text, 5th Ed, F.A.Davis, 2002
- Kern, ME & Blevins, KS: Medical Mycology; A Self-Instructional Text, 2nd Ed, F.A.Davis, 1997
- Mahon,C & Manuselis, G: Textbook of Diagnostic Microbiology, 2nd Ed, Elsevier Saunders, 2000

MLS 4550 & 4550L Immunohematology I / Lab

- Harmening, DM: Modern Blood Banking & Transfusion Practices, 5th Ed., F.A.Davis, 2005

MLS 4505 & 4505L Serology /Lab

- Turgeon, ML: Immunology & Serology in Laboratory Medicine; 3rd Ed, Elsevier Mosby, 2003

MLS 4630 & 4630L Clinical Chemistry II /Lab

- Burtis, CA & Ashwood, ER: Tietz Fundamentals of Clinical Chemistry, 5th Ed, Elsevier Saunders, 2001
- Campbell, JB, & Campbell, JM: Laboratory Mathematics-Medical and Biological Applications, Elsevier Saunders, 1997

MLS 4191 & 4191L Molecular Diagnostics /Lab

- Burtis, CA & Ashwood, ER: Tietz Fundamentals of Clinical Chemistry, 5th Ed, Elsevier Saunders, 2001
- Campbell, JB, & Campbell, JM: Laboratory Mathematics-Medical and Biological Applications, Elsevier Saunders, 1997

MLS 4705 Special Clinical Topics

- Harmening, DM: Laboratory Management : Principles and Procedures, 2nd Ed, F.A.Davis, 2006

Hospital Based Courses – Students are required to use the same books they used in University -based Courses

MLS 4820L Clinical Chemistry III

- Burtis, CA & Ashwood, .ER: Tietz Fundamentals of Clinical Chemistry, 5th Ed, Elsevier Saunders, 2001
- Campbell, JB, & Campbell, JM: Laboratory Mathematics-Medical and Biological Applications, Elsevier Saunders, 1997

MLS 4821L Diagnostic Microbiology II

- Leventhal, R & Cheadle, RF: Medical Parasitology; A Self –Instructional Text, 5th E, F.A.Davis, 2002
- Kern, ME & Blevins, KS: Medical Mycology; A Self-Instructional Text, 2nd Ed, F.A.Davis
- Mahon,C & Manuselis, G: Textbook of Diagnostic Microbiology, 2nd Ed, Elsevier Saunders, 2000

MLS 4822L Hematology II

- Harmening, DM: Clinical Hematology and Fundamentals of Hemostasis, 4th Ed, F.A. Davis, 2002
- Carr, JH & Rodak BF: Clinical Hematology Atlas, 2nd Ed, Elsevier Saunders, 2004
- Strasinger, SK & Di Lorenzo, MS: The Phlebotomy Workbook, 2nd Ed, F.A.Davis, 2003

MLS 4823L Immunohematology II

- Harmening, DM: Modern Blood Banking & Transfusion Practices, 5th Ed, F.A.Davis, 2005

MLS 4824L Urinalysis & Body Fluids II

- Strasinger, SK & Di Lorenzo, MS: Urinalysis and Body Fluids, 4th Ed, F.A.Davis, 2001

MLS 4825L Special Clinical Methods

- Strasinger, SK & Di Lorenzo,MS: The Phlebotomy Workbook, 2nd Ed, F.A.Davis, 2003
- Leventhal, R & Cheadle, RF; Medical Parasitology; A Self –Instructional Text, 5th Ed, F.A.Davis, 2002
- Kern, ME & Blevins, KS: Medical Mycology; A Self-Instructional Text, 2nd Ed, F.A.Davis, 1997
- Mahon, CR & Manuselis, G:, Textbook of Diagnostic Microbiology, 2nd Ed, Elsevier Saunders, 2000

Standard 8C-3

Resource Materials Available in the Faculty / Program Offices-Textbooks and Journals

Hematology/Hemostasis

Turgeon, ML: Clinical Hematology: Theory and Procedures, 4th Ed; Mosby, 2005
Carr, JH & Rodak, BF: Clinical Hematology Atlas, 2nd Ed, WB Saunders, 2004
McKenzie, SB: Clinical Laboratory Hematology, Prentice Hall, 2004
Anderson, SC & Poulsen, KB: Atlas of Hematology, Lippincott Williams & Wilkins, 2003
Harmening, DM: Clinical Hematology and Fundamentals of Hemostasis, 4th Ed, FA Davis, 2002
Rodak, BF: Diagnostic Hematology, 2nd Ed, Saunders, 2002
Diggs, Sturm & Bell: The Morphology of Human Blood Cells; 5th Ed, Abbott Dia, 1998
Stevens, ML: Fundamentals of Clinical Hematology, WB Saunders, 1997
Simpson, P, et al: Instructor=s Guide to Harmening=s Clinical Hematology and Fundamentals of Hemostasis, FA Davis, 1997
Heckner, F, et al: Practical Microscopic Hematology, Urban and Schwarzenberg, 1994
O'Connor, BH: A Color Atlas and Instruction Manual of Peripheral Blood Cell Morphology, Williams & Wilkins, 1984
Kapff, CT & Jandl: JH; Blood-Atlas and Source Book of Hematology; Little Brown and Company, 1981
Bessis, M: Blood Smears Reinterpreted; Springer International, 1977

Microbiology

Winn.W, et.al: Koneman's Color Atlas and Textbook of Diagnostic Microbiology; 6th Ed, 2006
Forbes, et al: Bailey and Scott=s Diagnostic Microbiology, 11th Ed, Mosby, 2002
Marler: Direct Smear Atlas-A monograph of Gram Stained Preparation of Clinical Specimens, Lippincott, Williiams & Wilkins, 2001
Garcia, LS & Bruckner, DA: Diagnostic Medical Parasitology, 4th Ed, ASM Press, 2001
Mahon, CR & Manuselis, G: Textbook of Diagnostic Microbiology, 2nd Ed, Saunders, 2000
Bartlett. MA: Diagnostic Bacteriology- A Study Guide, F.A.Davis, 2000
Pierce, BE & Leboffe, MJ: Exercises for the Microbiology Laboratory, Morton, 1999
Leboffe, MJ & Pierce, BE: Photographic Atlas for the Microbiology Laboratory, Morton Pub Company; 1999
Gobat, BP: Diagnostic Microbiology Laboratory Manual, Mosby, 1998
Kern, ME & Blevins, KS: Medical Mycology, FA Davis, 1997
Murray, PR, et al: Medical Microbiology, Mosby, 1997
Zeibig, EA: Clinical Parasitology, Saunders, 1997
Delsot: Introduction to Diagnostic Microbiology, Mosby; 1997
Leland, DS: Clinical Virology, Saunders, 1996
Howard, BJ: Clinical and Pathogenic Microbiology, Mosby, 1994
Markell, EK, et al: Medical Parasitology, 8th Ed, Saunders, 1999
Leventhal, R & Cheadle, RF: Medical Parasitology, FA Davis, 1994
Summanen, et.al: Wadsworth Anaerobic Bacteriology Manual, Star Publishing Company; 1993

Clinical Chemistry

Burtis, CA, Ashwood, ER, & Bruns, DE: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, WB Saunders, 2006
Bishop, ML, Fody, EP & Schoeff, L: Clinical Chemistry: Principles, Procedures, Correlations, 5 th Ed, LWWW, 2005
Kaplan, LA & Pesce, AJ: Clinical Chemistry: Theory, Analysis and Correlations, 4th Ed, Mosby, 2003
Anderson, SC & Cockayne, S: Clinical Chemistry Concepts and Applications, McGraw Hill, 2003
Tsongalis, GJ & Colemen, WB: Molecular Diagnostics, AACC Press, 2002
Burtis, CA & Ashwood, ER: Tietz Fundamentals of Clinical Chemistry, 5th Edition, Saunders, 2001
Christenson, RH, et al: Outline Review-Clinical Chemistry, Appleton-Lange, 2001
Doucette, LJ, Mathematics for the Clinical Laboratory, WB Saunders, 1997
Campbell, JM & Campbell, JB, Laboratory Mathematics, Mosby, 1996
Kaplan, A et al, Clinical Chemistry: Interpretation and Techniques, Williams and Wilkins, 1995
Lehman, W & Leiken: Clinical Laboratory Instrumentation and Automation-Principles, Applications & Selection, Saunders, 1994

Immunohematology

Harmening, DM: Modern Blood Banking and Transfusion Practices, 5th Ed., FA Davis, 2005
Rudmann, SV: Textbook of Blood Banking and Transfusion Medicine, 2nd Ed, Saunders, 2005
AABB, Technical Manual, 14th Ed., AABB Press, 2002
Blaney & Howard: Basic and Applied Concepts of Immunohematology, Mosby, 2000
Quinley, ED, Immunohematology: Principles and Practices, 2nd Ed., Lippincott, 1998
Flynn, J, Essentials of Immunohematology, WB Saunders, 1998
Turgeon, ML, Fundamentals of Immunohematology, 2nd Ed., Williams and Wilkins, 1995
Bryant, N, An Introduction to Immunohematology, 3rd Ed., WB Saunders, 1994

Immunology/Serology

Mahon, CR & Tice, D: Clinical Laboratory Immunology, Prentice Hall, 2006
Turgeon, ML: Immunology and Serology in Laboratory Medicine, 3rd Ed., Mosby, 2003
Stevens, CD: Clinical Immunology and Serology: A Laboratory Perspective, 2nd Ed, FA Davis, 2003
Zane, HD: Immunology - Theoretical and Practical Concepts in Laboratory Medicine, Saunders, 2001
Sheehan, C, Clinical Immunology, Principles and Laboratory Diagnosis, 2nd, Ed., Lippincott, 1997
Roitt, I, Brostaff, J and Male, D: Immunology, 4th Ed., Mosby, 1996
Miller, LE, et al: Manual of Laboratory Immunology, 2nd Ed, Lea & Febiger, 1991

Urinalysis & Body Fluids

Brunzel, NA: Fundamentals of Urine and Body Fluids, 2nd Ed, Saunders, 2004
Strasinger, SK & Di Lorenzo, MS: Urinalysis and Body Fluids, 4th Ed., FA Davis, 2001
Ringsrud, KM & Linne, JJ: Atlas of Urinalysis and Body Fluids, Mosby, 1996
McBride, LJ, Textbook of Urinalysis and Body Fluids, Lippincott, 1998

Graff, L: A Handbook of Routine Urinalysis, Lippincott, 1983

Phlebotomy

McCall, RE & Tankersley, CM: Phlebotomy Essentials, 3rd Ed., Lippincott, 2003
Strasinger, SK & Di Lorenzo, MA: Phlebotomy Workbook, 2nd Ed, FA Davis, 2003
Garza, D & Becan-McBride, K: Phlebotomy Handbook, Prentice Hall, 2002
Flynn, JC: Procedures in Phlebotomy, 2nd Ed, Saunders, 1999
Pendergraph, GE & Pendergraph, CB: Handbook of Phlebotomy and Patient Services, Williams and Wilkins, 1998
Becan-McBride, K & Garza, D, Quick Review of Phlebotomy, Appleton and Lange, 1998
McCall, RE & Tankersley, CM: Phlebotomy Exam Review, Lippincott, 1997

Review Books

Leach, DL & Ryman, DG: Outline Review of Medical Technology/Clinical Laboratory Science, Prentice Hall, 2004
Beck, SJ: NCA Review for the Clinical Laboratory Sciences, 4th Ed, LWW, 2002
Graves, L: Case Studies in Clinical laboratory Medicine, Prentice Hall, 2002
Ciulla, AP & Buescher, GK: Q & A Review- Medical Technology/Clinical Laboratory Science, 3rd Ed, Prentice Hall, 2002
Harr, RR: Clinical Laboratory Science Review, 2nd Ed, F.A.Davis, 2000
Hubbard, JD: A Concise Review of Clinical Laboratory Sciences, Williams and Wilkins, 1999
McClatchey, KD: Clinical Laboratory Medicine Self Assessment and Review, Williams and Wilkins, 1997
Alba=s Medical Technology Board Exam Review, 8th Ed., Berkeley Scientific, 1996
ASCP, Board of Registry Study Guide, Clinical Laboratory Certification Examinations, ASCP Press, 1996

General

Harmening, DH: Laboratory Management: Principles & Procedures, 2nd Ed, Prentice Hall, 2006
Hudson, J: Principles of Clinical Laboratory Management: A Study Guide and Workbook, Prentice Hall, 2004
Mahon, CR & Fowler, DG: Diagnostic Skills in Clinical Laboratory Science, McGraw-Hill, 2004
Stine, GJ: AIDS Update 2003, Prentice Hall, 2003
Fremgen, BF: Medical Law & Ethics, Prentice Hall, 2002
Polgar, S & Thomas SA: Introduction to Research in Health Sciences, 4th Ed, Churchill Livingston, 2000
Polansky, VD: Medical Laboratory Technology, Pearls of Wisdom, Boston Med Pub Corp, 1999
Davis, BC, et al: Principles of Clinical Laboratory Utilization and Consultation, Saunders, 1999
Flight, M: Law, Liability and Ethics for Medical Office Professionals, 3rd Ed, Delmar Pub, 1998a
Lehmann, CA: Saunders Manual of Clinical Laboratory Science, Saunders, 1998
Wallace, MA & Klosinski: DD, Clinical Laboratory Science, Education and Management, WB Saunders, 1998
Veatch, RM & Flack, HE: Case Studies in Allied Health Ethics, Prentice Hall, 1997
Henry, JB: Clinical Diagnosis and Management by Laboratory Methods, 19th Ed, Saunders, 1996
Longest, BB: Health Professions in Management, Appleton and Lange, 1996
Varnadoe, LA: Medical Laboratory Management and Supervision, FA Davis, 1996

Journals & Periodicals

LAB MEDICINE (ASCP)
Clinical Laboratory Science (ASCLS)
CAP Today
Advance for Medical Laboratory Professionals
Medical Laboratory Observer (MLO)
American Clinical Laboratory
Clinical Laboratory News (AACC)
Transfusion (AABB)
Biotechnology Laboratory

Standard 8C- 4:
WEB Based Informational Resources

- MTS- Lab Training and Competency Assessment –University of Washington Department of Medicine - Subscription Paid by the University
- WEB PATH – The Internet Pathology Laboratory Medical Education
  http://www-medlib.med.utah.edu/WebPath/webpath.html
- Atlas of Hematology: http://www.bekkoame.ne.jp/~take-tomo/indexENG.html
- Hematology Digital Image Study Sets:
  http://medocs.ucdavis.edu/IMD/420A/dib/
- Hematology Cell List: Wadsworth Center, NYC Department of Health
  http://www.wadsworth.org/chemheme/heme/microscope/celllist.htm
- Atlas of Hematology: http://www.hematologyatlas.com/principalpage.htm
- Blood Line-Carden Jennings - Image Atlas & Case Studies:
  http://image.bloodline.net/
- Hematography Case Studies , University of Minnesota
  http://www1.umn.edu/hema/pages/casestudies.html
- American Society of Hematology (ASH) Teaching Cases
  http://www.hematology.org/education/teach_case/
- American Society of Hematology (ASH) Image Bank :
  http://www.ashimagebank.org/
- Clinical Laboratory Sciences Internet Resources
  http://members.tripod.com/~LouCaru/index-5.html#Molecular
- PATHMAX: http://www.pathmax.com/main.html
- Hematopathology Self Study Laboratory:
  http://www.umdnj.edu/pathnweb/genpath/hem/hem.htm
- Internet Atlas of Hematology
  http://www.hematologica.pl/Atlas3/Angielska/InternetInfo.htm
- Atlas of Hematology: http://pathy.med.nagoya-u.ac.jp/atlas/doc/atlas.html
- Medical slide Presentation:
  http://www.thecrookstoncollection.com/Collection/medslides/Medslides7.htm

Standard 8D: Clinical Resources Used in Instruction

On campus student laboratories are managed by a dedicated full-time laboratory instructor who is engaged in collection, purchase and/or preparation of clinical, demonstration and reference materials used in clinical laboratory science courses

University faculty works closely with the clinical affiliates, other local hospitals and other health care facilities such as the Northwest Florida Blood Center to obtain appropriate clinical specimens for instruction in on-campus labs. Likewise, the University provides the affiliates with instructional materials for use during student's= clinical rotations.

Clinical materials for the on-campus laboratories are obtained from several sources: a) commercial purchases b) from local clinical laboratories c) in house preparation of simulated clinical specimens and d) supplied by commercial vendors for educational purposes.

Hematology
Since training in Phlebotomy is also part of each on-campus course, students collect venipuncture specimens from each other and these specimens are used in various manual and semi-automated procedures in the lab. Occasionally, whole blood specimens, screened for HIV & HBV, are obtained from the local Northwest Florida Blood Center
Hematology slide boxes, each containing 100 normal and abnormal stained smears are provided for each student. The abnormal slides are saved by the technologists at the hospitals and sent to the University on an ongoing basis.
Hematology has an abundance of audio, visual and soft ware programs for demonstration, instruction and evaluation of student learning.
Normal and abnormal control specimens are purchased from commercial vendors for use in hematology cell counter and for special procedures in Hematology such as screening tests for sickle hemoglobin and fetal hemoglobin screening.
Materials such as hemoglobin electrophoresis patterns, platelet aggregation curves, flow cytomery printouts are obtained from hospital labs and demonstrated in class.

Hemostasis
Plasma collected from students, commercial controls, and commercial factor deficient plasma specimens are largely used for hemostasis labs.

Clinical Chemistry
Normal and abnormal commercial controls are used in the preparation of specimens to be analyzed in clinical chemistry. Periodically students collect their own specimens for analysis. Simulated abnormal serum specimens are prepared by faculty.

Diagnostic Microbiology
ATCC stock cultures are purchased and maintained for student laboratory use in instruction and lab practical examinations. Stock cultures and demonstration materials such as plates with cultures of patient specimens, gram stained smears, acid fast smears, yeast/fungal growths, parasitology specimens, and such other material is obtained form local hospital laboratories.

Immunohematology
Whole blood specimens from students and specimens from Northwest Florida Blood Center (NWFBC) are used in ABO, Rh typing and in other methods requiring whole blood. Serum specimens with clinically significant antibodies are collected from NWFBC and aliquots are frozen. Technologists at hospital labs also provide frozen abnormal sera and interesting cases of antibody identification panels as they become available from patients. For the past several years Gamma / Immucor lab has been a major source of abnormal sera with antibodies. Commercial antibodies are purchased and used in lab exercises as unknown specimens in antibody identification.

Serology
Serum specimens from students are used whenever available. Frozen aliquots of abnormal sera, positive for CRP, Mono, RA, Lupus, Syphilis, Streptococcal Antibodies and other commonly tested antibodies are obtained from hospitals and Escambia County Public Health Department laboratory. Positive serology specimens are frozen and saved on an ongoing basis to be picked up by the university instructors during hospital visits. Stained smears positive in fluorescent antibody testing such as FANA or FT-ABS are also obtained from the hospital labs for demonstration in the student labs. All serology kits come with positive and negative controls. Control specimens are also purchased to be used in practical exams.

Urinalysis & Body Fluids
Urine specimens and preserved sediments are provided by the affiliates on a weekly basis during the urinalysis class. Simulated specimens, for urine, CSF and other body fluids are prepared by faculty for urinalysis and body fluid examination. Body fluid controls such as CSF and Semen are purchased from vendors.

Case studies
Case studies are incorporated into every lecture and lab session in each MLS course on campus. Case studies are also used in almost every quiz, lecture exam and lab exam given to students. Case studies are the main vehicle by which critical thinking is taught and student learning is evaluated. Case studies are made available to students in several ways: a) power point presentations in classroom / lab, b) posted on the UWF e-learning site for the given course, c) software installed on the student computers, d) Web Based resources. The classroom / laboratory is equipped with a multimedia station containing a Pentium II 250, ELMO TRV-35H slide film-to-video converter, Cannon RE-350 Document Camera, Pioneer laser disk player, video player and a Sharp XG-NV3XU projector. Internet located case studies are frequently accessed during instructional presentations. Students are provided with links to a variety of excellent web sites containing case studies for additional reinforcement.

Instructional resources at clinical affiliates
In addition to the work on daily patient specimens, the clinical affiliates have an abundance of clinical instructional materials including: abnormal hematology slide sets supplemented with patient information, gram stained smears, parasitology and mycology slide sets, abnormal frozen serums for clinical chemistry and serology and antibodies for immunohematology. In microbiology students receive weekly instructor-prepared unknowns. More information on clinical sites is in the Appendix.

AUDIO/VISUAL AND COMPUTER SOFTWARE PROGRAMS

MLS 4550 Immunohematology

Video Recordings

X ID-Micro Typing System, Ortho
X Chemicals in the Blood Bank, Organon Teknika Corp.
X Monoclonal Antibodies as Blood Banking Reagents, OrganonTeknika Corp.
X Platelet Transfusion Therapy, Organon Teknika Corp

Kodachrome Slide Presentations

X Continuing Education Program Series from Organon Teknika
-Drug-Induced Anemia
-Transfusion Reactions
-The Major Histocompatibility Complex and its Relationship to the Bg System
-Cold Auto Agglutinins
-The Direct Antiglobulin Test

Software Applications

X Medicomp SHIESL Software
-ABO (H) & Rh System
-Blood Grouping System
-Cord Blood Testing
-Cold Agglutinins
-Antibody Identification
X Modern Bloodbanking & Transfusion Practices 5th Ed, 2005 Electronic Test Bank

MLS4305 Hematology

Video Recordings

X Automated Reticulocyte Analysis, A hematology video conference

Kodachrome Slide Presentations

X Blood Smear Preparation, Staining, Artifacts and Normal Blood Cells
X Hematopoiesis – RBC
X Abnormal RBC Morphology
X Anemias
-Iron Deficiency Anemia
-Pernicious Anemia
-Aplastic Anemia
-Hereditary Spherocytosis
-Hereditary Elliptocytosis
-G6PD Deficiency
-Sideroblastic Anemia
-Anemia due to Lead Poisoning
-Hemochromatosis
-Anemia Due to Parasites and Disease
-Hb Electrophoresis
-Hemoglobinopathies Hematopoiesis -WBC and Platelets

X Non Leukemic Leukocytosis, Leukopenia and Disorders
X Myeloproliferative Disorders
X Lymphoprolifrative Disorders
X Bone Marrow Aspiration and Biopsy
X Lymphomas
X Improved Classification of Anemias
X Hematology Case Studies
X Thalassemia and Disorders
X Atlas of Blood Cells; Zucker and Franklin (two volumes)

Software Applications

X Electronic Test bank- Clinical Hematology and Fundamentals of Hemostasis , 4th Ed, 2002
X Hematography II - A Instructional Program in Morphologic alterations of Blood Cells; Karen Lofsness (U. Mn.)
X Peripheral Blood Tutor; Department of Laboratory Medicine & Center for Bioengineering University of Washington, Seattle, WA.
X Hematology (A CD-ROM Atlas); Shauna C. Anderson, et. al.
X Hematololgy Morphology; Red, White, and Big Blue Cells; Thomas F. Dutcher; ImageDisc Library

MLS4625 Clinical Chemistry

Video Recordings

X LDL Cholesterol
X Glycated Hemoglobin
X Electrophoresis Theory and Principle
X Synchron CX3 Maintenance
X Introducing The Monarch
X Chem I Sales Presentation
X Clinical Chemistry - A Partnership in Healthcare by AACC
X Health line: Perspectives on Prostate Cancer

Kodachrome Slide Presentations

X Disorders of Glucose Metabolism
X General Electrophoresis Slide Series
X Helena Laboratories Slide Series
-High resolution Protein Electrophoresis, A Clinical overview with case studies
-Quality Assurance
-Cardio Rep CK-MB ISO forms
-Glycosylated hemoglobin, An Overview;
X Disorders of Glucose Metabolism; Nelson B. Watts; A.V.S.

Software Applications

X Medicomp SHIESL Software -Chemistry, Advanced Clinical
X Electrophoresis Tutor
X The Association of Clinical Biochemists, Computer Aided Learning
-Acid Base Disorders

-Thyroid Disorders

Molecular Diagnostics

Roche Diagnostics Education Program, A set of 3 CDs, 2003

X Molecular Technology

X Roche Genetics

X Regulations-Molecular Diagnostic Laboratory

DNA: The Foundation of Molecular Technology

Lab Safety:

X Safety in the Research Laboratory - Howard Hughes Medical Institute (Video Tape)

Video Recordings

X Chemical Hazards

X Emergency Response

X Glassware Washing Hazards

X Centrifugation Hazards

X OSHA=s Bloodborne Pathogens Standards

X Assessing Risks

X Mammalian Cell Culture Hazards

X Radionuclide Hazards

X X-ray diffraction Hazards

X Practicing Safe Science

X Set Two - Safety series Centrifugation Hazards, Chemical Storage Hazards, and Glassware Washing Hazards on one tape

X Smith Industries Medical Systems: Needle Protection

X TraCom: Formula for Safety

X Bloodborne Pathogens Policy Review (copy)

X Bio-Plexus Safeguarding the Future of Healthcare Worker

Media Lab Inc: CD - Safety and OSHA Compliance

Media Labs Inc: CD - CLIA Competency Testing

Software Applications

X Media Lab Inc., Software; Safety and OSHA Compliance, Bloodborne Pathogens, Chemical Hygiene/HAZ/COM, TB, Formaldehyde, Electrical Safety, Fire Safety, First Aid;

MLS 4460 Diagnostic Microbiology & MLS 4462 Medical Microbiology

Video Recordings

X Parasitology Home made Video, Intestinal Protozoa, Blood and Tissue Protozoa, Nematodes, Trematodes and Cestodes, Medical Micro Lab Quiz Intestinal protozoa

X E. coli 0157:H7

X Disk Susceptibility Testing by NCCLS

X Oxidase, Catalase, Coagulase by NCCLS

X Operation of the Laminar Flow Biological Safety Cabinet by NCCLS

Kodachrome Slide Presentations

X Medical Microbiology Slide Series: Murray, Kobayashi, Pfaller, Rosenthal; Mosby

Software Applications

X Media Lab Inc., Wheel of Bacteriology, Atlas of Bacteriology, Review of Bacteriology.

X Media Lab Inc., Wheel of Mycology, Atlas of Mycology, Review of Mycology.
X Media Lab Inc., Wheel of Parasitology, Atlas of Parasites, Review of Parasites
X A Photographic Atlas for the Microbiology Laboratory; Michael J. Leboffe & Burton E. Pierce
X Gram Stain Tutor; Department of Laboratory Medicine and Center for Bioengineering, University of Washington, Seattle, WA.
X Direct Smear Atlas, A CD-ROM of Gram Stained Smear Preparations of Clinical Specimens; Marler, Siders and Allen; Williams & Wilkins
X Gram Stain Primer, A Microscopic Review of Microbial Pathogens; Price, Martin, Martinez, Latta; Allied Health - Health Sciences Consortium
X Infectious Diseases by Mosby (interactive CD)
X Mycology Tutor; Department of Laboratory Medicine and Center for Bioengineering, University of Washington, Seattle, WA.
X Parasite Tutor; Department of Laboratory Medicine and Center for Bioengineering, University of Washington, Seattle, WA.
X Microscope Tutor; Department of Laboratory Medicine and Center for Bioengineering, University of Washington, Seattle, WA.
X Microbes in Motion; WCB WM. C. Brown Publishers
X Medicomp SHIESL: Technique in Clinical Mycology

MLS 4334 Hemostasis and Thrombosis

Kodachrome Slide Presentations

X Helena Laboratories
-Evaluation of Platelet Function
-Functional Aspects of Hemostasis
X Vascular Disorders
X Functional Aspects of Coagulation
X Hemostasis and You; General Diagnostics, Division of Warner-Lambert Company
X Bleeding Time; General Diagnostics, Division of Warner-Lambert Company

MLS 4505 Serology

Video Recordings

X Report on Prenatal AFP testing
X Murex Suds HIV-1 training
X Helena Laboratories;
-Immunoelectrophoresis and its Interpretation
-Immunofixation - For the Identification of Monoclonal Gammopathies
-Screening for Bence Jones Protein
X HIV in the Research Laboratory

Software

X DiaSorin, MARIA (Multimedia Autoimmune Reference Image Assistant)
X CDC: Hepatitis C- What Clinicians and other Health Professionals Need to Know

MLS 4220 Urinalysis and Body Fluids

Video Recordings

X Yellow Iris
X Using your Clinitek 100
X Urinalysis (Collection) by NCCLS
X Urinalysis (Evaluation) by NCCLS
X Report on Prenatal AFT Testing by Abbott Laboratories

Software Applications

X Urinalysis - Tutor, Department of Laboratory Medicine & Center for Bioengineering University of Washington, Seattle, WA.
X The Urinary Sediment, Dr. C.J. Ward, Image Disc Library

Phlebotomy

Video Recordings

X ASCP Blood Collection
X ASPT Blood Collection Technique
X ASCP Blood Collection ASpecial Procedures@
X ASCP Blood Collection AThe Difficult Draw@
X ASCP Blood Collection AThe Pediatric Patient@

Software Applications

X Phlebotomy Tutor, Department of Laboratory Medicine & Center for Bioengineering University of Washington, Seattle, WA.

Other Programs

X ASCP Recruitment Kodachrome Slide Series/Video
X Identifying Blood Cells
X Identifying Cancer Cells
X Identifying Microorganisms
X Careers in Medical Laboratory Sciences

Miscellaneous Software (CDs)

X Clinical Laboratory Science Review, Robert R. Harr
X BOR Study Guide, Clinical Laboratory Certification Examinations, 4th ed, 1996
X CLS Student Bowl Games (ASCLS & Illinois CLS Association) set of 2 CDs

MTS- Lab Training and Competency Assessment –University of Washington Department of Medicine: **SEE NEXT PAGE**

Here include the front page from MTS- Lab Training and Competency Assessment –University of Washington Department of Medicine
(from WEB site)

Standard 8E: Computer Technology Resources

Clinical Laboratory Sciences Program

In January 2006, through a generous grant from the college Dean, the computer resources in the CLS Program's dedicated student laboratory / classroom complex were significantly enhanced. The old eight (8) computers purchased in 1998 were replaced by twenty (20) brand new Gateway personal computers. Now we have 20 student work stations, each with a computer and internet connectivity. Students in the clinical year of the Program have unrestricted access to this classroom/computers, including evenings and weekends. Students who desire to do home work or practice lab procedures during the weekends may obtain access to the building from UWF security/public safety office, upon proper identification.

The computers have been configured with a variety of software packages which are most frequently used and/or needed for instruction, learning and evaluation of the student learning. These computers are also configured with tutorial programs on topics specifically intended for clinical laboratory sciences students. A list of the available tutorial software can be found in the Standard 8D of this self study. These computers are also networked through a LAN and extends the learning capability by allowing students to access Distant Learning courses designed by the faculty as well access the Internet mail and all Internet facilities. Computer based assignments are included in each clinical course.

The faculty computers have Intel Pentium ® 4, CPU with 2.40 GHz capacity, configured with Windows XP operating system, with both Word Perfect and Microsoft Office word processing applications. Additional software applications for designing and developing graphic illustration/multimedia presentation and HTML are also available.

Other Access to Computers through Biology/Chemistry Departments

In addition to the CLS Program computers, there is a student computer lab in building 58 and 58A accessible to all science majors in this building. The labs have both PC Pentium 4, 3.06 GHz Windows operating computers and Macintosh G3 (Mac OS 10 platform) models available. These labs provide microcomputers and associated equipment configured with a variety of software packages.

University of West Florida - Computer / Instructional Technology Services

The University of West Florida provides a rich information technology environment to faculty and students for teaching, learning, research, and scholarship. Over 4500 computer work stations populate the Pensacola and Emerald Coast campuses, including more than 1000 machines resident in 36 student computer labs. Over 75% of classrooms are technology equipped, with several providing computers for student use. The University's network-based services and information environment, called ArgoNet, is made available to every student, faculty, and staff member via their ArgoNet account; students receive an ArgoNet account automatically upon being admitted to the University. The two main focal points for delivery of network-based services in ArgoNet are ARGUS, the University's web portal system, and eLearning.uwf.edu, which is UWF's web-based learning management system that is based on the Desire2Learn platform.

Network-based services are delivered over a robust network infrastructure. Fiber-based optical networks provide a 10-gigabit-per-second (Gbps) and 1-Gbps backbone on all campuses. Wall ports in both academic buildings and student residence halls provide at minimum 100-megabits-per-second (Mbps) connections for computer workstations. ArgoAir, UWF's wireless network environment, covers most of the Pensacola and Fort Walton Beach campuses (including several student residence halls) and provides up to 54 Mbps connectivity using an 802.11b/g wireless environment. UWF is connected to the external world via Florida LambdaRail, Florida's statewide research and education network, at 10-Gbps bandwidth. Via Florida LambdaRail, faculty and students have access to the Internet, to Internet2, to National LambdaRail, and via those connections to a variety of national and international research and education networks.

ARGUS, eLearning, and UWF's virtual computer lab (called the "eDesktop") deliver services, software, and resources flexibly to any Internet-connected computer. Students have several options for accessing this robust technology environment. Students who own computers or personal digital assistant (PDA) devices can directly access resources via public wired ports or the ArgoAir wireless environment. Residential students can utilize hard-wired ports and wireless service available in UWF's residence halls, while off-campus students can use UWF's dial-in network access or the Internet service provider of their choice to access the university network. Students who do not own computers may use the hundreds of computer workstations available in general-access and instructional computer labs. These labs include the Student Access Information Lab (SAIL) in Building 79 of the Pensacola campus, which has 110 computers available 24 x 7 for student use; the CyberLounge in the university commons; scores of computers available in the university libraries; and over 30 college computer labs.

Most university services for students – including items from course registration to purchasing a parking permit – are available on the web via ARGUS. Specialized instructional and teaching tools are used by instructors in the eLearning.uwf.edu environment, which can be used to augment a traditional course, provide a "blended" course environment combining online and in-classroom learning activities, or host a purely online distance learning course. Through ArgoNet, students have electronic mail, centralized file storage, personal webpage hosting, and access to both general- and special-purpose software packages provided by the University for their use in learning and scholarship.

Students are assisted in using these technology resources at a variety of levels, ranging from course- and program-specific assistance in academic departments and the colleges to the centralized help provided by the Information Technology Services (ITS) department. ITS services for students include training, a 24 x 7 technology help desk, an online knowledge base, and orientation to the technology environment for incoming students.

III. CURRICULUM

Standard 9A: Structured Curriculum Plan/Sequence of Courses

Degree Plan for a BS in Clinical Laboratory Sciences

FRESHMAN YEAR

Fall 13 sh	**Spring** 13 sh	**Summer** 7 sh
ENC 1101 ENG Comp I……3	ENC 1102 Eng Comp II……3	CHM 2046 Gen Chem II/Lab..4
ZOO 1010 Zoology /Lab…….. 4	CHM 2045 Gen Chem I /Lab…4	XXX xxxx SS/History…….3
MAC 1105 Coll Algebra……...3	XXX xxxx Ethics/Values……..3	
XXX xxxx Fine Arts…….....3	MLS 3031 Intro to CLS…….2 (not required for graduation)	

SOPHOMORE YEAR

Fall 12sh	**Spring** 13 sh	**Summer** 6 sh
CHM 2010 Org Chem I /Lab….4	CHM 2011 Org Chem II/Lab.....4 XXX xxxx SS/Poli Sci……..3	HSC 3550 Pathophysiology …3
PCB 2131 Cell Biology/Lab…..4		STA 2023 Statistics ……3
PCB 4703 Human Physiol…….3	XXX xxxx Literature…….3	
Elective …… 1	XXX xxxx SS/ Behavioral……3	

JUNIOR YEAR

Fall 12 sh	**Spring** 12 sh	**Other Grad Requirements:**
PCB3063 Genetics/Lab…….4	PCB 4233 Immunology/lab…...4	1. Foreign Language: 2 years in HS or 2 sem in college, of the same language
MCB3020 Microbio/Lab……...4	MLS 4305 Hematology I/Lab…4 MLS 4460 Diag Micro I /lab… 4	2. A Multicultural Course as part of the General Studies
BCH 3033 Biochem I /Lab……4	**Selection into Clinical Year**	

CLINICAL YEAR-UNIVERSITY

Summer (On Campus) 11 sh	**Fall (On Campus)** 12 sh
MLS 4220 Urine/Body Fluids……..2	MLS 4630 Clinical Chemistry II…….3
MLS 4625 Clinical Chemistry I …….. .3	MLS 4191 Molecular Diagnostics……2
MLS 4334 Hemo & Thrombosis..……..2	MLS 4550 Immunohematology I…….4
MLS 4462 Med Microbiology……4	MLS 4505 Serology ……2
	MLS 4705 Special Clinical Topics……1

CLINICAL YEAR- HOSPITAL LABORATORY

Spring (Hospital Lab Rotations) 12 sh	**Summer (Hospital Lab Rotations)** 8 sh
MLS 4820L Clinical Chemistry III…….4	MLS 4823l Immunohematology II…….. 4
MLS 4822L Hematology II……. ...4	MLS 4824L Special Clinical Methods……..2
MLS 4821L Diagnostic Microbiology II……..4	MLS 4825L Urinalysis/ Body Fluids I……..2

Graduation:	**:**	**Last Saturday in July**
National Board Certification Exam	**:**	**Eligible by 1st Week of August**
Florida Temporary License	**:**	**By 1st week of August**
Florida Regular License	**:**	**By the end of August**

Standard 9A: Program Goals and Competencies

CLINICAL LABORATIRY SCIENCES

Mission Statement

The Clinical Laboratory Sciences Program offers a baccalaureate degree of highest quality in clinical laboratory sciences, enabling the graduates to develop successful careers in bio-medical technology fields and to pursue advanced degrees in related fields. The faculty of the program strive to advance the knowledge, technology, and education methods in clinical laboratory sciences; to maintain clinical affiliations with local and regional health care facilities and serve as a source of well qualified personnel to staff their clinical laboratories; and to promote and enhance the public's knowledge regarding the profession of clinical laboratory sciences and the UWF's Clinical Laboratory Sciences Program.

Student Learning Outcomes

UWF Clinical Laboratory Sciences Program graduates should be able to do the following:

Content

- Recognize and apply concepts, principles, and theories from the sciences that underlie clinical lab skills (e.g., biochemistry, pathophysiology)
- Apply methodological principles from clinical courses
- Recognize and apply principles of quality assurance
- Use medical technology terminology accurately
- Describe career opportunities available in clinical laboratory science, including opportunities in independent practice
- Articulate frontiers of knowledge in chosen profession

Critical Thinking

- Distinguish abnormal from normal results
- Interpret and evaluate clinical procedures and results
- Make and confirm sound diagnostic conclusions
- Predict clinical course following diagnosis
- Conduct research using appropriate literature
- Select and apply appropriate statistical procedures to evaluate data

Communication

- Select, operate, and maintain appropriate strategies for recording and reporting results
- Communicate effectively with related medical discipline professionals and service providers
- Interact effectively with patients using calm and reasoned judgment and sensitivity to patient characteristics?
- Make professional oral presentations of findings

Integrity/Values

- Articulate appropriate professional responsibility for patient's welfare
- Recognize and adhere to applicable professional regulations, ethical standards, and program's code of conduct
- Advocate for effective, timely, accurate, and cost effective service to demonstrate commitment to patient's welfare
- Maintain confidentiality of patient information

Project Management

- Correlate results from various procedures with management of patient's condition
- Research, develop, and perform new laboratory procedures and evaluate effectiveness
- Enact principles of best practice for lab management
- Enact principles of best practice for human resource management

Hazard and Risk Management

- Recognize and describe principles and regulations regarding lab safety
- Practice lab safety procedures and protocols
- Identify and prevent medical error or minimize consequences of medical errors

Job Prospects for Medical Technology Graduates

Clinical Lab Scientist in:	Section Supervisor/Specialist	Clinical Laboratory Manager
Clinical Chemistry	Public Health Lab Scientist	Clinical Lab Outreach Director
Hematology/Hemostasis	Crime Lab Scientist	Blood bank Administrator
Diagnostic Microbiology	Lab Technical Supervisor	Lab Outreach/Marketing Officer
Immunohematology	Biotech Industry-Sales Rep	Quality Assurance Officer
Serology/Immunology	Biotech Industry-Training Rep	Information Systems Manager
Molecular Diagnostics	CLS Program Faculty	Clinical Lab Consultant
Toxicology	Pharmaceutical Lab Scientist	Regulatory Compliance Officer

Find Out More about Clinical Laboratory Sciences at UWF:
uwf.edu.clicallabsciences

Program Goals

- To maintain a nationally accredited program of excellence and to provide a sound educational opportunity for students who seek a career in clinical laboratory sciences and/or biomedical technology fields.
- To prepare well educated, highly skilled individuals for the nation's rapidly growing clinical and biotechnology laboratories.
- To develop recruitment materials and disseminate up-to-date information regarding educational requirements and career opportunities in Clinical Laboratory Sciences Program and CLS Profession to prospective students and the general public.
- To recruit, retain and graduate students with strong academic and professional potential.
- To prepare students for employment in a modern clinical laboratory as clinical laboratory scientists by:
  - Imparting the theoretical knowledge, critical thinking and analytical skills needed to perform clinical laboratory procedures accurately and efficiently.
  - Introducing the student to principles of clinical laboratory supervision, management and education.
  - Ensuring that students have acquired communication skills necessary to inform and interact with patients, physicians and other health care professionals.
  - Instructing and training students in practice of ethics, integrity and values necessary for prevention of medical errors and for ensuring, in line of their duty, welfare of patients and general public.
  - Training the students in lab safety practices.
  - Preparing students for national board certification exams and eligibility for state license.
- To stimulate students in their quest for knowledge and provide assistance to enter graduate or professional schools.
- To articulate with local and regional community colleges to provide up-to-date information and facilitate academic advisement of prospective majors.
- To maintain partnerships and affiliations with local and regional clinical laboratories, to support and enhance students' educational experience at the clinical sites.
- To provide continuing education programs in clinical laboratory sciences and serve as a source of academic information to the general public.
- To provide service to the university, to the profession, and to the community through faculty expertise, research and commitment.

Standard 9A: Course Syllabi with course goals and behavioral objectives for one sample unit of instruction (both lecture and lab)

MLS 4460 Diagnostic Microbiology I & MLS 4460L Diagnostic Microbiology Lab
SYLLABUS

General Course Information:
MLS4460 DIAGNOSTIC MICRO I and Lab
Bldg 58, Room 078
T R 11-12:15, Lab: MW 2:30-5:30
Instructor Information:
Kristina Jackson Behan, Ph.D., MT(ASCP)
Associate Professor
Office Address: Bldg 58, Room 76A Telephone Number: 474-3060
Email: kbehan@uwf.edu
Office Hours: MW 1-2; T R 2-4 and by appointment
Reading Materials
Required

- Textbook of Diagnostic Microbiology, Mahon and Manuselis. (2nd edition, 2000) ISBN 0-7216-7917-X. W.B. Saunders Company, Philadelphia, PA
- Lab Manual is available on elearning. Please print and bind it.

Recommended

- Bailey & Scott's Diagnostic Microbiology by Forbes, Sahm, & Weissfeld (11th Edition, 2002) Mosby, St. Louis
- Clinical and Pathogenic Microbiology by Howard, Keiser, Smith, Weissfeld, & Tilton (2nd Edition, 1994) Mosby, St. Louis
- Color Atlas and Textbook of Diagnostic Microbiology by Winn, Allen, Janda, Koneman, Procop, Schrenckenberger, & Woods (6th Edition, 2006) Lippincott, Philadelphia, PA
- Manual of Clinical Microbiology by Murray, PR (7th Edition, 1999) American Society for Microbiology Press, Washington, DC
- Diagnostic Bacteriology, A Study Guide, Margaret Bartlett, 2000, F.A. Davis Company, Philadelphia, PA

Course Description

Lecture component
Study of bacteria associated with infectious diseases. Includes microbial taxonomy, physiology, genetics and host-parasite relationships as they apply to clinical microbiology. Pathogens of particular organ systems, pathogenesis of infectious disease, clinical manifestations, etiology and epidemiology of disease are covered. Interpretation of test results and clinical relevance are taught utilizing case studies.
Lab component
Methods course for specimen collection, handling and processing of human tissues and body fluids for isolation and identification of bacteria. Conventional and rapid identification methods for clinically significant bacteria, principles of automation, susceptibility testing, infection control, and quality assurance procedures are included.

Topics covered

1. Laboratory Safety	13. Antimicrobial agents
2. Cultivation and Isolation techniques	14. Nonfermenters
3. Host Microbe interactions	15. Fastidious organisms
4. Gram stain	16. Gram positive rods
5. Staphylococcus and Micrococcus	17. Anaerobes
6. Streptococcus and Enterococcus	18. Wound/Fluid cultures
7. Alpha hemolytic Streptococcus	19. Molecular Diagnostics
8. Respiratory cultures	20. Agents of Bioterror
9. Enterobacteriaceae	21. Obligate intracellular agents
10. Urine cultures	22. Blood cultures
11. Enteric pathogens	23. Meningitis
12. Stool cultures	24. Emerging pathogens &Technologies

Special Technology

Course material will be available on elearning.

Prerequisites

MCB 3020 & 3020L

Board of Registry Information

The ASCP Board of Registry examines applicants using three levels of questions. Level 1 questions are straightforward recall questions. Level 2 requires interpretation of data. Level 3 requires the use of recalled knowledge to resolve a problem or make a decision. These three types of questions will be used in evaluating student performance.

Method of Instruction

This class has a lecture and laboratory component, and is presented face-to-face.

Method of Evaluation

There will be 5 major examinations with practical components that will be worth 100 points each. Quizzes will be added at the instructor's discretion. All points, in lecture or in lab are equivalent to each other, and will be averaged for the overall grade.

Diagnostic Microbiology I is a core course for Medical Technology students. A letter grade of C (73%) or better is required for successful completion of this course as well as for enrollment in MLS 4821L Diagnostic Microbiology II (during the hospital rotation). While the final grade received for the course will be derived from points earned through completion of all the examinations, a minimum of 70% accuracy is also required in each individual examination.

Students earning less than 63% will earn an "F" for the course.

Lab: Laboratory exercises are a vital component of this class. Each exercise will be evaluated for points, usually 10 points a piece. Students will also be responsible for identifying unknowns. Lab grades are integrated into the lecture grade, so that both grades will be the same. Quizzes will be given at the instructor's discretion.

Grading Scale:

93-100 = A	80-82 = B-	67-69 = D+
90-92 = A-	77-79 = C+	63-66 = D
87-89 = B+	73-76 = C	60-64 = D-
83-86 = B	70-72 = C-	Below 63 = F

Class Policies

Strict adherence to the following will be a requirement for course completion.
Punctuality: Tardiness in lecture sessions is unacceptable.
Make-up Examination: A maximum of one make-up examination will be allowed in this course. A make-up will be allowed ONLY at the instructor's discretion.
Assigned Reading: Should be completed before the corresponding lecture.
Maintenance of Class Notes: Note carefully that in the future you will be tested repeatedly for your knowledge and application of material covered in this course; not only during your hospital rotation, but also in national certification and state licensure examinations. It is therefore essential that you gain a sound knowledge of theory and practice of diagnostic microbiology towards success in future applications and practices. Keep an organized, up-to-date file of all the material gathered during this course for future use. The table of contents has blank spaces for you to fill in keywords and page numbers of handouts and lab exercises
Safe laboratory practices are a must. Closed shoes must be worn during laboratory sessions. No food/gum permitted in the lab. Do not put your fingers or pens/pencils into your mouth in the lab. Do not apply makeup/chapstick or insert contact lenses while in the lab. Lab coats must be worn within the lab. Long hair must be safely contained. OSHA fines hospitals for employees that fail these safe practices. You will be fined points instead.
Expectations for Academic Conduct/Plagiarism Policy:
As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity-personal and institutional-is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.
Assistance
Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.
Materials
Always bring your shoes to class. No open toes. Print information from elearning on your own paper, before class time.

MLS 4460 &4460L Diagnostic Microbiology

Diagnostic Micro Class 1: Introduction, Lab Safety, Specimen transport and collection.
Reading assignment: **Mahon Chapter 2, Phlebotomy workbook Chapter 3**
Lecture Outline:

I. Introductions
II. Syllabus and class policies
III. Safety Issues in the lab
- A. Chemical safety
  1. MSDS
  2. Fume hoods
- B. Fire safety
- C. Handling of compressed gasses- tanks need to be secured
  1. Chemical safety
  2. Fire safety
  3. Gas cylinders
- D. Biological safety
  - i. BSL levels
  - ii. Sterilization
    1. Moist heat
    2. Dry heat
    3. Filtration
    4. Chemical
  - iii. Disinfection
    1. Physical
       a) boiling
       b) pasteurizing
       c) nonionizing
    2. Chemical- alcohols, phenols, etc.
- E. Work practice controls
- F. Engineering controls
  - i. waste control
  - ii. safety cabinets
  - iii. mailing
  - iv. safety needles
- G. Personal protective equipment
- H. Bloodborne pathogens
- I. Mechanisms to reduce exposure
- J. Universal precautions movie

Student Learning Outcomes.
Following a successful completion of this class the student will be able to:

1.1. Define and give examples of sterilization, disinfection, bacteriostatic, bactericidal, disinfectant and antiseptics.
1.2. Understand when it is necessary to use each method listed above.

1.2. Describe the different heat methods and their respective applications; describe the way that physical agents control the growth of microorganisms.
1.3. Define MSDS and OSHA
1.4. Discuss the principles of Universal Precautions
1.5. Describe personal protective equipment and its purpose in the lab
1.6. List and describe the possible routes of lab-acquired infections
1.7. Describe the function of a biological safety cabinet
1.8. Describe how to dispose of hazardous waste
1.9. Describe the basis of chemical, fire, and gas safety
1.10. Distinguish work safety practices, PPE and engineering controls
1.11. State the temperature and pressure for autoclaving biological materials
1.12. List 8 factors that influence the activity of disinfectants
1.13. Contrast sterilization and disinfection
1.14. Describe the 4 types of Biosafety level labs
1.15. Describe the 3 types of Biological safety cabinets
1.16. List the most common methods of healthcare transmission of BBP
1.17. Access elearning successfully

Study questions:

1. What is the difference between sterilization and disinfection?
2. What type of sterilization would be used for making agar plate media?
3. CDC's Universal Precautions should be followed when working with what type of specimens?
4. Why do you use Biological Safety Cabinets?
5. How would you define normal flora and pathogen?
6. During a procedure, blood is spilled on a tabletop. What would be the best solution to clean the surface with?
7. What type of sterilization is used for glassware?
8. What is the single most important means of preventing the spread of disease?
9. A sterilization technique that involves pulling a solution through a membrane is called what?
10. What gas is used for sterilizing heat-sensitive objects?

Diagnostic Micro Class 2: Laboratory Cultivation and Isolation - Media
Reading assignment: **Mahon Appendix A**

Summary: Categories of media, conditions necessary for bacterial growth, characteristics of common media, streaking for isolation and aseptic technique, terms for gross colony morphology.

Lecture Outline:

I. Artificial media
  A. Enrichment
    1. Encourages the growth of particular organisms and suppresses the growth of others (ex. selenite broth)
  B. Supportive
    1. Contains nutrients that allow most nonfastidious organisms to grow at their natural rate. (Ex. nutrient agar)
  C. Selective

1. Contains agents that inhibit all organisms except the ones being sought. (Ex. PEA agar)

D. Differential
1. Employs factors that allow colonies to be morphologically distinguished (ex. sheep blood agar)

E. Preparation of media

II. Conditions necessary for growth
A. Aerobic
B. Anaerobic
C. Microaerophilic
D. Facultatively anaerobic
E. Capnophilic
F. Temperatures of incubators
G. pH of media

III. Characteristics of common media
A. Blood agar
1. Supports all but the most fastidious organisms
2. Differential- hemolysis reactions

B. Chocolate agar
1. Lysed red cells
2. Contains hemin (X factor) and coenzyme nicotine adenine dinucleotide (V factor)

C. MacConkey agar
1. Selective- contains crystal violet dye that inhibits Gram positive organisms.
2. Differential- pH indicator neutral red shows if colonies ferment lactose or not.

D. Chopped meat
1. Enriches and preserves anaerobes
2. Pieces of chopped meat serve to:
a) provide substrates for proteolytic enzymes
b) serve as reducing substances to maintain low Eh
c) Prevent rapidly growing bacteria from overgrowing slower forms

E. HE and XLD
1. Selective- high concentration of bile salts and dyes inhibits the growth of most normal fecal flora.
2. Differential-determines lactose or non-lactose fermenting and also H2S production

F. Thayer martin
1. Enriched chocolate agar base with
a) colistin- inhibits many Gram negative bacteria
b) Vancomycin- inhibits many Gram positive cocci
c) Nystatin- inhibits yeast

G. Thioglycollate broth
1. Enrichment broth that will grow aerobes and anaerobes

H. PEA- Phenylethyl Alcohol Agar
1. Selective- inhibits Gram negative bacilli

IV. Use of streak plates and streaking patterns for isolation
V. Aseptic technique

VI. Cover terms to describe gross colony morphology

Student learning outcomes:

Following a successful completion of this class the student will be able to:

2.1. Define and compare the following general concepts of artificial media
   a) enrichment
   b) supportive
   c) selective
   d) differential

2.2. Discuss conditions necessary for growth including incubation temperatures, atmospheric conditions, pH and CO2 considerations.

2.3. List and describe the types of hemolysis observed on sheep blood agar

2.4. For each of the following media state its purpose and describe the important components:
   a) Blood agar
   b) Chocolate agar
   c) MacConkey agar
   d) Chopped meat
   e) HE and XLD
   f) Thayer Martin
   g) Thioglycollate broth

2.5. Demonstrate the ability of streaking for isolation and be able to produce plates with at least three isolated colonies.

2.6. Describe the terms for gross colony morphology
   a) circular
   b) oval
   c) filamentous
   d) irregular
   e) swarming
   f) flat
   g) raised
   h) domed
   i) heaped
   j) sunken

2.7. Describe and compare the colony morphology of Staphylococcus aureus, Pseudomonas aeruginosa, Serratia marcescens, alpha strep, E. coli and Proteus.

Study Questions

1. How would you describe the following media as being:
   Selective /differential/ supportive / enrichment?
   a) MacConkey
   b) HE and XLD
   c) Thioglycollate broth
   d) Chocolate agar
   e) Thayer Martin
   f) PEA

2. What liquid media supports both aerobic and anaerobic growth?
3. How would you define a capnophilic organism?
4. What two media are selective for Gram positive cocci?
5. What are the two factors in chocolate agar?
6. What would be 3 organisms that could be used to QC MacConkey agar and why?
7. What are the main ingredients in Thayer Martin?
8. What are the three types of hemolysis seen on sheep blood agar?
9. What is the importance of a streak plate?
10. Why is it important to use only isolated colonies?

Diagnostic Micro Class 3: Media Lab
Reading assignment: **Mahon Chapter 9**
Summary: This lab exercise will concentrate on "reading" primary plates using a number of different organisms, as well as practice with organism isolation.
Lecture Outline:
I. Review the salient features of 4 types of media
- BAP/TSA with 5% blood
- MacConkey
- Hektoen
- Thioglycollate

II Review Streaking/aseptic approach and disinfection.
III. Laboratory exercise. Interpret the growth pattern of a number of different bacterial strains using the qualifiers of hemolysis, size, color, odor, shape and lactose fermentation.
Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
3.1. List the ingredients in BAP, Mac, Hektoen, and Thio
3.2. Describe the attributes of each media with respect to selection and differentiation
3.3. Interpret hemolysis patterns on BAP as alpha, beta or gamma
3.4. Interpret MacConkey plates as No growth, lactose fermenter or nonlactose fermenter.
3.5. Use a bacti-cinerator and loop to streak media for isolation.
3.6. Interpret the growth on plates using Semiquantitative qualifiers of 1+, 2+, 3+, 4+ and sparse, moderate and heavy.
3.7. Describe colony characteristics by color, size, shape and odor.
Study questions
1. What are the three patterns of hemolysis?
2. What is the significance of a purple colony on a MacConkey plate?
3. What is the significance of a white colony on a MacConkey plate?
4. In what instance will there be no growth on a MacConkey plate?
5. How are each of the 4 media used here differential?
6. Which of the media used here are selective?

Diagnostic Micro Class 4 and 5: Host Parasite Interactions
Reading Assignment: Mahon and Manuselis Chapter 6
Lecture Outline:

I. Host-parasite time line
II. Factors that affect colonization
III. Indigenous flora
IV. Pathogenicity
V. Host resistance factors
VI. Infectious agent factors
VII. Routes of transmission
VIII. Epidemiology
IX. Strategies to minimize disease and prevent infections

Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
Following this lecture, the successful student will be able to:

4.1. Define the terms indigenous flora, symbiont, commensal, carrier, endemic, epidemic, incidence rate, prevalence rate, index case, morbidity rate, nosocomial infection, iatrogenic, reservoir
4.2. List factors that affect colonization from the standpoint of the host and from the standpoint of the agent.
4.3. List 4 bacterial factors that aid in virulence
4.4. Compare and contrast exotoxins and endotoxins
4.5. List 8 host resistance factors, and host subpopulations at risk for infection
4.6. Illustrate phagocytosis in detail by sequence
4.7. Discuss typical routes of transmission of infectious agents
4.8. State the single most important mechanism to prevent the spread of infection
4.9. Discuss the role of public health agencies in protecting the population from disease
4.10. Describe humoral immunity by cell type and product
4.11. Describe cellular immunity
4.12. List the 4 components of inflammation

Study questions:

1. What are microorganisms called that cause infections and/or disease?
2. What are two natural barriers that a host has to protect itself from infection?
3. Why is it important to be knowledgeable about the normal flora of the human body?
4. How does the T cell assist the B cells?
5. How do humoral and cell-mediated immunity differ?
6. What is another name for antibodies?
7. What is the difference between an exotoxin and an endotoxin?
8. The primary cells that mediate cell-mediated immunity are?
9. What does the complement system do?
10. What is the body's first line of defense against microorganisms?
11. Endotoxins are most commonly associated with Gram positive or Gram negative?

Diagnostic Micro Class 6: Gram stain
Reading assignment: **M & M Chapter 8, medtraining.org on gram stains.**
Summary: Cellular differences between Gram positive and negative organisms. Microscope care and use, Gram Staining procedure, smear preparation, smear interpretation, colony morphology interpretation.
Lecture Outline:
I. Gram Stain
   A. Cell walls of gram positive and negative cells
   B. Procedure of the gram stain
   C. Examination of gram stain morphology
II. Smear preparations
   A. Liquid or broth smears
   B. Isolated colony
   C. Swab smear
III. Interpretation of smears
IV. Microscope Care and Use
   A. Transporting the microscope
   B. Coarse focusing with 4X (low power)
   C. Fine focusing with 10X and 40X (high power and oil)
   D. Proper cleaning of lenses after use
   E. Storing microscopes
Student learning outcomes:
Following a successful completion of this class the student will be able to:
6.1. The student shall demonstrate proper microscope care, use of 10X, 40X, and oil immersion lenses and cleaning of the scope
6.2. Diagram a gram negative and gram positive cell, and label the differences
6.3. List the steps in a Gram stain including smear preparation
6.4. Describe the function of the following reagents:
   a) crystal violet
   b) Gram's iodine
   c) Acetone alcohol
   d) Safranin
6.5. List an acceptable combination of 2 bacterial species to use as QC for a gram stain.
6.6. Correctly perform Gram stain's on broth cultures and plate cultures
6.7. Correctly describe the Gram stain morphology of assorted bacteria by using a microscope, oil immersion lens, lens paper of pre-stained slides.
6.8. Identify WBC and stain precipitate on slides
6.9. Correlate gram stain findings with bacterial growth on selective media
6.10. predict the effect of omitting particular reagents from the gram procedure
Lab exercise: continuation of previous lab, tutorial on gram stain at http://medtraining.org.
Study questions
1. The magnification used for visualization of most bacteria is what?
2. How do the cell walls of Gram positive and Gram negative organisms differ?
3. What are the four steps in a Gram stain?
4. In which step is time most critical?

5. What are the functions of the four steps?
6. What two organisms could be used to QC Gram stain reagents?
7. If the acetone-alcohol step were inadvertently omitted from the Gram stain, what color would both Gram positive and Gram negative organisms be?
8. If iodine were inadvertently omitted what color would both Gram positive and Gram negative organisms be?

Diagnostic Micro Class 7: β-lactams, Micrococcaceae
Reading assignment: **M&M Page 53-57, Chapter 10**
Summary: This class will begin with a discussion on beta lactams as cell wall inhibitors as antimicrobials, and continue with Staphylococcus aureus.
Outline:

I. Review of gram positive versus gram negative cells
II. Five types of antimicrobial action
III. Cell wall inhibitors
    a. Beta-lactams
    b. vancomycin
IV. Defense against antimicrobials
    a. Beta-lactamase
V. Micrococcaceae family
VI. Staphylococcus
VII. Staph aureus
    a. Modes of transmission
    b. Spectrum of disease
        i. Localized
        ii. Invasive
        iii. Toxin mediated
    c. virulence factors
        i. capsule
        ii. protein A
        iii. teichoic acid
        iv. enzymes
        v. β-lactamase
        vi. hemolysins
        vii. toxins
    d. identification
        i. BAP
        ii. Selective media
        iii. Catalase
        iv. Coagulase
        v. Vogues-Proskauer
        vi. Rapid tests
            1. latex agglutination for clumping factor
            2. antiprotein A antiserum
            3. passive hemagglutination

4. staphase

vii. Other methods

1. DNase
2. thermonuclease
3. DNA probes and PCR

e. MRSA and VISA

Student learning outcomes:

Following a successful completion of this class the student will be able to:

I. Antimicrobial section

7.1. List five sites of action for antimicrobials

7.2. State the two main types of antimicrobials that affect cell wall synthesis

7.3. Describe the mode of action of a beta-lactam

7.4. List two types of beta-lactams

7.5. Compare and contrast beta-lactamase activity in gram positive and gram negative cells

7.6. Contrast inducible versus constitutive b-lactamase activity.

II. Micrococcaceae

7.7. State the gram stain characteristics of this family

7.8. List the 4 genera

7.9. List the three main types of disease caused by Staph aureus

7.10. List the virulence factors of Staph aureus

7.11. List general and selective media on which Staphylococcus can be isolated.

7.12. State the principles and purpose of the catalase reaction, and perform it correctly.

7.13. State the principles and purpose of the coagulase test. Differentiate between bound and free. Perform the slide test correctly.

7.14. State the principle and purpose of the following media, and interpret the result.

a. Mannitol Salt Agar

b. DNase medium

7.15. Describe the identification of Staphylococcus intermedius versus Staph aureus

7.16. Describe the clinical significance of MRSA, and the rationale for oxacillin versus methicillin for in vitro testing

Study Questions

1. What biochemical tests are used to differentiate Staphylococcus from other gram positive cocci?
3. Describe one possible cause of a false catalase test.
4. How do "bound" and "free" coagulase differ?
5. Why is it necessary to perform a tube coagulase if the slide coagulase is negative?
6. How does Mannitol Salt Agar differentiate Staphylococcus species?
7. Describe one possible cause of a false catalase test.
8. What antibiotic is used to determine if S. aureus is methicillin resistant?
9. How can inducible resistance to oxacillin be detected?

Diagnostic Micro Class 8: Staph Identification
Reading assignment: **M & M Chapter 10**

Summary: During this class time, we will finish the discussion on CoNS (coagulase negative Staph), discuss the procedures for lab in depth, establish lab partners and perform the lab.

Lecture Outline:

I. Coagulase negative Staph (CoNS)
   a. Micrococcus
      i. Identification
      ii. Distinguished from Staph
         1. antibiotics
         2. OF media
            a. Oxidation requires oxygen, yellow is +
            b. Fermentation requires anaerobic environment
         3. lysostaphin and lysozyme
   b. Stomatococcus mucilaginous
      i. Distinguished from Micrococcus by Microdase
   c. Staphylococcus epidermidis
      i. Opportunistic
      ii. Nosocomial
      iii. Slime factor
      iv. Heart valve endocarditis
      v. Normal flora versus pathogen state
      vi. Identification in flowchart
   d. Staphylococcus saprophyticus
      i. Normal flora
      ii. UTI
      iii. Community acquired
      iv. Identification versus epidermidis

II. Laboratory procedures
   e. Catalase
   f. Coagulase
      i. Transfer pipets
      ii. Oxford pipettor use
      iii. parafilm
      iv. Disposal of waste
   g. McFarland standard density and lawn of growth
      i. 0.5 standard comparison
      ii. 3 directions for lawn
      iii. Add this info to your lab book, and reference it to the Bacitracin and Novobiocin procedures
   h. Bacitracin A disk
      i. Storage
      ii. Handling
      iii. Use/forceps
   i. Novobiocin disk

j. O/F media, needles and mineral oil

III. Laboratory exercise

k. Partners

Student learning outcomes:

Following a successful completion of this class the student will be able to:

8.1. List the predominant pathogenic Staph species
8.2. Contrast Staph aureus to Micrococcus and other CoNS
8.3. Give a method to distinguish Micrococcus from Stomatococcus mucilaginous
8.4. List three antibiotics that can distinguish S. aureus from Micrococcus
8.5. State the carbohydrate that can be fermented by S. aureus but not Micrococcus
8.6. Describe the visual effect of oxidation and fermentation on OF media
8.7. State the principle of the catalase reaction
8.8. State the principle of the coagulase reaction, and distinguish two types of coagulase.
8.9. State keywords that are associated with Staph saprophyticus and Staph epidermidis
8.10. Prepare a bacterial suspension with an approximate concentration of 1.5X 10^8 CFU/ml.
8.11. Interpret antibiotic susceptibility tests for Bacitracin and Novobiocin
8.12. Identify an unknown Staph species
8.13. Determine clinical significance of S. epi based on site of origin

Study Questions

1. What biochemical tests are used to differentiate Staphylococcus epidermidis from Staphylococcus saprophyticus?
2. How is the coagulase test utilized in the identification of organisms within the genus Staphylococcus?
3. Describe one possible cause of a false catalase test.
4. How do "bound" and "free" coagulase differ?
5. Why is it necessary to perform a tube coagulase if the slide coagulase is negative?
6. How do you differentiate Micrococcus from other coagulase negative Staphylococcus?
7. What type of specimen would you most likely find Staphylococcus saprophyticus in?
8. How does Mannitol Salt Agar differentiate Staphylococcus species?
9. What is the gram stain morphology of bacterial species within the family Micrococcaceae?
10. Which three species of Staphylococcus are of the greatest importance in the clinical microbiology laboratory?
11. What are two important toxigenic diseases caused by Staphylococcus aureus?
12. Name the antimicrobial agent most often used to treat infections caused by MRSA.
13. Describe the method used to detect MRSA.
14. Describe the enzymatic mechanism by which most strains of Staphylococcus aureus resist the effects of penicillin.
15. Name 4 factors that cause Staphylococcus aureus to be more virulent than other Staphylococcus species.
16. How does the catalase enzyme assist Staphylococcus aureus in surviving?
17. What does the coagulase enzyme do for Staphylococcus aureus?
18. What is Protein A?
19. A wound specimen arrives in the lab and the source is a dog bite infection. A coagulase positive Staphylococcus is cultured what would you possibly suspect? What tests differentiate this organism from other coagulase positive Staphylococcus?

20. Rapid particle agglutination tests for the identification of Staphylococcus aureus detect what two substances?
21. Would you consider recovery of Staphylococcus from an internal catheter line significant?

Diagnostic Micro Class 9: Staphylococcus identification continued: Rapid ID, sensitivity and specificity
Reading assignment: **Staphaurex procedure**
Summary: During this class period, we will complete the laboratory exercise from the previous day. We will evaluate the Staphaurex rapid method of detection by analyzing the product literature, and discuss the performance characteristics "sensitivity" and "specificity". We will continue with the ID process for the unknown.
Lecture Outline:

I. Review the Staphaurex procedure and answer a series of questions regarding it.
II. Discuss the procedure
III. Perform the procedure
IV. Complete lab from previous day.

Student learning outcomes:
Following a successful completion of this class the student will be able to:
9.1. List two advantages to performing a rapid Staph identification
9.2. List two virulence factors that are detectable by the Staphaurex procedure
9.3. List 2 specimens that are recommended for the procedure
9.4. Perform a Staphaurex test and interpret it
9.5. List 2 species that are used for QC of the procedure
9.6. Define sensitivity and specificity
9.7. Calculate sensitivity from data
9.8. Calculate specificity
9.9. Describe the virulence factors tested by the Staph aureus
Study Questions

1. Explain the difference between sensitivity and specificity using words
2. Give a formula for sensitivity
3. Give a formula for specificity
4. What virulence factors are associated with Staph aureus?
5. 500 cultures that are known to be Staph aureus were tested with the Staphaurex procedure, but only 490 had positive results. Determine the sensitivity of the test.
6. 500 cultures that did not grow Staph aureus were tested with the Staphaurex procedure. 12 gave a positive result. Determine the specificity of the test.

Diagnostic Micro Class 10: Catalase negative Gram positive cocci
Reading assignment: **M & M Chapter 11**

Summary: Streptococci are frequently grouped based on their hemolysis pattern, followed by a flow of biochemicals. This lab will distinguish gram positive cocci as Staph or Strep using routine biochemical methods.

Lecture Outline:

I. Methods of "grouping" Streptococci
II. Biochemical testing to distinguish □-hemolytic strep
    a. Bacitracin
    b. PYR –
        i. PYR substrate is cleaved to b-napthylamine
        ii. This product is detected in the presence of N,N-methylamino-cinnamaldehyde
    c. CAMP factor
    d. SXT sensitivity
    e. Hippurate hydrolysis

Student learning outcomes:

Following a successful completion of this class the student will be able to:

10.1. Compare and contrast the hemolysis and colony morphologies and gram stains of Streptococcus pyogenes and Streptococcus agalactiae, relative to S. aureus

10.2. State the principles of the following tests, state the expected reactions of Groups A and B Strep to them, and be able to correctly perform and interpret the following tests:
    A. Bacitracin test
    B. PYR
    C. CAMP
    D. SXT sensitivity
    E. Hippurate hydrolysis

Diagnostic Micro Class 11: Beta hemolytic Streptococci
Reading assignment: **M & M Chapter 11**

Summary: This class will focus on the diseases and virulence factors associated with the beta hemolytic streptococci.

Lecture Outline:

I. Taxonomy and general characteristic
II. Group A beta-hemolytic Streptococcus
    A. general characteristics
    B. mode of transmission
    C. spectrum of disease
    D. other complications
    E. Virulence factors
    F. Identification tests
III. Group B beta-hemolytic Strep
    A. general characteristics
    B. mode of transmission
    C. spectrum of disease

D. other complications
E. Virulence factors
F. Identification tests

IV. Group C
A. general characteristics
B. mode of transmission
C. spectrum of disease
D. other complications
E. Virulence factors
F. Identification tests

V. Group F
A. general characteristics
B. mode of transmission
C. spectrum of disease
D. other complications
E. Virulence factors
F. Identification tests

VI. Group G
A. general characteristics
B. mode of transmission
C. spectrum of disease
D. other complications
E. Virulence factors
F. Identification tests

Student learning outcomes:

Following a successful completion of this class the student will be able to:

11.1. List the general characteristics of the genus Streptococcus
11.2. Describe the Lancefield Grouping System
11.3. List the primary cultivation media used to isolate Streptococci
11.4. Discuss the clinical significance of rheumatic fever and acute glomerulonephritis.
11.5. Differentiate between Streptolysin O and Streptolysin S.
11.6. State the principle and purpose of the following tests:
i) Bacitracin (A disk)
ii) SXT susceptibility
iii) PYR
iv) ASO titer
v) CAMP test
vi) sodium hippurate hydrolysis
11.7. Discuss the clinical significance of infections caused by Group B Streptococcus in newborns.
11.8. Discuss the clinical significance of the following Streptococci:
i) Lancefield group C
ii) Lancefield group F
iii) Lancefield group G
11.9. Analyze a case study, using clinical, physical and biochemical clues to identify hemolytic

Streptococccus Group A, B, C, F and/or G

11.10. Propose a plan or flowchart that can be used to differentiate the beta hemolytic Strep.

Diagnostic Micro Class 12: Alpha and Gamma hemolytic Streps
Reading assignment: **M&M Chapter 11**
Lecture Outline:

I. Gamma streps
   a. Group D
   b. Enterococcus
   c. Non Group D
   d. Tests to differentiate
      i. Esculin hydrolysis
      ii. Resistance to bile
      iii. Resistance to high salt
      iv. PYR

II. Alpha streps
   a. Strep viridans
   b. Strep pneumoniae
   c. Tests to differentiate
      i. Optochin
      ii. Na desoxycholate
      iii. Colony morphology
      iv. Gram stain morphology

III. Nutritionally variant Strep
   a. Pyridoxal
   b. Blood culture caveat

IV. Strep like organisms
   a. Aerococcus
   b. Leuconostoc
   c. Pediococcus

V. Lab exercise

Student learning outcomes:
Following a successful completion of this class the student will be able to:

12.1. List 3 types of gamma hemolytic strep, and create a scheme to differentiate them.
12.2. Recognize suspected colonies of S. pneumo based on colony characteristics and gram stain
12.3. List four methods to distinguish alpha hemolytic strep species
12.4. Perform and interpret esculin hydrolysis
12.5. Perform and interpret 6.5% NaCl culture
12.6. Perform and interpret PYR test
12.7. Identify unknowns using the classic tests

12.8. State the principle and purpose of the following tests
Bile esculin hydrolysis
6.5% salt tolerance
PYR
Optochin
Bile solubility
Vancomycin sensitivity

12.9. Describe the isolation techniques for nutritionally deficient Strep

12.10. Compare and contrast Enterococcus and Aerococcus

12.11. Describe Leuconostoc and Pediococcus by morphology and special test results

Study Questions

1. How would you differentiate between Group D and Enterococcus?
2. If there is growth in a bile esculin slant but no color change would it be interpreted as positive or negative?
3. Why should susceptibility testing be performed on Enterococcus especially if found in a positive blood culture?
4. If a non-hemolytic Streptococcus is catalase- negative, bile esculin positive and grows in 6.5% NaCl what group would it belong in?
5. Why is vancomycin resistance in Enterococci a serious health problem?
6. What two Streptococci are PYR positive?
7. What three tests can PYR replace?
8. How would you differentiate between Streptococcus viridans and Streptococcus pneumoniae?
9. What does a colony of Streptococcus pneumoniae appear like on a blood agar plate?
10. What colony characteristic contributes to the virulence of Streptococcus pneumoniae?
11. On a blood culture gram stain you observe gram positive cocci in chains. Upon subculture there in no growth. What would you suspect and do next?
12. How would you differentiate Streptococcus bovis from Streptococcus viridans?
13. A direct gram stain on a CSF shows lancet-shaped gram positive diplococci, what would you suspect?
14. Subacute bacterial endocarditis (SBE) is most often caused by what group of Streptococcus?
15. Which Streptococcal species would you expect to have these results?
    Catalase- negative No hemolysis on SBA Bile esculin- positive NaCl- positive
16. On a respiratory culture you have an alpha-hemolytic colony that is mucoid. What would you suspect?
17. What would be your next biochemical test?
18. An organism on a "P" disk had a zone of inhibition of 9mm. How would you interpret this?
19. What is the principle of the bile esculin test?
20. What Streptococcal Group does an organism belong to if it is
    Bile esculin- positive NaCl- negative
21. What is the principle of the PYR test?
22. Describe the gram stain morphology of Streptococcus pneumoniae?
23. How would you differentiate between Group D and Enterococcus?
24. If there is growth in a bile esculin slant but no color change would it be interpreted as

positive or negative?

25. Why should susceptibility testing be performed on Enterococcus especially if found in a positive blood culture?
26. If a non-hemolytic Streptococcus is catalase- negative, bile esculin positive and grows in 6.5% NaCl what group would it belong in?
27. Why is vancomycin resistance in Enterococci a serious health problem?
28. What two Streptococci are PYR positive?
29. How would you differentiate between Streptococcus viridans and Streptococcus pneumoniae?
30. What does a colony of Streptococcus pneumoniae appear like on a blood agar plate?
31. What colony characteristic contributes to the virulence of Streptococcus pneumoniae?
32. On a blood culture gram stain you observe gram positive cocci in chains. Upon subculture there in no growth. What would you suspect and do next?
33. How would you differentiate Streptococcus bovis from Streptococcus viridans?
34. A direct gram stain on a CSF shows lancet-shaped gram positive diplococci, what would you suspect?
35. Subacute bacterial endocarditis (SBE) is most often caused by what group of Streptococcus?

Diagnostic Micro Class 13: Rapid testing for Streptococcus, QC and Performance
Reading assignment: **M & M Chapter 4**

Summary: All methods in the laboratory must be evaluated for their performance. This lecture uses a visual approach to evaluating performance characteristics of rapid Strep screening using agglutination from primary samples.

Lecture Outline:

I. Generation of reagent antibodies
   a) Polyclonal
   b) Monoclonal

II. Streptex, Liposome testing

III. POCT Strep Group A testing
   a) Sample collection
   b) Example using Abbott Test Pack
   c) Molecular view
   d) Controls

IV. Performance characteristics
   a) Sensitivity
   b) Specificity
   c) Efficiency/agreement
   d) Positive predictive value
   e) Negative predictive value
   f) Table versus text

V. Exercise

VI. Practice for practical

Student learning outcomes:
Following a successful completion of this class the student will be able to:

13.1. Define sensitivity and specificity, efficiency, positive predictive value and negative predictive value
13.2. Compare and contrast polyclonal and monoclonal antibodies with respect to production and specificity
13.3. Explain the appropriate sample collection for a throat culture/Strep screen
13.4. Evaluate performance characteristics using a grid;
13.5. Calculate performance characteristics given a set of data
13.6. State the appropriate follow-up to a negative strep screen
13.7. Collect a throat swab and perform a rapid strep screen
13.8. Discuss liposome and lateral immunodiffusion at a molecular level, using Strep testing as a paradigm

Diagnostic Microbiology Class 14: Examination

Diagnostic Micro Class 15: Respiratory Cultures
Reading: **Chapter 26 Mahon and Manuselis**
Lecture Outline

I. General Concepts
II. Host defenses
III. Upper respiratory anatomy
IV. The usual suspects
V. Diseases of URT
VI. Specimen collection
VII. Detection methods
VIII. Culture plates
IX. Lower respiratory tract infections
X. Sputum collection
XI. Bronchoscopy
XII. Direct exam
XIII. Routine culture
XIV. Opportunistic infections
XV. Gram stain tutorial

Student learning outcomes:
Following a successful completion of this class the student will be able to:

15.1. Distinguish URT and LRT by anatomy
15.2. List common causes of URT infections in select groups, including neonates, preschoolers, military and elderly
15.3. List routine culture media appropriate for throat culture, sputum culture, bronchial Specimens
15.4. List special media for Cornynebacterium diptheriae, Bordetella pertussis, Neisseria gonorrhoeae, Haemophilus influenzae
15.5. State and apply the screening criteria for expectorated sputum gram stains
15.6. Describe direct fluorescence antibody testing, and give an example of its use

15.7. State the appropriate collection for RSV and Bordetella, and describe the utility and controversy revolving around calcium alginate swabs
15.8. Define empyema, empiric therapy, epiglottitis, intubation and endotrach
15.9. Answer the questions at the end of the chapter
15.10. Analyze case studies presented in the chapter
15.11. State three host conditions that promote the virulence of opportunistic pathogens

Diagnostic Micro Class 16: Enterobacteriaceae Family Day 1
Reading assignment: **M&M Chapters 16**
Summary: In this class, we will begin to discuss the Enterobacteriaceae, and the common tests that distinguish them.
Lecture Outline:

I. Tribes, pathogens, opportunists of the Enterobacteriaceae family
II. The big 5 common characteristics
III. Lactose fermentation and ONPG
IV. IMViC
V. Lab exercise

Student learning outcomes:
Following a successful completion of this class the student will be able to:
16.1. State the 5 characteristics that are common to Enterobacteriaceae
16.2. Group the Enterobacteriaceae genera into tribes
16.3. List the pathogenic Enterobacteriaceae
16.4. List the substrate for the indole test, the enzyme provided by the bacteria, and the detection of the product. State 2 organisms that can be used as QC for the test
16.5. Compare and contrast the MR and VP test, with respect to substrate, products and detection. State 2 organisms that can be used as QC for the test
16.6. Describe the rationale for the citrate test, and state the caveat that can result in a false negative. State 2 organisms that can be used as QC for the test
16.7. List the tribes of bacteria that are strongly positive or negative for indole, VP and citrate.
16.8. State the principle and methodology for the NO3 reduction test, oxidase test, ONPG test, and state any caveats that can compromise its performance, as well as methods to override them.
16.9. Accurately perform and interpret a spot indole test, oxidase test, NO3 reduction test, ONPG test
16.10. Accurately inoculate a TSI slant, LDC slant and urease tube
16.11. Perform and interpret a spot indole test on a series of unknowns
16.12. Perform a series of biochemical tests on 3 unknowns to begin to identify them
16.13. List the organisms of this family that are able to utilize lactose (ONPG)

Diagnostic Micro Class 17: Enterobacteriaceae Day 2
Reading: Chapter M&M 16
Lecture Outline:

I. Review
II. Antigenic Factors
III. Escherichia

IV. Citrobacter
V. KESH
    a. Klebsiella
    b. Enterobacter
    c. Serratia
    d. Hafnia
VI. Proteae
    a. Proteus
    b. Providencia
    c. Morganella
VII. Special tests and gimmicks
    a. Motility
    b. H2S production
    c. Urease
VIII. Review

Student Learning Outcomes:

Following a successful completion of this class the student will be able to:

17.1. Discuss the 5 types of E. coli infections
17.2. State the methods used to classify E coli O157:h7
17.3. List the overt pathogens of the Enterobacteriaceae
17.4. List the three antigenic factors, and describe their ability to withstand heat, and state their Location
17.5. List the two toxins of E. coli O157:H7
17.6. Analyze a case study on E. coli, and answer appropriate questions
17.7. List two Escherichia that may be yellow pigmented
17.8. State three characteristics used to classify Citrobacter
17.9. Describe the common characteristic of the KESH group
17.10. List the most common Klebsiella species and state the mechanism to distinguish them
17.11. List the three organisms that are non-motile
17.12. Compare and contrast the most common Enterobacter species
17.13. Analyze biochemical profiles including IMPVC, motility, ONPG, H2S and urease to identify organisms
17.14. State the common Serratia organisms, a colony characteristic and a biochemical that is usually positive
17.15. State the organisms in the Proteae tribe, and the common characteristics
17.16. Compare and contrast Proteus vulgaris and Proteus mirabilis
17.17. Describe the most common colony characteristic of Proteus and Klebsiella
17.1 List the organisms that are H2S positive, and those that are urease positive.

Diagnostic Micro Class 18: **Enterobacteriaceae Day 3**
Reading assignment: **M&M Chapter 16**
Lecture Outline:

I. Amino acid metabolism
   a) lysine
   b) ornithine
   c) phenylalanine
   d) arginine
   e) decarboxylation
   f.) deamination

II. H2S
III. Motility, MIO
IV. Urease
V. Gelatin
VI. Sugars
   a) Mac and ONPG
   b) Kligler's iron agar
   c) Triple sugar iron

Student learning outcomes:
Following a successful completion of this class the student will be able to:

18.1. List the components of the lysine iron agar, and describe the changes that occur from time zero to time one to time two. List the famous bacteria that is LDC negative, and the tribe that is LDA positive.
18.2. Describe the changes that occur to pH during decarboxylation or deamination, and their effect on bromthymol purple.
18.3. Interpret the shorthand terms K/A, A/A, R/A etc, and use them appropriately to describe LIA results.
18.4. State the 3 (and ½) common H2S producers of the Enterobacterieaceae, and give 3 types of media that will identify it.
18.5. List the urease producers, and interpret the color shift in the media as positive or negative.
18.6. State the two genera that hydrolyze gelatin.
18.7. State the reagent that is added to phenylalanine to detect a deamination.
18.8. Given a brief synopsis of an organism's biochemical profile, deduce the correct identification
18.9. For all biochemicals, state the substrate, the enzyme or effector in the positive bacteria. Correctly perform and interpret results. Suggest appropriate quality control organisms for each test.
18.10. Discuss the MIO slant by each test, and give a positive and negative for each test.
18.11. Compare and contrast LDC and LDA, and give QC organisms for each reaction.
18.12. Compare and contrast KIA with TSI, and give QC organisms that will showcase each result.
18.13. Complete the flashcards PowerPoint associated with this module

Study questions: add these to your PowerPoint

1. What is the name of the indole reagent used for Enterobacteriaceae?
2. What does the indole test detect?
3. What is the purpose of the citrate test?
4. If you had heavy growth but no color change what would you do?
5. What are the two reagents used in the VP test?
6. What is the VP reaction of the Klebsiella-Enterobacter-Hafnia-Serratia group?
7. Both Citrobacter and Salmonella have an IMViC of being indole- negative, MR positive, VP Negative, Citrate positive. What is a test that will differentiate these two organisms?
8. A mucoid lactose positive colony is indole- negative, citrate-positive, PDA- negative. What is the most likely Genus?
9. What does IMViC stand for?
10. Give the principle of each reaction and describe a positive and negative test.
11. Name the organisms associated with an IMViC of (++ -- --)
12. Name the organisms associated with an IMViC of (-- -- + +)
13. Explain the major use of the decarboxylase reactions in the identification of Enterobacteriaceae.
14. What major group of Enterobacteriaceae is PDA positive?
15. The bacterial enzyme tryptophanase breaks down the amino acid tryptophan to produce what?
16. The production of acetoin and butanediol from dextrose constitutes the basis for what test?
17. An organism is PDA- positive but urease- negative what is the most likely genus?
18. What test differentiates Klebsiella pneumoniae from Klebsiella oxytoca?
19. Can an organism be MR positive and V-P positive?
20. A urine culture shows a lactose (+) colony that is spot indole (+). What would a preliminary identification?
21. What serotype of EHEC is most commonly seen?
22. What screening media detects EHEC?
23. What biochemical test differentiates Citrobacter from Salmonella?
24. Describe Klebsiella colony morphology on MacConkey.
25. A MacConkey plate shows a deep red colony. What would you suspect?
26. A blood agar plate is covered with a swarming organism that is lactose (=) on the MacConkey agar. What would you suspect?
27. How can you differentiate the two species that produce swarming colonies?
28. What organism causes "Friedlanders" pneumonia
29. What two tests differentiates E. coli from Klebsiella pneumoniae

Diagnostic Micro Class 19: **Urine cultures**
Reading assignment: **M & M Chapter 31**
Lecture Outline:

I. Bacteriuria
   a) Single vs. recurrent
   b) Complicated vs. uncomplicated
II. Urinary Tract
III. Epidemiology

IV. Etiology
V. Routes of infection
VI. Host defenses
VII. Virulence factors
VIII. Specimen types and collection and transport
    a) Clean catch
    b) catheterized
IX. Urine screening methods
    a) Gram stain
    b) Dipstick
    c) ATP detection
X. Culture plating and interpretation
XI. Chromagar
XII. Unknown set up

Student Learning Outcomes.

Following a successful completion of this class the student will be able to:

19.1. List the structures of the urinary tract
19.2. List the most common gram negative and gram positive organisms causing UTI
19.3. Describe the prevalence of UTIs in certain age and gender populations
19.4. List the three common routes of infection
19.5. List 5 virulence factors
19.6. Explain the clean catch urine collection to a lay person
19.7. Contrast a straight cath to an indwelling cath
19.8. State the best sample type and storage for urine culture, and rejection criteria
19.9. List three methods used to screen urine for infection
19.10. Given data, calculate a colony count
19.11. Interpret the significance of a positive culture based on the number and quantity of specimens
19.12. Describe the basic principle of Chromagar and its advantage in urine culture screening
19.13. Select appropriate media for urine culture, and correctly inoculate and incubate the media with an unknown.

Study Questions to add to your Flashcards

1. How should urines be handled if they cannot be cultured immediately?
2. What does bacteriuria mean?
3. What gender and age group is most likely to have acute UTIs?
4. What organism causes the majority of uncomplicated UTIs?
5. What types of organisms are found in hospitalized patients?
6. What are the two routes for getting a UTI?
7. Which route is the most common?
8. Differentiate between an uncomplicated and a complicated UTI
9. How does pyelonephritis differ from cystitis?
10. Describe the procedure to properly collect midstream clean-catch urine
11. Why were urine screening methods developed?

12. On a gram stain of a urine, how many organisms/OIF correlate to a colony count of >100,000/ml?
13. What is the premise of the nitrate reductase test?
14. Why would a patient with acute urethral syndrome give a negative leukocyte esterase test?
15. What type of calibrated loop would you use to inoculate a bladder aspirate?
16. What type of calibrated loop would you use to set up midstream urine?
17. What is the primary plating media for urine cultures?
18. Midstream urine culture grew over 100 colonies of a lactose positive GNB. Would you consider this significant?
19. The above organism was flat and lactose positive, spot indole positive. What would be a preliminary identification?
20. A midstream culture grew 20 colonies of a CNS, 10 colonies of an alpha hemolytic Strep, and 15 colonies of a diptheroid. How would you interpret this culture?
21. A catheterized urine grew 50 colonies of a lactose negative GNB. It was oxidase negative and swarmed over the blood agar. Would you consider this significant? What would be a preliminary identification of the organism?
22. A urine culture on a 28 year old female grew 100 colonies of a CNS. What would be the next test to identify the organism?
23. What CNS (coag negative staph) is a urine pathogen?

Diagnostic Micro Class 20: Enteric Pathogens
Reading assignment: **M & M Chapter 16**
Lecture Outline:

I. Zero Point Quiz
II. New biochemical tests
    a) Malonate
    b) MUG
III. Salmonella
    a) Epidemiology
    b) Differential from Citrobacter, Edwardsiella and Proteus
    c) Serotypes, Vi antigen
    d) Clinical infections
        1. Gastroenteritis
        2. Typhoid and enteric fever
        3. Nontyphoid bacteremia
        4. Carrier
IV. Shigella
    a) Tribe of Escherichia
    b) 4 species, A, B, C, D
    c) Biochemical characteristics
    d) Clinical infections
V. Yersinia
    a) Y. pestis
    b) Y. enterocolitica
    c) Y. pseudotuberculosis

d) Special media and incubation conditions

VI. New genera and biotypes

Student Learning Outcomes.

Following a successful completion of this class the student will be able to:

20.1. List the biochemical profile of Salmonella sps.
20.2. Create a flowchart to distinguish Salmonella from Edwardsiella, Citrobacter and Proteus
20.3. Describe the specific antigen that is tested in serotyping
20.4. State three tests that can be used to distinguish S. typhi from S. cholerasuis and S. paratyphi.
20.5. State the mechanism of infection in Salmonella subgroups
20.6. Explain the "infection cycle of S. typhi, starting with ingestion and ending with carrier state. State the timing when different body fluids will culture positive for typhi.
20.7. List the 4 species of Shigella grouped by O antigens
20.8. State the biochemical characteristics of Shigella, and state its tribe
20.9. Differentiate the most common form of Shigella in the US from other forms.
20.10. Discuss the common routes of infection
20.11. List the three common forms of Yersinia and their diseases, and media
20.12. Explain why Y. enterocolitica has been implicated in transfusion sepsis

Diagnostic Micro Class 21: Oxidase positive enterics
Reading assignment: **M&M Chapter 17**
Lecture Outline:

I. Vibrio
   a) General characteristics and tests
   b) V. cholera
   c) V. parahaemolyticus
   d) V. vulnificus
   e) V. alginolyticus
   f) Sample types and media
   g) Differential for speciating
   h) Comparison to other oxidase positive enterics

II. Aeromonas
   a) Clinical infections
   b) Identification

III. Plesiomonas
   a) Clinical infections
   b) Identification

IV. Campylobacter
   a) General characteristics
   b) C. jejuni
   c) C. coli
   d) C. lari
   e) C. fetus
   f) Special media, conditions for growth and caveats

V. Helicobacter
    a) General characteristics
    b) Non-culture identification

Student learning outcomes:

Following a successful completion of this class the student will be able to:

21.1. Describe the cultural characteristics and laboratory identification of the family Vibrionaceae.
21.2. Discuss the clinical significance and treatment of the family Vibrionaceae, risks of infection
21.3. Describe the appropriate collection, transport, and identification of Campylobacter species
21.4. Discuss the clinical significance of Campylobacter.
21.5. Describe the cultural characteristics and laboratory identification of Aeromonas and Plesiomonas.
21.6. Discuss the clinical significance of Aeromonas and Plesiomonas.
21.7. State the characteristics of Helicobacter, and the most common method for diagnosis.
21.8. Contrast these groups by one test: Vibrios, Aeromonas, Plesiomonas, Enterobacteriaceae.
21.9. List specialized media used for identification, and special biochemical tests. Interpret growth patterns and test results to speciate bacteria.
21.10. Match keywords to their disease/bacteria

Study Questions

1. What clinical syndrome makes Vibrio cholera so dangerous?
2. What is the selective media used for Vibrio? What makes it selective?
3. Describe the colony morphology of Vibrio cholera on this media.
4. Describe non-cholera Vibrio species on this media.
5. What is the Gram stain morphology of Vibrio?
6. What test differentiates Vibrio from Aeromonas and Plesiomonas?
7. Which organism ferments inositol, and grows on IBB agar?
8. What specific temperatures and atmospheric growth conditions are necessary for the isolation of Campylobacter?
9. What group of test will presumptively identify Campylobacter?
10. What tests differentiate C. coli from C. jejuni?
11. What is the purpose of a urea breath test?
12. Define halophilic. Which organism has the highest salt tolerance in this group?
13. What is the pathogenic significance of V. VULNIFICUS?
14. How do Vibrio appear on a gram stain? On TCBS agar?
15. What is the most common agent of bacterial gastroenteritis worldwide?
16. Describe a gram stain of Campylobacter
17. What are the special conditions/plates used to identify Campy coli? Campy fetus?
18. What is TCBS? IBB? Vibriostat? O/129? El tor? Rice-water? Skirrow? Tailing?

Diagnostic Microbiology Class 22: Cultures for Enteric Pathogens
Reading: Chapter 28 M&M
Lecture Outline:

I. GI tract cultures
   a) Definitions of itis-es
   b) Common causative agents
   c) Routes of transmission
   d) Symptoms
      i. Inflammatory diarrhea
      ii. Noninflammatory diarrhea
   e) Specimen collection and transport
   f) Media
      iii. C.N.A.
      iv. Mac
      v. He
      vi. Campy
      vii. GN broth/Selenite
      viii. Cefsulodin-irgasan-novobiocin
   g) Workup
      Only work up suspicious for SS, or E coli O157:H7
   h) Reporting results

Student learning outcomes:
Following a successful completion of this class the student will be able to:

22.1. Describe Yersinia's appearance on CIN agar
22.2. List the three species of Yersinia and discuss the clinical significance of each.
22.3. Discuss the identification of the subgroups and species of Shigella and the infections associated with Shigella.
22.4. Describe the currently accepted method for classification of Salmonella.
22.5. Describe the types of Salmonella infections and indicate how each is acquired.
22.6. Describe clinical significance and main characteristic of Edwardsiella tarda.
22.7. Compare and contrast the appearance of Salmonella and Shigella on enteric media.
22.8. Discuss the clinical presentation of typhoid fever, including the use of urine, blood and stool cultures.
22.9. List the key ingredients in XLD and HE and SMAC
22.10 Describe the appearance of Salmonella and Shigella on HE and XLD
22.11 Describe the appearance of lactose fermenters on HE and XLD
22.12 Distinguish nonpathogenic from enteropathogenic E. coli
22.13 Interpret a series of Stool culture plates, and deduce the presumptive ID as either a potential pathogen or not. Indicate the appropriate follow up.
22.14 List the most common causes of bacterial enteritis, the most commonly used media and the organisms that are selected for.

Study Questions for Enteric pathogens

1. Name the causative agent of human plague?
2. What type of antigenic determinate is a "Vi" antigen, O, H, or K?
3. What genus and species of Enterobacteriaceae produces "Vi" antigen?

4. Write the TSI, urea reactions for Salmonella.
5. Write the TSI, urea reactions for Shigella.
6. Describe the appearance of Salmonella on HE and XLD.
7. What is a selective media for Yersinia?
8. What are the most frequently encountered Salmonella species in the lab?
9. Can Salmonella infect the bloodstream? Can Shigella?
10. Why is it necessary to heat Salmonella if it doesn't agglutinate the polyvalent antiserum?
11. What is the causative agent of diarrhea in hospitalized patients?
12. Name the 4 species of Shigella, and state their O serotype.

Diagnostic Microbiology Class 23-25: Review sessions for Enterobacteriaceae.
Diagnostic Microbiology Class 26 is an Examination. No outlines.

Diagnostic Microbiology Class 27 and 28: Antimicrobial Testing
Reading: Mahon and Manuselis Chapter 3
Lecture Outline:

I. Characteristics of antimicrobial agents
II. Mechanisms of action
III. Primary sites by class
IV. Mechanisms of resistance to antimicrobials
V. Reasons to perform susceptibility testing
VI. Selecting agents for testing and reporting
VII. Goal of testing
VIII. Groups of antimicrobials
IX. Traditional methods: Disk diffusion
X. Modified methods
XI. Video

Student learning outcomes:
Following a successful completion of this class the student will be able to:

27.1. List 5 targets for antimicrobials, and give an example for each one
27.2. Define synthetic, natural and semi-synthetic with respect to antibiotics
27.3. Define the terms synergy, antagonism and indifference with respect to combination therapy
27.4. Associate penicillins and vancomycin with cell wall integrity
27.5. Describe the use of beta lactamase inhibitors in antibiotic use
27.6. List 5 mechanisms of resistance to antibacterial agents
27.7. List 4 reasons to perform susceptibility testing
27.8. Describe criteria used to select agents for testing
27.9. Describe and execute the Kirby Bauer method of antibiotic susceptibility testing, paying attention to means to standardize the procedure
27.10. State the appropriate times, temperatures and concentrations of the following with respect to AST: disk storage, inoculation, incubation, depth of agar, pH, salts content, thymidine content. Accurately predict the effect on the zone of inhibition when these are not met
27.11. Discuss the rationale for reading zones of inhibition against a dark or lighted background

27.12. Identify the media and incubation conditions for modified methods, especially for H. flu, Strep pneumo and GC

Diagnostic Micro Class 29: **Antimicrobial Testing MIC E-test QC**
Reading: **Mahon and Manuselis Chapter 3**
Lecture Outline:

I. MIC description
II. MIC interpretation
III. Breakpoint analysis
IV. Macrodilution
V. Microdilution
VI. Trailing
VII. Skipped wells
VIII. Agar dilution tests
IX. Special concerns
    a). ORSA
    b). VRE
    c). ESBL
X. Modified methods – E test
XI. Beta-lactamase detection
    a). Chromogenic
    b). Acidometric
    c). Iodometric
XII. Quality control

Student learning outcomes:
Following a successful completion of this class the student will be able to:

29.1. Describe 3 methods for quantitative susceptibility testing
29.2. Interpret an MIC from data presented
29.3. Utilize a CLSI document to determine susceptibility of an organism based on MIC
29.4. Describe a breakpoint panel. Analyze a breakpoint panel and determine S, I, R
29.5. Describe and interpret an E-Test
29.6. State the meaning of trailing, and explain the phenomenon with folic acid inhibitors
29.7. List 4 reasons for "skipped wells", and state the appropriate follow-up
29.8. Describe agar dilution tests
29.4. Explain Oxacillin resistance in Staph aureus, at the level of the gene, gene expression, and the ultimate choice of antibiotics for MRSA
29.5. List 5 conditions that are used in MRSA testing to enhance growth
29.6. Describe aminoglycoside resistance in Enterococci
29.7. Explain what is meant by ESBL
29.8. List three types of B-lactamase testing, and explain how they work.
29.9. Compare and contrast MIC and MBC
29.10. Calculate antibiotic concentration in serial dilutions

Diagnostic Micro Class 30: **Antimicrobials, then Nonfermenters**
Reading assignment: **M&M Chapter 18**

Lecture Outline:
Antimicrobials:

I. MIC review
II. MBC
III. Serumcidal testing
IV. Molecular probes

Outline for nonfermenters

1. Glucose metabolism
    a) fermenter
    b) oxidizer
    c) asaccharolytic
2. Characteristics of this class
    a) long thin GNB or coccobacilli
    b) BAP>MAC
    c) Lactose neg
    d) oxidase
    e) TSI
    f) API
    g) Resistance to antibiotics
3. Biochemical tests
    a) modified indole
    b) motility
    c) O/F media
    d) Nitrate
    e) Urease
    f) Oxidase
    g) Pigment production
4. Pseudomonas
    a) aeruginosa
    b) fluorescens
    c) putida
    d) stutzeri
5. Burkholderia
    a) cepacia
    b) mallei
    c) pseudomallei
6. Shewanella putrefaciens
7. Alcaligenes
    a) faecalis
    b) xylosooxidans
8. Stenotrophomonas maltophilia
9. Acinetobacter
10. Lab exercise

Student learning outcomes:
Following a successful completion of this class the student will be able to:

30.1. State 2 reasons to perform an MBC
30.2. Compare and contrast MIC with MBC
30.3. Describe the procedure for MBC
30.4. Describe a Schlicter test, and compare and contrast it to MIC/MBC
30.5. Define the term "nonfermenter"
30.6. Describe the natural environment and types of infections attributed to the nonfermenting gram-negative bacilli
30.7. Name the three species of nonfermenters most frequently encountered in the clinical laboratory, in the order of their frequency
30.8. Describe the clinical significance and identification of Pseudomonas aeruginosa
30.9. Discuss the identification and clinical significance of Pseudomonas species other than Pseudomonas aeruginosa.
30.10. Describe the clinical significance and identification of Burkholderia
30.11. Describe the clinical significance and identification of Stenotrophomonas maltophilia.
30.12. Describe the clinical significance and identification of Acinetobacter
30.13. Describe the clinical significance and identification of Alcaligenes.
30.14. Describe the clinical significance and identification of Shewanella
30.15. Compare and contrast TSI with O/F media

Study Questions

1. What are three clues that an unknown organism is a member of this group?
2. What are three tests are routinely used to group the nonfermenters?
3. What are the three most commonly isolated non-fermenters?
4. What pigment(s) does Pseudomonas aeruginosa produce? What temperature is significant?
5. Describe the characteristic colony morphology of Pseudomonas aeruginosa.
6. What organism causes a disease called meloidosis?
7. What genus of non-fermenters is asaccharolytic on O/F media?
8. What two carbohydrates does Stenotrophomonas maltophilia oxidize?
9. Which two non-fermenters are oxidase negative?

Diagnostic Micro Class 31: Gram negative rods, no MAC
Reading assignment: **M & M Chapters 15, 18**

Lecture Outline

I. Oligella
   a. O. urealytica
   b. O. urethralis
II. Moraxella
   a. M. nonliquefaciens
   b. M. osloensis
   c. M. lacunata

III. HACEK
   d. Haemophilus aphrophilus
   e. Actinobacillus
   f. Cardiobacterium
   g. Eikenella
   h. Kingella
III. Pasteurella
IV. Captocytophaga
V. Chromobacterium
VI. Flavobacterium
VII. Chyrsoebacterium
VIII. Comamonas

Student Learning Outcomes:

Following a successful completion of this class the student will be able to:

31.1. List the most common genera of gram negative bacilli that are MacConkey negative, oxidase positive and non-fermenters
31.2. Describe the clinical significance of each genus
31.3. List the means to differentiate Moraxella from Neisseria and Acinetobacter
31.4. Associate keywords with organisms, including but not limited to: star formation, pitting, rosettes, bleach odor, twitching motility, gliding motility, cat scratch, mushroom smell, neonatal meningitis
31.5. Group the organisms that require CO2 and won't grow on MacConkey by name

Study questions

1. Which GNB weakly ferments carbohydrates, is oxidase positive and does not grown on MacConkey. What animals are associated with its transmission?
2. What is the characteristic odor of Pasteurella? Eikenella, Pseudomonas? Stenotrophomonas?
3. What is the colony morphology of Actinobacillus?
4. What are the genera in the HACEK group? What is the common requirement?
5. Which organism is associated with IV drug users and human bites?
6. Which organism produces a thin fusiform GNB with gliding motility?
7. Which organism grows in water fountains and has been implicated as a source of neonatal meningitis outbreaks
8. Which organism may be comma or spiral shaped?
9. Which organism "pits" agar?

Diagnostic Micro Class 32: API interpretation, automation and Quality control

Summary: In this class, we will discuss the API system, and the octal calculation. We will inoculate unknowns to agar, and perform quality control on reagents.

Lecture Outline

1. API E testing
   A. Spontaneous tests
   B. Additional tests
   C. Scorecard

2. Octal interpretation
    A. Analysis of metabolic profiles
    B. Building the database
    C. Accessing the database
    D. Confidence in results

Student learning outcomes:

Following a successful completion of this class the student will be able to:

32.1. List 8 conventional tests performed by the API 20E
32.2. Calculate the Octal profile for API
32.3. Describe the creation of a biochemical database
32.4. Discuss confidence in identification
32.5. Calculate the confidence percentage of an unknown using database values
32.6. Perform quality control analysis on reagents needed for API 20E

Diagnostic Microbiology Class 33: Examination.

Diagnostic Microbiology Class 34: API interpretation.

Diagnostic Micro Class 35: API interpretation, automation and Quality control
Reading/Work Sheet: **API handout**

Summary: In this class, we will complete the API 20E on our unknown, discuss API Octal interpretation, build a better system, and make sure it is working.

Lecture Outline;

1. API NE testing
    A. Conventional testing – saline suspension
    B. Assimilation testing – aux media (minimal media)
    C. 24 hour results, reincubation protocol
    D. Scorecard
2. Octal interpretation
    A. Analysis of metabolic profiles
    B. Building the database
    C. Accessing the database
    D. Confidence in results
3. Automation
    A. Suggestions for improvement
    B. Vitek
    C. Microscan
4. Quality control
    A. Organisms
    B. Reagent testing

Student learning outcomes:

Following a successful completion of this class the student will be able to:

35.1. List 8 conventional tests performed by the API 20NE
35.2. Explain the different method used for Tryptophanase detection
35.3. Describe an assimilation test

35.4. Describe minimal media
35.5. Interpret API 20E unknown
35.6. Compare API results with biochemical profile and colony morphology
35.7. Calculate the Octal profile for API
35.8. Describe the creation of a biochemical database
35.9. Discuss confidence in identification
35.10. Calculate the confidence percentage of an unknown using database values
35.11. Describe colorimetric, fluorescent and turbidimetric endpoints
35.12 List improvements made by standardized, automated methods
35.13 List two major automated systems
35.14 Describe the purpose of quality control

Diagnostic Micro Class 36: **Fastidious Organisms part I**
Reading assignment: **Chapter 15**
Lecture Outline:

I. Species of Haemophilus
- a) growth requirements
  - i. X – hemin
  - ii. V – NAD
  - iii. CO2
- b) satellitism
- c) speciation
  - i. X, V
  - ii. porphyrin
  - iii. ALA disk
- d) H. influenza
  - i. Children under 6
  - ii. HiB vaccine
  - iii. subgroup aegypticus
- e) H. parainfluenza
- f) H. ducreyi
  - i. sexually transmitted
  - ii. gram stain
- g) X and V factor use
- h) Kirby Bauer
- i). Brucella
- j) Francisella
- k). Lab exercise

Student Learning Outcomes:
Following a successful completion of this class, the student will be able to:
36.1. Describe the general morphology and biochemical characteristics of Haemophilus
36.2. Describe the X and V factors and indicate a source for each. Be able to perform and interpret the test for X and V factors, and to speciate the Haemophilus based on X, V, and hemolysis patterns.
36.3. List what media Haemophilus will grow on and why sheep blood is unacceptable.

36.4. Describe how satellitism around Staph aureus works, and the factor it produces
36.5. State the principle of the ALA & porphyrin test.
36.6. List the serotypes of Haemophilus and what type is found most frequently in humans. State the diseases caused by the Haemophilus species.
36.7. Describe how the capsular antigen is used to identify Haemophilus and how it relates to the type of infection present.
36.8. Explain the infections caused by Haemophilus influenza and the populations most affected by the organisms.
36.9. Describe beta lactamase utility
36.10. Describe the identification and clinical relevance of Haemophilus ducreyi
36.11. Briefly describe the identification and clinical relevance of other Haemophilus species.
36.12. Describe the general morphology and biochemical characteristics of Francisella and Brucella
36.13. State the correct media and atmosphere for the cultivation of Francisella and Brucella, and the biosafety requirements.
36.14. State the recommendation for blood cultures for Brucella
36.15. State the gram stain characteristics for Francisella and Brucella
36.16. Correctly inoculate, test and identify a Haemophilus unknown based on X and V factors
36.17. Perform a b-lactamase test and state the purpose and methodology of the test.
36.18. State alternate names for diseases caused by Brucella and Francisella

St**udy Questions**

1. What is the gram stain morphology of Haemophilus? Francisella? Brucella?
2. What type of atmosphere do they require?
3. Most Haemophilus species are normal flora of _____.
4. Which factor is hemin?
5. Which factor is NAD?
6. How is chocolate agar prepared?
7. In the Staph Streak what do colonies of Haemophilus appear as?
8. Which Haemophilus species require only the V factor?
9. The ALA test detects if an organism requires which factor?
10. Is H. influenza positive or negative for this test?
11. Which Haemophilus serotype is most commonly seen?
12. How do biotypes differ from serotypes?
13. What types of disease do the capsulated Haemophilus cause?
14. What age group is most at risk for Haemophilus influenza meningitis?
15. What types of infections do the nonencapsulated influenza organisms cause?
16. Name 4 specimens that should always be checked for Haemophilus.
17. Why is it necessary to check for beta lactamase production in Haemophilus and Neisseria?
18. Which Haemophilus causes chancroid?
19. What other names are used for Brucella and Francisella?

Diagnostic Microbiology Class 37: **Species of Neisseria and Moraxella catarrhalis**
Reading assignment: **Chapter 14**
Lecture Outline:

I. Neisseria
- a. General characteristics
- b. media
- c. N. gonorrhoeae
  - i. symptoms
  - ii. ID
  - iii. collection
  - iv. growth – atmosphere and plates
  - v. morphology
  - vi. differential
  - vii. versus Moraxella and Acinetobacter
  - viii.medico-legal
  - ix. antibiotics
  - x. other methodologies
- d. N. meningitidis
  - i. symptoms
  - ii. differential
- e. N. lactamica
- f. N. sicca
- g. N. flavescens
- h. N. elongata

III. Moraxella catarrhalis
- a. morphology
- b. tributyrin

Student Learning Outcomes:
Following a successful completion of this class, the student will be able to:

37.1. Describe the general morphology and biochemical characteristics of Neisseria.
37.2. Explain the significance of pili in morphology
37.3. Describe the clinical infections associated with N. gonorrhoeae
37.4. List the type of specimens and selective media and incubation used for isolation.
37.5. Contrast the use of the direct gram stain in the diagnosis of gonorrhoeae for males and females
37.6. Identify N. gonorrhoeae by oxidase, superoxol, gram stain and carbohydrates.
37.7. Describe the specimens for isolation of N. meningitidis and how they should be cultured and processed.
37.8. Describe the infections caused by N. meningitides, the population at risk and the etiology.
Explain how it is isolated and identified.
37.9. List 4 other Neisserias, and discuss their role in pathogenesis, and a key feature of each
37.10. Describe the isolation, identification, and clinical relevance of Moraxella catarrhalis.

Study Questions:

1. Why should specimens for Neisseria never be refrigerated?
2. Describe the characteristic gram stain that is a presumptive positive for GC?
3. How is N. gonorrhoeae identified?
4. How do you differentiate N. gonorrhoeae from N. meningitidis?
5. What is the mode of transmission of N. meningitidis?
6. What is petechia? In which type of infection is it seen?
7. What age groups are most at risk for contracting N. meningitidis?
8. Which serogroups of Neisseria meningitidis are seen in the U.S.?
9. How do you differentiate Moraxella from Neisseria?
10. What childhood disease is Moraxella catarrhalis seen in?
11. Why are underage children tested differently than adults for GC?
12. What is superoxol? How is it used in the differential?
13. Why are JEMBEC and transgro good media? Why is calcium alginate a poor collection swab?

Diagnostic Micro Class 38: Fastidious organisms part 3
Reading assignment: **Chapter 15**

Summary: In this class, we will finish the discussion on fastidious organisms by focusing on Bordetella and Legionella

Lecture Outline:

I. Review Haemophilus identification schema
II. Review Neisseria differential
III. Bordetella pertussis
    a) Gram negative coccobacillus
    b) pertussis
    c) Nasopharyngeal swab and aspirate
    d) Media
        Bordet-Gengou, charcoal horse blood, BCYE
    e) incubation temperature – 35 ambient air, 5-7 days
    f) direct agglutination, direct fluorescence
    g) other species
    h) adult pertussis – reading material
IV. Legionella
    A. Found in natural aquatic sources and in artificial reservoirs such as hot water systems, cooling systems, etc. Transmitted to humans through aerosols and particles.
        1. Can survive between temperatures of 20-60 C
        2. Can adhere to pipes and plastics
    B. Virulence is attributed to their ability to multiply and survive within macrophages.
    C. Infection- intracellular organisms
        1. Legionnaires disease- starts as pneumonia then the organisms disseminate through the body and cause extra-pulmonary infection. 15-30% mortality if not treated early.
        2. Pontiac fever- milder non-pneumonic form of Legionella infections
    D. Risk factors

E. Identification
    1. Specimens are sputum's and bronchial washings
    2. Direct Fluorescent Antibody test (DFA) - rapid test and done directly on the patients specimen.
    3. DNA probes- rapid and done directly on a patients specimen but expensive
    4. Culture-
        a) require the amino acid L-cysteine for growth
        b) Media- Buffered-Charcoal-Yeast-Extract (BCYE) - can come with or without antibiotics.
        c) Treat specimens with acid before inoculating to decrease contaminating organisms.
        d) Hold plate's 3-5 days and observe for small gray-white "speckled" colonies.
        e) Gram stains as GNB but stain poorly so use carbol fuchsin as the counter stain.
        f) Confirm suspicious colonies with the DFA
    5. Urine antigen test- the antigen to Legionella is excreted in the patient's urine.
    6. Antibody detection- indirect fluorescent test detecting antibodies to Legionella in the patient's serum.

F. Treatment- erythromycin

G. Direct Fluorescent antibody testing
    1. Specific antibodies for Legionella
    2. Detected by fluorescence
    3. Fluorescent microscopy
        a) Eliminate background
        b) Stokes shift
            i. wavelength and energy
            ii. 2 filters for excitation and emission
        c) Fluorescein Isothiocyanate FITC

H. Urine antigen testing

I. Antibody testing
        a) acute versus convalescent serum
        b) fourfold change in titer

Student learning outcomes:

Following a successful completion of this class, the student will be able to:

38.1. List requirements for growth, and special media used for Bordetella and Legionella
38.2. Describe risk factors and course of pneumonia for Legionella
38.3. Illustrate direct fluorescent technique, and correctly perform a DFA
38.4. Use a fluorescent scope to view DFA testing if available
38.5. Describe the utility of Urinary Legionella testing
38.6. Suggest molecular approach for rapid identification
38.7. Describe the principle of fluorescence microscopy
38.8. Describe a Stokes shift
38.9. Describe the types of samples used for Bordetella
38.10. Compare and contrast Legionnaire's disease with Pontiac Fever
38.11. Name the amino acid that is required for Legionella growth

38.12. State the specific gram stain alteration for Legionella
38.13. Name the two types of filters used for fluorescent microscopy
38.14. State the color of the light used to excite FITC, and the color that is emitted
38.15. Compare and contrast acute and convalescent serum, and illustrate a 4-fold change in titer.
38.16. Describe the clinical course of pertussis.
38.17. Discuss specimen collection and transport for Bordetella
38.18. Discuss the rationale for HCl/KCl washing of sputum

Diagnostic Micro Class 39: Gram positive rods Day 1
Reading assignment: **Chapter 12**
Lecture Outline:

I. Corynebacterium
- a) GP, nonspore forming small pleomorphic rods – Chinese letters
- b) Nonmotile, catalase +, BAP in ambient air.
- c) Generally normal flora
- d) C. diphtheria
  - i. Toxigenic via bacteriophage
  - ii. Pseudomembrane obstructs airway
  - iii. Metachromatic granules, Babes-Ernst granules
  - iv. ID: Special media. Tellurite, Tinsdale, Loeffler, Pai agar.
  - v. Urease negative
  - vi. ELEK test for diphtheria toxin
  - vii. Therapy: penicillin, erythromycin and anti-toxin
  - viii. Prophylaxis: vaccination
- e). C. ulcerans
  - i. Halo on Tinsdale, urease +. May be toxigenic
  - ii. Mastitis in cattle.
- f.). C. pseudotuberculosis
  - i. Halo on Tinsdale, urease +. May be toxigenic
  - ii. Veterinary pathogen
- g) C. jeikeium
  - i. Normal flora – invasive procedure risk
- h). C. urealyticum
  - i. Urinary pathogen
- i.) C. pseudodiptheriticum
  - i. No Chinese letters
  - ii. AIDS patients at risk

II. Miscellaneous coryneforms
- a) Arcanobacterium sp
  - i. Found on throat culture
  - ii. Catalase negative
- b) Rothia dentocariosa
  - i. NF in mouth
  - ii. Branching filaments

iii. Catalase +, NO3 +, Nonmotile, urease

c) Erysipelothrix rhusiopathiae
   1. Animal pathogen
   2. "erysipeloid" lesions
   3. bacteremia and endocarditis
   4. ID: Gram positive pleomorphic (short to very long) nonspore forming rod.
      i. Catalase
      iii. Nonmotile
      iv. Media BAP Choc C N A, PEA
      v. H2S in TSI.

d) Give penicillin

III. Lactobacillus
   a) Normal vaginal flora
   b) Opportunistic
   c) ID: Gram positive medium to long rods in chains.
      i. Catalase – (presumptive ID)
      ii. Air requirements vary
      iii. Nonmotile
      iv. Media: BAP Choc
      v. Don't speciate unless clinically significant site

IV. Gardnerella vaginalis
   a) Normal vaginal flora
   b) May overgrow lactobacillus, lead to Bacterial Vaginosis BV
   c) ID: gram positive, gram variable pleomorphic coccobacillus
      i. Nonmotile facultative anaerobe
      ii. NF at that site
      iii. pH, sniff test, clue ce
      iv. hemolysis on human blood: V agar
   d) sequellae.

V. Listeria monocytogenes
   a) Diseases and virulence factors
   b) Biochemical properties
   c) Comparison to Streptococcus agalactiae
   d) motility pattern

Student learning outcomes:

Following a successful completion of this class, the student will be able to:

39.1. Describe gram stain morphology for Corynebacteria and coryneforms

39.2. Identify a Clue cell and explain its significance

39.3. Describe the following terms and correlated them with the appropriate bacteria
   a) diptheroid
   b) metachromatic granules
   c) pleomorphic
   d) Clue cell
   e) palisade
   f) reverse CAMP test

g) tumbling motility
h) Babes Ernest granules

39.4. State the principle and primary use of the following media:
a) Tinsdales tellurite medium
b) Loeffler serum medium
c) Pai, HBT and V agar

39.5. Discuss the identification and infectious process of Corynebacterium diptheriae.
39.6. Describe the significance of and the technique used to identify C. diptheriae exotoxin. Illustrate and interpret an ELEK test.
39.7. Describe the identification and clinical significance of Listeria monocytogenes.
39.8. Describe the identification and clinical significance of Lactobacillus.
39.9. Describe the identification and clinical significance of Erysipelothrix.
39.10. Based on colonial morphology and biochemical reactions, differentiate Lactobacillus, Gardnerella, Erysipelothrix and Listeria.
39.11. Describe the identification and clinical significance of other medically important Corynebacterium.
39.12. Describe the pathogenic Corynebacteria, and the means to differentiate them
39.13. Associate the predominate characteristic of the species presented in this section

Diagnostic Micro Class 40: CSF cultures
Reading assignment: **Chapter 29**

Summary: In this class, we will discuss bacterial meningitis, and then concentrate on the usual suspects. The lab will involve identification of 7 unknown samples using a testing schema designed by pairs of students, based on colony morphology and cytocentrifuged gram stains

Lecture Outline:

I. Central Nervous System
a) anatomy and function of CNS
b) diseases and sequelae
c) predominant pathogens
E. coli, GBS, Listeria, H flu, N. meningitidis, S. Pneumo, etc
d) routes of entry
e) Spinal tap
f) CSF handling and culture

II. Lab identification of unknowns

Student learning outcomes:

Following a successful completion of this class the student will be able to:

40.1. List the 6 major pathogens that cause bacterial meningitis
40.2. State the appropriate media used to set up a CSF culture
40.3. List 4 routes of infection for CNS
40.4. Associate each CNS pathogen with an age group that is at risk
40.5. Compare and contrast Listeria monocytogenes with Group B strep
40.6. Perform a cytospin procedure to concentrate CSF
40.7. Predict the identity of unknown samples using gram stain and colony morphology
40.8. Design a testing strategy to confirm the identity
40.9. Work collaboratively with a partner to identify unknowns

40.10. Organize and present the testing strategy along with biochemical results to all classmates to reinforce microbiological critical thinking

Diagnostic Micro Class 41: Gram positive rods - Bacillus
Reading assignment: **Chapter 13**
Summary: In this class, we will look at Bacillus, which is a spore former. B. anthracis is an agent of Bioterrorism, so we will focus on that**.**
Lecture Outline:
I. Gram positive bacilli are grouped as
   a) Endospore formers –
   b) Morphologically regular nonendospore formers
   c) Irregular or coryneforms, nonspore formers
   d) Nocardioforms and aerobic actinomycetes
II. Spores
   a) description, staining, production
III. Bacillus
   a) B. anthracis
   b) B. cereus
   c) B. subtilis
   d) B. stearothermophilus
IV. Branching aerobes/facultative anaerobes
   a) Genera
   b) Staining characteristics
   c) Acid fast and partially acid fast staining
Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
41.1. Describe the significant morphological and microscopic characteristics of the genus Bacillus.
41.2. List and describe the types of anthrax
41.3. Compare and contrast Bacillus anthracis and Bacillus cereus including biochemical reactions, morphological characteristics and diseases.
41.4. Describe the gram stain morphology of aerobic Actinomycetes
41.5. Describe what "partially acid-fast" means, and what is signifies
41.6. Describe spores by morphology, mechanism of production, staining by gram and malachite green
41.7. Describe the use of the Shaeffer-Fulton stain
41.8. Describe the quality control use of B. stearothermophilus
41.9. State the mechanism used to distinguish Bacillus from Clostridium
41.10. State three ways to distinguish fungus from bacteria

Diagnostic Micro Class 42: Gram positive rods - Branchers
Reading assignment: **Chapter 13**
Lecture Outline:
I. Actinomycetes
   A. General characteristics

1. Branching, filamentous forms
2. Divided into 2 groups based on cell wall composition
    a) cell walls contain mycolic acid and are partially acid-fast
    b) cell walls do not contain mycolic acid and are non acid-fast

B. Nocardia species- partially acid-fast Actinomycetes
1. Nocardia species- N. asteroides, brasiliensis, otitidis-caviarum
    a) often beaded on Gram stain
    b) produce aerial hyphae
2. Mode of transmission
    a) found in soil infects through inhalation or wounds
    b) causes mostly infections in immunocompromised patients
3. Spectrum of disease and infection
    a) N. asteroides causes 80% of all infections. It can cause lung abcesses which can spread to other organs.
    b) N. brasiliensis- can form actinomycetoma which is a chronic localized, draining infection. Forms granules in the drainage which contain the organisms.
4. Identification
    a) Colonies are chalky, heaped, musty odor. Grow in 48-72 hrs
    b) Partial acid-fast
    c) Identify species by their ability to hydrolyze casein, xanthine and tyrosine

C. Rhodococcus, Gordona and Tsukamurella- partially acid-fast
1. Mode of transmission-
    a) found in soil, water and farm animals
    b) acquired by inhalation - rare in humans
2. Spectrum of disease and infection
    a) Rhodococcus equi- infects HIV patients causing pneumonia, bacteremia, skin infections
    b) Gordona and Tsukamurella- opportunistic infections can cause skin, catheter associated infections
3. Virulence-little is known
4. Identification
    a) Rhodococcus produces a salmon-coral color pigment

D. Streptomyces- non acid-fast
1. Mode of transmission
    a) found in soil enters humans through wounds usually in the lower extremities
2. Spectrum of disease and infections
    a) Causes actinomycetomas-produces granules

3. Identification
    a) non acid-fast branching Gram positive bacilli
    b) to differentiate from Nocardia-
        Nocardia is lysozome- susceptible (no growth)
        Streptomyces is lysozome- resistant (growth)

c) Streptomyces produces no aerial hyphae

E. Actinomadura- non acid-fast
    1. Mode of transmission
        a) found in soil mostly in tropical countries
    2. Spectrum of disease and infection
        a) causes Actinomycetoma
    3. Identification
        a) colonies are white-pink with a mucoid or "molar tooth" appearance.
        b) Biochemicals- urea, nitrate, lyszome, acid-fast stain

F. Oerskovia
    1. Cause infected heart valves, wounds
    2. Produces a yellow pigment

G. Dermatophilus
    1. Causes foot rot- pustular, exudative dermatitis
    2. Found in tropics
    3. Beta-hemolytic colonies that start white and turn orange.

Student Learning Outcomes:

Following a successful completion of this class the student will be able to:

42.1. Describe the gram stain morphology of aerobic Actinomycetes
42.2. Describe what "partially acid-fast" means, and what is signifies; state which Actinomycetes are partially acid-fast
42.3. Discuss the clinical significance, colony morphology, growth characteristics and media used to identify Nocardia species; utilize a set of biochemical tests to differentiate the 3 major Nocardia from each other
42.4. Describe the colony morphology of Rhodococcus
42.5. Describe the clinical significance of Streptomyces
42.6. State two major tests that differentiate Nocardia from Streptomyces
42.7. Describe the clinical significance of Actinomadura
42.8. Define “sulfur granule” in the context of Nocardia

Diagnostic Microbiology Class 43: Review for Exam

Diagnostic Microbiology Class 44: Exam

Diagnostic Micro Class 46: **Blood Cultures**
Reading assignment: **Chapter 30 in Mahon and Manuselis**
Chapter 8 in Strasinger and Di Lorenzo

Lecture Outline:

I. Bacteria versus Septicemia, definitions
II. Risk factors
III. Etiology of bacteremia
    A. Intravascular
    B. Extra vascular
        1. Urinary tract
        2. Respiratory tract
        3. Abscesses
        4. ETC
III. Mortality rate
IV. Blood culture collection
    A. Anaerobic media
    B. Aerobic media
    C. Anticoagulant: SPS sodium polyanethol sulfonate
    D. 10-20 ml of blood per culture; 1 to 5 or 1 to 10 dilution; frequency
    E. 1-5 ml for child, aerobic bottle
    F. Collection in ordinary culture bottles with blind subculture
    G. Gram stain
V. False positives
VI. Probable pathogens
VII. Indwelling Catheter bacteremia
VIII. Special Cultures
IX. Problems with BLC manual methods
X. Castenada bottle and Automated systems
    A. Bacti-Alert
    B. Bactec
    C. ESP
    D. Isolator
XI. Lab activity

Student Learning Outcomes:

Following a successful completion of this class the student will be able to:

46.1. Explain the difference in the terms "bacteremia" and "septicemia"
46.2. Differentiate the types of bacteremia: transient, occult, intermittent and continuous.
46.3. List the main causative organisms of bacterial endocarditis and intravascular catheter associated bacteremia.
46.4. State the cause of septic shock.
46.5. Describe the proper procedure to blood culture collection
46.6. Perform an aseptic blood culture collection
46.7. List the anticoagulants used in BLC, and the organisms that are sensitive to them

46.8. Discuss conventional methods for BLC, and state the macroscopic characteristics of a positive blood culture
46.9. Discuss automated methods for BLC, including Bact-Alert and Bac-Tec
46.10. Interpret positive blood culture results, including the possible contaminants.
46.11. List the most common organisms that cause bacteremia. List the most common contaminants
46.12. Describe the correct order of the draw when blood cultures are collected with other tests
46.13. State the best blood to broth ratio for BLC collection, and state one reason why too much blood is bad, and one reason why too little blood is bad
46.14. Compare the collection requirements for a child versus an adult
46.15. State the clinical utility of a gram stain of blood from a septic patient
46.16. Describe or draw a Castenada bottle
46.17. State the caveats associated with septicemia from Brucella, Abiotropia and Mycoplasma
46.18. Assemble materials for a blood culture collection, correctly select and prepare a patient site
46.19. Answer corresponding questions in Phlebotomy Workbook

Study questions:

1. What is a blind subculture?
2. What agar medium should be used for doing blind subcultures of BLC?
3. What is the ideal volume to be collected from children for BLC?
5. When should blood be collected in a patient with intermittent bacteremia having fever and chills?
6. When should blood be collected in a patient with endocarditis?
7. Give an example of a transient bacteremia.
8. Name three organisms that are considered contaminants of blood cultures.
9. What is the best anticoagulant to use in BLC?
10. List three changes in a BLC bottle that indicate growth.
11. How long should isolates from positive blood cultures be stored?
12. Name five organisms that are always considered significant when isolated from a blood culture bottle.
13. How long should cultures suspected of having Brucella be held?
14. Which Borrelia species can be detected in a blood culture?
15. If GPC in chains are seen in the gram stain of an aerobic blood culture bottle, but there is no growth on the subculture, what do you suspect?
16. What supplement does this organism require?
17. What small anaerobic GPB is a common blood culture contaminant?
18. What two antiseptic agents are used to clean the skin when collecting blood cultures?
19. What is the appropriate ratio of blood to broth in BLC?
20. What is the primary cause of bacterial infectious endocarditis?

Diagnostic Micro Class 47: Non-PCR strategies
Reading assignment: **Gen-Probe PDF file**
Lecture Outline:
I. Ligase Chain Reaction
II. Transcription Mediated Amplification
III. Strategies to reduce contamination
IV. Branched DNA
V. Review questions
Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
47.1. List the components and the sequence of events for Ligase Chain reaction, including the template, the enzymes, the primers and the experimental conditions.
47.2. List the components and the sequence of events for Transcription mediated amplification, including the template, the enzymes, the primer and the conditions.
47.3. Compare and contrast DNA replication to transcription
47.4. Illustrate TMA, and describe how the signal is detected
47.5. Describe a hybridization protection assay
47.6. Illustrate LCR, and describe how the signal is detected
47.7. List three types of RNA
47.8. Correlate these enzymes with the appropriate molecular method:
- DNA polymerase
- RNA polymerase
- Ligase
- Reverse transcriptase

47.9. Identify molecular techniques that amplify probes and signals versus those that amplify target
47.10. List 3 mechanisms used to prevent false positives
47.11. List 3 mechanisms used to prevent contamination
47.12. Given a DNA sequence, write the sequence for a probe using the correct convention of 5' to 3'
47.13. Define the terms or recognize the structure for: ribose, deoxyribose, oligonucleotide, 20-mer, melt temperature, capture probe, target probe, promoter, exon, intron, ribosome, biotin, streptavidin, NASBA, reverse-transcription, RNA pol, DNA pol, promoter-primer, RNAse H, multiplex, amplicon, isothermal, ART, quantitative, qualitative
47.14. List the components and the sequence of events for branched DNA, including the template, reagents, probes, substrate and output that is measured

Diagnostic Micro Class 48: Anaerobes day 1
Reading material: Chapter 19
Lecture Outline:
I. Air environments
II. Classification of bacteria based on aerotolerance
III. Mechanisms to reduce media
IV. Source of anaerobic infections
V. Predisposing factors

VI. Indications of anaerobic infection
VII. Specimen quality
VIII. Specimen processing
IX. Primary set up media
X. Lab exercise

Student Learning Outcomes:

Following a successful completion of this class the student will be able to:

48.1. Discuss the 4 environments that bacteria can be grown in
48.2. Classify bacteria based on their air requirements
48.3. List three chemicals that are reducing agents added to bacterial media
48.4. Compare and contrast exogenous and endogenous anaerobic infections
48.5. State the common predisposing factors for anaerobic infection
48.6. List common signs that an infection is due to anaerobes
48.7. Discriminate specimen sources as acceptable or non-acceptable for anaerobic culture
48.8. State the common mechanisms used to maintain anaerobes during transport and processing
48.9. List the common components of an anaerobic system, whether it be a glove box or a jar
48.10. List the 4 steps in specimen processing
48.11. List the primary set up media for anaerobes, and state the rationale for the use of each type of plate; state the alternative plates if there are any
48.12. State the rationale for using a standard "blind" set up for body fluids and tissue culture
48.13. Correctly inoculate a bacterial unknown to a series of plates, and design a table for recording results
48.14. Correctly perform a gram stain on an unknown

Diagnostic Microbiology Class 49: Anaerobes: Clostridium
Reading material: **Chapter 19**

Lecture Outline:

I. Clostridium
   a) Gram stain inconsistencies
   b) Antibiotic identification of gram stain
   c) Spores
      i. Ethanol test
      ii. Heat shock test
   d) Aerotolerance
   e) Disease/Organisms
      i. C. perfringens
      ii C. difficile
      iii. C. botulinum
      iv. C. septicum
      v. C. tetani

II. Anaerobic Actinomycetes
    a) Actinomyces israeli
    b) Bifidobacerium
    c) Propionibacterium
III. Lactobacillus
IV. Mobiluncus

Student learning outcomes:

Following a successful completion of this class the student will be able to:

49.1. List 5 species of Clostridium
49.2. Distinguish aerotolerant Clostridium from Bacillus and Lactobacillus
49.3. State the colony morphology of Clostridium perfringens
49.4. Describe the reverse CAMP test
49.5. Illustrate a Nagler test
49.6. List the two toxins of C. difficile
49.7. Discuss the etiology of C. difficile
49.8. Illustrate a cytotoxicity test
49.9. Illustrate an ELISA test specific for C. diff
49.10. Discuss botulism as a toxin, including the clinical manifestations
49.11. State the morphology and source of C. tetani
49.12. List the antibiotic pattern of sensitivity for Clostridium, using K, V, and C
49.13. Describe tetany
49.14. Discuss anaerobic identification by aerotolerance
49.15. List other tests used in anaerobic identification
49.16. List special plates utilized in distinguishing Clostridium and the other gram positive anaerobes
49.17. Associate unusual colony characteristics with specific anaerobes

Diagnostic Micro Class 50: **Anaerobes identification**
Reading assignment: **Chapter 19**

Lecture Outline:

I. Reading the primary plates
II. Interpreting the gram stain
III. Aerotolerance
IV. Presumptive ID methods
V. Presumpto plates
VI. Definitive identification
VII. Lab exercise – continuing on the unknown

Student learning outcomes:

Following a successful completion of this class the student will be able to:

50.1. List three antibiotics used to classify anaerobes
50.2. Classify anaerobes using zone of inhibitions for antibiotics and bile disks susceptibility
50.3. Recognize characteristic gram stain morphology of anaerobes
50.4. Describe the use of SPS disk in differentiating Peptostreptococcus species
50.5. Correlate the gram stain morphology with the major strict anaerobes
50.6. Use kanamycin, vancomycin and bile to distinguish the gram negative rods

50.7. List two gram negative rods that fluoresce
50.8. Use morphology, aerotolerance and high potency antimicrobials to determine the genera of lab unknown samples
50.9. State the type of hydrogen peroxide used for the catalase test & calculate how to make it
50.10. Describe gas liquid chromatography and its role in anaerobe identification
50.11. State the purpose of a Presumpto plate

Diagnostic Microbiology Class 51: Anaerobes continued and Anaerobe cultures
Reading assignment: **Chapter 19**
Summary: In this class, we will finish the discussion on anaerobes.
Lecture Outline:
I. Gram positive cocci
   Peptococcus
   Peptostreptococcus
II. Gram negative cocci
   Veillonella
III. Gram negative rods
   Bacteroides
   Prevotella
   Porphyromonas
   Fusobacterium
   Bilophila
Student learning outcomes:
Following a successful completion of this class the student will be able to:
51.1. Categorize the gram negative cocci and rods by name, gram stain and major presumptive testing
51.2. Differentiate P. anaerobius from other Peptostreptococcus
51.3. Use the LKV plate to differentiate anaerobes
51.4. Describe the two findings on BBE agar, and describe growth characteristics of Bacteroides fragilis
51.5. Organize a differentiation schema to differentiate B. fragilis from B. urealyticus
51.6. State the gram negative anaerobes that fluoresce brick red
51.7. Associate anaerobes with distinctive morphology
51.8. Complete a flowchart for gram positive anaerobes
51.9. Complete a flowchart for gram negative anaerobes
51.10. Describe the use of SPS disk in differentiating Peptostreptococcus species

Diagnostic Microbiology Class 52: Plan for Lab
1. Discuss the Staph aureus experiment
2. Nares culture on BAP, Mannitol salt

Create a display of your unknown results, for other students to get the information.
Complete lab, turn in.

Student learning outcomes:
Following a successful completion of this class the student will be able to:
52.1. Utilize the differential media Mannitol salt and BAP to rapidly identify Staphylococcus grown from nares culture
52.2. Discuss the relevance of MRSA in the community
52.3. Utilize the appropriate collection technique to acquire a nares culture

Diagnostic Microbiology Class 53: Chlamydia and other nonculturable organisms
Reading assignment: **Chapter 21**
Lecture Outline:
I. Chlamydia
  A. General characteristics
  B. C. pneumonia
  C. C. trachomatis
  D. C. psittaci
II. Mycoplasma
  A. M. pneumoniae
  B. M. hominis
III. Ureaplasma urealyticus
Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
53.1. Describe the characteristics of Chlamydia that make it fastidious
53.2. State growth conditions for Chlamydia
53.3. Compare and contrast the elementary body with the reticulate body
53.4. List the three common forms of Chlamydia, how it is contacted, how it is conventionally detected and emergent methods for diagnosis
53.5. Analyze a research paper on Chlamydia pneumonia and its association with Alzheimer's disease
53.6. Describe the important characteristics of the Mycoplasma and Ureaplasma, including gram stain, growth on media and types of special media used
53.7. Discuss the infectious diseases associated with Mycoplasma pneumoniae.
53.8. Explain how M. pneumoniae is diagnosed.
53.9. Describe the typical colony morphology of M. pneumoniae on solid media.
53.10. Name the clinically significant genital Mycoplasma and Ureaplasma organisms.
53.11. Describe the clinical infections caused by the above species.
53.12. Describe the test for Cold Agglutinins in relationship to the Mycoplasma infection.
Study questions:
1. What Mycoplasma and Ureaplasma species are associated with genital infections?
2. Why won't antibiotics that interfere with cell wall synthesis work on Mycoplasma?
3. What organism causes "atypical pneumonia"?
4. Describe a typical Mycoplasma colony on E-agar?
5. What does the cold agglutinin test detect?
6. What stage in the life cycle of Chlamydia are they infectious?
7. Name four genera of organisms that are intracellular.
8. What Chlamydia species causes an acute respiratory illness?

9. What Chlamydia is the most commonly transmitted sexual disease?
10. What serotypes of C trachoma cause endemic trachoma?
11. What serotypes of C. trachoma cause venereal disease?
12. What serotypes cause LGV?
13. What is the reservoir for Chlamydia as a STD?
14. Which Chlamydia is a disease of birds (ornithosis)?
15. How is it transmitted to humans and what type of disease does it cause?
16. Describe the inclusion bodies of Chlamydia after staining with iodine, Giemsa, & DFA.
17. In a cell culture for Chlamydia how are the organisms detected?

Diagnostic Micro Class 54: Spirochetes
Reading assignment: **Chapter 20**
Lecture Outline:

I. Leptospira
II. Borrelia
    A. recurrentis
    B. burgdorferi
III. EIA versus Western Blot
IV. Spirochetes
    A. T. pallidum
    B. Other treponemes
    C. Testing
V. Discussion

Student Learning Outcomes:
Following a successful completion of this class the student will be able to:

54.1. Describe the organism morphology for the Spirochaetales
54.2. Discuss the major spirochetes by organism versus disease and risk factors, list all relevant media and stains
54.3. Describe the etiology of Lyme disease
54.4. List the steps in a Western Blot test
54.5. Compare and contrast EIA with Western Blot
54.6. Describe the 3 stages of syphilis in depth
54.7. Illustrate the FTA-ABS test for T. pallidum

Diagnostic Microbiology Class 55: Zoonotics and Rickettsiae
Reading assignment: **Chapter 34**
Lecture Outline:

I. Overview of zoonotics and vector borne transmission
II. Review of zoonotics addressed in other sections
III. Bacillary and spirallary rat-bite fevers
IV. Rickettsia
V. Diagnostic methods
VI. Molecular ID of Rickettsia using PCR

Student Learning Outcomes:
Following a successful completion of this class the student will be able to:

55.1. Describe the gram stain and predominant growth characteristic and biochemical reactions of the zoonotics and rickettsial infections
55.2. State the major classifying information that groups the Rickettsials
55.3. Associate the Rickettsia responsible for RMSF, epidemic typhus, endemic typhus, scrub typhus, Q fever, Trench fever and Ehrlichiosis by genus and species, and associate symptoms and key features with each
55.4. State the conventional test for Rickettsia that uses antigens from Proteus vulgaris
55.5. Analyze in depth a report on Rickettsia felis infection and its diagnosis by PCR

Diagnostic Microbiology Class 56: Review for exam

Diagnostic Microbiology Class 57: Exam

Diagnostic Micro Class 58: Agents of Bioterror
Reading assignment: **Chapter 34**
Lecture Outline:
I Level A lab versus BSL 2, 3, 4
II Francisella tularensis
III Yersinia pestis
IV Variola
V Hemorrhagic fevers
VI Brucella
VII Clostridium botulinum
VIII Bacillus anthracis
Student Learning Outcomes:
Following a successful completion of this class the student will be able to:
58.1 List 6 organisms that are classified by the CDC as agents of bioterror
58.2 Describe the colony morphology and gram stains of the bacterial agents
58.3 List all special media required for fastidious organisms
58.4 Correlate these disease states with the correct organism: rabbit fever, undulant fever, bubonic plague, tularemia
58.5 List the 3 types of Anthrax infections
57.6 State the minimum identification requirements to rule out Anthrax, Plague, Tularemia, Brucellosis
58.7 List 3 viruses that are considered to be agents of bioterror
58.8 Explain the role of the BSL-2 Lab in identification of these agents
58.9 Contrast BSL-2, 3 and 4 labs in their safety requirements
58.10 Identify which of the organisms may cause infection in a laboratory setting

Diagnostic Microbiology Class 59: Complete cultures in progress

Lecture Outline Diagnostic Microbiology Class 59: Quality Monitoring
Reading assignment: **Chapter 4**
Lecture Outline:

I. Quality control versus Quality assurance
II. Guidelines for analytical QC
III. Personnel competency
IV. Performance Improvement
V. Problem/Action Form
VI. Performance characteristics of tests
VII. Effect of prevalence on predictive values

Student Learning Outcomes:
Following a successful completion of this class the student will be able to:

59.1 Describe pre-analytical, analytical and post analytical activities
59.2 List 5 types of QC activities besides running controls, and give examples of each
59.3 State the appropriate timing for performing QC tests on reagents
59.4 List 11 variables that may affect antimicrobial susceptibility testing
59.5 Describe proficiency testing, and explain its role
59.6 Describe the rationale for performance improvement, and discuss how it should be organized
59.7 Describe an incident report, and explain its role
59.8 Compare and contrast analytical sensitivity versus clinical sensitivity
59.9 Define the terms sensitivity, specificity, efficiency, positive predictive value and negative predictive value
59.10 Given data, calculate the above characteristics
59.11 Analyze 2 populations with different prevalence rates of a disease, and determine which performance characteristics of a test will change due to prevalence?
59.12 Contrast prevalence with incidence

Diagnostic Microbiology Class 60: Final Examination

Objectives for Affective Domain

During the lecture and laboratory sessions of this course the students shall demonstrate:

- Punctuality and consistency of attendance in scheduled classes, labs, field trips and special assignments.
- Willingness and ability to follow verbal and written instructions.
- Ability to accept constructive criticism and good faith effort to improve performance.
- Effective communication skills with instructors, staff and other individuals at work place.
- Efficient time/work organizational skills in and out of the classroom.
- Application of previous learning to subsequent learning exercises.
- Ability to work independently and accurately to perform assigned tasks.
- Adherence to all of the required lab safety precautions and procedures.
- Intellectual curiosity and enthusiasm for learning; does additional preparation and reading, looks for additional work assignments.
- Ability to recognize errors and discrepancies; and take appropriate corrective measures.
- Cleanliness and good organization at the work station.
- Honesty in academic work and integrity in performing lab work / reporting results.
- A professional appearance through personal grooming, hygiene and appropriate clothing.
- Professionalism and courtesy in interactions with instructors, staff and classmates.
- An interest in life-long learning by attending continuing education programs.

MLS 4460 & 4460L DIAGNOSTIC MICROBIOLOGY

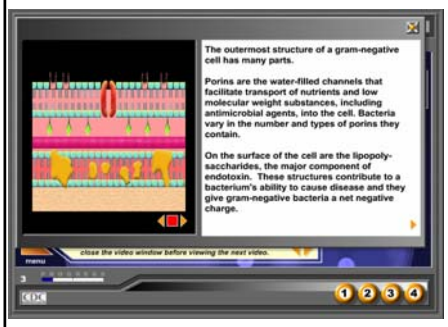
SAMPLES OF POWER POINT PRESENTATIONS

MLS 4460/4460L
Diagnostic Microbiology-I
2006 Lecture and Lab

Class 7

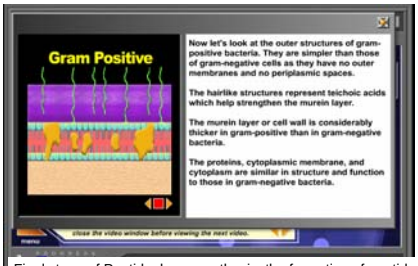
Antimicrobial action on cell walls.
What good is identification if there is no therapy?

Gram negative cell



Porins
Murein layer
Peptidoglycan
LPS
Periplasmic space
Cytoplasm
Outer membrane

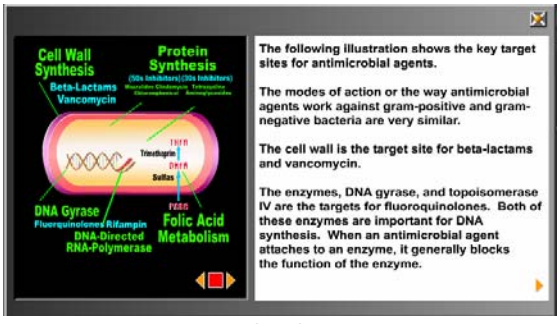
Gram positive cell



Porins
Murein layer
Peptidoglycan
LPS
Periplasmic space
Cytoplasm
Outer membrane
Teichoic acid linkage

Final stage of Peptidoglycan synthesis, the formation of peptide bonds, requires specific enzymes known as transpeptidases. This critical crosslinking can be interrupted by the beta lactam antibiotics, which bind to these enzymes. These enzymes (proteins) are also known as penicillin-binding proteins.

Antimicrobials have different sites of action



Out to CD

Cell wall inhibitor acting thru PBP: b-lactams

Box 3-1

Some Common β-Lactam Antibacterial Agents

Penicillins	Cephalosporins
Penicillin G	Cephalothin
Ampicillin	Cefamandole
Methicillin	Cefoxitin
Ticarcillin	Cefotaxime
Piperacillin	Ceftazidime
	Cefepime
Monobactams	**Carbapenems**
Aztreonam	Meropenem
	Imipenem

There are different versions of PBP, not all b-lactams will be effective on all PBP. The spectrum of activity of the drug depends on its structure

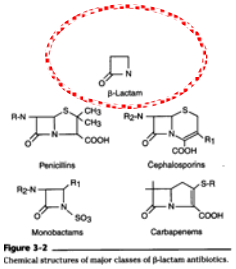


Figure 3-2
Chemical structures of major classes of β-lactam antibiotics.

b-lactams

- Four membered, nitrogen containing, beta-lactam ring at the core of the structure
- Generally non-toxic to humans
- Bind enzymes (PBP) involved in cell wall synthesis
- Inhibit cell wall synthesis → death
- Bacteria contain 4-6 different types of PBPs

b-lactamase is a virulence factor

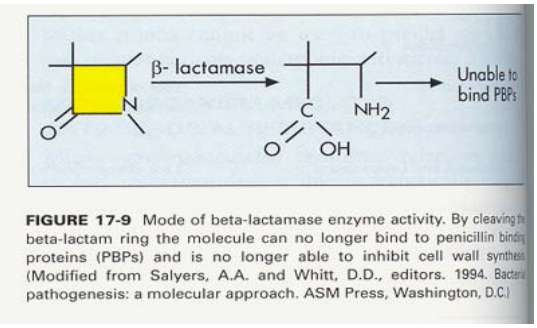
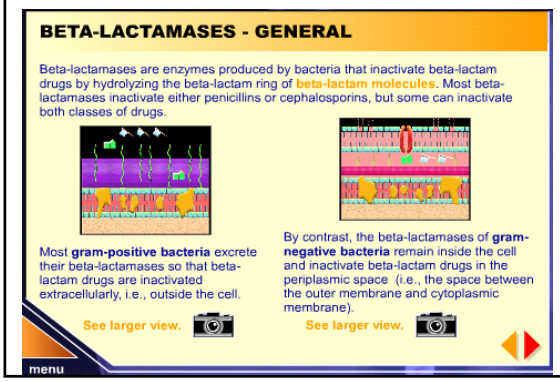


FIGURE 17-9 Mode of beta-lactamase enzyme activity. By cleaving the beta-lactam ring the molecule can no longer bind to penicillin binding proteins (PBPs) and is no longer able to inhibit cell wall synthesis (Modified from Salyers, A.A. and Whitt, D.D., editors. 1994. Bacterial pathogenesis: a molecular approach. ASM Press, Washington, D.C.)

Take notes



View CDC CD

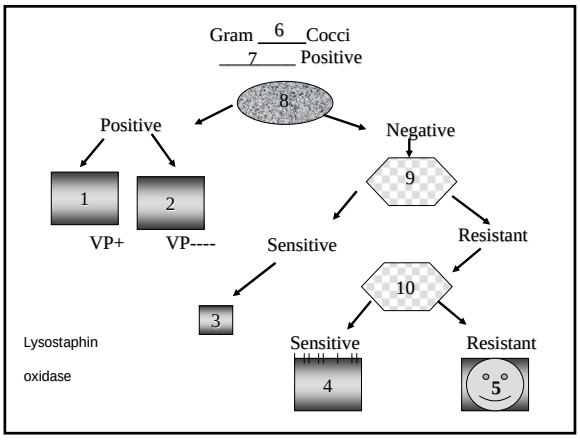
- Modes of action for b-lactam
- 5 ways bacteria resist microbial agents
- Video 13-17
- Acquired resistance
- B-lactams
- B-lactamase general (2 pages)
- B-lactamase inducible vs.constitutive

Class 7

Micrococcaceae

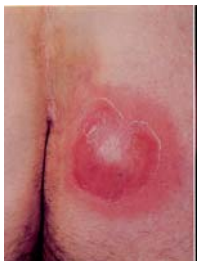
Staphylococcus species

1. **33 species, 17 are found clinically**
2. **GPC 0.5 - 1.5 um in diameter**
3. **They divide in more than one plane to form clusters**
4. **Cell wall contains teichoic acid**
5. **Metabolism is fermentative**



Answer key

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____



Furuncle caused by S. aureus

Fig 28-2 B&S

Staph aureus in carriers

- anterior nares
- nasopharynx
- perianal area
- skin

Modes of transmission

1. Normal flora
2. Carrier state
3. ?

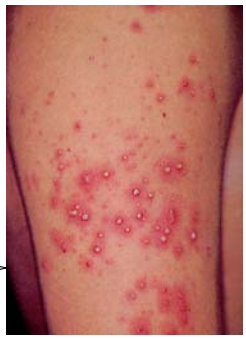
?

S. aureus
Spectrum of diseases and infections

1. Localized
2. Invasive
3. Toxin-mediated

Localized infections:
Folliculitis - infection of the hair follicles

B&S 28-2



S. aureus: Invasive Staph infections

- Injury due to trauma, burns, surgery
- prior viral infections
- chronic disease
- deficiencies in humoral immunity
- presence of IV's, catheters, pacemakers
- disease like DM, alcoholism, malignancies
- Staph in blood can spread to bone, heart, lung, brain

S. aureus : Toxin mediated syndromes

Food poisoning
Scalded skin syndrome
Toxic Shock syndrome

S. aureus; Toxin mediated syndrome

Food poisoning

Picnic food - potato salad, processed meats baked goods at 28C or higher for 2-4 hours

S. aureus:
Toxin mediated syndrome: Ritter's disease

Scalded skin syndrome SSS

- systemic dissemination of EXFOLIATIN toxin

(aka Epidermolytic toxin)

- affects neonates, with extensive sloughing of the epidermis

S. aureus: Toxin mediated syndrome

Toxic Shock syndrome TSS

Exfoliatin toxin released systemically:

- High fever
- Headache, confusion
- Vomiting
- Watery diarrhea
- Diffuse rash

Risk factors:

Tampon use
Postpartum infections
Surgical wound infections
Use of barrier contraception

Host Factors contributing to pathogenicity:

- Lack of antibody to TSST-1
- Altered hormonal states
- Presence of a nasal pack after surgery

Toxic Shock Syndrome (TSS) is caused when a strain of bacteria that usually lives harmlessly on our hands and in the vagina gains entry into the bloodstream, multiplies in great numbers, and produces toxins in a person who does not have antibodies for those toxins.

It was discovered almost 20 years ago. At first no one knew what was causing it, although it was quickly linked with "super absorbent" tampons. Tampons seem to facilitate TSS by causing lacerations of the vaginal wall and by providing a medium that supports bacteria growth.

Super absorbent tampons expand so much and are so thirsty for moisture that they can actually adhere to the vaginal wall and pull off the outer layer of cells when removed. Also, they tend to be left in place longer than regular tampons, and the longer they are in there, the better chance bacteria has to multiply.

This is also a potential problem with contraceptive sponges, diaphragms, and cervical caps. TSS is correlated with their use in instances when these devices have been left in the vagina for longer than the recommended time. While most cases of TSS are tampon-related, in rare cases even men and children get it following burns, boils, insect bites or infections after surgery.

Teenage women and women under 30 years of age are at higher risk of developing TSS. However, it doesn't occur very often - only about 1 to 15 individuals out of 100,000 people get it. The bacterium that causes TSS is found most commonly on the skin, in the nose, armpit, groin or vagina. Certain strains of the bacterium produce toxins that can cause TSS. Most people have the antibodies in their bloodstream to protect them from the toxin if it is produced, but many do not.

Toxic Shock Syndrome :Symptoms

If you have any of these symptoms and are wearing a tampon you should remove the tampon immediately and contact your doctor for immediate treatment.

- Fever (102 F or 38.9 C)
- Fainting (due to a drop in blood pressure)
- Headache
- Dizziness
- Vomiting
- Diarrhoea
- Decreased urination
- Strawberry-red tongue
- Sunburn-like rash on the palms and soles of your feet
- Sore muscles and joints
- Sudden drop in blood pressure, kidney damage, and shock

TSS: Treatment

It is usually treated with antibiotics, and drugs to lower temperature, and large amounts of fluids and electrolytes (essential body chemicals) to raise lowered blood pressure. Blood and other specimens from the body are analysed in a lab to identify bacteria. Antibiotics are given to help prevent recurrence. Patients often are hospitalised, and severe cases require intensive care. With proper treatment, patients generally recover within three weeks.

Prevention

Make sure you keep the following in mind, to protect yourself against TSS:

- Change tampons frequently (every 4-8 hours). You may wear a tampon overnight for up to 8 hours.
- Avoid tampons that are more absorbent than needed. The lower the absorbency, the lower the risk.
- Try using the new cotton tampons that have lower risk than rayon tampons.
- Wash your hands before inserting a tampon.
- Wear sanitary napkins some of the time - especially at night.
- If you've ever had TSS, it's best to stop using tampons and the diaphragm, as the condition can recur.
- If you're a diaphragm user, don't leave it in place longer than the recommended time - and don't use it during your period or in the first 12 weeks after you've had a baby.
- If you suspect you might be starting to have TSS symptoms and are wearing a tampon, remove it right away. This stops bacterial growth in 80 per cent of cases. Also visit a doctor immediately.
-

TSS: Choosing the Right Tampon

When using tampons, it's important to choose the lowest absorbency necessary for your menstrual flow. And because the amount of flow varies from day to day, it's likely that you will need to use different absorbencies on different days of your period.

If a tampon absorbs as much as it can and has to be changed before 4 hours, then you may want to try a higher absorbency. If you remove a tampon and after 4-8 hours white fibber is still showing, you should choose a lower absorbency. When using a tampon at night (for up to 8 hours), choose the lowest absorbency needed, insert a fresh one just before going to bed and remove it as soon as you wake up in the morning.

The absorbency ranges on tampon packages are:

- 6 grams and under junior absorbency
- 6-9 grams regular absorbency
- 9-12 grams super absorbency
- 12-15 grams super-plus absorbency

S. aureus Virulence Factors

1. Capsule formation
- may impede phagocytosis
- may promote adherence to cells and prosthetic devices
- 8 types of S. aureus based on capsular polysaccharide typing

2. Protein A
- Surface protein that binds IgG molecules
- Disrupts phagocytosis
- Protein A is used as a reagent in Staphaurex (coagglutination tests)

S. aureus Virulence Factors

3. Teichoic acid in the cell wall facilitates adherence to mucosal surfaces.

4. Enzymes
   1. Catalase
   2. Coagulase
   3. Staphylokinase or fibrinolysins
   4. Hyaluronidase
   5. Lipase
   6. B-lactamase

S. aureus: Virulence Factors

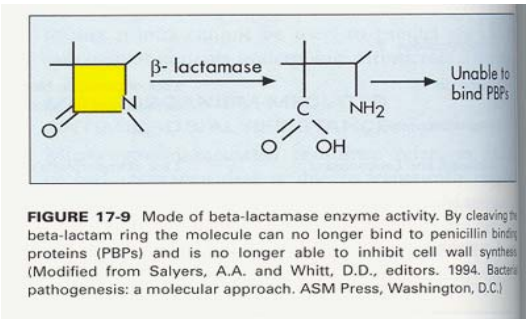


FIGURE 17-9 Mode of beta-lactamase enzyme activity. By cleaving the beta-lactam ring the molecule can no longer bind to penicillin binding proteins (PBPs) and is no longer able to inhibit cell wall synthesis (Modified from Salyers, A.A. and Whitt, D.D., editors. 1994. Bacterial pathogenesis: a molecular approach. ASM Press, Washington, D.C.)

S. aureus Virulence Factors

5. Hemolysins
   Alpha hemolysin
   Beta hemolysin
6. Toxins
   Leucocidin _Panton-Valentine leucocidin
   Exotoxin
   Cidin (kills) leuco (white cells)
   Exfoliatins
   Enterotoxins A-E
   TSST

Staph aureus Identification

- Colony description ?
- Staph colonies at 1 day are generally opaque, smooth, circular and buttery (butyrus)

- S. aureus - off white to yellow-orange, with pigment more obvious at room temp.
- Hemolysis
- Catalase
- Coagulase

What media will support growth?

BAP
Chocolate
MacConkey
CNA
Thayer Martin
PEA
Thio
Brain-heart infusion

Red media will support growth
BAP
Chocolate
MacConkey
CNA
Thayer Martin
PEA
Thio
Brain-heart infusion

Which of the Red labeled media is selective?

BAP
Chocolate
MacConkey
CNA
Thayer Martin
PEA
Thio
Brain-heart infusion

Selective for gram positives
BAP
Chocolate
MacConkey
CNA
Thayer Martin
PEA
Thio
Brain-heart infusion

Which of the red labeled media is differential?

BAP
Chocolate
MacConkey
CNA
Thayer Martin
PEA
Thio
Brain-heart infusion

Mannitol salt agar

Mannitol Salt agar is a selective and differential medium that selects the growth of Staph aureus over other flora (nasal screening)
Mannitol is a _____
The salt is at 7.5%. What is our physiological salt concentration?
The pH indicator in the medium is phenol red.Fermentation of mannitol results in a yellow halo around the colonies.

Biochemical identification: 1. Catalase

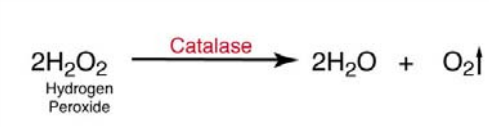
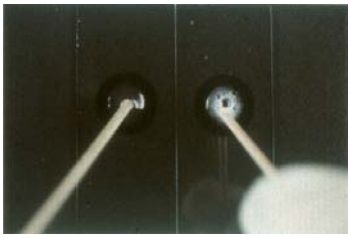


FIGURE 5-15 Catalase is an enzyme of aerobes and facultative anaerobes that converts hydrogen peroxide to water and oxygen gas.
Leboffe and Pierce

\- +



Catalase test stolen by Sherman Bonomelli

Caveat emptor

- Blood is catalase +
- H2O2 is very unstable, run QC daily

QC for catalase

- Positive – any Staph
- Negative – use Strep

Biochemical identification: 2. Coagulase

The enzyme coagulase is a thrombin-like enzyme that converts fibrinogen to fibrin

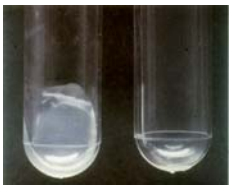
Fibrinogen → coagulase → Fibrin

Plasma will clump or clot

Physiologically, coagulase may increase the virulence of the organisms by surrounding the infecting organisms with a clot that protects them from the host's defenses.

neg pos

Slide coagulase test for Clumping Factor

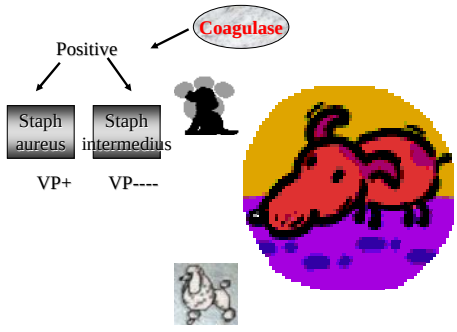


Tube coagulase test for Free coagulase

QC for Coagulase

- Positive is Staph aureus
- Negative is CNS – S. epi, S. saprophyticus

Gram Positive Cocci
Catalase Positive



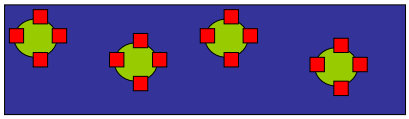
Alternate Procedures- "rapid" reagent kits you buy

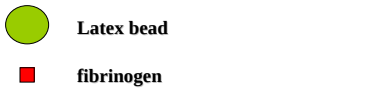
1. Latex agglutination tests
2. Anti-protein A antiserum
   Staphaurex, SeroSTAT Staph, Accu-Staph
3. Passive hemagglutination
   Staphloslide, Hemostaph
4. Staphase is a commercial system with little cups of rabbit plasma to emulsify colonies in.

Alternate Procedures- "rapid" reagent kits you buy

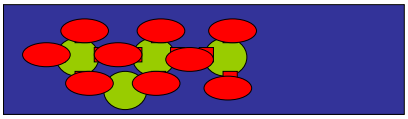
1. Latex agglutination tests

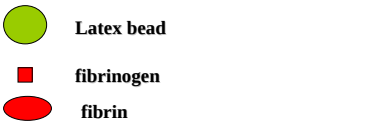
Latex agglutination for clumping factor





Latex agglutination for clumping factor





Latex agglutination test for clumping factor

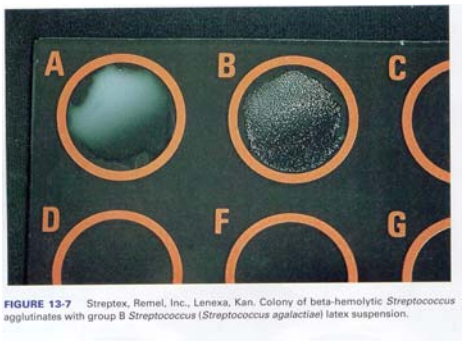
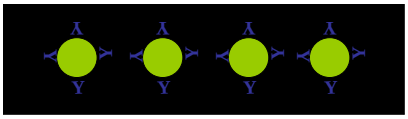
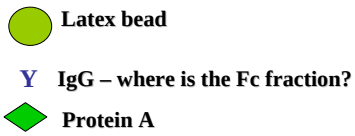


FIGURE 13-7 Streptex, Remel, Inc., Lenexa, Kan. Colony of beta-hemolytic *Streptococcus* agglutinates with group B *Streptococcus* (*Streptococcus agalactiae*) latex suspension.

Latex agglutination for protein A

Independent of that, Protein A is on the surface of 95% of S. aureus strains; Protein A binds Fc portion of IgG





Latex agglutination test for protein A

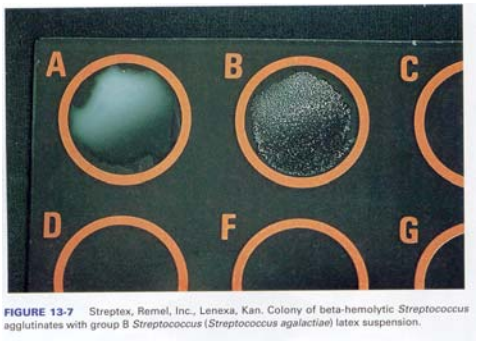


FIGURE 13-7 Streptex, Remel, Inc., Lenexa, Kan. Colony of beta-hemolytic *Streptococcus* agglutinates with group B *Streptococcus* (*Streptococcus agalactiae*) latex suspension.

Other methods for ID of S. aureus

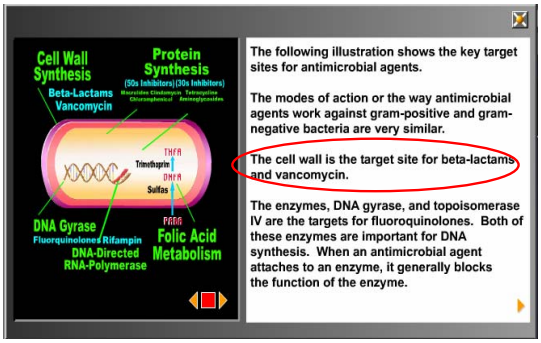
1. Dnase production
2. Thermonuclease production
3. DNA probes and PCR

Leboffe & Pierce

S. aureus Identification

1. Colonies usually what color?
2. Most are ___ hemolytic
3. Catalase _____
4. Coagulase _____
5. Mannitol Salt Agar _____
6. Commercial systems available

S. aureus Antimicrobial Therapy-used to be penicillin



Methicillin resistant Staph aureus

- Staph infections spread in Santa Rosa **Oct 25, 2003**
  Highly resistant strain strikes nine Pace, Navarre High athletes. Santa Rosa County Superintendent John Rogers confirmed that football players at Pace and Navarre high schools have been hit by infections from methicillin-resistant staphylococcus aureus, a strain of bacteria highly resistant to treatment by penicillin-based antibiotics (Pensacola News Journal, FL).

Methicillin resistant Staph aureus

- Staph infection sacks star Pace player **Oct 25, 2003**
  Surratt was hospitalized for three days recently and missed an important game against Escambia High School after his hand was infected with methicillin-resistant staphylococcus aureus bacteria. Officials with the Escambia County School District, Pensacola Junior College and the University of West Florida say they have had no reported cases of methicillin-resistant staphylococcus aureus in their athletic programs (Pensacola News Journal, FL).

MRSA and VISA

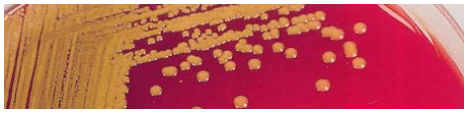
- CDC CD Section 3 on MRSA to VISA
- 5 points extra credit: write 1-2 paragraphs describing MRSA, how it came to be, and how hospitals screen patients, what the appropriate therapy is. Due within one week

Coagulase negative Staphs CNS or CoNS

Micrococcus
S. epidermidis
S. saprophyticus

Micrococcus

- Small to medium colonies
- Nonhemolytic
- White, tan, yellow, pink, yellow-orange



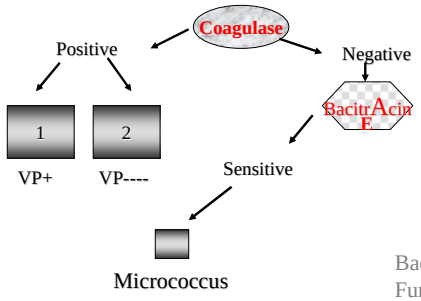
Micrococcus

- Mode of transmission – NF skin, mucosa, oropharynx
- Rare infections – endogenous strains in compromised hosts
- Virulence low

Identification

- Catalase
- Coagulase
- Bacitracin and Furazolidone
- O/F medium – unable to ferment glucose
- Resistant to lysis by lysostaphin 200 ug
- Susceptible to lysozyme 25 ug
- Microdase (modified oxidase test)

Gram Positive Cocci
Catalase Positive



Bacitracin
Furazolidone
Erythromycin

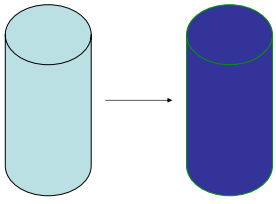
Figire 5-2
Bacitracin susceptibility on a sheep blood agar plate. *Staphylococcus aureus* (R) is on top and *Micrococcus luteus* (S) is below.
Leboffe and Pierce

Furazolidone

- Micrococcus is resistant
- Staph aureus is sensitive

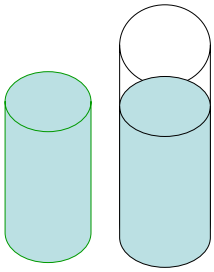
Oxidation Fermentation Media

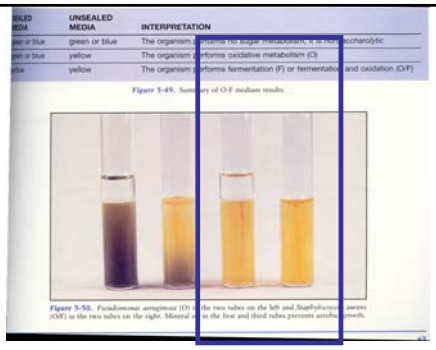
- Oxidation and fermentation change the pH of the media



O/F media

- Oxidation is aerobic
- Fermentation is anaerobic
  - inoculate agar
  - Incubate under mineral oil





This organism performs both oxidative metabolism and fermentation. This is Staph.

Micrococcus

Will not ferment glucose
May be completely asaccharolytic
May weakly oxidize glucose

2 enzymes are used in reference labs to ID Micrococcus

1. Lysozyme - cleaves glycan strands. Micrococci are more susceptible to lysozyme than Staph are.

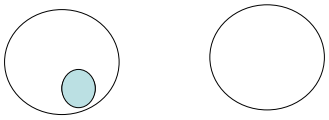
2. Lysostaphin - lyses the Gly-Gly bonds in the cell walls of Staph. Micrococcus do not have these bonds, so they are resistant to lysostaphin.

Stomatococcus mucilaginous

- Medium white colony
- Strong adherence to agar – sticky
- Nonhemolytic
- Transmission same as Micrococcus, seen in bone marrow recipients, malignancies
- Infection is rare
- Virulence is low

Microdase disk

- Turns blue when dabbed with Micrococcus
- Differentiates Stomatococcus, which is weakly catalase +, lysostaphin resistant, and Microdase negative



Micrococcus Stomatococcus

Staph epidermidis

- Small, smooth grey-white
- Nonhemolytic
- May be sticky
- Normal flora of skin and mucus membranes
- Opportunistic pathogens
- S. epi is a major nosocomial pathogen
- Gain entrance through ports, IVs , indwelling catheters.
- May be spread person to person, or on contaminated medical equipment.

Staph epi spectrum of disease

- Difficult to establish clinical significance
- Venous catheterization increases risk
- Patients at risk are already immunocompromised, esp bone marrow transplants, premature infants
- Heart valve endocarditis
  - Especially in prosthetic heart valves
  - Native heart valve endocarditis may be the most common S. epi infection.
- Post surgical complications
- Osteomyelitis through trauma or prosthesis

S. epi Virulence factors

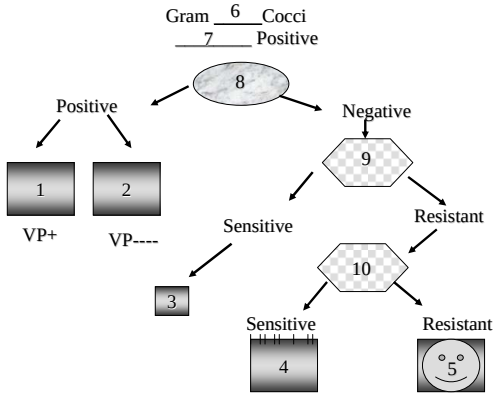
- Extracellular slime enhances adhesion to plastic – a polysaccharide covering over a cluster of bacteria.
- Slime protects against antimicrobials
- Slime production is a marker of infectivity in blood culture isolates
- Can acquire/disseminate antimicrobial resistance, allowing its survival in hospitals

S. epi identification

- If they are "normal flora", they are not significant
- Restrict ID to
  - Isolates that are normally sterile – CSF, blood, body fluids
  - Pure culture growing in urine

Staph epi

- Identification
- Catalase _____
- Coagulase _____
- Bacitracin _____
- Novobiocin _____
- Commercial systems same as S. aureus



S. epi Antimicrobial therapy

Not for normal flora

- 50% produce penicillinase
- Vancomycin is drug of choice for methicillin-resistant CNS

Staph saprophyticus

- usually white
  - May be yellow-orange
  - nonhemolytic

S. saprophyticus

S. saprophyticus

- Normal flora of skin and mucosa of GU tract
- "Community acquired" – sexually active females.
- Not nosocomially acquired
- Honeymoon cystitis

http://honeymoons.about.com/cs/femalebody1/a/cystitis.htm

S. sapro ID

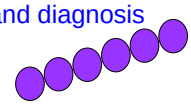
- Catalase
- Coagulase
- Bacitracin
- Novobiocin
- Therapy same as for S. epi

Family Micrococcaceae:

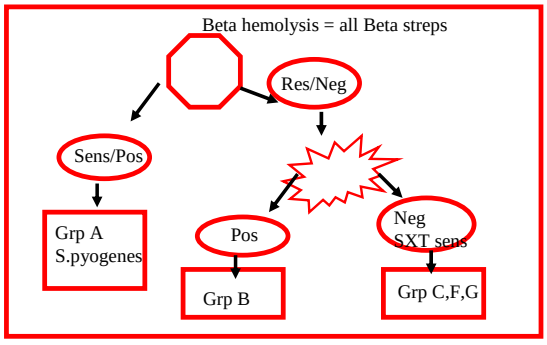
A. Planococcus
B. Micrococcus sp.
C. Stomatococcus mucilaginaosus
D. Staphylococcus

Class 11 Streptococcus

Diseases and diagnosis



Streptococcus Flow Chart
Gram Positive Cocci
Catalase Negative



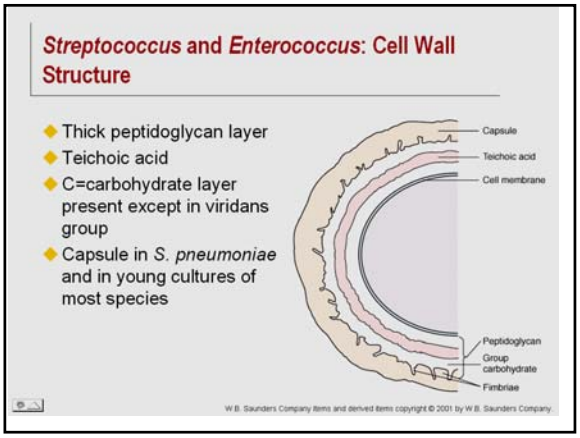
Family Streptococcaceae

Streptococci
Enterococci
Characteristics

- GPC
- Catalase neg
- Facultative anaerobe & capnophilic

Cell wall similar to other GPC

- What is the thick region that holds dye?
- Carbohydrates
- Teichoic acids
- Lipoproteins
- Surface protein antigens



Streptococci and Enterococci

- Media that support this?
- Media that differentiate this?
- Media that select for these?

What three ways are used to classify strep?

- Hemolysis on sheep blood (not in vivo)
  - What types are there?
- Lancefield grouping
  - ~1930's, based on extraction of C carbohydrate from cell well. Type A through T
  - A,B, C, F, G are cell wall polysaccharides
  - Group D and Enterococcus are based on lipoteichoic acids

Species names - caveat

Group A = S. pyogenes

Group B = S. agalactiae

BUT

Group D includes several, including S. bovis and S. equinis

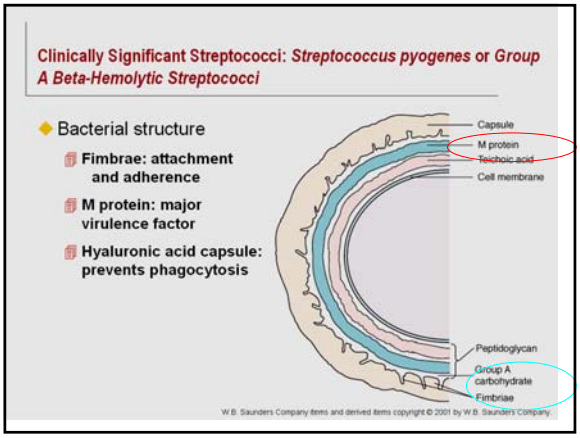
Lancefield Group A beta-strep

Streptococcus pyogenes

- What diseases can it cause?
- This organism causes the greatest variety of diseases, from sore throat to kidney failure
- Penicillin has stopped its rampage

Mode of transmission

- Live on skin and mucus membranes
- 20% "carrier" rate
- Spread skin to skin, towels, medical equipment
- How about in your house?



Acute pharyngitis

- Seasonal to winter and spring
- Mostly school children
- Crowded classrooms – breathe droplets
- Food/milk can transmit it
- What symptoms?
- Why is it important to diagnose Strep throat versus viral/other bacterial sore throats?

Sequela: Scarlet fever

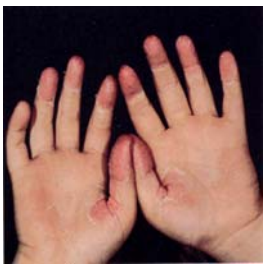
- **S. pyogenes with bacteriophage that produces pyrogenic (erythrogenic) exotoxin (SPE).**
- **Rash by 2nd day, on upper chest →trunk, extremities**

Quarantine!

Scarlet Fever

Rash fades within weeks,
Followed by peeling skin for several weeks.

"Strawberry tongue" – beefy, red, moist, glistening tongue



Suppurative sequela

- "pus producing"
- Sinusitis, otitis media, abscesses on tonsils

Infections (pyodermal) of skin

- Impetigo
- Erysipelas "St. Anthony's Fire"
- Cellulitis
  - Diffuse acute infection of the skin and subQ tissue, heat, redness, pain, swelling → lead to abscess, even gangrene
- Necrotizing fasciitis "flesh eating"
  - Inflammation of connective tissue

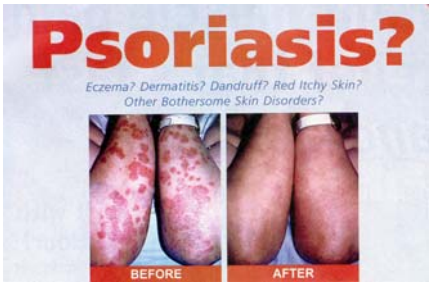
Nonsuppurative Sequelae

- Rheumatic fever
- Fever, carditis, subQ nodules, joints, blood vessels
- Follow RT infection, antibodies cross react with heart tissue
- May be chronic
- Children 6-15 with recent strep infections
- Rheumatic strains produce a large amount of "M protein"
- Diagnosis:
  - Preceding strep infection
  - Positive ASO test (anti-streptolysin O)
  - Anti-DNAse
  - Streptozyme test
- Penicillin is treatment, done monthly
- Give Pen prophylactically to family

Acute glomerulonephritis

- Only a few M serotypes
- Circulating immune complexes may (postulated) be deposited in the glomerulus, fix complement, cause inflammation. Damage to kidney leads to loss of filtering ability → loss of proteins into urine
- Edema, hypertension, hematuria, proteinuria.
- May follow respiratory or cutaneous infection, mostly preschool children
- 6-10 days after sore throat
- 14-21 days after skin infection
- Urine smoky/rusty color
- Decreased C3 levels, High anti-Dnase.
- May have positive ASO.
- Most patients recover completely
- Therapy to prevent hypertension and treat edema
- Treat with penicillin

Superantigen activity
Autoimmune consequences



Virulence factors

- Capsule may have hyaluronic acid – prevents phagocytosis
- M protein (80 serotypes of M protein)
- No vaccine
- Organisms without M protein are easily opsonized by complement
- M protein binds fibrinogen/fibrin/FDP to block complement → resists phagocytosis

Opacity factor

- Also an M protein associated cell surface antigen

Hemolysins

Streptolysin O

- O2 labile – Would see increased hemolysis if the agar was stabbed on BAP
- Is antigenic → make anti-streptolysin O
- Toxic to leukocyte, platelets, RBC
- Some strains of C and G produce it, too
- Basis for ASO test

Streptolysin S

- O2 stable
- Not antigenic
- Toxic to various cells, including leukocytes
- Produced by A, C and G.
- Hemolysis on BAP due to this

Extracellular products spread strep

- Exotoxins and enzymes break down large molecules.
- Pus from strep is runny because of this
- Streptokinase, hyaluronidase (spreading factor), DNase
  - DNase A, **B**, C, D, cause antibody production
- Strep pyrogenic exotoxins (SPE) cause rash – these are super antigens that cause release of potent cytokines

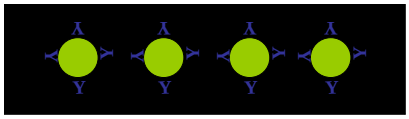
Identification

- Hemolysis
- Media – BAP at ambient (not CO2)
- Media – BAP with neomycin, trimethoprim, SXT "sulfamethoxazole"
  - Inhibits NF, enhances group A and B
  - Since group C, F and G are sensitive to SXT, lab report must specify: Negative for beta hemolytic Strep group A and B"

Direct tests

- Direct antigen testing – tomorrow's lab
- Bacitracin – ANY zone of inhibition is sensitive (positive)
  - This is good enough for presumptive ID
- PYR
  - Positive for Group A and Enterococcus
  - Quick test
- SXT disk – resistant to 25 ug disk
- Serodiagnosis – ASO test
- Commercial kits
- Latex agglutination with group specific antisera
- Coagglutination

Latex agglutination for protein A

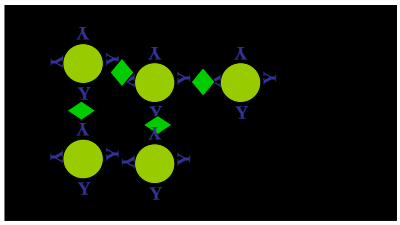


Latex bead

Y IgG – where is the Fc fraction?

Protein A

Latex agglutination for protein A



Coagglutination: Uses staoh aureus as reagent instead of latex Coagglutination

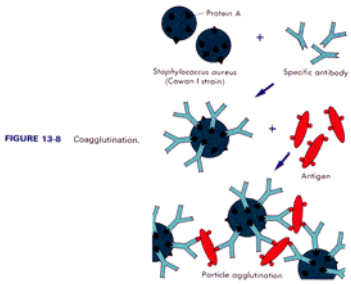


FIGURE 13-8 Coagglutination.

Therapy

- Shot of penicillin
- If allergic, use Erythromycin

- Strep pyogenes from non-throat samples should be further worked up to rule out other Streps

Group B strep

- Streptococcus agalactiae
- Inhabits lower GI and female genital tract.
- Vaginal colonization in 20% of healthy women
- Risk in delivery

Mode of transmission

- In utero or during delivery
- Nosocomially by health care workers or mother
- Adults infected by endogenous strains to sterile sites

Group B strep

Infections and disease

- #1 cause of neonatal sepsis and meningitis
- 10-20% of affected babies die, others have brain damage, hearing, vision loss
- ~1% of positive mothers have affected babies
- Early onset
- <7 days after birth
- Acquired prenatally or perinatally
- Degree of colonization is a contributor
- Premature babies at risk
- Prolonged rupture of membranes at risk
- Respiratory tract is probable portal of entry

Late onset

- Neonatal sepsis and meningitiis >1 week
- Mortality is lower
- Nosocomial or maternal infection
- IV Penicillin

Prevention

- Screen prenatally (close to term) for GBS
- Vaginal/rectal culture
- Positive does NOT mean infant will be affected
- Mother given IV antibiotics before delivery

GBS colonization

- 20% health women are asymptomatic
- During pregnancy, may become pathogenic
- May cause bacturia, chorioamnionitis, stillbirth
- Postpartum may cause endometriosis or post cesarean bacteremia

GBS UTI

- During pregnancy - Treat with penicillin

Compromised adults

- Cellulitis, arthritis, meningitis
- DM, elderly, alcoholic

GBS virulence factors

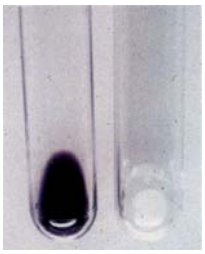
- Capsule contains sialic acid, inhibits complement
- GBS without sialic acid are not as virulent
- Polysaccharide capsule is NOT immunogenic → no vaccine

GBS identification

- Type of hemolysis?
- Zone of hemolysis?
- SXT resistant (BAP-SXT grows A&B)
  - Group C, F, G are SXT sensitive
- Bacitracin _____
- Christie Atkins Munch Peterson →

Hippuric acid hydrolysis

- Products are glycine and benzoic acid
- Detection of glycine with _____
- Detection of benzoic acid with FeCl3 – this makes a precipitate that lasts > 10 minutes



Antigen detection

- Kits for CSF, serum, urine
- Vaginal swab, not as accurate

Commercial kits

- Like RapID strep, et cetera
- Group C beta hemolytic strep

Group C beta hemolytic strep

- Pyogenes like
- Less frequently encountered
- Strep equisimilis is associated with humans

Normal flora

- Pharynx, vagina, GI tract, skin
- Endogenous strains access sterile sites

Infections

- Tonsillitis and pharyngitis
- Immunocompromised patients may have pneumonia, post op infections, bacteremia, puerperal sepsis, osteomyelitis

Group C

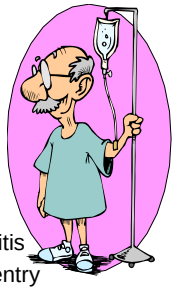
Virulence Factors

- Hyaluronic acid capsule and M protein
- Binds fibrinogen and secretes many of the extracellular enzymes as Group A

Group C Identification

- Latex or coagglutination
- May also be sensitive to bacitracin
- How do they react with SXT?

Group G beta strep

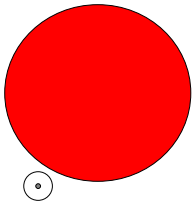


- Similar to Group C
- Contain M proteins, bind fibrinogen, extracellular enzymes
- Found on skin, GI, vagina, pharynx
- Pharyngitis, otitis media, endocarditis
- In bacteremic patient, IV portal of entry
- Also IV drug users, DM, malignancy

Group C Identification

- Latex or coagglutination

Group F beta strep



- Minute colony
- Large hemolysis
- "Strep milleri" group
- NF in oropharynx and mucous membranes
- Main species: *S.anginosus*
- Severe suppurative infections
  - Abscesses in soft tissue, lung, brain, abdominal cavity
- Patients have underlying disease
- Cause osteomyelitis, bacteremia, meningitis

Group F Identification

- Colony/hemolysis ratio
- More microaerophilic/anaerobic than other strep
- S. milleri group may be α, β, γ
- Latex or coagglutination

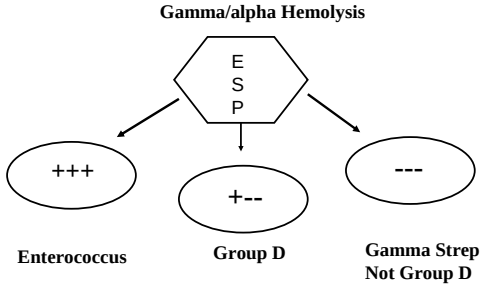
?

- Which strep accounts for most Upper resp infections?
- Which strep accounts for most GU infections?
- Which causes meningitis?
- Which is “minute”?
- Which grows on SXT-BAP?

Class 12 Other Streps

Alpha and Gamma Streps
Group D or not Group D
Enterococcus
Etc.

Streptococcus Flow Chart
Gram Positive Cocci
Catalase Negative



Group D Strep

- Includes S. bovis and S. equinus et al.
- Generally not found in intestines (bovis may be)
- Produce endocarditis, UTI, wound infections
- S. bovis in the blood is a hint that patient may have a GI tumor
- Group D is susceptible to penicillin
- Hemolysis varies, even beta may be seen

Enterococcus

- Used to belong to Group D, but is reserved for species found in intestines
- Have the D group antigen
- E. faecalis is most common (UTI)
- E. faecium
- E. avium
- E. durans
- Caveat: This may give a weak positive on a catalase test with 24-48 hour old colonies
- Normal flora in GI and female GU
- Endogenous strains to sterile site
- Contaminated food/soil
- Person to person, nosocomial

Diseases:

- Nosocomial
- UTI
- Bacteremia, endocarditisi, infection of abdomen and pelvis
- Rare in CNS and respiratory

Antimicrobial treatment

- Most are resistant to penicillin and penicilinase resistant penicillins
- Must do a sensitivity test
- Combine Pe with aminoglycosides like gentamycin
- Vanco and erythromycin
- VRE is an emerging threat

Superbowl prediction for the game

- Use ESP
- Esculin
- Salt
- PYR

Gamma strep flowchart

Esculin hydrolysis

- The ability to hydrolyze esculin is a characteristic of most enterococci, as well as Group D strep.
- Members of the Strep viridans group also do this

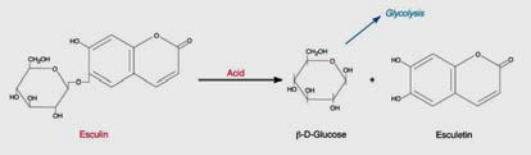


FIGURE 5-5 Acid hydrolysis of esculin with the production of esculetin is done by many organisms. However, the group D streptococci and enterococci are unique in their ability to do this in the presence of bile salts.

Leboffe and Pierce

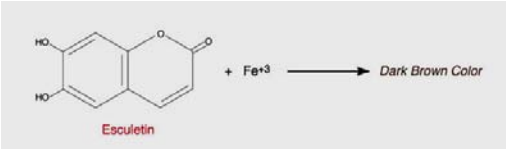
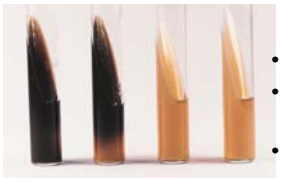


FIGURE 5-6 The bile esculin test indicator reaction involves the reaction of esculetin, produced during the hydrolysis of esculin, with Fe^{3+}. The result is a dark brown to black color in the medium.

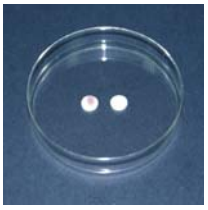


- Growth in BE:
- If it can grow, it is bile resistant
- If it runs black, it can hydrolyzer esculin to esculetin

FIGURE 5-7 The bile esculin test. From left to right:
A positive result is indicated if more than half the tube turns black within 72 hours.

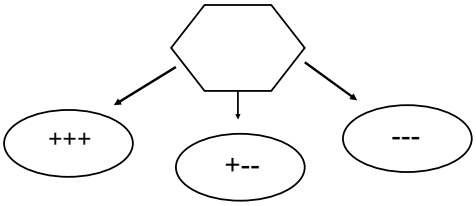
2 other distinguishers

- 6.5% NaCl broth – ability to survive : tubes will get cloudy or stay clear
- PYR



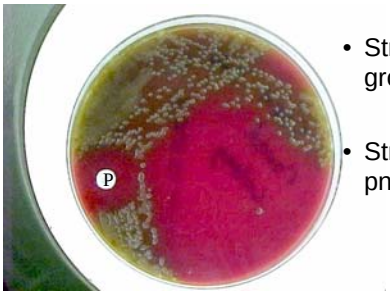
Streptococcus Flow Chart
Gram Positive Cocci
Catalase Negative

Gamma/alpha Hemolysis



Enterococcus | **Group D** | **Gamma Strep Not Group D**

Green strep



- Strep viridans group
- Strep pneumoniae

Strep pneumoniae

- Aka Pneumococcus
- Chief antigen is the capsule (82 types). This is antigenic, and antibody to it will cause the capsule to swell (Quellung test); stained with methylene blue
- Are vaccines for this organism
- Other Antigen similar to C carbohydrate. Humans make a protein that will precipitate this antigen → protein is called C-reactive protein (~ inflammation)

Clinical infections S pneumo

- Pneumo, sinusitis, otitis media in <3 yr, bacteremia, meningitis in adults, normal flora
- Most common cause of bacterial pneumo
- Penicillin usually works
- Lobar pneumonia: Aspiration of NF, edema in alveoli spread infection, stops when it reaches fibrous septa that separate the lobes of the lung.
  - Alcoholism, anesthesia, malnutrition, viral infections

Differentiate Green Streps

- Optochin = P disk: ethylhydrocupreine HCl
- Bile solubility – Sodium desoxycholate
- Colony morphology
  - Use BHI, BAP or choc, CO2 helps
  - Alpha with wet, mucoid, dome shaped colonies
  - Autolytic → umbilicate
  - Bile salts lower surace tension between cell membrane and media, and accelerate autolysis
- Gram stain
  - Gram positive lancet shaped pairs and chains(capsule)

Optochin is "P" disk

Figure 5.66
Optochin susceptibility test on a sheep blood agar plate. The zone of inhibition surrounding the disk indicates susceptibility to optochin and presumptive identification of *S. pneumoniae*.

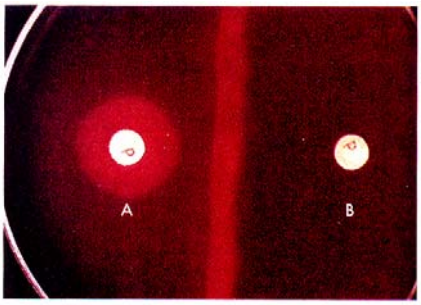
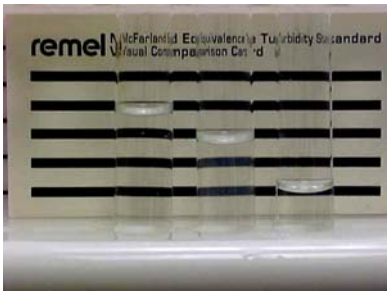


FIGURE 30-24 Optochin test. A, *Streptococcus pneumoniae* showing zone of inhibition (14mm). B, Alpha hemolytic *Streptococcus* growing up to the disk.

Optochin = P disk = ethylhydrocupreine Hcl. Bailey and Scott

Bile solubility



Morphology: Umbilicated colonies or mucoid colonies

COLOR PLATE 25. Umbilicated pneumoc colonies on blood agar.

Gram stain morphology: GP lancet shaped diplococci

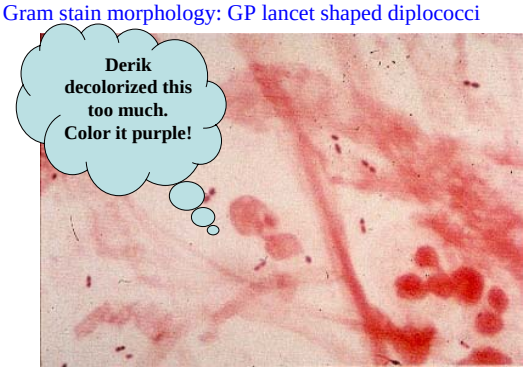


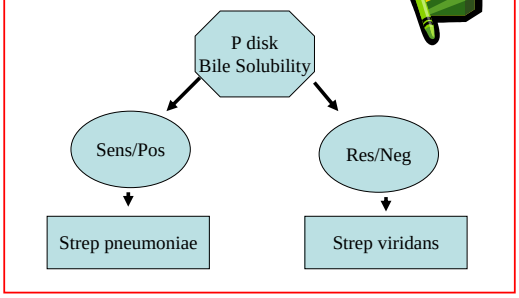
Figure 17

Strep viridans

- Green strep without Lancefield grou pantigens that are not S. pneumo
- May be gamma, too
- Oropharyngeal commensals, can cause subacture bacterial endocarditis, meningitis, dental caries, abscesses, osteomyelitis, empyema.
- Use 6.5% NaCl to tell virdans from Enterococcus if they are gamma
- Virulence is low, extracellular polysaccharide
- ID: BE neg, optochin resistant, bile solubility neg
- Antimicrobials: use penicillin or vanco

Streptococcus Flow Chart
Gram Positive Cocci
Catalase Negative

Alpha hemolysis



Nutritionally variant strep

- Pyridoxal-dependent
- Viramin B6 dependent
- Thiol dependent
- Symbiotic strep
- Satellite around Staph, E. coli, Klebsiella, Enterobacter and yeast
- Supplemented media will grow them
- Normal oral flora → endocarditis, qouns, otitis media

Streptococcus-Like Organisms

- *Aerococcus*
  - Gram-positive cocci that tend to form tetrads
  - α-hemolytic; and may resemble viridans group
  - Usually a contaminant
  - PYR +
  - Salt tolerant (6.5%)
  - BE variable
  - Leucine aminopeptidase NEGATIVE
  - May be confused with *Enterococcus biochemically bu for the LAP differential*

Streptococcus-Like Organisms

- *Leuconostoc*
  - Resemble streptococci microscopically; colonies resemble viridans group or *Enterococcus, hydrolyzes esculin, grows in salt*
  - Found in plants, vegetables, and dairy products
  - LAP negative
- *Pediococcus*
  - Found in nature; used in bioprocessing and biopreservation of foods such as cheese, meats, and vegetables
  - Rarely seen in human infections; has been associated with septicemia
  - LAP positive, can grow at 45C, PYR neg

Points to Remember

- General characteristics and hemolytic patterns of streptococcal and enterococcal species
- Infections produced by pathogenic species
- Microscopic and colony morphology
- Tests used to identify these species
- Emergence of resistant strains

Lab exercise: 2 components

- Examine S. pneumo
- Identify unknowns

Class 16 Enterobacteriaceae

Day 1 Lab

Tribes

•**Escherichieae** - Escherichia and Shigella
•**Edwardsiellae** - Edwardsiella
•**Salmonellae** - Salmonella
•**Citrobacteriaceae** - Citrobacter
•**Klebsiella** - Klebsiella, Enterobacter,Serratia, Hafnia "KES" group
•**Proteeae** - Proteus, Morganella and Providencia
•**Yersinieae** – Yersinia

Overt Pathogens

Salmonella
Shigella
Yersinia

Diseases

- Shigella – bacterial dystentery
- Klebseilla pneumonia – you guess
- Salmonella-
- Serratia marsecens – nosocomial infections
- E. coli – Gastroenteritis, UTI
- Yersinia enterocolitica – Gastroenteritis
- Yersinia pestis

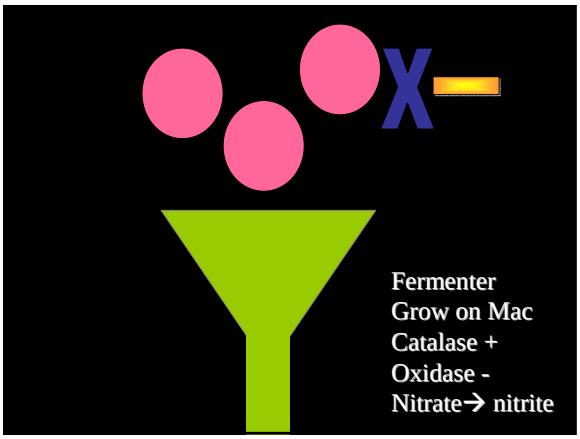
Opportunistic pathogens

- Citrobacter, Enterobacter, E. coli, Hafnia,
- Klebsiella, Morganella, Proteus, Providencia, Serratia
- Normal flora that go AMOK
  - Eg. E. coli in CNS
  - Coliforms into urinary tract
  - Nosocomial infections

Enterobacteriacea: Gram negative nonspore forming rods

- Ferment glucose
- Oxidase negative
- Reduce nitrates to nitrite
- Grow on MacConkey
- Catalase positive

Memorize these 5



All members ferment carbohydrates

- All ferment glucose
- Others are variable
- Acid pH is visible in media via pH indicators

All produce Catalase

- Some slower than others
- What is the substrate for catalase?

All members are Cytochrome oxidase negative

- Rapid test
- First test of a nonlactose fermenter
- QC: Pseudomonas is oxidase positive

All Enterobacteriacea grow on MacConkey

Selective and differential
Bile salts and crystal violet inhibit GP
Carbohydrate is _____
Pink or red means _____, due to the acid pH effect on "neutral red".
Plates go at room air.

What color will they be?_____

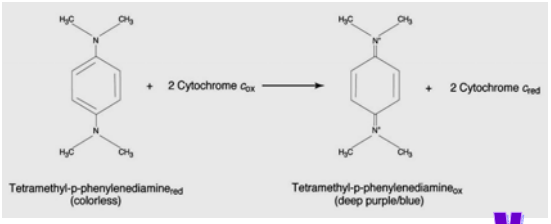
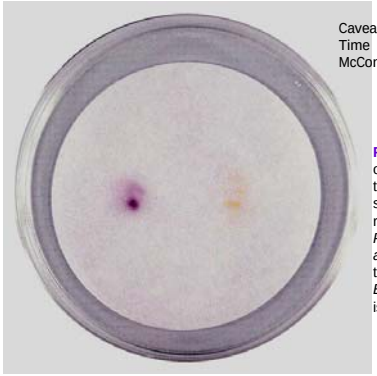


FIGURE 5-67 Chemistry of the oxidase reaction.



Caveat: wire loop
Time
McConkey may interfere; use BAP

FIGURE 5-69 The oxidase test done on paper saturated in oxidase reagent. *Pseudomonas aeruginosa* (+) is on the left and *any Enterobacteriacea* (–) is on the right.

All Enterobacteriaceae will reduce NO3

Gas may be obvious
Captured in Durham tube
Or
NO3 converted to NO2
Detect as follows:

Medium has KNO3

KNO_3 --> HNO_2

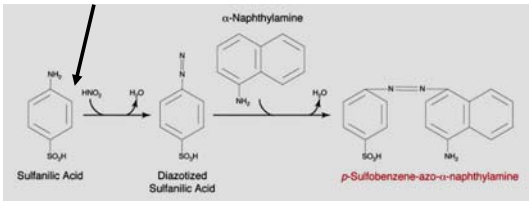


FIGURE 5-58 Phase 1 indicator reaction. If nitrate is reduced to nitrite, nitrous acid will form in the medium. Nitrous acid then reacts with sulfanilic acid to form diazotized sulfanilic acid, which reacts with the α-naphthylamine to form *p*-sulfobenzene-azo-α-naphthylamine, which is red. Thus, a red color indicates the presence of nitrite and is considered a positive result for nitrate reduction.

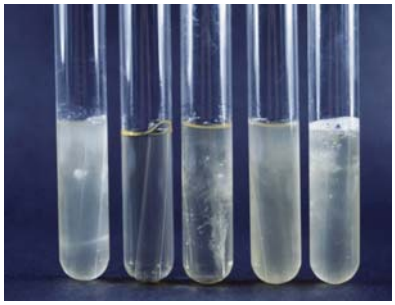


FIGURE 5-59 Nitrate broth tubes after incubation before the addition of reagents. From left to right: *Enterobacter aerogenes*, an uninoculated control, *Enterococcus faecalis*, and two different strains of *Pseudomonas aeruginosa*. Note the gas produced by the *P. aeruginosa* strain on the far right indicating a positive result (*P. aeruginosa* is a nonfermenter, therefore, the gas produced is an indication of denitrification.) The four tubes on the left must now proceed to the phase 1 reaction.

Durham tubes

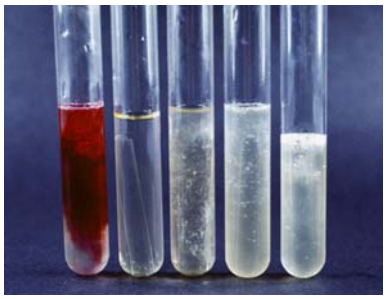


FIGURE 5-60 Nitrate broth tubes after addition of sulfanilic acid and α-naphthylamine (phase 1 reaction). From left to right: *Enterobacter aerogenes* (+1), an uninoculated control, *Enterococcus faecalis* (–), and the two *P. aeruginosa* strains (no reagents were added to the one on the right since it was positive for denitrification). A positive result indicates reduction of nitrate to nitrite; a negative result at this point must be checked for the presence of nitrate in the medium (phase 2 reaction).

Quality control: prove that a negative really "worked"

If the test is really negative, KNO_3 will remain. Reduce it with Zn.

$$KNO_3 \xrightarrow{Zn} HNO_2$$

From the zinc

KNO_3 --> HNO_2

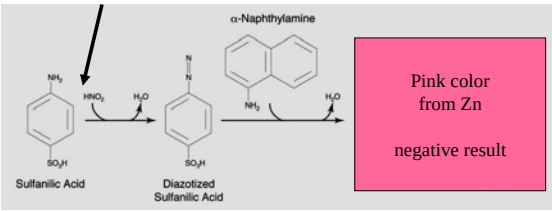
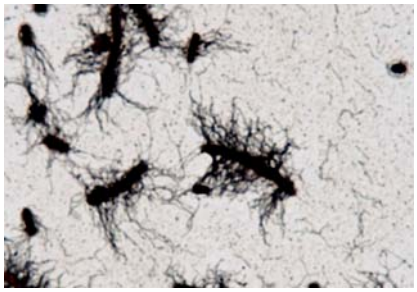


FIGURE 5-58 Phase 1 indicator reaction. If nitrate is reduced to nitrite, nitrous acid will form in the medium. Nitrous acid then reacts with sulfanilic acid to form diazotized sulfanilic acid, which reacts with the α-naphthylamine to form *p*-sulfobenzene-azo-α-naphthylamine, which is red. Thus, a red color indicates the presence of nitrite and is considered a positive result for nitrate reduction.

Is this organism a NO3 reducer?

1. Organism is incubated in NO3 broth overnight. After the addition of sulfanilic acid and alpha-napthylamine, the solution turned red.
2. Organism is incubated in NO3 broth overnight. Prior to the addition of reagents, the presence of gas was noted.
3. Organism is incubated in NO3 broth overnight. After the addition of sulfanilic acid and alpha-napthylamine, the solution did not change color. Following addition of zinc, the solution turned red.

Motile enterobacteriacea have peritrichous flagella



Primary isolation media

- Name two types that are selective and differential for gram negatives.
- What sugars (carbohydrate source) do they offer?

Lactose fermentation

- Lactose is a disaccharide
- For lactose utilization, bacteria require
  - Permease
  - B-galactosidase

  Organisms with both of these are lactose fermenters

Highly predictable lactose fermenters

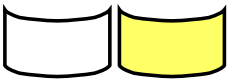
- E. coli
- Enterobacter
- Klebsiella

Some bacteria produce b-gal, but not permease. These are late lactose fermenters

Among these are
Serratia
Citrobacter
Hafnia

ONPG tests for late bloomers

- Permease enzyme is not required
- B-galactosidase cleaves a sugar analog – o-nitrophenyl-β-D-galactopyranose
- Yellow color develops



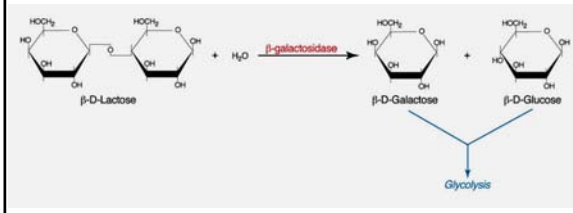


FIGURE 5-63 Hydrolysis of lactose by β-galactosidase.

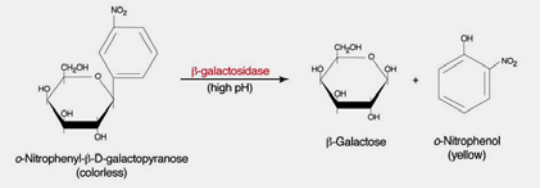


FIGURE 5-64 Conversion of ONPG to β-galactose and o-nitrophenol by β-galactosidase.

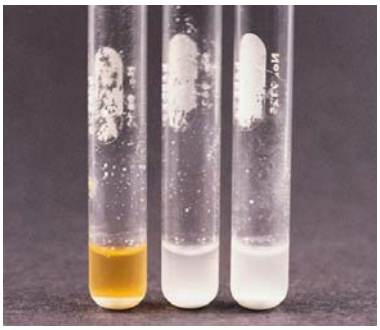


FIGURE 5-65 The ONPG test. *Escherichia coli* (ONPG-positive) is on the left and *Proteus vulgaris* (ONPG-negative) is on the right. An uninoculated control is in the middle.

IMViC

- Indole for Trp'ase
- MR for glucose metabolism to acid
- VP for glucose metabolism to butanediol
- Citrate as sole carbon source

- Used to be the standard before automation
- Expectation – know the reagents/substrate/easy identifiers, eg. ++OO

Indole test:
Step 1 Indole production

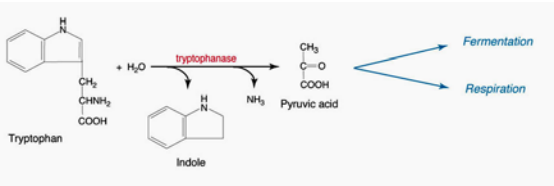


FIGURE 5-38 Tryptophan catabolism in indole-positive organisms.

Media must contain _____ (BAP)

Step 2 – Indole detection – using an "aldehyde"

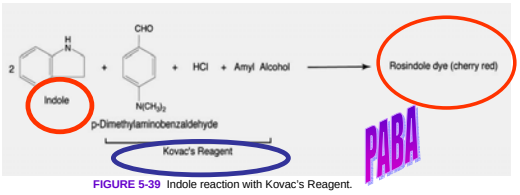
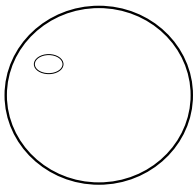


FIGURE 5-39 Indole reaction with Kovac's Reagent.

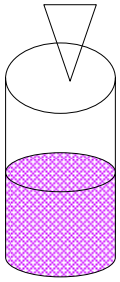
2 types of tests

- Rapid indole uses dimethylaminocinnamal dehyde, and turns blue
- Kovac's reagent (p-dimethylaminobehzalde hyde)

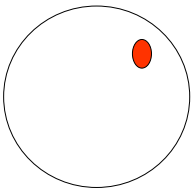


Filter paper

Indole tube test: : Media with Trp, add either Kovac's reagent (p- dimethylaminobenzaldehyde)



Add Kovacs reagent



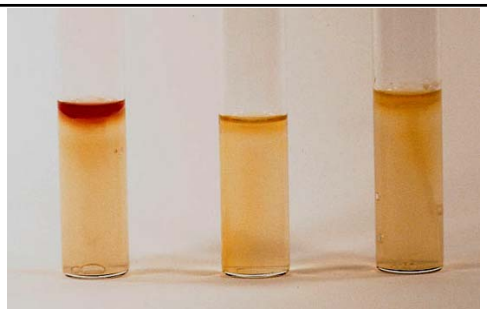


FIGURE 5-40 The indole test. This is SIM medium inoculated with *Morganella morganii* (indole-positive) on the left and *Enterobacter aerogenes* (indole-negative) on the right.An uninoculated control is in the center.

MR and VP

- Glycolysis results in different end products for groups of bacteria.
- The pathway that produces acid endproducts used _____ as an indicator.
- The pathway that produces butanediol is detected with the _____ method

MR and VP substrate broth

- Peptones, glucose, buffer
- Same broth for both tests
- Inoculate broth, grow 48 hours.
- Split broth and test

- Acidic end products detected by MR
- Metabolism to butanediol detected by VP

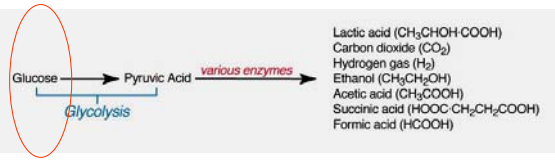


FIGURE 5-52 The mixed-acid fermentation of *Escherichia coli*, a representative methyl red-positive enteric bacterium. Products are listed in order of abundance. Most of the formic acid is converted to H_2 and CO_2 gases.

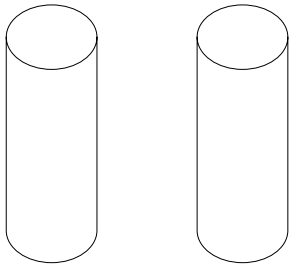
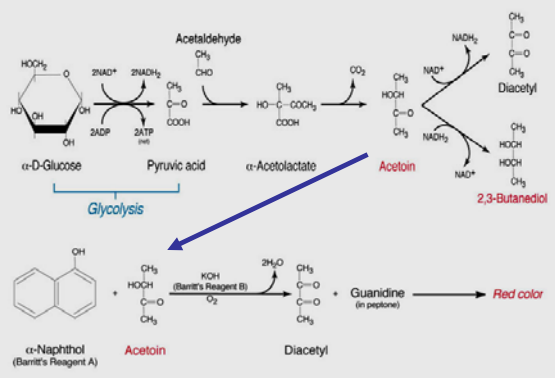


FIGURE 5-53 The methyl red test. *Enterobacter aerogenes* (MR-negative) on the left and *Escherichia coli* (MR-positive) on the right.

The pH indicator methyl red is red with pH < 4.4. Yellow higher

Vogues-Proskauer



?

- A positive indole indicates what enzyme?
- What famous bacteria is indole +?
- What is the name of the reagent?
- What pH must the methyl red be to be MR?
- What famous bacteria is MR positive?
- What tribe is positive for VP?

Both MR and VP detect glycolysis products

- Which detects acetoin and butanediol production?
- Which is the more acidic of the two?
- Hafnia and P. mirabilis may be MR/VP positive

Citrate metabolism

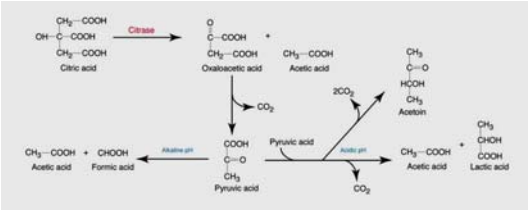


FIGURE 5-18 Metabolism in citrate-positive organisms. Once in the cell, citrate is hydrolyzed by citrase into oxaloacetic acid and acetic acid. The oxaloacetic acid is further hydrolyzed into pyruvic acid and CO_2. This CO_2 is responsible for the color change in the medium . The fate of the pyruvic acid depends on the cellular pH as shown in the figure.

Caveat for Citrate test

- Test detects the ability to utilize Citrate as the SOLE carbon source
- Dead bacteria may acts as a carbon source
- Light inoculum is required
- Don't pick up any media from primary culture
- Those provide a false negative. Luxuriant growth is suspicious of this.

Citrate + is blue

Lab discussion

- New teams of partners
- unknowns
- Tests are for
  - Nitrate reductase
  - Oxidase
  - ONPG
  - Indole
  - Citrate
- Set up Tests for Wed
  - Lysine decarboxylase
  - TSI
  - Urease
  - Gelatin?

Class 17 Enterobacteriaceae

Day 2 Lecture

Tribes

•**Escherichieae** - Escherichiea and Shigella
•**Edwardsiellae** - Edwarsiella
•**Salmonellae** - Salmonella
•**Citrobacteriaceae** - Citrobacter
•**Klebsiella** - Klebsiell, Enterobacter, Hafnia, Serratia "KES" group
•**Proteeae** - Proteus, Morganella and Providencia
•**Yersinieae** – Yersinia

Overt Pathogens

Salmonella
Shigella
Yersinia

Diseases

- Shigella – bacterial dystentery
- Klebseilla pneumonia – you guess
- Salmonella-
- Serratia marsecens – nosocomial infections
- E. coli – Gastroenteritis, UTI
- Yersinia enterocolitica – Gastroenteritis
- Yersinia pestis

Escherichia

- Most common
- Mode of transmission
- Spectrum of disease

Toxigenic Strains

- ETEC
- EIEC
- EPEC
- EHEC
- EAggEC

Identification

- Lactose _____
- IMViC _____

OHK antigens

- O groups have cross reactivity with similar antigens in some other genera, especially Shigella
- Adding the H typing completes the serotype
- Capsular antigen may mask the O antigen when doing an agglutination test. Capsular antigens are heat labile, so boil to destroy it.

Jack in the Box

- Sorbitol non fermenter
- E coli H157:O7
  - Verotoxin I (vero cells of monkey) is a phage encoded cytotoxin identical to Shiga toxin of Shigella dystentariae type 1.
  - Verotoxin II aka Shiga toxin 2
  - Other serotypes can also cause HUS
- Paper on E coli H157:O7
- Read, and for Homework answer # 1-4, 8-10, 12-15, 18 and 20. 13 points.

Other Escherichia

- E. hemannii is yellow pigmented, from CSF, wounds, blood, and spread like O157;H7.
- E. vulneris from wounds. May be yellow pigmented.

	ONPG	ADH	LDC	C
E. coli	95	17	90	
Shigella (serogroups A,B,C)	2	5	0	
Shigella sonnei	90	2	0	
Salmonella (most serotypes)	2	70	98	
Salmonella typhi	0	3	98	
Salmonella paratyphi A	0	15	0	
Citrobacter freundii	95	65	0	
Citrobacter diversus	95	65	0	
Edwardsiella tarda	0	0	100	
Klebsiella pneumoniae	99	0	98	
Klebsiella oxytoca	100	0	99	
Enterobacter aerogenes	100	0	98	
Enterobacter cloacae	99	97	0	
Hafnia alvei	90	6	100	
Serratia marcescens	95	0	99	
Proteus mirabilis	0	0	0	
Proteus vulgaris	1	0	0	
Providencia rettgeri	5	0	0	
Providencia stuartii	10	0	0	
Providencia alcalifaciens	1	0	0	
Morganella morganii	5	0	0	
Yersinia enterocolitica	95	0	0	
Yersinia pestis	50	0	0	
Yersinia pseudotuberculosis	70	0	0	

Hideous chart to memorize

Citrobacter (C freundii)

- Transmission – NF, endogenous
- Spectrum of dx: nosocomial, UTI, blood, sterile sites in debilitated patients
- ID:
  - What about the lactose fermenting?
  - Also makes H2S.
  - Ornithine negative
  - IMViC V+-V

KES(H) tribe

- KES common characteristic:
  - Generally, IMViC opposite of E. coli
  - These are the only VP + organisms
  - What are the genera?

Klebsiella

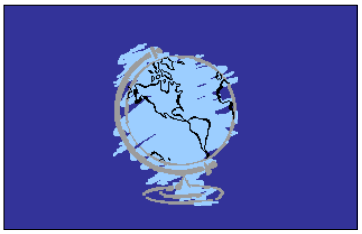
- K. pneumonia: mucoid characteristic
  - Polysaccharide capsule
  - Lower RT infections, wound, UTI, bacteremia

- K. oxytoca – similar, but indole +
- K. ozaenae – nasal secretions
- K. rhinoscleromatis – nasal infections, found in Africa, SA

Key feature of Klebsiella: non-motile

Motility

- Negative for Shigella, Klebsiella, Yersinia



Enterobacter

- E. cloacae
- E. aerogenes
- Which of the above makes gas from adonitol and inositol? It is also LDC + (and ADH -)
- Transmission : NF in FI
  - Person to person, endogenous
  - Nosocomial
  - E. Sakazakii is rare, but life threatening sepsis and meningitis in neonates

Enterobacter Quiz

- What is the Indole?
- What is the VP?
- What is the motility?
- What is the ONPG?
- Name 2-3 tests that disinguish cloacae from aerogenes.
- Make a cheat sheet with these clues on it.

Serratia (marscensens, liquifaciens, rubidaea)

- Transmission: NF in GI
- Nosocomial
- Multiple resistance to antibiotics
- Infection following surgery, use of catheters
- Red pigment in colonies of mars and ruby

Serratia Quiz

- What is the motility?
- What is the ONPG?
- What is the Mac?

- P.S. Proteus and Serratia liquify gelatin (hence liquefasciens, ja?)

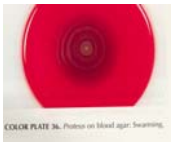
Proteae Tribe

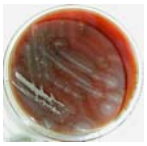
- In parts per million
- P
- P
- M

- Shared characteristic: PDA +, LDC -, MR +, VP -. Most are indole +.

Proteus

- P. mirabilis look on chart and distinguish from
- P. vulgaris
- Transmission: NF in GI
- Person2person, endogenous
- UTI



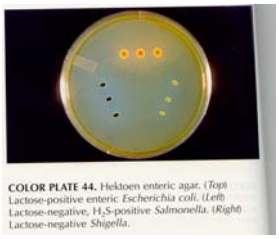


Proteus ID

- Lactose fermentation _____
- Colony charcteristic _____
- Stink: 2 stick factors: urease, H2S
- PDA +
- Mirabilis is indole negative, vulgaris is indole positive (very important person VIP)

The stink factors

- Urease
  - If the organism can hydrolyze urea, it will produce ammonia.
- H2S production
  - Provide a source of sulfur and a source of heavy metal to detect it.
  - Ferrous sulfate, sodium thiosulfate
  - Media that detects this: HE, XLD, LIA, TSI



COLOR PLATE 44. Hektoen enteric agar. (*Top*) Lactose-positive enteric *Escherichia coli*. (*Left*) Lactose-negative, H_2S-positive *Salmonella*. (*Right*) Lactose-negative *Shigella*.

H2S production

- Provide a source of sulfur, sulfide or thiosulfate and a source of energy
- Detected in the presence of heavy metal, lead or iron
- Black precipitate
- Salmonella, Proteus, Edwardsiella

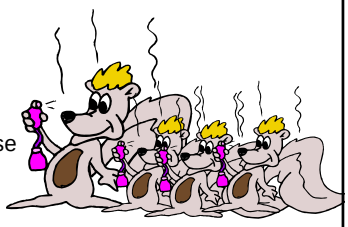
H2S smell of _____

SPcEd out eggs

Urease

- Proteae family
- Citrobacter
- Klebsiella
- Yersinia

- PU Proteae urease
- Smells CKY
- PU, CKY



Morganella

- Species: M. morganii
- UTI and other infections
- PDA _____
- Urea positive, H2S negative
- MR ___ VP _____

Providencia

- P. rettgeri
- P. stuartii
- P alcalifaciens
- UTI, nosocomial infections
- PDA +,

Edwardsiella

- E. tarda
  - ~snakes, birds, water
  - H2S+
  - Urease –
  - Indole +
  - Citrate negative

Review

- What are the 5 characteristics of Enterobacteriacea?
- List the organisms that will be ONPG +
- List the orgs that are non motile
- What tribe is PDA +
- What tribe is VP +
- Distinguish P. mirabilis from P. vulgaris
- Which org is mucoid?
- Which is a swarmer?
- Which can have red colonies?

Review

- What about that E. coli?
  - IMVC?
  - Oxidase
  - Urease
  - H2S
  - Lactose
  - ONPG
  - Nitrate reductase
- What genera produced H2S?
- Name the urease producers
- What family is VP+?
- What organisms are nonmotile?

Class 18 Enterobacteriaceae Day 3

Biochemical testing

Please sit with your partner, and get your slants from Monday

- What will a positive test look like for
  - Citrate
  - Oxidase
  - ONPG
  - NO3 reductase
  - Urease
  - How can you tell if the indole is positive?

New concepts today

- Amino acid metabolism
  - Ornithine
  - Phenylalanine
  - Arginine
  - lysine
- Triple sugar fermentation
  - Lactose
  - Sucrose
  - glucose

in living color

Amino acid metabolism

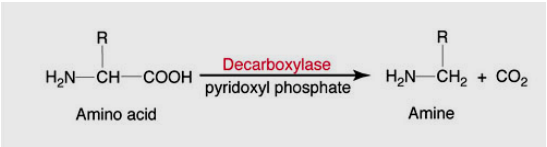


FIGURE 5-22 Amino acid decarboxylation results in the formation of an amine and carbon dioxide.

Assume the amino acid is neutral. What is the product?

Amino acid decarboxylation yields a basic product

- pH indicator is bromcresol purple
- Acid pH is yellow
- Alkaline pH is purple
- Positive decarboxylation is _____

Three choices of amino acids

- Lysine
- Ornithine
- Arginine
- These are anaerobic reactions, either occuring in the butt of the tube or in semisolid (hence anaerobic) media

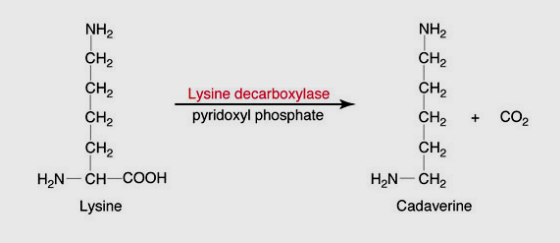


FIGURE 5-23 Decarboxylation of the amino acid lysine produces cadaverine and CO_2.

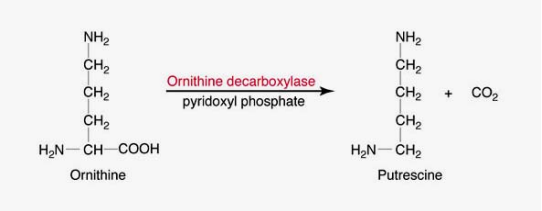


FIGURE 5-24 Decarboxylation of the amino acid ornithine produces putrescine and CO_2.

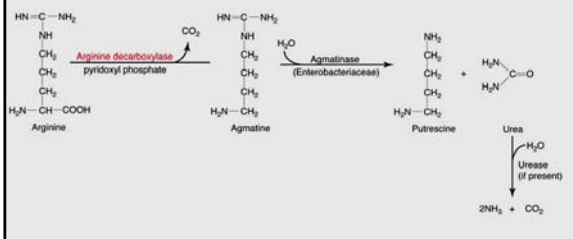
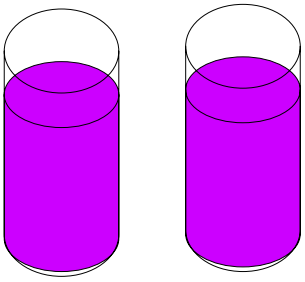


FIGURE 5-25 Decarboxylation of the amino acid arginine produces the amine agmatine. Members of *Enterobacteriaceae* are capable of degrading agmatine into putrescine and urea. Those strains with urease can further break down the urea into ammonia and carbon dioxide. Thus, the end products of arginine catabolism are carbon dioxide, putrescine and urea, or carbon dioxide, putrescine and ammonia.

Makeup of the test

- “Test” tube has glucose for growth, and amino acid of interest, and pH indicator.
- Control tube has glucose for growth, and pH indicator

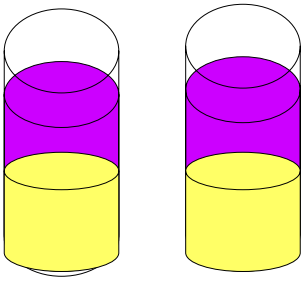
Draw an uninoculated tube that has lysine in it. Draw a control tube as well



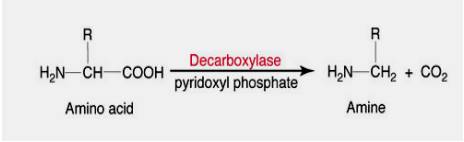
After inoculation, what happens to the control tube

- Hint, glucose is fermented by all Enterobacteriacea

Both tubes will ferment glucose

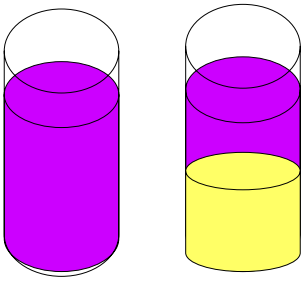


If the organism can decarboxylate the amino acid, then what?



What happens to the control?

pH shift in “test” indicates decarboxylation



This color change occurs in two steps. Purple to yellow to purple

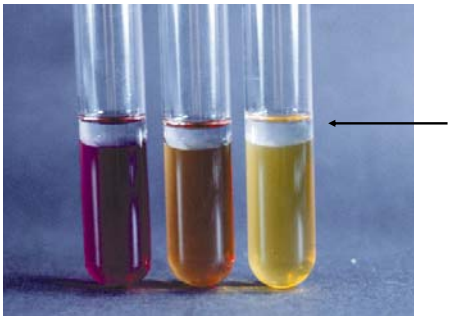


FIGURE 5-26 The lysine decarboxylase test results are shown here, but the colors are the same for all amino acids in Møller's medium. *Pseudomonas aeruginosa* (+) is on the left and *Proteus vulgaris* (–) is on the right. An uninoculated control is in the center.

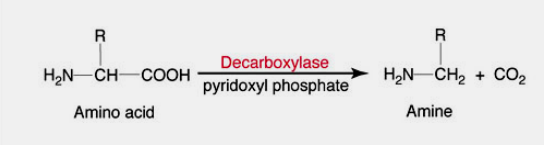
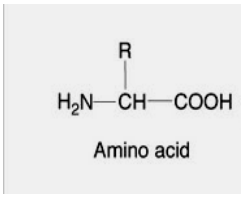


FIGURE 5-22 Amino acid decarboxylation results in the formation of an amine and carbon dioxide.

Some organisms can deaminate amino acids



What pH consequence will this be?
This activity is aerobic

Proteae tribe deaminate Phenylalanine
On the slant on the tube
Requires addition of FeCl3 for detection

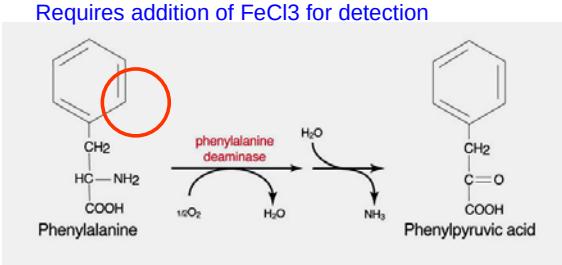


FIGURE 5-71 Deamination of the amino acid phenylalanine by phenylalanine deaminase.

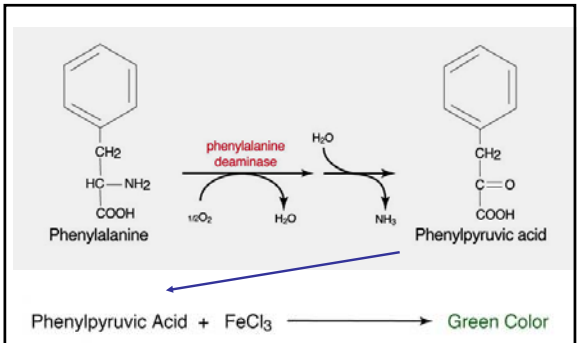


FIGURE 5-72 The reaction of phenylpyruvic acid with $FeCl_3$ to indicate a positive phenylalanine test.

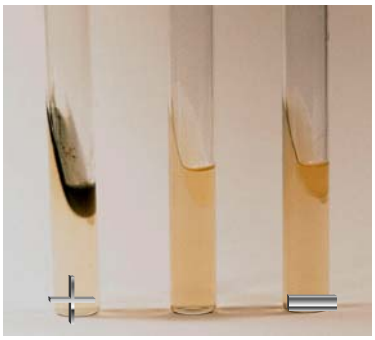


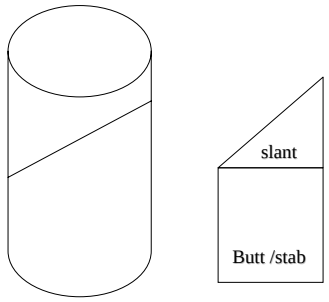
FIGURE 5-73 Phenylalanine agar tubes. *Proteus mirabilis* (+) is on the left and *Escherichia coli* (–) is on the right. An uninoculated control is in the center.

Proteae family deaminate Lysine

Lysine may be
Decarboxylated
Deaminated
Deneithered

Use LIA Lysine Iron Agar. Has Lysine, glucose, iron, peptones on a slant.

Which is anaerobic? Where does fermentation take place?

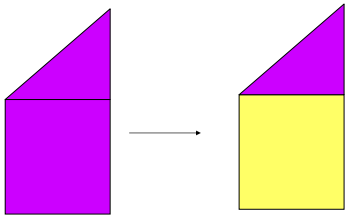


Steps for deaminase

use your crayons again.

- 1. glucose is fermented.
- What is the pH?
- Where is that happening?

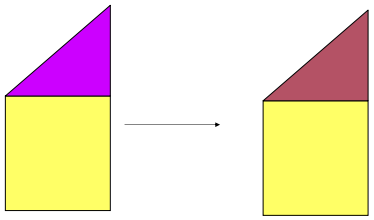
Phase 1 – glucose fermentation



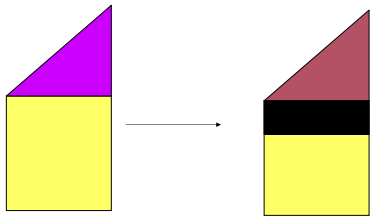
Step 2 – lysine is deaminated

- Where does that occur?

Phase 2 – deamination produces "red" color on slant



Phase 3 – H2S production makes black precipitate with metal



H2S production

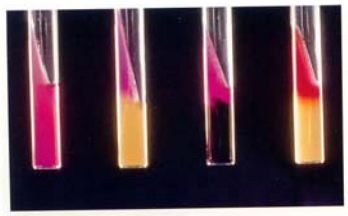
- Provide a source of sulfur, sulfide or thiosulfate and a source of energy
- Detected in the presence of heavy metal, lead or iron
- Black precipitate
- Salmonella, Proteus, Edwardsiella
- Different media have different sensitivities. The more acid the media, the more H for the H2S.
- More intense black ppt in the inoculation line, in the deeps, centers of colonies.

Shorthand results

- A – acid (yellow)
- K – alKaline (purple)
- R – red
- H2S

- K/A is alkaline slant, acid butt
- What is K/K?

Lysine iron agar



What are the shorthand results for each tube?

Examine your LIA tubes

- Which organisms produce H2S?
- Which organisms have a yellow butt? What does that mean?
- Which organisms have a purple slant?
- Do any have a reddish tinge?
- Which are LDC+? Which are LDA+?

Other combinations detect H2S

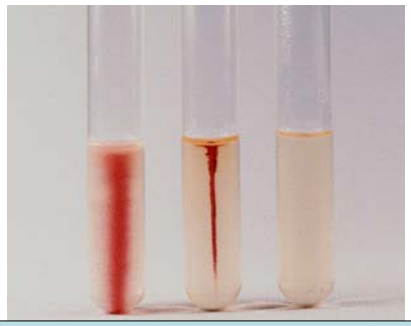
- SIM – sulfur, indole, motility
- Hektoen
- XLD
- TSI

COLOR PLATE 44. Hektoen enteric agar. (*Top*) Lactose-positive enteric *Escherichia coli*. (*Left*) Lactose-negative, H_2S-positive *Salmonella*. (*Right*) Lactose-negative *Shigella*.

Motility

- Wet prep under 1000X – drop settles, search for purposeful movement, not brownian

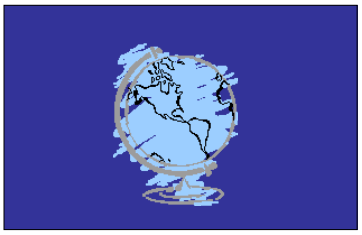
- Tube uses semisolid media (0.4% agar)



Which organism is motile, tube 1 or 2?

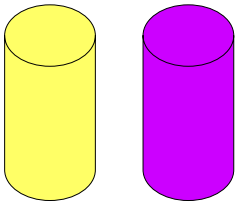
Motility

- Negative for Shigella, Klebsiella, Yersinia



Urease

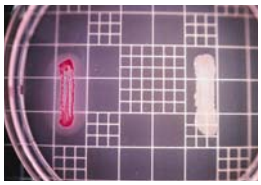
Urea + H2O → CO2 + H20 + NH3



P.S. Don't forget Gelatin hydrolysis

Lactose fermentation

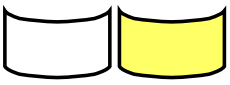
- Lactose is a disaccharide
- For lactose utilization, bacteria require
  - Permease
  - B-galactosidase



Organisms with both of these are lactose fermenters

ONPG tests for late bloomers

- Permease enzyme is not required
- B-galactosidase cleaves a sugar analog – o-nitrophenyl-β-D-galactopyranose
- Yellow color develops



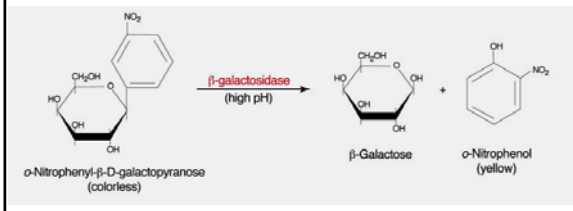
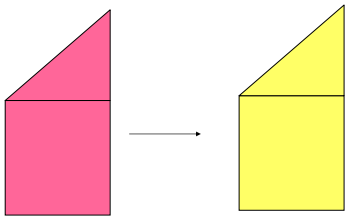


FIGURE 5-64 Conversion of ONPG to β-galactose and o-nitrophenol by β-galactosidase.

Kligler Iron Agar

- Agar
- 1 g glucose
- pH indicator – phenol red (yellow in acid)
- 10 g lactose
- FeSO4
- Peptones

Phase 1 – sugar fermentation

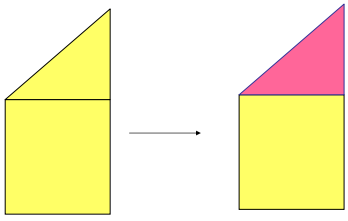


T=0 Is this aerobic or anaerobic? t=1

Phase 2 – oxidative decarboxylation

- Peptides are converted to amines by oxidative decarboxylation – all bacteria do this, not just Enterobacteriaceae
- Where does oxidation occur?

Oxidative carboxylation shifts pH of slant

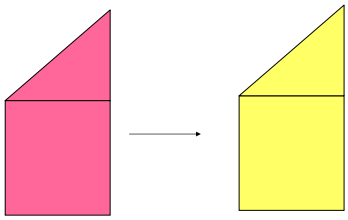


T=1 t=2

Lactose fermentation

- 1 g glucose
- 10 g lactose
- EEK will ferment glucose, with an overwhelming amount of acid production

Peptone oxidation occurs, but the pH is so strongly acid, the slant stays acid

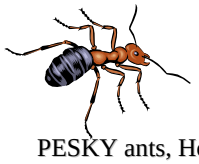


H2S production

- Requires acid environment
- Only fermenters will produce acid

Sucrose fermenters

- Proteus vulgaris, Enterobacter Serratia Klebsiella Yersinia



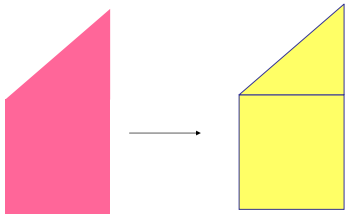
PESKY ants, How vulgar!

TSI: Triple sugar Iron agar

Detects fermentation
H2S production

1 g glucose
10 g lactose
10 g sucrose
Sulfur thiosulfate and ferric ammonium sulfate
Phenol red
Salt
peptones

Phase 1 – sugar fermentation

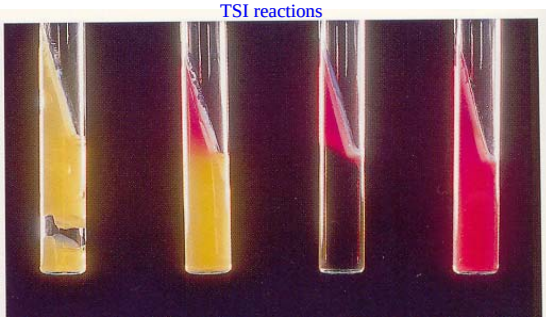


Predict what will happen if lactose is fermented. If sucrose is fermented. If only glucose is fermented.

How are KIA and TSI different?

- List sugars
- List peptones
- List sulfide detection

TSI reactions



Interps: list each as K and A, and H2S + or -

Controls: for each reaction should be _____

Other carbohydrates

- Mannitol
- Dulitol
- Salicin
- Adonitol
- Inositol
- Sorbitol
- arabinose
- Raffinose
- Rhamnose
- Maltose
- Xylose
- Trehalose
- cellobiose

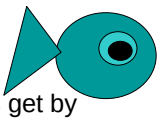
2 new tests

- Malonate
  - Similar to citrate – tests the ability of the organism to use malonate as a sole carbon source. Turns the media blue if + (alkaline)
- MUG
  - Significant in that E. coli usually is +; O157:H7 is negative
  - 4-methylumbelliferyl b-D-glucuronide will be cleaved by the presence of the enzyme b-glucouronidase. This makes a fluorescent product visible by UV light.

Class 20 pathogens of the Enterobacteriacea

Salmonella
Shigella
Yersinia

Salmonella



- GI tracts of animals, humans get by contaminated food. GI tracts of human, same goes
- On HE, produce clear, colorless, non-lactose fermenting colonies; with black centers due to H2S.
- Lactose_____, motility ____, urea ____
- VP ____, gelatin____, PDA ___, LDC+

Salmonella is not Citrobacter

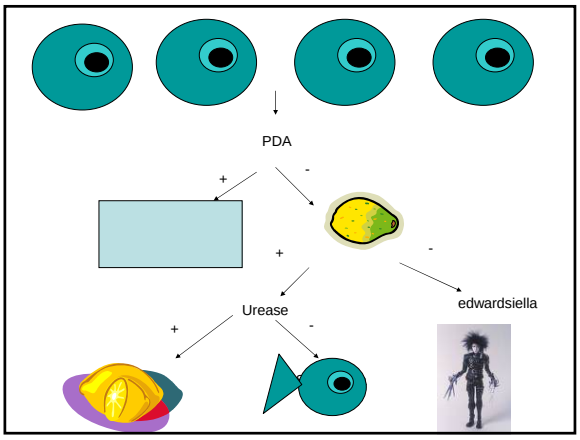
- They appear similar on Hektoen agar, citrate positive
- Use urea and LDC to distinguish. These have opposite results
- Citrobacter
  - Urea ____
  - LDC ____

Salmonella
urea _____
LDC _____

Salmonella is not Edwardsiella

- Both are H2S positive

- Salmonella is citrate positive, indole neg
- Ed is citrate neg, indole +



Salmonella enterica is the only species

- Serogroups based on O antigens, A, B, C1, C2, D
- Serotypes based on O, H and Vi antigens
- Kaufmann White scheme defines over 2200 serotypes
- 7 Subgroups, and former names
  - 1 Salmonella I cholerasuis
  - 2 Salmonella II salamae
  - 3a and 3 b Arizona III and III arizonae and diarizonae
  - 4 Salmonella IV houtenae
  - 5 and 6 Salmonella no subgensu
- Subgroup 1 has the human pathogens
- Rest are associ with rodents, reptiles, birds

Virulence factors

- Fimbrae for attachment
- Invasiveness – traverse intestinal mucosa
- Enterotoxin

Antigenic structure

- O – some have more than one O, and they are numbered
- H are heat labile, treatable with ethanol or acid
  - Phase 1 are specific, antigens agglutinate only with homologous antisera
  - Phase 2 occur among several strains, react with heterologous antisera
- Some have a K antigen called Vi – associated with S. typhi, and its Virulence (boil it)

Type 1 Salmonella differential

Test	S. cholerasuis	S. parathyphi A	S. typhi Mustache of H2S	Other (group A to E)
Arabinose		+		+
Citrate	V			+
Glucose gas production	+	+		+
LDC	+		+	+
ODC	+	+		+
Rhamnose	+	+		+
Trehalose		+	+	+

Clinical infections

- Food poisoning, vomiting and diarrhea
- Typhoid fever from typhi; enteric fevers from other groups
- Nontyphoidal bacteremia
- Carrier state
- Spread by food, water, milk with dumplings
- S. typhi and paratyphi have no animal reservoir

Salmonella gastroenteritis

- Usually from S. enteritidis
- Chicken, fowl, eggs,
- Cooking utensils
- Pig ear epidemic in doggies
- Infective dose ~ a million
- 8-36 hours after ingestion, v, d, fever, watery diarrhea and abd pain
- Usually self limiting
- Risk if: sickle cell, hemolytic disorder, ulcerative colitis, malignancy, very young, elderly
- Don't give antibiotics (usually) or anti-motility agents

Listen to the story of Typhoid Mary

- Fill in details
  - What are the specimens
  - How was the bacteria passed

Typhoid fever and enteric fevers

- Prolonged fever
- Bacteremia
- Involvement of liver, spleen, intestines, mesentary
- Spread to multiple organs
  - S. typhi
  - S. parathyphi
  - S. choelrsuis

Course of typhoid fever

- 9-14 days after ingestion
- During first week of disease, fever, malaise, anorexia, lethargy, myalgia, dull frontal headache
- When organisms enter and penetrate intestinal mucosa they cause constipation
- Enter lymphatic system and spread to blood, liver, spleen, bone marrow
- Multiply intracellularly, released for a second time →fever (positive blood cultures)
- 2-3 weeks, sustained fever with bacteremia
- Invasion of gallbladder and Peyer's patches
- Reinfection through biliary tract to intestine, now found in stool.
- Gall bladder resends, sheds

ID – finding the bug

- Blood _____
- Urine _____
- Stool _____
- Serum _____

Salmonella bacteremia

- prolonged fever
- S. typhimurium
- S. paratyphi A and B
- S. cholerasuis

Case study on S. enteriditis

47 year old phereis donor. Product split for two recipients. He was in good health, but treated for bloody diarrhea 13 days prior to donation.

Patient one experienced nausea, chills, RDS, required intubation and hemodialysis.

Patient two experienced similar symptoms, and died from refractory septic shock and hemorrhage. Her unit of platelets had been stored 1 day longer prior to transfusion, and her underlying disease was cirrhosis of the liver.

Patient's pet snake was cultured for the S. enteriditis, and it, the platelets, and the 2 recipients had the same serotype

Jadari M, Forsberg J, Gilcher RO, Smith JW, Cruthcer JM et al. Salmonella Sepsis caused by a Platelet Transfusion from a donor with a pet snake. NEJM Vol 347: 1075-1078 2002

Shigella

- Very similar to Escherichia (O157:H7 makes a Shiga toxin
- Biochemically similar
- Not normal flora → bacillary dysentery
- Dysentery characterized by presence of blood, mucus, pus in stool

4 species grouped by major O antigens

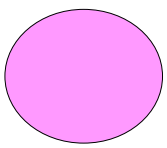
- Shigella dysenteriae (A)
- Shigella flexneri (B)
- Shigella boydii (C)
- Shigella sonnei (D)
  - Most common isolate in US

Shigella characteristics

- Motility ____
- Urea ____
- H2S _____
- Do not decarboxylate Lysine

Subgroups and gimmix

- Shigella dysentariA
- Be flexible, man
- C the boy
- Sonny is in the MOOD
  - S. sonnei is group D
  - Mannitol +
  - ONPG +
  - Ornithine decarboxylase +



Mac and Hek
What will happen?

Shigella are fragile

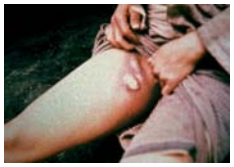
- Plate immediately or preserve in Cary-Blair

Clinical infections

- S. sonnei short, self limiting
- Dysenteriae type 1 most virulent, found in developing countries
- Humans are the only reservoir
- Day care
- Anal oral sex
- Low infective dose, 200 germs
- Penetrate intestinal epithelial cells, form ulcers, shed lining of intestines
- High fever, chills, cramps, pain
- Bloody stools with mucus and WBC
- S. dysenteriae may cause HUS.

Yersinia

- Y. pestis
  - Bubonic plague
  - Pneumonic plague
  - Rodents to humans to by fleas
- Y. enterocolitica
- Y pseudotuberculosis



Y. pestis

- Bites of fleas
- High fever, painful regional lymph nodes swell _ buboes
- Pneumonic plague is secondary to bubonic plague, after organisms gain entrance to blood stream.
- Short, plump rod. Bipolar staining (safety pin) in Wayson stain
- Prefers 25 to 30 instead of 37
- Motility ___?

Selective media

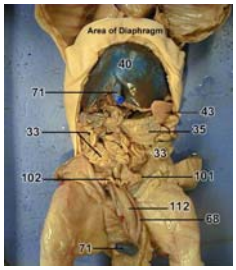
- http://www.cellscience.com/CF4.htm
- Search bubonic plague

Y. enterocolitica

- Household pets are a source
- Contaminated food, water
- This organism laughs at refrigeration
- Associated with blood transfusions
- Clinically: acute enteritis, fever, pain, nausea, bloody stool

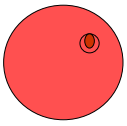
Y. enterocolitica mimics appendicitis

- Right lower quadrant abdominal pain
- Enlarged mesenteric lymph nodes
- Inflamed ileum and appendix



Special media and conditions

- Grows on BAP and MAC
- Likes cold, cold enrichment helps it
- Culture at 25 on CIN agar cefsulodin, irgasan, novobioicn, bile salts and crystal violet
- Fermentation of mannitol causes the pH to decrease, making the neutral red in the media turn red
- Colonies look like a bulls eye
- Caveat: will be _____ at 25.



Y. pseudotuberculosis

- Similar in zoonotic to Y. pestis
- Rare human infection, contact with infected animals
- Spread to mesenteric lymph nodes
- Septicemia, may appear similar to appendicitis
- Motile at 18 to 22, produces urease, ferments rhamnose.
- Y. pestis is always nonmotile, and urease negative

New genera and biotypes

- Budivicia
- Buttiausella
- Cedecea
- Ewingella
- Kluyvera
- Koserella
- Leminorella
- Moellerella
- Obesumbacterium
- Rahnella
- Tatumella
- Xenorhabdus

Class 22 Gastrointestinal tract cultures

Diarrheal disease is the #2 leading cause of death worldwide

Chapter 28, exclusive of parasites and viruses

Definitions

- Gastritis – inflammation of the stomach
- Gastroenteritis – inflamm of stomach and intestines
- Enterocolitis – inflamm of the small and large intestines
- Diarrhea – abnormal increase in the # of bowel movements. Fecal material is loose to liquid
- Dysentery – diarrhea with cramping abdominal pain and straining
- Proctitis – inflamm of the rectal mucosa.

Common causative agents (bacterial)

- Salmonella
- Shigella (bacillary dysentery)
- Campylobacter
- E. coli
- Yersinia enterocolitica
- Edwardsiella tarda
- Vibrio
- Aeromonas
- Plesiomonas
- Helicobacter pylori
- Clostridium
- Staphylococcus aureus
- Pseudomonas aeruginosa
- Bacillus cereus
- Mycobacterium avium complex

Routes of transmission

- Fecal-oral
- Person to person
- Animal contact
- toxins

Pathogenic mechanisms can be divided by presentations
Pathogenic mechanisms can be divided by presentations

- Enterotoxin mediated
- Invasion of bowel mucosal surface
- Invasion of full bowel, to lymphatics

Mechanisms: Enterotoxin-mediated

- Case study: sudden onset of diarrhea, with nausea, numerous episodes/day (20)
- Watery, no blood, pus, mucus
- No fever
- Abdominal cramps

- ETEC, Vibrio, Staph aureus, C. perfringens, B. cereus, Aeromonas and Plesiomonas

Mechanisms: Invasion of bowel-mucosal surface

- Incubation 1-3 days
- Invasion is superficial, bacteremia and spreading infection is not common
- WBC and RBC in gram stain
- Fever may be present

- Shigella in volunteers found low infective dose → flask shaped ulcers and intense inflammatory response. S. sonnie in US.
- Campy jejuni, C. difficile
- EHEC may do this

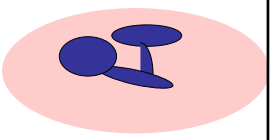
Mechanisms: Invasion of Full bowel thickness with lymphatic spread

- S. typhi and Y. enterocolitica are invasive
- Incubation 1-3 days
- Fever
- Bacteremia, meseneric adenitis mimics appendicitis
- Salmonella survives inside monocytes, transported through body, stored in gall bladder

Inflammatory diarrhea

- Organisms invade intestinal mucosa
- Fever, loose, small volume stools
- Fecal leukocytes, blood, mucus
- *Salmonella spp, Shigella spp, Y.enterocolitica, C. jejuni, enteroinvasive E. coli*

Noninflammatory diarrhea
Bacterial toxins
Afebrile
Watery, large volume stools
V. cholerae and enterotoxigenic E. coli



Clostridium difficile

- Most common cause of diarrhea in hospitalized patient
- Spore forming anaerobe, gram pos rod
- Antibiotics as well as chemotherapy can elicit this overgrowth
- Produces a cytotoxin and enterotoxin
- Pseudomembranous colitis

Other gram positive rods

- Listeria monocytogenes
- Bacillus cereus

Specimen collection and transport

- 2-3 samples on 2-3 days
- If the patient has been hospitalized for >3 days, and CC was not gastroenteritis, STLC is not recommended; C. difficile immunoassay or ID is appropriate
- Clean wide mouth container
- No urine/paper
- Fresh is best. 2 hr old should be preserved (Cary-Blair)
- Rectal swabs: preferred for Shigella and young patients

Visual inspection

- Macroscopic: color, consistency, blood and mucus
- Microscopic: PMN's

Media

Routine
- BAP/CNA
- MAC/EMB
- XLD/HE
- Campy-BAP/Skirrow
  - Grow at 42, microaerophilic
- GN/Selenite broth
  - Grow for a few hours, then sub to XLD/HE

HEKTOEN
- Peptone base agar
- Bile salts
- Lactose
- Sucrose
- Salicin
- Ferric ammonium citrate
- Bromthymol blue and acid fuschia

Check your chart – what sugars do Salmonella and Shigella ferment?

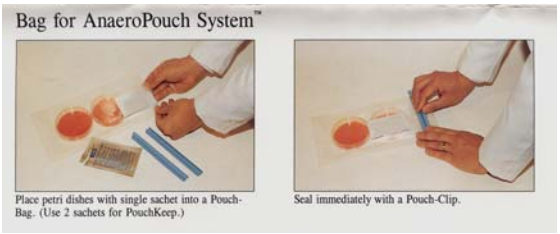
XLD
- Xylose lysine desoxycholate
- Yeast extract with lysine, xylose, lactose, sucrose, ferric ammonium citrate
- Desoxycholate inhibits gram positives, phenol red as indicator (yellow is acid, red is base)
- Shigella does not ferment these carbohydrates → red
- Salmonella decarboxylates lysine, → red

SS agar
- Peptone base with lactose, ferric citrate and sodium citrate
- Neutral red as indicator
- Inhibition by brilliant green and bile salts
- Looks like Mac, except for the iron deposits
- Neutral red as indicator
- Lactose
- Ferrous sulfate
- Sodium citrate

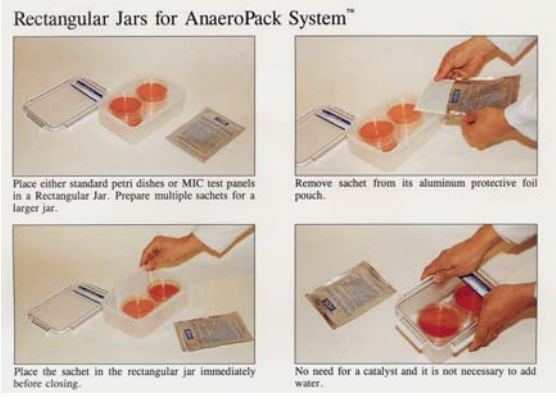
GN (Gram negative) broth
- Peptone with glucose and mannitol
- Bile salts inhibit normal flora
- Selects for Salmonella and Shigella
- Subculture 6-8 hours, plate out
- Alternate: Selenite is toxic to most enterobacteriacea

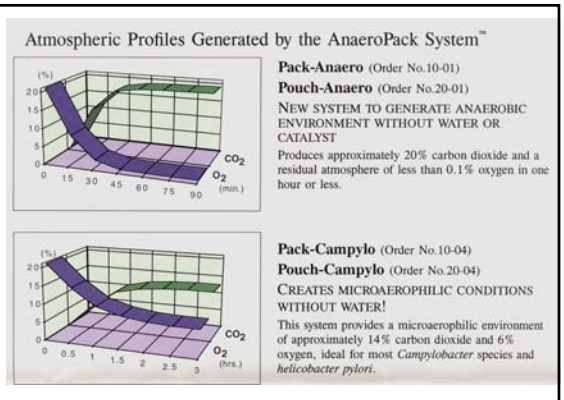
CAMPY-BAP
- Or Skirrow plate
- For isolation of Campylobacter
- Nutrient rich agar base, sheep or horse red cells
- Have antibiotics to repress normal flora
- CVA – Campylobacter-cefoperazone-vancomycin-amphotericin medium
- Prefer microaerophilic atmosphere, and can withstand higher temp

AnaeroPack System™



Microaerophilic atmosphere for Campylobacter





Media

- Specialty – only when requested
  - Yersinia CIN
    - Cefsulodin-irgasan-novobiocin
  - Vibrio TCBS
    - Thiosulfate-citrate-bile salts

CIN

- Cefsulodin-irgasan-novobiocin
- For isolation of Yersinia
- Y. pestis grows best (phenotypically) at 25C – 30C.
- Y. pestis is pinpoint at 1 day, normal size at 48 hours
- Characteristic “bullseye” at 48 hours

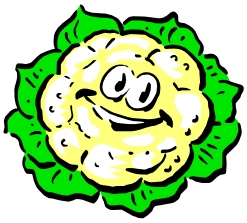
Bullseye at 48 hours

- Caveat: so does Aeromonas. Differentiate with an oxidase test. Which is Yersinia?

FIGURE 25-1 “Bulls-eye” *(arrow)* colony of Yersinia enterocolitica on cefsoludin-irgasan-novobiocin (CIN) agar.

Yersinia

- On BAP plates, pinpoint at 1 day, cauliflower on day 2.



Yersinia

- Broth cultures have “stalactite” pattern, adhering to side of tube.

Brr, it’s cold in here. I bet it’s 25 degrees.

Workup

- Plates with suspicious results for Salmonella or Shigella, E coli O157:H7
- Consider XLD and Hektoen plates – these detect H2S production. Which organism above produces H2S?
- What other organisms produce H2S?
- Name a test that will differentiate the two.

Shigella

- Non lactose fermenter
- No H2S production

How can you tell Salmonella from Shigella?

Using XLD?
Using HE?

What does E.coli look like?

- On MAC?
- On SMAC?
- On HE?
- On XLD?

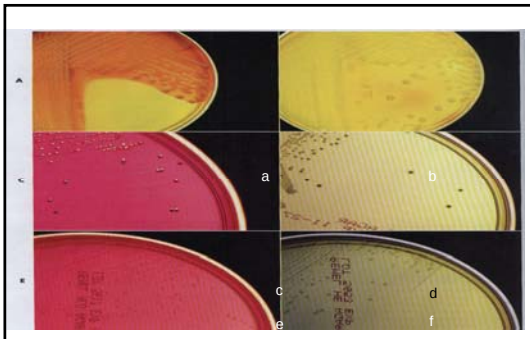
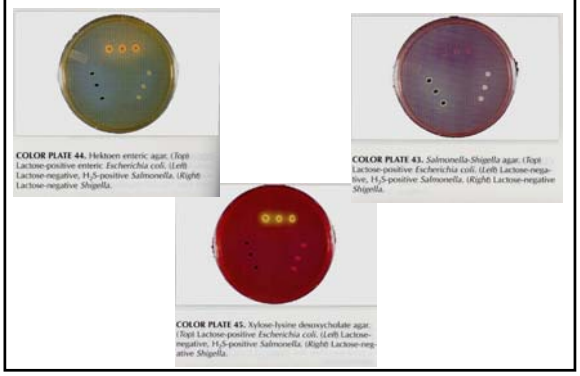


FIGURE 62-7 Colonies of a lactose-positive organism growing on **A,** xylose-lysine deoxycholate (XLD) agar and **B,** Hektoen enteric (HE) agar. Colonies of *Salmonella enteritidis* (lactose-negative) growing on **C,** XLD and **D,** HE agar. (Note how both agars detect H_2S production.) Colonies of *Shigella* (lactose-negative) growing on **E,** XLD and **F,** HE agar.

Reporting results

- Positive results should be phoned
- Public health officials should be notified for S&S
- Cx with a predominance of S. aureus, P. aeruginosa or yeast should be reported as such.
- Negative results are reported as no Salmonella, Shigella or Campylobacter isolated

Guess who



COLOR PLATE 44. Hektoen enteric agar. (Top) Lactose-positive enteric *Escherichia coli*. (Left) Lactose-negative, H_2S-positive *Salmonella*. (Right) Lactose-negative *Shigella*.

COLOR PLATE 43. *Salmonella-Shigella* agar. (Top) Lactose-positive *Escherichia coli*. (Left) Lactose-negative, H_2S-positive *Salmonella*. (Right) Lactose-negative *Shigella*.

COLOR PLATE 45. Xylose-lysine desoxycholate agar. (Top) Lactose-positive *Escherichia coli*. (Left) Lactose-negative, H_2S-positive *Salmonella*. (Right) Lactose-negative *Shigella*.

Sequence for interpretation of STLC for SS or EHEC

- HE plate (or XLD). Is it a fermenter?
  - A. No. Determine H2S, and work up for Salmonella or Shigella.
  - B. Yes. No workup.
- MAC plate. Is it a LF?
  - A. No. Not E Coli O157.
  - B. Yes. Examine SMAC. If non fermenter, do latex agglutination for O157 antigen.
- Examine the special plates for growth
  - -CIN, TCBS, Campy

Lab continued

- Make observations, and determine which of the cultures require further work-up. DO this on your own, not with your group.
- Examine the agglutination tests in the backroom, to decide which tests should be run on which samples. Only if appropriate to do so.

Standard 9B:
Description of Course Work Required for Completion of the Program

A total of 127 semester hours (sh) are required for completion of the BS Degree in Clinical Laboratory Sciences.

	sh	
General Studies Requirement……	30	
Lower Division Common (Science) Prerequisites….	27	(11 Biology +16 Chemistry)
Upper Division Biology Prerequisites……	19	
Clinical Laboratory Sciences – University…….	31	
Clinical Laboratory Sciences – Hospital……	20	

Freshman/Sophomore Years (60 sh)

English/Humanities (15 sh)
ENC 1101 English Composition I…….....3
ENC 1102 English Composition II…….3
Humanities Elective - Literature ……3
Humanities Elective - Fine Arts…….3
Humanities Elective – Values.……3

Social Sciences / History (9 sh)
XXX xxxx Historical…… 3
XXX xxxx Behavioral…… 3
XXX xxxx Socio/Political……. 3

Mathematics (6 sh)
MAC 1105 College Algebra……..3
STA 2023 Statistics……....3

Foreign Language (8-10 sh) (Not included in the total sh required for the degree)
XXX xxxx Foreign Language I……. 4
XXX xxxx Foreign Language II ……4

Gordon Rule, Florida Statutes: for earning the first baccalaureate degree, 12 semester hours of English or humanities course work, with a writing component of minimum 6000 words per a 3 sh course ; and 6 semester hours of mathematics at the level of college algebra or higher are required. Clinical laboratory Sciences majors are required to take a course in statistics as the second course in the Gordon Rule mathematics requirement.

Foreign language requirement: must be met by satisfactory completion of a study of two years in high school or two semesters (8-10 SH) in college, in a single foreign language.

Common Program Prerequisites - Lower Division (31-32 sh)

During 1995-96, the State of Florida, through a legislative mandate, established common course prerequisites at the lower division for each Bachelor=s degree program offered in the State University System. These courses may be taken at any public community college, a four-year college or a university across the State and transferred to an upper level institution for credit towards the degree. For a B.S. degree in clinical laboratory sciences the Acommon science prerequisites@ in Florida are as follows:

Course	**(31-32 sh)**
ZOO 1010 General Zoology with Lab……..	4
PCB 2131 Cell Biology with Lab……	4
PCB 4703 Human Physiology…….	3-4
CHM 2045 Chemistry I with Lab …….	4
CHM 2046 Chemistry II with Lab……	4
CHM 2210 Organic Chemistry I with Lab……	4
CHM 2211 Organic Chemistry II with Lab …….	4
MCB 2013 General Microbiology with Lab… …….	4

A list of courses and alternate courses which are considered equivalent may be found in State of Florida Common Course Prerequisite Manual; Florida Center for Advising and Academic Support at: http://www.facts.org

College Level Academic Skills Test: (CLAST):

The Florida CLAST is an achievement test of the communication and computational skills expected of all the students by the time they complete their sophomore year of college. Students are required by Florida Statutes and rules of the State Board of Education to satisfactorily complete the Florida CLAST or satisfy one of the CLAST alternate options before being granted admission to upper division status at University of West Florida. Transfer students with an Associate of Arts (A.A.) degree from a Florida Public Community College will have completed the CLAST and the General Education course requirements. Transfer students with deficiencies in lower division **'common prerequisites'** are required to take the above listed courses at University of West Florida.

Lower Division prerequisite courses must be completed prior to taking the following upper division prerequisites

Junior Year

Upper Level Biology Prerequisites	**(23 sh)**
PCB 3063 Genetics with Lab…….	4
HSC 3550 Pathophysiology……..	3
BCH 3033 Biochemistry I with Lab……..	4
PCB 4233 Immunology with Lab……..	4
Clinical Laboratory Science Courses	
MLS 4305 Hematology I with Lab……	4
MLS 4460 Diagnostic Microbiology I with Lab……	4

All the above courses and other graduation requirements must be completed prior to admission into the clinical year of the Program.

CLINICAL YEAR

During the spring semester of each year one class of clinical year students is selected. Students selected into the clinical year begin classes during the first week of May, and complete the course work listed below over a period of following four (4) semesters.

University-Based Courses

Summer Semester: (11 sh)	**Fall Semester: (12sh)**
MLS 4220 UA/Body Fluids I/Lab……2	MLS 4630 Clinical Chem II/Lab…….3
MLS 4334 Hemo/Thrombosis/Lab…..2	MLS 4191 Mol Diagnostics ……2
MLS 4625 Clinical Chem I/Lab…….. 3	MLS 4550 Immunohematology I/Lab…..4
MLS 4462 Medical Micro I/Lab……..4	MLS 4505 Serology/Lab ……2
	MLS 4705 Special Clinical Topics……..1

Students must maintain a minimum grade of C in each of the major (MLS) courses in order to progress to the hospital based clinical rotations.

Hospital-Based Courses

In the following January, upon successful completion of the above courses, clinical year students will be placed in individual clinical rotations at one of the university=s clinical affiliates. Hospital based training is 29 weeks long, including one week off during spring break in April. Students are required to attend 40 hours per week, Monday through Friday, while undergoing advanced practical training in the clinical laboratory. Clinical rotations are grouped into several sections, each section corresponding to a university course. Students should register for the corresponding university courses in order to receive college credit.

Hospital Rotations:	**# of Weeks**	**Equivalent University Course**	**SH**
		Spring Semester:	
Diagnostic Microbiology	5	MLS 4821L Diagnostic Microbiology II-	4
Hematology & Coagulation	5	MLS 4822L Hematology II -	4
Clinical Chemistry	5	MLS 4820L Clinical Chemistry III -	4
			12
		Summer Semester:	
Special Chemistry & TB/Mycology	3	MLS 4824L Special Clinical Methods -	2
Immunohematology & Serology	6	MLS 4823L Immunohematology II-	4
Urinalysis, Parasitology, Phlebotomy	3	MLS 4825L Urinalysis & Body Fluids II-	2
Miscellaneous & Makeup	1	N/A	8
Spring Vacation	1	N/A	
Total	**29 Weeks**	**Total**	**20 SH**

During the last week of July, students are given a series of review sessions and comprehensive exams in preparation for the national board certification exams. Upon graduation students are awarded a Bachelor of Science Degree in Clinical Laboratory Sciences and are eligible to take the ASCP an d/or NCA, exams. Upon passing the certification exam, students are eligible for State of Florida licensure in the 5 practice areas of a Generalist Technologist in a clinical laboratory.

Standard 9B: Brief Course Descriptions

MLS 4305 & 4305L - Hematology I; Credit: 4 sh
Lecture: 3 Hrs/Wk; Lab: 5 Hr/Wk; 16 Weeks

Catalog- Course Description
Manual and automated methods for blood cell counts and hemoglobin measurements. Production, maturation and morphology of normal and abnormal human blood cells. Pathological alterations in peripheral blood and bone marrow morphology in primary and secondary hematological disorders. Purpose, principle, and clinical value of all the routine and special procedures in a modern hematology lab. Material and supply fee will be assessed for corresponding lab. Permission is required. Corequisite: MLS 4305L.

Course Syllabus- Lecture Topics:

Section I: Basic Methodology
Introduction to Hematology.
Blood Collection, Anticoagulants, Specimen Processing and Explanation of Automated CBC.
Manual Blood Cell Counting: White Blood Cells and Platelets under phase contrast microscope.
Hemoglobin Measurement: Clinical Hemoglobinometry - Purpose, Principle and Methodology.
Hematocrit and Red Blood Cell Indices.
Reticulocyte Count and Erythrocyte Sedimentation Rate.
Principles of Automated Blood Cell Counting and WBC Differential Analysis.
Quality Control in Hematology.
Blood Smear Preparation and Staining.

Section II – RBC Disorders
Erythropoiesis - Production and Maturation of Red Blood Cells.
Red Blood Cell: Structure and Function.
Hemoglobin Synthesis and Degradation.
Erythrocytes: Variation in Size, Shape, Color - Abnormal Morphology.
Anemias: Diagnosis, Classification and Clinical Considerations.
Anemia Due to Iron Deficiency, Iron Overload & Chronic Hemorrhage.
Other Hypochronic/Microcytic Anemias; Anemia Due to Chronic Disease.
Anemia Due to Membrane Disorders.
Macrocytic Anemia and Megaloblastic Maturation.
Anemia Due to RBC Enzyme Deficiencies and Immune Hemolytic Anemias.
Aplastic Anemia and Mechanical Hemolytic Anemia.
Normal and Abnormal Hemoglobins - Laboratory Diagnosis.
Hemoglobinopathies - Sickle Cell Anemia and Hemoglobin-C Disease.
Laboratory Diagnosis of Thalassemias and Unstable Hemoglobins.

Section III- WBC Disorders
Hematopoiesis - Leukocytes and Thrombocytes.
Granulocytes and Precursors; Pathologic Forms of PMN.
Lymphocytes, Plasma Cells and Monocytes.
Leukocytosis, Neutophilic Leukemoid Reaction and Reactive Lymphocytosis.
Normal Cells in Peripheral Blood: Manual and Automated Differential Counts.
Acute Myeloproliferative Leukemias.

Chronic Myeloproliferative Leukemias.
Myelodysplastic Syndromes.
Acute and chronic Lymphoproliferative Leukemias.
Alterations in Morphology of Blood Cells in Treated Leukemias.
Blood Protein Disorders: Multiple Myeloma and Waldenstrom's Macroglobulinemia.
Bone Marrow Aspiration and Examination.
Staining Methods of Blood and Bone Marrow Smears – Cytochemistry.
Lymphomas and Their Expression in Peripheral Blood.
Molecular Methods in Hematology.
Introduction to Flow Cytometry and Clinical applications in of Flow Cytometry findings.

Course Syllabus- Laboratory Exercises

Introduction to a hematology laboratory; laboratory safety.
Blood specimen collection: venipuncture and finger stick procedures.
Blood smear preparation and staining; microscopic examination of stained blood smear.
Manual blood cell counts – WBC and Platelets.
Hemoglobin measurement – Cyanmethemoglobin Manual Method: Preparation of standard curve and hemoglobin measurement on unknown samples.
Differential blood cell counts.
Reticulocyte counts; Erythrocyte Sedimentation Rate; Red Blood Cell Indices; Buffy Coat Smear - preparation and staining.
Osmotic Fragility test.
Sickle Hemoglobin Screening Tests.
Automated CBS – Principles and Operation of Beckman Coulter AcT 10.
Other tests for anemias: Alkali denaturation test for Hb F.
Acid elution test for Hb F (Kleihauer-Betke).
Heinz body inclusion test.
Microscopic examination of blood smears: Normal differential counts.
Normal red cell morphology.
Platelet estimations and morphology.
Microscopic examination of stained blood smears: Abnormal red cell morphology.
Correlation with indices.
Red cell maturation stages (nucleated red blood cells).
Correction of WBC counts.
Leukocytosis and leukemoid reaction.
Abnormalities of PMN: shift to the left, toxic granulation, vacuoles, Dohle bodies.
Reactive lymphocytes.
Microscopic examination of stained blood smears - Leukemias; identification of WBC precursors; Chronic Myelogenous Leukemia (CML); Chronic Lymphocytic Leukemia (CLL); Multiple Myeloma (MM); Myeloid Metaplasia (MMMF) and other Chronic Myeloproliferative Disorders.
Microscopic examination of stained blood smears: Acute Myelogenous Leukemia (AML); Acute Lymphoblastic Leukemia (ALL); Acute Myelomonocytic Leukemia (AMMOL); Acute Monocytic Leukemia (AMOL); Erythroleukemia; Acute Megakaryocytic Leukemia.
Study of bone marrow smears in various leukemias, anemias and other proliferative disorders
Case studies, identification of unknown cells and computer-based programs in Hematology.

MLS 4460 - Diagnostic Microbiology I; Credit: 3 SH
Lecture: 3 Hrs/Wk; 16 Weeks

Catalog - Course Description

Study of bacteria associated with infectious diseases. Includes microbial taxonomy, physiology, genetics and host-parasite relationships as they apply to clinical microbiology. Pathogens of particular organ systems, pathogenesis of infectious disease, clinical manifestations, etiology and epidemiology of disease are covered. Interpretation of test results and clinical relevance are taught utilizing case studies. Permission is required. Prerequisite: MCB 3020. Corequisite: MLS 4460L.

Course Syllabus- Lecture Topics:

Host-microbial interactions.

Purpose, philosophy, and general principles of diagnostic microbiology.

Micrococcaceae: Morphology and general characteristics, structure and extracellular products, differentiation of pathogens from non-pathogens, susceptibility.

Streptococcus and Enterococcus species: Classification and pathogenic mechanisms; laboratory identification of beta-hemolytic Streptococci, Enterococci and Pneumococci, rapid methods and commercial kits, alpha-hemolytic Streptococci and their identification.

Neisseriaceae: Morphology and general growth characteristics, specimen collection, culture media and preliminary identification, differentiation between pathogenic and opportunistic species, definitive identification of N. meningitidis and N. gonorrhoeae, non-biochemical methods for identification.

Enterobacteriaceae: General characteristics of Enterobacteriaceae, pathogenesis of infections, isolation of organisms from clinical material, principles of biochemical tests used in differentiation of genera and species. Identification of clinically significant genera and species.

Nonfermentative gram-negative bacilli: General characteristics, pathogenicity, culture and identification of clinically important organisms of the group to include Pseudomonas, Alkaligenes, Acinetobacter, Eikenella, Flavobacterium and Agrobacterium; nontraditional identification methods and susceptibility testing.

Gram-negative facultatively anaerobic bacilli and aerobic coccobacilli: Pathogenesis, selection of specimens, culture and identification of Hemophilus, Brucella, Bordetella, Francisella, Pasteurella, Actinobacillus and Kingella species.

Unclassified and miscellaneous pathogens: Characteristics, pathogenicity, culture and identification of Legionella, Bartonella, Gardnerella, Cardiobacterium, and Chromobacterium species.

Vibrio, Aeromonas and Plesiomonas: Pathogenicity, culture and isolation, identification of pathogens.

Campylobacter and Helicobacter: Pathogenicity, selection of specimens, culture and isolation, identification of pathogens.

Spirochetes: Pathogenicity, selection of specimens, morphology, culture and isolation, identification of Borrelia, Leptospira, and Treponema species.

Bacillus species: Morphology, general characteristics, pathogenicity, culture and identification.

Aerobic and facultative gram-positive non-spore-forming bacilli: Morphology, general characteristics, pathogenicity, culture and identification of Corynebacterium, Listeria, Erysipelothrix and Nocardia.

Anaerobic bacteria: Special methods for collection, transportation, culture and incubation of anaerobic specimens; presumptive identification of pathogens by direct examination, gram stain morphology, primary plates; subculture of isolates and identification of isolated organisms by specific tests.

Anaerobic gram-positive cocci and bacilli: Morphology, general characteristics, pathogenicity, culture and identification of Peptococcus, Peptostreptococcus, Clostridium, and Actinomyces Sps.

Anaerobic gram-negative bacilli: Morphology, general characteristics, pathogenicity, culture and identification of Bacteroides, Fusobacterium, Prevotella, and Porphyromonas species.

Mycoplasma species: General characteristics, pathogenicity and laboratory diagnostic methods.

Chlamydia species: General characteristics, pathogenicity and laboratory diagnostic methods.

Rickettsia species: General characteristics, pathogenicity and laboratory diagnostic methods.

Overview of commonly used semi automated molecular techniques, including LCR and TMA, and hybridization protection assay and chemiluminescence.

Immunoassay testing in Microbiology, polyclonal and monoclonal antibody generation, ELISA.

MLS 4460L Diagnostic Microbiology Laboratory; Credit 1 SH
Lab: 6 Hrs/Wk; 16 Weeks

Catalog- Course Description

Methods for specimen collection, handling and processing of human tissues and body fluids for isolation and identification of bacteria. Conventional and rapid identification methods for clinically significant bacteria, principles of automation, susceptibility testing, infection control, and quality assurance procedures are included. Material and supply fee will be assessed. Permission is required. Prerequisite: MLS 3020&3020L. Corequisite: MLS 4460.

Course Syllabus-Laboratory Activities:

Clinical Microbiology Laboratory Safety: Types of hazards (physical, chemical, etc.), occupational infection risks, OSHA Bloodborne Pathogens Standard (compliance).

Specimen Collection and Handling I (Sterile sites): Blood culture collection and handling exercise, other sterile body fluids, wound aspirates, surgical tissue.

Specimen Collection and Handling II (Respiratory): Throat culture collection and handling exercise, other upper respiratory tract specimens, lower respiratory tract specimens.

Specimen Collection and Handling III (Urogenital, Gastrointestinal): Urine culture collection and handling exercise, fecal specimens.

Optical Methods I (Identification of Gram Stain Morphologies): Gram stain morphology identification exercise utilizing online tutorials at www.medtraining.org.

Optical Methods II (Microscope use): Examination of prepared Gram stain materials (including smears of gram-positive cocci, gram-negative cocci, gram-positive bacilli, gram-negative bacilli.

Cultivation and Isolation of Bacterial Pathogens: Isolation by dilution streaking exercise.

Use of cytocentrifuge for concentrating bacteria in body fluids.

Antibiotic Sensitivity Testing: Kirby-Bauer disk diffusion methodology, exercise including inoculum preparation and standardization, agar plate inoculation, antimicrobial disk application, plate incubation, and measurement and interpretation of zone size, serial dilution to determine MIC, E-test.

Identification of Staphylococcus Species (S. epidermidis, S. saprophyticus, and S. aureus).

Exercises to promote familiarity with these species, including anterior nares culture, and comparison of the following characteristics: colony morphology on sheep blood and mannitol salt agars, catalase, coagulase (slide and tube) and novobiocin sensitivity reactions/results.

Identification of Streptococcus Species I (S. pyogenes and S. agalactiae): Exercises to promote familiarity with these species by comparison of the following characteristics: colony morphology on sheep blood agar, catalase, PYR, and CAMP reactions, susceptibility to penicillin, vancomycin, sulfamethoxazole/trimethoprim, and bacitracin.

Interpretation of performance characteristics of rapid immunoassay for Streptococcus Group A.

Identification of Streptococcus Species II (S. bovis, viridans Streptococcus, and Enterococcus faecalis): Exercises to promote familiarity with these species by comparison of the following characteristics: colony morphology on sheep blood agar, catalase and PYR reactions, growth and reactivity in bile esculin agar, growth in 6.5% sodium chloride broth and growth at 10 and/or 45 degrees centigrade, susceptibility to penicillin, vancomycin, and gentamycin.

Identification of Streptococcus Species III (S. pneumoniae and viridans Streptococcus): Exercises to promote familiarity with these species by comparison of the following characteristics: colony morphology on sheep blood agar, catalase and bile solubility reactions, growth and reactivity in bile esculin agar, susceptibility to optochin, penicillin, vancomycin, and gentamycin.

Identification of Neisseria Species (N. meningitidis, N. gonorrhoeae, N. lactamica): Exercises to promote familiarity with these species by comparison of the following characteristics: growth and/or colony morphology on sheep blood, chocolate, and modified Thayer-Martin agar, oxidase reaction, utilization of carbohydrates.

Identification of Species Within the Enterobacteriaceae I: Exercises to promote familiarity with these species by comparison of the following characteristics: colony morphology on sheep blood, MacConkey, and Eosin Methylene Blue agar, oxidase, nitrate reduction, catalase.

Identification of Species Within the Enterobacteriaceae II: Exercises to promote familiarity with these species by comparison of the following characteristics: microscopic motility, motility in semisolid agar, citrate utilization, indole production.

Identification of Species within the Enterobacteriaceae III: Exercises to promote familiarity with these species by comparison of the following characteristics: triple sugar iron agar and lysine iron agar reactions and urease.

Identification of Species Within the Enterobacteriaceae III: Exercises to promote familiarity with these species by comparison of the following characteristics: hektoen enteric and xylose lysine dextrose agar reactions.

Media Reactions Interpretation: Identification of the possible specific identities of four unknown species of family Enterobacteriaceae, based upon the interpretation of their reactions on seven media.

Miniaturized Biochemical Testing of Species of Enterobacteriaceae: Use of the API 20E biochemical system for species identification, including inoculum and strip preparation, strip inoculation and incubation, chemical development, and reaction interpretation.

Identification of Pseudomonas aeruginosa: Exercises to promote familiarity with this species by observation of the following characteristics: Colony morphology on sheep blood and MacConkey agars, triple sugar iron agar reaction, spot oxidase reaction, OF glucose reactivity, growth pattern in thioglycollate broth, growth at 25, 35, and 42^0C, pyocyanin production, resistance to antibiotics.

Identification of Haemophilus species utilizing X and V discs.

Identification of Legionella organisms utilizing direct fluorescent antibodies.

Identification of Anaerobic Bacteria I: Review of Gram stain morphologies, colony morphology on anaerobic blood, kanamycin/vancomycin laked-blood, and bile esculin agar, pigment production, indole reactions, and antibiotic sensitivities.

Identification of Pathogenic Bacteria by Immunological Means: Prepackaged kit identification of bacteria via latex agglutination, coagglutination, or flow-through immunoassay.

MLS 4334 & 4334L - Hemostasis & Thrombosis; Credit: 2 SH
Lecture: 3 Hrs/Wk; Lab: 5 Hrs/Wk; 6 Weeks

Catalog -Course Description

Role of blood vessels, platelets and coagulation factors in normal hemostasis. Morphology and function of platelets; diseases of platelets and tests for platelet function. Study of coagulation pathways and fibrinolytic mechanisms. Study of normal and pathologic coagulation inhibitors; inherited and acquired coagulation disorders. Laboratory diagnosis and management of hemorrhagic diseases, hypercoagulability and anticoagulant therapy. Corequisite: MLS 4334L. Material and Supply fee will be assessed for corresponding lab. Permission is required.

Course Syllabus-Lecture Topics:

Hemostasis and Blood Vessels: Hemorrhagic Diseases Resulting from Vascular Defects.

Structure and Function of Platelets; Tests for Platelet Function.

Laboratory Investigation of Diseases of Platelets.

Diagnosis of a Bleeding Patient due to a Platelet Disorder.

Coagulation Factors and Pathways; Fibrinolytic System.

Interrelation of Coagulation, Fibrinolytic, Kinin and Complement Systems; and related pathology

Routine Screening Tests for Coagulation Disorders: PT, APTT and TCT.

Special Tests for Coagulation Disorders: Fibrinogen Assay, Single Factor Assays, Chromogenic Synthetic Substrate Assays and other assays.

Coagulation Disorders: Hemophilia-A and Von Willebrand's Disease.

Coagulation Disorders: Disseminated Intravascular Coagulation and Fibrinolysis.

Other Coagulation Disorders: Inherited and Acquired; Factor Deficiencies.

Normal and Pathological Coagulation Inhibitors and inhibitor Assays.

Hypercoagulability & Thrombosis; and Fibrinolytic Therapy.

Laboratory Monitoring of Anticoagulant and Fibrinolytic Therapy.

Course Syllabus-Laboratory Exercises:

Hemostasis - slide/tape viewing and discussion.
Bleeding Time - procedure (the need for bleeding time before surgery).
Specimen collection, handling and storage for coagulation tests.
Coagulation Lab Tests- dos & don'ts.
Whole blood clotting time/demonstration and practice.
Demonstration of Clot Retraction and Whole Blood Clot Lysis.
One-stage Prothrombin Time (PT).
Activated Partial Thromboplastin Time (APTT).
Fibrinogen assay, manual method.
Thrombin Clotting Time (TCT).
Reptilase Clotting Time (RCT).
Screening test for Factor XIII.
Mixing and differential tests to qualitatively identify a single factor deficiency.
Euglobulin lysis test.
FDP test and D-dimer test.

MLS 4220 & 4220L - Urinalysis/Body Fluids I; Credit: 2 SH
Lecture: 5 Hrs/Wk; Lab: 8 Hrs/Wk; 6 Weeks

Catalog - Course Description

Collection, transport and processing of urine and other body fluid specimens. Analysis of physical properties and chemical examination. Microscopic examination for normal and abnormal cellular elements and crystals. Correlation of laboratory findings to various disease conditions. (Material and supply fee will be assessed for corresponding lab.) Prerequisite: Special Permission Required. Corequisite: MLS 4220L.

Course Syllabus- Lecture Topics:

Renal anatomy and physiology: Gross anatomy of the urinary tract, renal circulation, structure and function of the juxtaglomerular apparatus, the glomerulus, and the tubules, renal secretory process, renal contribution to acid-base equilibrium.

Diseases of importance in the practice of urinalysis I: Urinary tract infections, diabetes insipidus, diabetes mellitus, glomerular disease, nephrotic syndrome.

Diseases of importance in the practice of urinalysis II: Tubular disease, renal tubular acidosis, metabolic defects (alkaptonuria, phenylketonuria, galactosemia, cystinuria, cystinosis).

Specimen collection and handling of urine: Urine specimen types, proper collection techniques, proper handling of urine specimens.

Physical examination of urine: Methods of measurement and significance of urinary color, foam, clarity, odor, concentration, and volume.

Chemical examination of urine I: Proper use of reagent strips, methods of measurement and significance of urinary pH, blood (hemoglobin & myoglobin), and leukocyte esterase.

Chemical examination of urine II: Methods of measurement and significance of urinary nitrite, protein, and glucose.

Chemical examination of urine III: Methods of measurement and significance of urinary ketones, bilirubin, urobilinogen, porphobilinogen, ascorbic acid.

Urinary microscopy I: Standardization of sediment preparation, and microscopy techniques.
Urinary microscopy II: Means of identification and significance of cellular elements and casts, including erythrocytes, leukocytes, epithelial cells, hyaline casts, granular casts, cellular casts, fatty casts, waxy casts, and pigmented casts.
Urinary microscopy III: Means of identification and significance of crystals and miscellaneous formed elements including crystals characteristic of acidic and alkaline urine specimens, mucus threads, bacteria, and yeast.
Cerebrospinal fluid (CSF) analysis: Anatomy of the meninges, definition of the brain-blood barrier, formation of CSF, CSF specimen collection, examination of CSF by physical, microscopic, chemical, cultural, and immunological methods.
Amniotic fluid (AF) analysis: AF formation and function, AF specimen collection and handling, examination of AF by physical and chemical methods.
Synovial fluid (SF) analysis: Physiology and composition of SF, classification of joint disorders, SF specimen collection and handling, examination of SF by physical, microscopic, chemical, and cultural methods.
Serous fluid analysis (pleural, pericardial, peritoneal): Physiology and composition of serous fluids, specimen collection and handling of serous fluids, transudates versus exudates, examination of serous fluids by physical, microscopic, and chemical methods.
Seminal fluid analysis: Seminal fluid formation and function, specimen collection and handling of seminal fluid, examination of seminal fluids by physical, microscopic, and chemical methods.
Fecal analysis: Formation of feces, specimen collection and handling of feces, examination of feces by physical microscopic, and chemical methods.

Course Syllabus-Laboratory Activities:

Specimen collection and handling of urine specimens: View NCCLS urine specimen collection video, discuss collection of midstream clean-catch, catheterized, and suprapubic aspiration specimens.
Physical examination of urine: Observe and measure the physical features of urine, including (1) color, (2) clarity, (3) foam, (4) specific gravity, (5) volume.
Chemical examination of urine I: Orientation to and exercise in the manual use of reagent strips, reagent strip detection of urinary pH, blood, leukocyte esterase, nitrite, protein, glucose, ketones, bilirubin, and urobilinogen.
Chemical examination of urine II: Orientation to and exercise in the use of methods that serve as alternatives to (or confirmation of) reagent strip assays, including the pH meter and pH paper, sulfosalicylic acid precipitation, Benedict copper reduction, Acetest (ketoacid detection) tablets, Ictotest (bilirubin detection) method.
Urinary microscopy I: Review of photographic, tutorial and laser disc images of microscopic elements in urine, including erythrocytes, leukocytes, epithelial cells, casts (hyaline, granular, cellular, fatty, waxy, pigmented), crystals, mucus threads, bacteria, and yeast.
Urinary microscopy II: Microscopic examination of preserved urine sediments provided by the clinical affiliates.
Urinary microscopy III: Continuation of microscopic examination of preserved urine sediments provided by the clinical affiliates.Complete urinalysis exercise: Physical, chemical, and microscopic evaluation of urine specimens.

Automated urinalysis exercise: Use of reflectance photometry in the physical and chemical examination of urine (orientation to the use of the Clinitek 100 instrument).
CSF microscopy I: Cell count and differential using hemacytometer and cytofuge.
Fertility study: sperm count, pH, viscosity and motility evaluation.
Synovial fluid crystal analysis by polarized microscopy.
Occult blood testing: Hemoccult.

MLS 4462/4462L - Medical Microbiology; Credit: 4SH
Lecture: 3 Hrs/Wk; Lab: 4 Hrs/Wk; 12 Weeks

Catalog - Course Description
Study of medical microbiology covering the areas of clinical parasitology, mycobacteriology, clinical virology, clinical mycology and miscellaneous and emerging pathogens. Material and Supply fee will be assessed for corresponding lab. Permission is required Prerequisite: MLS 3020 & 3020L. Corequisite MLS 4462L

Course Syllabus-Lecture Topics
Section I: Introduction to Medical Parasitology
Host-Parasite Relationships.
Classification of Medically important Parasite.
Collection and Handling Techniques of Parasites.

Intestinal Protozoa:
General life cycle, identifying characteristics and specimen requirements for:

Entamoeba histolytica,	Entamoeba coli,
Iodamoeba butschlii,	Blastocystis hominis,
Chilomastix mesnili,	Trichomonas vaginalis,
Dientamoeba fragilis	Retortamonas intestinalis
Isospora belli	Cryptosporidium parvum
Entamoeba hartmanni	Entamoeba gingivalis
Endolimax nana	Giardia lambilia
Trichomonas hominis	Trichomonas tenax
Enteromonas hominis	Balantidium coli
Sarcocystis	Cyclospora cateyensis

Blood and Tissue Protozoa:
General life cycles, Identifying characteristics and specimen requirements for:

Naegleria fowleri	Acanthamoeba
Trypanosoma gambiense	Trypanosoma rhodensiense
Trypanosoma cruzi	Leishmania tropica
Leishmania braziliensis	Leishmania donovani
Plasmodium falciparum	Plasmodium malariae
Plasmodium vivax	Plasmodium ovale
Babesia microti	Toxoplasma gondii
Pneumocystis carinii	

Trematodes: General life cycles, Identifying characteristics and specimen requirements for:

Fasciolopsis buski	Fasciola hepatica
Clonorchis (opisthorchis) sinensis	Heterophyes heterophyes
Metagonimus yokogawai	Paragonimus westermani
Schistosoma mansoni	Schistosoma japonicum
Schistosoma haematobium	

Cestodes: General life cycles, Identifying characteristic and specimen requirements for:

Diphyllobothrium latum	Taenia solium
Taenia saginata	Multiceps multiceps
Echinococcus granulosus	Echinococcus multilocularis
Dipylidium caninum	Hymenolepis nana
Hymenolepis diminuta	

Nematodes: General life cycle, Identifying characteristic and mode of infection, pathogenesis and specimen requirements for:

Ascaris lumbricoides	Enterobius vermicularis
Ancylostoma duodenale	Necator americanus
Strongylodies stercoralis	Trichuris trichiura
Trichinella spiralis	

Dracunculus medinensis

Tissue Nematodes:

Wuchereria bancrofti	Brugia malayi
Loa loa	Mansonella ozzardi
Mansonella streptocerca	Mansonella perstans
Onchocerca volvulus	Angiostrongylus cantonensis
Angiostrongylus costaricensis	Gnathostoma
Thelzsia	

Arthropods: General ways arthropods are involved in human disease, pathology and identification processes for:

Sarcoptes scabiei	Demodex folliculorum
Pediculus humanus (capitis	Phthirus pubis
and corporis)	Tunga penetrans
Linguatula.	

Section II: Mycobacteria

Introduction to Morphology of Mycobacteria.
Growth requirements for *Mycobaterium tuberculosis.*;
Risk groups and predisposing factors to infection with Mycobacteria.
Mode of transmission, Pathology of pulmonary tuberculosis.
Extrapulmonary tuberculosis, Leprosy and MOTT.
Safety precautions dealing with Mycobacteria.
Chemoprophylaxis.

Introduction to Medically Important Fungi:

Morphology of commonly encountered fungi associated with mycoses.
Collection and Handling.
Superficial Fung.
Opportunistic Fung.
Environmental Culturing of Fungi.
Dermatophytes.
Subcutaneous Fungi.
Systemic Fungi.

Section III: Virology

Introduction to Viral Structure.
Viral Replication.
Viral Classification.
Pathogenesis of Viral diseases.
Antiviral Vaccines and Antiviral Therapy.
Overview of Human Viral Diseases.
Specimen collection, processing, storage, and shipping.

Course Syllabus- Laboratory Exercises:

Section I:

Microscope Calibration.
Trichrome Staining Technique for Ova and Parasite.
Examination of Intestinal Protozoa Microscopic Slides.
Examination of Blood/Tissue Protozoa Microscopic Slide.
Examination of Trematodes and Cestodes Microscopic Slides.
Examination of Nematodes Microscopic Slides.
Examination of Arthropods Microscopic Slides .
Computer Tutorial in Parasitology.

Section II:

Acid Fast Staining technique.
Environmental Culturing and Slide Cultures.
KOH Wet Prep., Lactophenol Cotton Blue Wet Prep.
Computer Tutorial in Mycology.

MLS 4625 & 4625L - Clinical Chemistry I; Credit: 3 SH
Lecture: 5 Hrs/Wk; Lab: 8 Hrs/Wk; 6 Weeks

Catalog - Course Description

Introduction to the basic principles and procedures of clinical chemistry. Lecture and lab devoted to chemical analysis of blood and other body fluids. Lab safety, specimen collection/handling/storage; lab mathematics, basic lab instrumentation and automation, data management, reference range determination and quality control monitoring will be stressed throughout the course. This class will discuss the pathophysiology and diagnostic testing related

to the metabolism of carbohydrates and lipids, assessments of diabetes and diabetic risk, assessments of cardiac risk and monitoring and prognosis following myocardial infarction. Methodologies discussed include spectrophotometry, immunodiagnostics and computer generated analyses. Students will participate in class discussions about recent research in clinical chemistry which will be presented in the forms of abstracts, research papers and figures. Material and supply fee will be assessed for corresponding lab. Permission is required. Corequisite: MLS 4625L.

Course Syllabus- Lecture Topics:

Clinical chemistry overview, chemistry panels, normal ranges.
Specimen collection, handling, control of preanalytical variation, reference range determination.
Laboratory statistics and quality control.
Laboratory mathematics.
Laboratory equipment and absorption photometry.
Turbidimetry, immunoassay, nephelometry.
Automation I: Colorimetric/ion-selective electrode-based systems.
Automation II: Immunochemistry analyzers.
Carbohydrates I: Structure, metabolism, pathophysiology.
Carbohydrates II: Laboratory measurement.
Diabetes Risk assessments.
Evaluating Research, biostatistical tools.
Lipids and lipoproteins I: Structure, metabolism, pathophysiology.
Lipids and lipoproteins II: Laboratory measurement.
Cardiac risk assessments.
Cardiac Profile.
Point of care testing for cardiac management.
Osmometry.
Electrolytes I: Physiology and pathophysiology.
Electrolytes II: Laboratory measurement.

Course Syllabus- Laboratory Exercises:

Safety lessons and safety videos.
Glassware orientation, manual pipetting (large volumes).
Micropipette calibration, use, and care.
Balances and weighing.
Introduction to absorption photometry, correlating colors and wavelengths.
Spectrophotometer use and care, absorption spectrum.
Glucose measurement (enzymatic, colorimetric, manual).
Glycated hemoglobin analysis (colorimetric with cation exchange).
Triglyceride measurement (enzymatic, colorimetric, manual).
Cholesterol measurement (enzymatic, colorimetric, manual).
HDL cholesterol measurement (precipitation with polyanionic solutions).
Creatine kinase (enzymatic).
CK-MB, troponin, myoglobin (immunofluorescent).
BNP (immunofluorescent).
Bicarbonate level (colorimetric, manual).

MLS 4630 & 4630L - Clinical Chemistry II; Credit: 3 SH
Lecture: 5 Hrs/Wk; Lab: 8 Hrs/Wk; 10 Weeks

Catalog - Course Description

This course continues where Clinical Chemistry I left off, discussing kidney function, electrolytes, blood gases, acid-base balance, mineral metabolism, enzyme measurement, liver function studies, and pancreatic function assessment. It also includes the more esoteric tests involved in testing endocrine function, therapeutic drug monitoring, toxicology, tumor markers, and testing during pregnancy. Methodology is primarily immunoassay, potentiometry and spectrophotometry. Reading and disseminating research in the discipline is emphasized in the format of a journal club. Material and Supply fee will be assessed for corresponding lab. Permission is required. Corequisite: MLS 4630L.

Course Syllabus-Lecture topics:

Acid/Base control.
Kidney function.
Calcium, Phosphorous, Magnesium and PTH regulation.
Iron physiology.
Principles of clinical enzymology I: Nature and measurement of enzymes.
Principles of clinical enzymology II: Enzymes as disease markers.
Gastrointestinal function, pathophysiology, and related laboratory assays.
Pancreatic function, pathophysiology, and related laboratory assays.
Liver I: Physiology and pathophysiology.
Liver II: Laboratory measurement of plasma markers of liver pathology.
Overview of endocrine testing in the clinical laboratory.
Hypothalamic and pituitary hormones and related laboratory assays.
Thyroid anatomy, physiology, and pathophysiology.
Tests of thyroid function, change of analyte in disease.
Adrenal hormones and related laboratory assays.
Gonadal hormones and related laboratory assays.
Adenomas and ectopic hormone production.
Pregnancy detection and monitoring by laboratory testing.
Tumor markers I: Laboratory testing and significance of results.
Therapeutic drug monitoring I: Principles underlying TDM.
Therapeutic drug monitoring I: Laboratory measurement of specific drugs.
Toxicology I: Principles underlying clinical and forensic toxin assays.
Toxicology II: Laboratory measurement of specific toxins.
Laboratory assays for vitamins and other trace nutrients.
Heterogeneous and homogeneous immunoassays.
Plasma proteins: Biochemical characteristics, functions, and role as disease markers.
Electrophoretic methodologies.
Significance of abnormal electropherograms.
Journal Club.
Molecular disease introduction.

Course Syllabus-Laboratory Exercises:

Iron and Iron Binding Capacity.
Bilirubin assay (total and direct, Evelyn & Malloy methodology).
Alkaline phosphatase assay (enzymatic end-point, colorimetric, manual).
Aspartate aminotransferase assay (enzymatic end-point, colorimetric, manual).
Alanine aminotransferase assay (enzymatic end-point, colorimetric, manual).
Albumin and total protein assays (bromcresol green and biuret methodologies).
Alcohol testing.
Serum protein electrophoresis I: Electrophoresis and staining.
Serum protein electrophoresis II: Densitometry.
Hemoglobin electrophoresis.
Immunofixation electrophoresis.
Hormone measurement: hCG, LH, FSH.
Thyroid testing.
Sweat testing.

MLS 4191 & MLS 4191L Molecular Diagnostics; Credit: 2 SH
Lecture: 5 Hrs/Wk; Lab: 5 Hrs/Wk; 6 Weeks

Catalog - Course Description

Molecular Diagnostics is a relatively new and rapidly changing focus in the Clinical Laboratory. Two broad topics will be addressed, molecular diseases/variants and molecular methods to diagnose and monitor disease. Molecular diseases and variants include inborn errors of metabolism, hemoglobinopathies, and cystic fibrosis, along with the conventional methods for their detection. The discussion of molecular approaches to diagnosing and monitoring disease will span the conventional methods of PCR, gel electrophoresis and Southern Blotting to semi-automated methods of TMA, LCR and Real-time PCR. HIV testing will be used as a paradigm for the development of sensitive, specific and genotypic analysis of HIV in patient populations and in the nation's blood supply. Disorders of amino acids and proteins will also be discussed.

Course Syllabus- Lecture Topics

Pathophysiology and diagnosis of molecular diseases at the level of DNA, amino acids and proteins, including sickle cell anemia and cystic fibrosis.
Common and emerging molecular strategies used in Clinical Microbiology to detect pathogens.
Principles and applications of PCR, DNA electrophoresis, Southern Blot, Western Blot, Northern Blot, Transcription mediated amplification, branched DNA, RFLP, STR, LIPA and RIBA.
Principles of Real time PCR, Reverse transcription PCR, STR for identity testing, and DNA chip technology will be discussed. Methods used in molecular laboratories to minimize contamination. Data mining methods using public access data bases.

Course Syllabus – Laboratory Exercises

Isolation and quantification of DNA by absorbance in bacteria, human (buccal and blood).
PCR amplification for mecA gene in Staphylococcus.
PCR amplification for LTR ALU sequence in human.
Gel electrophoresis and quantitation of DNA using Kodak 1D densitometry.
Restriction digest – RFLP testing and paternity testing.
Southern Blot
Western Blot

MLS 4550 & 4550L Immunohematology I; Credit: 4 sh
Lecture: 3 Hrs/Wk; Lab: 8 Hrs/Wk; 10 Weeks

Catalog- Course Description

Fundamentals of blood group immunology, pretransfusion testing of the patient's blood for compatibility with donor blood, detection and identification of allo and autoantibodies, transfusion therapy and hazards of transfusion, investigation of transfusion reactions, collection and processing of donor blood, component preparation and uses in transfusion therapy. Material and supply fee will be assessed for the corresponding lab. Permission is required. Corequisite: MLS 4550L

Course Syllabus-Lecture Topics

Immune response as it relates to blood group antigens and antibodies.
Blood group Immunogenetics.
Fundamentals of Immunology as it relates to Immunohematology: Antigens, Antibodies. Complement and Immune Response.
Blood Group Immunogenetics.

ABO blood group system:	Antigens, antibodies, inheritance, subgroups, discrepancies in ABO typing, ABO antigens in disease.
Rh blood group system:	Mode of inheritance, nomenclature, testing for antigens, phenotyping, complete and incomplete Rh antibodies, causes of false reactions, test for weak antigens, reagents for Rh typing, detection of antibodies and their clinical significance.
Other blood group systems:	Lewis, MNSs, P, I, Kell, Duffy, Kidd, Lutheran and other miscellaneous blood groups. In each case, antigens, antibodies, frequencies and clinical significance are discussed.
Antiglobulin testing:	Direct and indirect antiglobulin tests, production of antiglobulin serum, monospecific and polyspecific antiglobulin sera, sources of error, applications in clinical practice.
Red cell antibodies:	Their detection and identification, antibody screen, red cell panel, phenotyping the patient, other methods of identification.
Compatibility testing:	Identification procedures, collection and preparation of samples, testing procedure, limitations of compatibility testing, verification of current and previous test results
Compatibility testing	in special circumstances: Transfusion of non-group specific blood, intrauterine and exchange transfusions in neonates, emergency situations, massive transfusions
Positive DAT:	Investigation of positive direct antiglobulin test and immune hemolytic anemia: Cold and warm reactive autoantibodies, their detection and identification, cold agglutinin disease, laboratory tests affected by cold and warm reactive antibodies, techniques to resolve the problems encountered in compatibility testing.
Drug Induced HA:	Mechanisms of drug induced hemolytic reactions, laboratory investigation, resolution of compatibility testing.

HDN:	Etiology, pathophysiology, serologic investigation, diagnosis and treatment of Hemolytic Disease of the Newborn.
Transfusion Reaction:	Types and causes of transfusion reactions, investigation of acute hemolytic transfusion reactions, prevention methods.
Donor Blood:	Donor Selection, Blood Collection, storage and handling.
Donor Blood Testing:	For Transfusion Transmitted Pathogens.
Blood Components:	Preparation, Storage and Quality Control of Blood Components.
Transfusion Therapy:	Selection and use of Blood Components for Transfusion Therapy.
Medico/Legal Issues:	Regulations, Medical and legal issues in Transfusion Medicine.

Course Syllabus- Laboratory Exercises /Discussions

Donor selection, blood collection, processing and blood component preparation.
Visit to the Northwest Florida Blood Center.
Preparation of washed red blood cell solutions.
Detection and grading of agglutination reaction.
Detection of rouleaux and hemolysis.
Collection and handling of specimen for pretransfusion testing.
Patient identification, specimen labeling, criteria for rejection of the specimen.
ABO typing: Forward and reverse grouping. Slide and tube testing. Interpretation of results. Discrepancies between cell and serum results and their resolution. Detection of weak subgroups. Saliva testing for ABH antigens.
Rh typing: Slide and modified tube tests. Test for weak D antigen. Saline tube test.
Rh antigens – phenotyping.
Antiglobulin tests: Direct and indirect AGT. Detection of false positive and false negative Results and interpretation of results
Antibody Screening - Interpretation of results in various clinical conditions /types of antibodies.
Antibody identification: Reagent red cell panel - interpretation of results and identification of antibody/ies
Enzyme techniques fro antibody identification.
Antibody elution and absorption techniques.
Neutralization technique.
Titration of an antibody and scoring .
Routine Crossmatch- Interpretation of results.
Crossmatch - incompatible. Interpretation of results.
Resolving crossmatch problems: Rouleaux, alloantibody, autoantibody, prewarmed crossmatch.
Donald Landsteiner test for PCH.
Procedure for investigation of autoimmune hemolytic anemia.
Rho GAM work up: Prenatal testing of mother’s blood. Neonatal testing of baby's blood, Screening for and quantitation of Feto-Maternal Hemorrhage (FMH).
Nontraditional laboratory tests: Gel test, solid-phase adherence test, red cell-affinity-column test, flow cytometry.
Quality control procedures in immunohematology.
Case studies.

MLS 4505 & 4505L - Serology; Credit: 2 SH
Lecture: 3 Hrs/Wk; Lab: 8 Hrs/Wk; 6 Weeks

Catalog- Course Description

Diagnostic methods for diseases that show a specific immune response by developing an antibody/ies to the invading organism. In vitro antigen-antibody reactions to detect, confirm and manage the treatment of diseases such as syphilis, viral hepatitis, rubella, infectious mononucleosis, lupus, and several other bacterial fungal, viral and parasitic infections. The infectious agent, nature of the disease, types of antibodies produced and techniques to detect and quantitate are discussed. Material and supply fee will be assessed for corresponding lab. Permission required. Corequisite: MLS 4505L.

Course Syllabus-Lecture Topics:

Basic principles of immunology: Types of immunity, antigens and antibodies structure of immunoglobulins, B-lymphocytes and antibody production, patterns of antibody production in infectious disease.

Antigen-antibody reactions: Types of in vitro Ag-Ab reactions, factors which affect them, practical applications in diagnostic laboratory.

Complement: Components, mechanisms of activation, complement in disease states.

Hypersesitivity Reactions – Immunological basis and lab tests.

Fundamentals of serological procedures: Specimen collection, processing and preparation of serial dilutions .

Syphilis and serological tests for syphilis: The causative organism, the disease, types of antibodies produced and laboratory procedures for their detection. Discussion of false positive and false negative results .

C-reactive protein, streptococcal antibodies, and cold agglutinins: Serological tests to detect and quantitate these antibodies.

Detection and quantitation of antibodies in Rheumatoid Arthritis and Infectious Mononucleosis. Discussion of the disease, confirmatory tests, sources of error.

Laboratory diagnosis of autoimmune disorders: Discussion of types of systemic and organic specific autoimmune diseases, their etiology, mechanism and laboratory findings. Serologic tests for SLE and other autoimmune disorders and fluorescent antibody tests.

Laboratory diagnosis of viral Hepatitis: Hepatitis viruses and their nomenclature, types of diseases caused, serologic methods used in hepatitis testing, hepatitis profiles and their interpretation (patient's immune status).

Rubella: Serologic tests for detection of rubella antibodies and interpretation of test results related to patient's previous infection or exposure to rubella (immune status).

Immunoglobulin quantitation and complement levels.

Acquired Immunodeficiency Syndrome and HIV: Transmission, epidemiology, serology, clinical features, legal/ethical considerations.

Serology tests for Toxoplasma, CMV, Cryptococcus and other routine tests for parasitic, fungal and viral infections.

Serologic tests for Lyme Disease, Ehrlichiosis, and antibody detection in emerging pathogens.

Course Syllabus -Laboratory Exercises- Discussions

Collection and preparation of serum specimens for serology tests. Handling contaminated specimens. Criteria for rejection of specimens.

Dilutions and serial dilutions. Preparation of erythrocyte cell suspensions. Determination of antibody titer, quality control in serology.

Determination of Cold Agglutinin Titer.

Serological Tests for Syphilis: RPR Test, VDRL - serum and CSF, FTA-ABS test.

Streptozyme - latex slide test.

Antihyaluronidase test.

Mono Spot Test.

Mono Differential Test.

Paul-Bunnell presumptive heterophil antibody test.

Rubella passive hemagglutination test.

Salmonella - Widal test

Test for Rheumatoid Arthritis.

Fluorescent Antinuclear Antibody test for SLE.

Cryoglobulins Detection.

C-reactive protein and haptoglobin in neonates.

Cryptococcal antigen detection.

Viral Antibody Tests /ELISA Method, whenever test kits are available through donations .

Discussion of principles and methodology for serologic tests based on:

- Agglutination
- Hemolysis
- Immunoprecipitation
- Immunoelectrophoressis
- Laurel's Rocket IEP
- Immunofixation EP
- Nephelometry
- ELISA
- Complement Fixation
- Flow Cytometry

MLS 4705 Special Clinical Topics
2 hrs/week; 6 weeks

Catalog- Course Description

Fundamentals of clinical laboratory management, supervision and educational methodologies are covered. Students are introduced to clinical laboratory operations in areas of financial and human resource management, marketing of laboratory services, communications with other health care professionals, laboratory information systems and regulatory compliance with applicable regulatory agencies. Other special clinical topics related to education and training, lab safety, HIV/AIDS, prevention of medical errors, professional ethics and career planning are presented.

Topics Covered

Laboratory management.

Laboratory finance.

Laboratory compliance.

Laboratory information systems.

Quality assurance, total quality management, continuous quality improvement.

Lab Safety.
Education and training.
Preparation of educational objectives and test construction .
Preparation of oral presentations.
Changes in the healthcare field, managed care, patient- focused care, point-of-care testing.
HIV/AIDS (Biology, epidemiology, prevention, legal, social, and economic aspects).
Prevention of Medical Errors.
Florida State Statutes and Regulation, Compliance.
Professional, ethical, and legal issues in healthcare.
Career Planning.

MLS 4820L - Clinical Chemistry III; Credit: 4SH
40 Hrs/Wk; 5Wks

Catalog - Course Description
Application of the laboratory principles and practices presented in Clinical Chemistry I and Clinical Chemistry II at one of the clinical affiliate hospitals. Instruction includes, theory, instrumentation, practice and performance, under supervision, of all routine clinical chemistry procedures.

Topics Covered:
Orientation to the clinical chemistry laboratory.
Laboratory information system management.
Specimen collection, handling and processing.
Instrumentation- includes the following for each instrument:
- Routine operation.
- Preventative maintenance.
- Theory of operation.
- Electronics and computerization.
- Standardization.
- Trouble-shooting.
- Quality Control.

Chemistry, physiology, linearity, normal values and interfering factors of tests for:
- Carbohydrate metabolism.
- Electrolyte balance.
- Acid-base balance.
- Liver function.
- Renal function.
- Cardiac monitoring.
- Gastrointestinal function.
- Enzyme function.
- Bone and muscle disorders.
- Iron homeostasis.
- Gastrointestinal function and pancreatic disease.
- Prenatal testing.

MLS4821L - Diagnostic Microbiology II; Credit: 4SH
40 Hrs/Wk; 7 Wks

Catalog - Course Description

Application of clinical microbiology principles and techniques presented in MLS 4460. Supervised practice in the hospital laboratory. Includes manual and automated identification and susceptibility testing, specimen collection and processing, quality assurance and laboratory organization.

Topics Covered

Safety in the microbiology laboratory.
Specimen processing, media inoculation and incubation.
Types of specialized media.
Performing and reading gram stains.
Blood cultures - commonly encountered organisms, automated detection systems.
Automated biochemical panel inoculation and interpretation.
Identification of normal flora and pathogenic organisms in:

- Urine cultures.
- Stool cultures.
- Genital cultures.
- Wound cultures.
- Throat and nasopharyngeal cultures.
- Sputum cultures and bronchial washings.
- Cerebrospinal fluid and other body fluids.
- Performing and reporting susceptibility testing.
- Performing and reporting acid-fast stains for mycobacteria.
- Inoculation and incubation of mycobacteria cultures.
- Biochemical identification of mycobacteria.
- Performing and reporting India ink and KOH preparations.
- Inoculation and incubation of fungal cultures.
- Fungal morphology, molds and yeasts.
- Fungal identification techniques.

MLS 4822L - Hematology II; Credit: 4SH - Clinical Rotation at a Hospital Laboratory
40 Hrs/Wk; 5 Wks

Catalog- Course Description

Continuation of Hematology I. Advanced practical training in automated hematology and coagulation instrumentation, routine and special procedures in hematology and coagulation, quality control and interpretation of test results, maintenance and trouble-shooting of clinical hematology equipment. Training includes all aspects of clinical lab medicine in a modern hematology/ coagulation lab and prepares the student to assume responsibility as a clinical laboratory scientist. Permission is required. Prerequisites: MLS 4305 & MLS 4305L

Course Syllabus- Advanced Practical Training in the following functions:

- Collection, handling and processing of hematology and coagulation specimens.
- Operation of automated blood cell counter, including daily start-up, calibration, quality control, daily/weekly maintenance and minor trouble-shooting.
- Performance of automated CBC on patient samples and report the results under supervision.
- Interpret the results in relation to normal, abnormal and critical values as established in the laboratory.
- Detection of errors and sources of errors and application of corrective action/s a s needed.
- Practice of quality assurance /quality improvement methods as applied to pre-analytical, analytical and post-analytical components of hematology and coagulation lab services.
- Performance of other routine manual or automated such as:
  - Erythrocyte sedimentation rates.
  - Body fluid cell counts.
  - Reticulocyte counts.
  - Microhematocrits / Buffy coat preps .
  - Siickle Hb screening.
- Performance of special /non routine tests such as:
  - Osmotic Fragility tests.
  - Heinz Body preps.
  - Platelet Aggregation.
  - Cytochemistry Stains for leukemias.
- Preparation and staining of blood smears and review of abnormal slides.
- Microscopic examination of stained blood smears for:
  - Description of abnormal RBC Morphology and correlation to a possible disease.
  - Identification of abnormal /immature WBC correlation to a possible disease .
  - Correlation of automated and manual differential results.
  - Performance of automated differential counts.
- Identification of T and B cell populations in evaluation of leukemias.
- Observation of bone marrow aspiration/biopsy procedures and practice making BM smears under the guidance of a senior technologist.
- Analysis and evaluation of hematology test results as they relate to patient conditions.
- Performance of automated coagulation tests, normal values, interpretation of results.

Performance of manual coagulation tests, correlations with automated results.

MLS 4823L - Immunohematology II; Credit: 4 sh; Clinical Rotation at a Hospital Laboratory. 40 Hrs/Wk; 6 Wks

Catalog - Course Description

Continuation of ImmunohematologyI and Serology at one of the clinical affiliate hospitals. Advanced practical training in modern bloodbanking and transfusion services at the hospital. Training includes practice and performance, under supervision of all the procedures involving pre-transfusion tests on the patient's blood, selection of donor blood, compatibility determination, problem solving, release of suitable blood/blood components for transfusion therapy. Permission is required. Pre-requisites: MLS 4550 & 4550L.

Course Syllabus- Advanced Practical Training in the following functions:

Practice of quality assurance /quality improvement methods as applied to pre-analytical, analytical and post-analytical components of Immunohematology and Serology lab services.

Preparation of washed red cell solutions and agglutination grading.

Perform routine Pretransfusion Testing Procedures:

- ABO forward and reverse typing, weak reactions and subgroups and resolving discrepancies.
- Rh typing, weak D and phenotying.
- Direct Antiglobulin Test.
- Indirect antiglobulin testing, antibody screening.
- Antibody identification, cold, warm, single, multiple.
- Routine and abbreviated compatibility testing.

Identification and resolution of problems in compatibility testing - positive autocontrol, cold and/or warm antibodies.

Autoabsorption of cold and warm antibodies, as appropriate, and according to lab protocol.

Performance of Antibody Elution techniques.

Performance of tests on maternal blood, neonatal blood, antibody identification and titration.

Detection and quantification of fetal maternal bleed, RhoGam workup.

HDN investigation and exchange transfusion workups.

Transfusion reaction investigation.

Release of blood /components for transfusion of red cells, platelets, FFP, and other components.

Visit a Bloodbank and observe procedures and protocol for:

- Selection of donors and Phlebotomy/Apheresis procedures.
- Component preparation and storage.
- Procedures and protocol of donor blood processing.
- Quality control and regulations as they apply to preparation and storage of blood products.
- Appropriate collection and labeling of patient specimens.

Specimen collection, handling and storage for serology specimens.

Serological tests for Syphilis.

Tests for detection of anti-Streptococcal and Infectious Mononucleosis antibodies.

Diagnostic tests for Rubella, EBV, Hepatitis, HIV, CMV, Herpes and other viral infections.

Tests for autoimmune disorders B Rheumatoid Arthritis and SLE.

Qualitative and quantitative tests for acute-phase reactants - CRP, Haptoglobin, Transferrin.

Detection of antibodies to microbial infections- Toxoplasma, Cryptococcus, Lyme disease.

Quantitation of amniotic fluid phospholipid levels and other procedures done in the lab.

MLS 4824L - Special Clinical Methods; Credit: 2SH
40 Hrs/Wk; 3 Wks

Catalog - Course Description

Supervised practice in a hospital laboratory. Special methods in clinical laboratory sciences, including non-routine (special) chemistry procedures and methods in immunodiagnostics, mycobacteriology and clinical mycology.

Topics Covered

Principles of electrophoresis, procedures, instrumentation.
Interpretation of serum protein, immunofixation and hemoglobin electrophoresis.
Principles of chemiluminescence, fluorescence polarization, procedures, instrumentation.
Evaluation of endocrine function, including thyroid, adrenal cortical and medullary hormones.
Principles of enzyme immunoassay, instrumentation.
Toxicology testing.
Hormone measurement.
Analysis of hepatitis markers.
HIV testing.
Tumor markers.
Nephelometry.
Mycobacterial culturing and concentration.
Acid fast staining.
Colonial morphology and growth characteristic of mycobacteria.
Instrumentation for mycobacterial growth detection.
Chemical testing of mycobacteria.
Fungal culturing.
KOH preparations.
Lactophenol cotton blue staining.
Tease preparations.
Colonial characteristics of molds and yeasts.
Microscopic characteristics of molds.
Chemical identification of yeasts.
India ink preparations.
Serological detection of fungal infections.

MLS 4825L - Urinalysis/Body Fluids II; Credit: 2SH
40 Hrs/Wk; 1 Wk

Catalog - Course Description

Supervised practice in a hospital laboratory in the analysis of urine and other body fluids, phlebotomy procedures and techniques in parasitology.

Topics Covered

Urinalysis and Body fluids

- Operation, maintenance and quality control of the reagent strip analyzer.
- Physical examination of urine color and clarity, terminology used in reporting.
- Reagent strip technique for manual procedures, interpretation of color reactions.
- Performance of Clinitest, sulfosalicylic acid and Ictotest, procedures, principles and indications for performing them.
- Bright field, phase and polarizing microscopy techniques.
- Identification of casts, red and white blood cells, squamous, transitional and renal tubular epithelial cells, normal and abnormal crystals, bacteria, parasites and artifacts in urine sediments.

Quality control in urinalysis, correlation of physical, chemical and microscopic results.
CSF and other body fluid cell counts and differentials.
Synovial fluid examination for crystals using bright field, polarized and compensated polarized microscopy.
Infertility and post-vasectomy semen analyses.
Amniotic fluid testing for bilirubin.
Amniotic fluid testing for lung phospholipids, determination of fetal maturity.
Microscopic examination of feces for fats, white blood cells and fibers.
Fecal screening for the presence of occult blood, patient instructions, test principles.

Phlebotomy

Orientation to hospital phlebotomy area.
Safety procedures in phlebotomy.
Venipuncture equipment, types of vacutainers, needle gauges, syringes, butterflies.
Types of specimens required.
Patient identification, specimen labeling.
Venipuncture technique.
Special venipuncture procedures, blood cultures, cold agglutinins, TDM specimens.
Complications of venipuncture.
Dermal puncture technique, heel and finger punctures.
Special dermal puncture procedures, bleeding times, neonatal bilirubins, filter paper Collections.

Parasitology

Preparation of parasitology slides, wet preps and permanent mounts.
Characteristics of stools containing parasites.
Examination of parasitology slides, identification of ova and larvae.
Morphologic characteristics and classification of protozoa and helminthes.
Characteristics of blood and tissue parasites, identification of malaria parasites.
Artifacts associated with parasitology specimens.

Standard 9B: Location of Subject Matter Areas in the Curriculum

Standard 9B 1	**Course**	**Location**
Anatomy / Physiology	PCB 2131 Cell Biology/Lab PCB 4703 Human Physiology HSC 3550 Pathophysiology	University/Preclinical
Immunology	PCB 4233 Immunology/Lab	University/Preclinical
Genetics / Molecular Biology	PCB 3063 Genetics/Lab	University/Preclinical
Microbiology	MCB 3020 Microbiology/Lab	University/Preclinical
Organic Biochemistry	CHM 2010 Organic Chem I/Lab CHM 2011 Organic Chem II /Lab BCH 3033 Biochemistry I /Lab	University/Preclinical
Statistics	STA 2023 Elements of Statistics	University /Preclinical
Standard 9B 2		
Pre-analytical, analytical and post-analytical components of laboratory science		
Hematology	MLS 4305 Hematology I/Lab → MLS 4822L Hematology II →	University /Clinical Hospital Lab
Hemostasis	MLS 4334 Hemostasis & Thrombosis /Lab → MLS 4822L Hematology II →	University/Clinical Hospital Lab
Chemistry	MLS 4625 Clin Chemistry I/Lab → MLS 4630 Clin Chem II/Lab → MLS 4820L Clin Chem III →	University /Clinical University/Clinical Hospital Lab
Microbiology	MLS 4460 Diag Micro I /Lab → MLS 4462 Medical Micro/lab → MLS 4821L Diag Micro II →	University /Clinical University/Clinical Hospital Lab
Urinalysis	MLS 4220 UA/BF I /Lab → MLS 4825L UA/BF I →	University/ Clinical Hospital Lab
Microscopy	MLS 4305 Hematology I/Lab → MLS 4460 Diag Micro I /Lab → MLS 4220 UA/BF I /Lab → MLS 4462 Medical Micro/lab → MLS 4822L Hematology II → MLS 4821L Diag Micro II → MLS 4825L UA/BF II →	University-based Clinical Year Courses Hospital Labs
Molecular Diagnostics	MLS 4191 Molecular Diagnostics	University/Clinical
Immunology	MLS 4505 Serology/Lab MLS 4823L Immunohematology →	University/Clinical Hospital Labs
Immunohematology	MLS 4550 Immunohematology I → MLS 4823L Immunohematology →	University /Clinical Hospital Lab

Standard 9B3	Course	Location
Principles and practices of quality assurance/quality improvement as applied to the pre-analytical components of laboratory services	All across the curriculum In clinical year	University Clinical Year Courses and Hospital Clinical Rotations
Principles and practices of quality assurance/quality improvement as applied to the analytical components of laboratory services	All across the curriculum In clinical year	University Clinical Year Courses and Hospital Clinical Rotations

Standard 9B4		
Application of safety to laboratory Practice	All across the Curriculum In clinical year	University Clinical Year Courses and Hospital Clinical Rotations
Application of governmental regulations and standards as applied to laboratory practice	MLS 4705 Sp Clinical Ttopics	University Clinical Courses Hospital Clinical Rotations

Standard 9B5		
Principles of interpersonal and interdisciplinary communication and team building	MLS 4625 Clin Chemistry I MLS 4630 Clin Chemistry II MLS 4705 Spe Clin Topics MLS 4824L Sp Clinical Methods →	University Clinical Year Courses Student Seminars and Journal Club Presentations in Hospital Clinical Rotations

Standard 9B6		
Principles and application of ethics	Ethics/Values course in General Studies Curriculum MLS 4705 Sp Clin Topics and all across the curriculum Orientation to hospital rotations →	University / Pre-clinical Course University /Clinical courses Both at the University and at the Hospital
Principles and application of professionalism to address ongoing professional career development.	MLS 4705 Sp Clinical Topics UWF CLS Program CE Seminar →	University Clinical Course UWF campus at FWB

Standard 9B7		
Education techniques and terminology sufficient to train/ educate users and providers of laboratory services.	MLS 4705 Special Clinical Topics MLS 4824L Special Clinical Methods	University Course/Clinical Year Student Seminars & Journal Club Presentations in Clinical Rotations

Standard 9B8		
Knowledge of research design/ practice sufficient to evaluate published studies as an informed consumer.	MLS 4625 Clin Chemistry-I MLS 4630 Clin Chemistry-II MLS 4460 Diag Microbio- I	University Courses/Clinical Year

Standard 9B9		
Critical pathways and clinical decision making.	In all of the Clinical Courses In all of the Clinical Rotations	University Hospital Laboratory
Performance improvement.	In all of the Clinical Courses In all of the Clinical Rotations	University Hospital Laboratory
Dynamics of health care delivery systems as they affect laboratory service.	MLS 4705 Sp Clin Topics	University / Clinical Year Course
Human resource management to include position description, performance evaluation, utilization personnel and analysis of workflow and staffing patterns.	MLS 4705 Sp Clin Topics	University / Clinical Year Course
Financial management: profits and loss, cost/benefit, reimbursement requirements, materials/inventory management.	MLS 4705 Sp Clin Topics	University / Clinical Year Course

Standard 9C: Description of Development of Entry-level Competencies

Preclinical curriculum: In addition to the strong general studies requirements, the State of Florida established a set of lower division common (science) prerequisites for BS degree seeking students in clinical laboratory sciences. The University of West Florida=s program is further strengthened by the upper level science prerequisites with labs, in Genetics, Pathophysiology, Biochemistry, Immunology and Microbiology. These courses are the same courses taken by biology/preprofessional students heading for graduate or medical schools. The Chemistry and Biology departments at UWF have strong undergraduate programs, also providing an excellent preparation for CLS majors.

So, in essence, the clinical laboratory science students at University of West Florida are well prepared with a strong science background, to advance in the profession, as well as to enter graduate school or postgraduate-professional schools. The graduates' performance in the national certification exams reflects not only the high the quality of the clinical curriculum, but also their foundations in Biology, Chemistry, Pathophysiology and Mathematics. The structured curriculum plan provides a sequential, progressive learning in these science prerequisites and prepares the student very well to understand and master the complex subject matter in the clinical courses. This incremental learning process in our curriculum is exemplified by the following progression in course work of a typical student:

General Biology → Cell Biology → Human Physiology → Pathophysiology → Genetics → Immunology → Immunohematology I → Serology → Immunohematology II.

General Biology → Cell Biology → General Microbiology → Diagnostic Microbiology I → Medical Microbiology → Diagnostic Microbiology II.

General Chemistry I → General Chemistry II → Organic Chemistry I → Organic Chemistry II→ Genetics → Biochemistry I → Clinical Chemistry I → Clinical Chemistry II → Molecular Diagnostics → Clinical Chemistry III.

General Biology → Cell Biology → Human Physiology → Pathophysiology → Genetics→ Biochemistry →Immunology → Hematology I → Hemostasis & Thrombosis → Hematology II

University Based Clinical Curriculum: The clinical curriculum of the CLS Program at the University West Florida is divided into two sequential phases. For a select group of students who have completed all the prerequisite courses and other graduation requirements, Phase 1 begins in January and ends in December of the same year. During this period students take eleven (11) on-campus clinical laboratory science courses covering all the major areas commonly practiced in a modern clinical laboratory. Each course has a lecture (minimum 3hrs/wk) and a laboratory (8 hrs/wk) component. The course in Special Clinical Topics has only a lecture component.

The lecture sessions include formal didactic presentations by the instructor, class discussions, student seminars, audio-visual instructional programs and question/answer sessions. The main objective in the lecture portion of the courses is to impart the theoretical knowledge in clinical

pathology of various disease processes, which are diagnosed and managed by laboratory tests. In each course students are also taught the purpose, principle, clinical significance, common sources of error, clinical correlations, detection and interpretation of abnormal results and follow up actions needed for all the routine and special procedures done in a given section of the laboratory. Each course has a manual prepared by the instructor, which contains the syllabus, general course objectives (expected student learning outcomes), specific objectives for each lecture and lab session, study questions, case studies, and other instructional material to assist the student in fulfilling the course objectives (this manual is now posted on-line in UWF elearning program called D2L) .

Laboratory sessions are designed to introduce the student to the basic principles and develop basic skills in clinical laboratory practice, to include but not limited to: specimen collection/handling/storage, reagent preparation and storage, laboratory safety, quality control, general instrumentation, laboratory mathematics and statistical skills, correlation of laboratory data with normal and abnormal physiologic conditions, and procedure manual writing skills. In each course, the manual and semi-automated methods for a majority of the **routine** clinical laboratory procedures are demonstrated and performed by students. They are required to practice each procedure to develop the manual dexterity and psycho-motor skills needed to acquire the entry level competencies. Students are given a check list with a minimum number to be practiced for each procedure. The student=s performance is evaluated through continuous monitoring in the laboratory (there are two instructors present in each laboratory session), and through unknown specimens and practical examinations.

Affective Domain: Instruction and assessment of competency are also provided in areas of professional ethics, knowledge of clinical laboratory laws and regulations, appropriate conduct in the clinical laboratory and other aspects of affective domain.

UWF elearning program-Desire2 Learning or D2L:
eLearning.uwf.edu is UWF's web-based course management system. It allows instructors to post information and online learning objects, communicate with students, and conduct instructional and learning assessment activities online in a secure web-based environment. It also facilitates group learning and student-to-student communication. eLearning.uwf.edu can be used as the sole delivery mechanism for instruction, or as a complement to classroom- and lab-based face-to-face instruction and learning activities. eLearning.uwf.edu is based on the Desire2Learn Learning Environment product, which is a commercially-available system for online learning and learning objects storage. For more information, see www.desire2learn.com.

In 2003 UWF switched its on-line course delivery system from WEB CT to D2L. Since then all of our university-based clinical courses are converted into a D2L format. All of the course material, which was previously given to students through a hard copy of course manual (purchased by the student) is now available on-line to all students enrolled in a given course. Adaptation of D2L enabled us to gain a significant development/advancement in curriculum delivery; in that all the lecture /lab presentations are now in power-point format and are available to the student on line prior to the class meeting. Case studies, homework assignments, hematology and other microscopy pictures and unknowns; and WEB links to tutorials, etc, are

made available to students ahead of the class meeting time and after the class, at home. The primary mode of instruction, however, is by direct contact in a classroom/laboratory.

Hospital Based Clinical Curriculum: Phase II of the clinical curriculum begins in January following the completion of the university course work, and is completed by the end of July each year. Students are in clinical rotations for 28 weeks/40 hrs per week. The student=s progression to the hospital rotations is contingent upon successful completion (minimum grade of C required) of all the university based clinical courses. Prior to the beginning of hospital rotations, students are given
a day-long orientation to the policies / procedures for the clinical rotations and a comprehensive examination for self assessment of their knowledge in the clinical course work just completed at the University.

Students are required to purchase a >hospital clinical rotations manual= prepared by the university faculty in consultation with the clinical education coordinators at the hospitals. This manual provides the expected student-learning-outcomes, reading and practical assignments, study questions and examination schedules for each clinical rotation. Academic policies, criteria for passing/failing, assignment of grades for each rotation, rules and disciplinary measures for unacceptable conduct, evaluation forms for affective domain assessment, and other related information are also included in this manual.

At the clinical sites students are mainly given supervised practice and experience to achieve entry level competencies in all the major areas commonly practiced in a clinical laboratory. It is generally acknowledged by the clinical instructors that UWF students, by the time they are placed in clinical rotations, have a solid foundation in each subject area and usually prove to be quick studies in acquiring required entry level competencies in each area. Building upon their basic learning at the university, students learn and practice the competencies required on the job, to include: assessing the suitability of specimens and criteria for rejection, performing the laboratory procedures with speed and accuracy, instrument calibration and maintenance, reporting results, documentation techniques, correlation of laboratory data for the purpose of assessing the validity of results, quality management, problem solving, operation of the laboratory computer information systems, lab safety, communication skills, and professional conduct. They also receive first hand knowledge in practice of laboratory administration, supervision, articulation with other departments, and point-of-care testing by shadowing the supervisors and/or the administrative director of the laboratory.

Special Clinical Topics and Student Seminars: In the university based courses and through special assignments during their clinical rotations, students learn and practice educational methodologies in writing objectives, giving talks on selected topics, preparing examinations, leading discussions, conducting group projects and summary presentations of latest journal articles.

Entry Level Competencies in Phlebotomy: There is no single designated course for instruction in phlebotomy. Topics in phlebotomy and lab safety are covered all across the university-based clinical curriculum. A total of 20-25 hours of presentations in these topics are given during the

laboratory sessions of all ten (10) university based clinical courses, during spring, summer and fall semesters. Major topics covered:

Phlebotomy Lecture Topic	**Presented in Course ……..**
1. Blood Collection Equipment and Supplies 2. Factors to Consider Prior to Blood Collection 3. Venipuncture Collection Procedures	MLS 4305 Hematology I- Spring semester
4. Infection Control, Safety, and First Aid	MLS 4460 Diagnostic Micro- I- Spring
5. Skin Puncture Equipment and Procedures	MLS 4625 Clinical Chemistry I – Summer
6. Non-blood Specimen Tests	MLS 4220 UA / BF I – Summer
7. Quality Assurance and Specimen Handling	MLS 4550 Immunohematology I- Fall
8. Special Procedures and Point of Care Testing 9. Arterial Blood Gases	MLS 4630 Clinical Chemistry-II- Fall
10. The Health Care Setting	MLS 4705 Special Clinical Topics- Fall

Beginning with Hematology in spring semester, during the laboratory portions of the university-based courses students are given demonstrations in venipuncture procedure and in utilization of phlebotomy equipment. Based on each student=s experience and level of confidence they begin to practice first on an artificial arm, followed by practice on each other=s arms. Students are required to perform a minimum of 5 venipunctures per semester. Student=s progress is evaluated at the end of each course and further practice is provided accordingly. The primary objective of phlebotomy training at the University is to ensure that each student is familiar with the equipment, practices safety standards, and can easily draw blood from a healthy subject with good veins. Along with phlebotomy, students are also taught and are trained in laboratory safety procedures all across the university-based curriculum, through lectures, video presentations and on-line tutorials. They are given a copy of OSHA Bloodborne Pathogens Standards and are required to practice safety procedures in student laboratory sessions on campus.

Phlebotomy training at the clinical sites includes one week (40 hrs) of practice and advanced training in specimen collection from patients. Here, the students learn and practice, first under the supervision of an experienced phlebotomist and later independently, various routine and special procedures in phlebotomy.

Entry level competencies and psychomotor skills are achieved through this combination of basic training at the University followed by practice on a variety of patient populations at different levels of difficulty in a hospital setting. Students are given special assignments to ensure patient contact in various settings such as Nursery, Intensive Care Units, Emergency Room, Out Patient Clinics, etc. After this week in phlebotomy is completed, students are required to do phlebotomy only for periodic review and practice during the rest of their clinical rotations.

Summary of phlebotomy training schedule:

	Hours
University, Lectures	20
University, laboratory practice	40
Clinical rotation (1 week)	40
Periodic Review and Practice	40
Total Hours in Phlebotomy	140

Review Week: At the end of their clinical rotations students return to the university for a week of review sessions and comprehensive exams. They also receive a debriefing in general and miscellaneous procedures, including test taking skills, graduation procedures and tips for job seeking and interview skills.

Thus the curriculum is well designed for students to develop entry level competencies in a sequential and progressive learning process. The university based courses are thorough and designed to acquire not only the minimum entry level competencies for employment, but also a strong foundation of theoretical knowledge in bio-medical technology sciences, preparing the motivated students for entry into graduate school.

Our clinical sites are of top notch quality and are enthusiastic partners in clinical laboratory sciences education. In spite of the busy environment of today=s clinical laboratories our students receive personal attention and instruction on a one to one basis. By the time of graduation, the students are fully equipped with entry level competencies to begin career as a clinical laboratory scientist.

Standard 9C: Career Entry-Level Competencies of Graduates

Upon successful completion of the Clinical Laboratory Sciences Program at the University of West Florida, the graduate will have acquired the theoretical knowledge and practical skills necessary to function as an entry-level clinical laboratory scientist in a modern clinical laboratory. The graduate will:

- Develop and evaluate procedures for collecting, processing, storing, shipping and analyzing specimens in a clinical laboratory.
- Be proficient in performing the full range of clinical laboratory rests in areas such as hematology, clinical chemistry, immunohematology, microbiology, serology/ immunology, coagulation, molecular and other emerging diagnostics.
- Identify and verify critically abnormal results and follow up on the lab protocol to alert the nurse/physician of the patient.
- Detect possible errors or discrepancies, verify the accuracy of instrument or procedure and make decisions regarding alternative courses of corrective action.
- Analyze and interpret test results; correlate the results with data generated by other areas of the clinical laboratory. Make clinical decisions for follow up testing as needed.
- Perform quality control methods; analyze and interpret quality control results and take corrective action when needed.
- Practice quality assurance/quality improvement methods in pre-analytical, analytical and post-analytical components of the laboratory services.
- Write, update or revise laboratory procedure manuals according to the accreditation/ licensure agency's standards.
- Evaluate new methods, instruments and reagents in terms of their sensitivity, specificity and cost effectiveness.
- Be engaged in continuing education as a means of professional development and for maintaining professional competence.
- Have knowledge of educational methods to train students and new employees in the laboratory.
- Demonstrate professional conduct and communication skills to effectively interact with members of the health care team, external relations, customer service and patient education.
- Have basic knowledge and skills for information management to enable effective, timely, accurate and cost-effective reporting of laboratory generated information.
- Have basic knowledge and skills in financial, operations, marketing, and human resource management in a clinical laboratory.
- Demonstrate knowledge of laws and rules related to personnel licensure, laboratory accreditation and professional organizations.
- Have basic knowledge and skills in research design and will be able to evaluate published studies in the subject areas of clinical laboratory sciences.

Standard 9C: Describe how student experiences at different sites are ensured as comparable.

We have at present 8 clinical affiliates

	No of Beds	
Baptist Hospital	429 …….	Level II Trauma Center
Sacred Heart Hospital	449 …….	Level II Trauma Center
West Florida Hospital	400 …….	Level II Trauma Center
Fort Walton Beach Medical Center-	247……..	Level II Trauma Center
Bay Medical Center-	403…….	Level II Trauma Center
Shands at AGH-	367…….	Level III Trauma Center
Shands at Univ of FL -	618…….	Level I Trauma Center
Shands Jacksonville-	733 …….	Level I Trauma Center

All of these hospitals are tertiary care hospitals and trauma centers with 24 hour emergency room services. Each laboratory offers a full spectrum of state-of-the art laboratory services to support the medical services offered by each hospital. All of the clinical affiliate laboratories have adequate number and variety of laboratory procedures to provide the training required for entry-level competencies of a generalist clinical laboratory scientist in areas of hematology, clinical microbiology, clinical chemistry, immunohematology/transfusion medicine and serology/ immunology.

However, as can be seen from the size and number of beds of each hospital, variations do exist in the extent of clinical laboratory services. To the extent possible, steps are taken to ensure that student experiences at different clinical sites are comparable as follows:

For example:

- Only Sacred Heart and Baptist Hospital have a Flow Cytometer. Students from WFH, FWBMC and BMC are rotated through either SHH or Baptist to observe and get a brief demonstration of this technique. The theory and clinical applications of Flow Cytometry are covered for all students in the University based courses: Hematology and Serology.
- Fort Walton Beach Medical Center's serology and special chemistry rotations are supplemented by students spending 2 weeks at one of the larger hospitals in Pensacola.
- Molecular Diagnostic testing is slowly emerging as routine testing at various hospitals.So students' exposure to this area is variable. However, for the past 4 years, all students received Molecular Diagnostics training in the university- based courses: Diagnostic Microbiology and Clinical Chemistry I & II. Beginning Fall 2006, Molecular Diagnostics will be taught as a concentrated course: MLS 4191 & 4191L Molecular Diagnsotics/Lab.
- Shands at UF and Shands Jacksonville are larger teaching/research hospitals for University of Florida College of Medicine. They offer specialized health care services such as organ transplantation and other cutting edge medical procedures. Accordingly the laboratories have a higher level of services such as Histocompatibility, Flow Cytometry, Molecular Diagnostics, Cytogenetics, and other specialty procedures. Students placed at these hospitals have opportunities to observe and perform tests which are not available at other hospitals.

- Shands at AGH is located in close proximity to Shands at University of Florida, in Gainesville, FL. Both hospitals are part of the Shands Health Care System. A single affiliation agreement (between UWF and Shands Teaching Hospitals, Inc) covers both hospitals. Some of the services between these hospitals are consolidated at the larger hospital. Accordingly, microbiology laboratory work for Shands at AGH laboratory is sent to Shands at UF, which is at a nearby street location. So the student who is placed at Shands at AGH rotates through microbiology department at Shands at UF.

In Summary, student experiences at all of our clinical affiliates are comparable in that each affiliate is capable of offering the basic training required for achieving entry-level competencies of a clinical laboratory scientist When needed, comparable experiences are provided at another affiliate as described above. Inevitably, some affiliates have specific resources and opportunities for a higher level of clinical laboratory experiences to the student's benefit in that specialization.

The adequacy and excellence of our graduates' preparation is repeatedly verified by the sustained, excellent Program Performance Reports we receive from the national board examination agencies and the graduates' success in the employment sector.

Standard 9C: Submit a brief summary of the types of laboratory tests performed in each clinical area

Types of Laboratory Tests Performed in the university-based courses

A laboratory section accompanies each on campus clinical course. The primary purpose of these laboratory sections is to teach students the principles of basic laboratory testing and to develop manual and organizational skills. A variety of semi automated instrumentation is available in the student laboratory and students acquire principles of automation which can then be transferred to more sophisticated instrumentation present in the clinical affiliates. Strong emphasis is placed on laboratory safety, labeling of specimens and tubes, recording of results and clinical correlations.

Hematology-I

Blood Specimen Collection – Venipuncture.
Blood Smear Preparation and Blood Smear Staining.
Microscopic identification of normal blood cells.
Platelet Estimation from a stained blood smear.
Manual White Blood Cell Count.
Manual Blood Platelet Count (Unopette /Phase).
Preparation of Buffy Coat Smears.
Microhematocrit Determination.
Calculation and Interpretation of RBC Indices.
Reticulocyte count.
Erythrocyte Sedimentation Rate.
Sickle Cell Screening Test.
Hemoglobin Measurement (Manual Cyanmethemoglobin Method).
Fetal Hemoglobin determination (Kleihauer-Betke).
Osmotic Fragility Test.
Automated CBC and Differentials (Coulter-Beckman AcT10).
Normal Differential Counts and normal RBC morphology.
Abnormal Diffs and Abnormal RBC Morphology.
Identification of Nucleated Red Blood Cells.
Identification of immature granulocytes.
Case Studies- discussion of normal and abnormal findings, diagnosis, clinical correlations and follow up actions.

Diagnostic Microbiology-I

Gram stain.
Colony morphology.
Streaking for isolation.
Differential and selective media (Blood, MacConkey, Columbia nutrient agar, Hektoen, thioglycollate, chocolate.
Specialty media (donated and integrated when available: XLD, Chromagar, GC-lect, Thayer-Martin, BBE, Anaerobic Blood agar).
Catalase, coagulase.
Bacitracin and Novobiocin.

Bile esculin, 6.5% salt, PYR.
TSI, LIA, KIA, MIO, Nitrate reduction, citrate, O/F inoculation and interpretation.
Oxidase.
CAMP, hippurate hydrolysis.
API 20E, API 20 NE.
Rapid strep testing.
Staphaurex.
Anaerobe ID by discs.
Direct fluorescent antibody testing for Legionella.
Unknowns by categories: respiratory, urine, enteric, anaerobe.
Sensitivity by Kirby Bauer, MIC and E-test.

Medical Microbiology

Parasitology

Trichrome Staining.
Stool Concentration.
Saline Wet Mount .
MIF Examination.
Parasite Identification.

Mycobacteria

Kinyoun Acid-Fast Staining.
Observation of Calcofluor White Slides.
Written exercises on speciation of MTB and MOTT.
Written exercises on determining antibiotic susceptibility.

Mycology

Lactophenol Cotton Blue Staining.
Tease Mounts.
Slide Cultures.
Coverslip Sandwich Technique.
Identification of Environmental Fungal Cultures.
KOH preps and Identification.
Colonial Morphology descriptions.
Germ Tubes.

Hemostasis and Thrombosis

Whole Blood Clotting time (Demonstration).
Bleeding Time.
Clot Retraction (Demonstration).
Prothrombin Time (Manual Method).
Prothrombin Time (Automated Method).
Activated Partial Thrombin Time (Manual).
Activated Partial Thrombin Time (Automated Method).
Thrombin Clotting Time (Manual).
Thrombin Clotting Time (Automated).

Mixing Studies.
Fibrinogen Assay (Manual Method).
Factor XIII Screening Test.
Derivation of Factor Deficiency (Paper exercises).
Fibrin Degradation Products.
D- Dimer Test.

Clinical Chemistry-I

Lab Safety.
Balances and making solutions.
Micropipette use and calibration.
Absorption photometry.
Spectrophotometer use and care.
Glucose testing.
Glycated hemoglobin testing.
Lipid profile (Cholesterol, HDL, triglycerides, calculated LDL)
- Calculated LDL.
- Triglycerides.
- Cardiac profile
- CK.
- Myoglobin.
- Troponin.

BNP
Osmolality.
Iron profile.
Liver profile (bilirubin, enzymes ALT, AST, alkaline phos).
Electrolytes.
Bicarbonate.
Calcium, magnesium, phosphorous.
Automated chemistry Dimension.

Clinical Chemistry -II

Total protein.
Albumin.
Serum protein electrophoresis.
Immunofixation electrophoresis.
Hemoglobin electrophoresis.
Sweat chloride.
ELISA.
hCG, LH and FSH testing.
T uptake (donated).
DAU.

Urinalysis/Body Fluids -I

Color and clarity.
Refractometry.
Manual and automated biochemical strip testing.
Microscopic identification.
Body fluid and CSF cytology.
Clinitest.
Ictotest.
Acetest.
Sulfosalicylic acid.
Fecal occult blood.
Polarized microscopy for crystals.
Sperm motility and sperm count.

Molecular Diagnostics

DNA isolation
- Bacterial.
- Buccal swab – human.
- Blood – human.

Restriction digest – RFLP.
PCR design and testing.
Western Blot.
Southern Blot.

Immunohematology -I

Treatment of Incompletely Clotted Specimen.
Preparation of Washed Cell Suspension.
Grading of Agglutination Reaction.
ABO Typing , Forward and Reverse..
Subgroups of A- Testing with anti-A_1.
Reactions of Anti-H with various types of RBC.
Saliva Testing for Secretor Property.
Rh Slide and Tube Typing.
Test for Weak D.
Direct Antiglobulin Test (DAT).
Indirect Antiglobulin Test.
Antibody Screening.
Antibody Identification –Panel.
Enzyme Techniques.
Neutralization Techniques.
Donath-Landsteiner Test.
Absorption/Elution Techniques.
Pre-warming Techniques.

Cold Antibody Identification.
Saline Replacement Technique for Rouleaux.
Prenatal Profile.
Neonatal Studies.
Screening Test for FMH.
Antibody Titration .
Quantitation of FMB (K&B Method).

Serology
Serial Dilutions.
Cold Agglutinins Titer.
Agglutination Methods.
Tests for Streptococcal Antibodies.
Precipitation Techniques.
Tests for Syphilis - VDRL, RPR.
Radial Immunodiffusion.
C-Reactive Protein.
Test for Infectious Mononucleosis.
Test for Rheumatoid Arthritis.
Fluorescent Antinuclear Antibody Test (FANA).
Viral Antibody Tests (when kits are available), Rubella, Influenza, Herpes Zoster, and others.
Discussion of Immunoelectrophoresis, Immunofixation Electrophoresis, ELISA.
Other immunoassay techniques..

Procedures Performed at Clinical Affiliates

All five clinical affiliates are full service hospitals requiring a full complement of clinical laboratory tests. All have state of the art instrumentation in each section of the laboratory.

In clinical chemistry, all affiliates perform a variety of metabolic profiles, stat testing, routine urine and body fluid testing, therapeutic drug monitoring, urine testing for drugs of abuse, thyroid and other routine endocrine function testing, tumor-marker tests and a small number of manual procedures. Students assigned to Ft Walton Beach Medical Center spend a week at one of the Pensacola hospitals for instruction in electrophoresis and other procedures which are not offered at that affiliate.

In hematology, all affiliates perform automated cell counting and differentials and automated coagulation testing. Routine manual procedures are performed. Factor analysis and coagulation disorder work ups are performed. Dual headed microscopes are available for student one on one instruction.

Routine urinalysis including physical, chemical and microscopic analysis is performed at all affiliates. All affiliates perform CSF and body fluid cell counts and differentials.

Immunohematology at all affiliates provides routine typing and cross matching, antibody screening and identification, anti-globulin testing, neonatal testing and component therapy. During the immunohematology rotation each student spends a day at the Northwest Florida Blood Center for instruction in donor blood collection and component preparation.

Routine serology and immunology testing is performed at all affiliates and with the exception of Fort Walton Beach Medical Center and Shands AGH.. Students at Fort Walton Beach Medical Center spend a week at one of the Pensacola hospitals for instruction in these procedures. Students at Shands AGH rotate through Shands UF.

In microbiology, all affiliates have automated equipment for blood cultures, routine bacterial identification and susceptibility testing. Manual identification and serological identification and screening procedures are also performed. With the exception of Fort Walton Beach Medical Center and Shands AGH, all affiliates perform mycobacteria, mycology and parasitology testing. As a part of the Columbia Healthcare System, Fort Walton Beach Medical Center sends these specimens to West Florida Hospital following initial staining and plating procedures. Students from Fort Walton Beach spend one week in the dedicated Mycobacteria, Mycology and Parasitology sections at West Florida Hospital. Students at Shands AGH do their microbiology rotation at Shands UF.

Inpatient and outpatient phlebotomy is performed at all affiliates and students spend the first week of the clinical rotation in this section. Throughout the rotations they are scheduled for morning rounds on a rotating basis of approximately one week once every 3 to 4 weeks.

A brief summary of the types of laboratory tests performed in each clinical area at the clinical affiliates is included in the Appendix. Full documentation of the laboratory services offered by each clinical affiliate will be available for site-visitors.

Standard 9C- continued: Justify learning experiences during hours other than the normally scheduled clinical experience

Students are not assigned clinical experiences outside of day time hours, Monday through Friday. All of the University based clinical courses have 2-3 lectures and 1-2 labs per week, scheduled between 8:00 am and 5:00 pm. In clinical rotations at the hospitals normally scheduled hours are Monday through Friday 7:00 am to 3:30 pm. These hours may vary slightly among the hospitals and between the clinical rotations, to maximize the students= learning experiences according to the department=s peak work hours. Typically phlebotomy rotation is from 6:00 am to 2:30 pm, since most of the routine phlebotomy is done in the early morning hours. Microbiology rotation is usually 8:00 am to 4:30 pm. Students are off on all the major holidays and weekends.

Since the State of Florida requires continuing education for biennial relicensure, students are asked to begin cultivating this habit by attending continuing education programs offered once a month, after 5 pm by Northwest Florida Laboratory Association. Once a year, on a Saturday, UWF CLS Program offers a day-long CE program at the University's Emerald Coast Campus at Fort Walton Beach. This is free and open to all students. Students in the clinical year of the Program are required to attend.

Standard 9C: Distribution of Policies and Procedures Regarding Service Work

Policies and procedures regarding service work are described in the A **Student Manual for Hospital Laboratory Rotations**@ which is updated each year prior to the beginning of clinical rotations in January. Students and Education Coordinators at the hospitals have a copy of this manual. In December, the program faculty conducts a day of orientation to the clinical rotations and the policy for service work is discussed in detail with the students. This policy is also discussed at the Fall meeting of Faculty/ Education Coordinators, especially if any problems were encountered in implementation during the previous year. The University= s Clinical Site Coordinator reaffirms this policy, as needed, with both the students and the laboratory administrators and instructional personnel.

Policies and Procedures regarding when students may perform service work

It is the policy of the Program and a State of Florida Training Program regulation that students are not to be left alone performing service work during their clinical rotations. Prior to the beginning of their clinical rotations students are required to obtain a > Trainee License= from the Board of Clinical Laboratory Personnel of the State of Florida. As registered >Trainees= they must always work under direct supervision of the teaching technologist or the supervisor in that section. Student=s clinical experiences are designed only to achieve the objectives and to acquire entry level competencies within the time allotted to a given rotation. Students should be engaged only in activities which are based on sound educational objectives and their clinical rotations should not be altered only to fulfill the laboratory=s need for service work or to make up for a staffing shortage. The Education Coordinators, section supervisors and the Clinical Site

Coordinator are responsible for ensuring that this policy is implemented at all times during the clinical rotations. On the other hand, once they acquire competency in a given area, students are required to practice and reinforce their knowledge and skills to the maximum extent possible, and work as an integral part of the laboratory's technical staff unit. All of our clinical affiliates have laboratories staffed by well qualified personnel and they comply with this requirement without exception.

Students who wish to work as an employee at the clinical site or elsewhere, outside the regularly scheduled hours, should inform the Education Coordinator and also obtain permission from the Clinical Site Coordinator; in order to ensure that the after hours work will not interfere with or impede the student=s academic performance. The Program officials encourage the students to work, whenever an opportunity becomes available in a section in which they completed their training. Students are hired and compensated at a rate equivalent to a laboratory assistant or technician. During these work hours the student is under the direct supervision of a staff technologist.

Only those students with satisfactory academic and practical performance are permitted to work after hours for compensation. Students who are having difficulties in maintaining the required C (73%) average and/or showing an overall unsatisfactory performance are not permitted to work at the clinical site. Service work done by students in clinical settings outside of regular academic hours is non-compulsory and compensated for, by the hospital. Overlapping of regular training hours with the compensated work hours is not permitted. Students who commit themselves to after hours work are expected to maintain a minimum C (73%) average in each course. When a student fails to make the minimum score of 73 in a given exam, she/he will receive a warning to reduce the number of service work hours. If the student fails to improve the score in the next exam the student will be asked to stop working until the grades improve and a passing score is achieved. Failure to comply with these policies will result in an appropriate disciplinary action, determined on a case by case basis.

POLICY FOR STUDENT SERVICE WORK:

Following is an excerpt from AStudent Manual for Hospital Laboratory Rotations@:

"Work (After Hours): Students who wish to work after regular hours of training (weekends/nights) in the laboratory will be hired as jobs become available. Students are eligible to work in a given department upon successful completion of their rotation in that department. They are required to notify and obtain approval of the Education Coordinator and the University faculty, in order to ensure that the after hours work will not interfere with the student's academic performance. Upon Program faculty's approval and the recommendation of the departmental supervisor, the students are hired by the Laboratory Manager. This work is compensated at the current rate of pay for a laboratory assistant. During these work hours the student is under the direct supervision of a staff clinical laboratory scientist. The student is not allowed to turn out the results unless first checked and initialed by the supervising technologist. Students will not be permitted to have any job in or outside the hospital unless approved by the Education Coordinator and the University faculty member in charge of the rotation. Students are allowed to work after regular hours of training only when they maintain the required academic performance.

Students who commit themselves to after hours work are expected to maintain a C average or higher and be in good academic standing. When a student fails to make a minimum 73 percent in a given test, she/he will receive a warning to limit the number of work hours. If the student fails to improve in the next exam, the faculty reserves the right to ask the student to discontinue work, until their grades meet the required criteria. Failure to follow this policy will result in appropriate disciplinary action determined on an individual basis".

Standard 9 D: Criteria for Passing, Failing and Progression in the Program

Student must earn a minimum grade of >C = in each of the university and hospital based clinical courses (all courses with a prefix MLS). The letter grade is calculated by averaging the scores obtained in all of the written exams, practical exams, unknowns, quizzes, lab manual write-ups, term papers, seminar presentations and other assignments as detailed in the syllabus for each course.

Students are required not only to maintain a > C ' (73%) average , but also to make no less than 70% in a given exam, in which case they receive a warning. If the score is not improved in the next exam the student will be placed on probation. Students who are on probation return to satisfactory academic status by raising their average score to or above 73%. Failure to bring up the grade to a cumulative average of 73% (C) will result in a grade of F.

If a student makes less than >C = in a prerequisite clinical course, for example MLS 4305 Hematology I, the student will be required to repeat the course before being permitted to advance to the hospital rotation in Hematology - MLS 4822L Hematology II.

According to the University=s requirements, a semester GPA of less than 2.0 will result in academic probation and failure to bring up the cumulative GPA to 2.0 over two semesters results in academic suspension.

In the clinical year of the Program, when a student fails to make the minimum > C = in two or more of the university- based courses, the student will not progress to the clinical rotations at the hospital. The student is required to appeal for reinstatement and will be subject to the conditions put forth by the faculty committee reviewing the case.

If a student fails to make a minimum > C = in two or more of the clinical (hospital) rotations, he/she will be suspended from further progression in the clinical rotations. The student is required to appeal for reinstatement and will be subject to the conditions established by the faculty committee reviewing the case.

Students are also evaluated for achievements in the affective domain. The affective domain evaluation forms used in the university based courses and at the clinical sites are included in the following pages. A separate list of >Policies for Improper Conduct During Hospital Rotations= is also included. During the university courses the students are evaluated on the basis of a maximum attainable score of 40 points, which score is added to the total score achieved in the course, before averaging for the letter grade. During the hospital rotations students are evaluated at midterm and at the end of each rotation. The maximum attainable score is 100. Students are evaluated on a 80% cutoff pass/fail grade basis.

Grading System: At the end of each course and clinical rotation the student is given a letter grade which is calculated by averaging the total number of points earned in all the written and practical exams, quizzes, unknowns, lab notebooks, seminar presentations and affective domain evaluation.
In clinical rotations students receive a letter grade as soon as they complete the rotation. However the individual grades are not reported to the University Registrar until the completion of all rotations for all the students. Students in clinical rotations register for 3 courses in the spring semester and are given an incomplete (I) at the end of the semester. They register for 3 more courses for the summer semester. During the first week of August the grades for the hospital-based courses are finalized by the Education Coordinator and the Clinical Site Coordinator; and submitted to the University Registrar through the Program Director. The forms used to record and report the final grades in hospital-based courses are included in the following pages.

Following grading scale is used in Clinical Laboratory Sciences Program in computing the grades in all of the Hospital-Based clinical courses:

95 -100	=	A
90 - 94	=	A-
87 - 89	=	B+
83 - 86	=	B
80 - 82	=	B-
77 - 79	=	C+
73 - 76	=	C
68 - 72	=	C-
64 - 67	=	D+
61 - 63	=	D
60 or below	=	F

When the Information is given to students:

Students receive the information regarding the criteria for pass/fail/progression in the program on several occasions during their course of study. This information is published in the "Handbook for Clinical Laboratory Sciences Program Majors". The Handbook is given to given to the students entering the University, mailed to prospective students and in response to student inquiries.

Policies for pass/fail and progression in the degree program are discussed in detail during the first academic advisement session with each student.

At the beginning of each clinical course at the university, students receive this information as part of the syllabus.

Students entering the hospital phase of the program receive this information as part of the AStudent Manual for Hospital (Clinical) Rotations@. During the orientation session conducted by the faculty on the last day of the fall term, academic policies for the hospital based courses are discussed at length, including the evaluation forms and criteria for pass, fail and progression in the Program.

Standard 9D: Evaluation Systems for One Sample Unit of Instruction

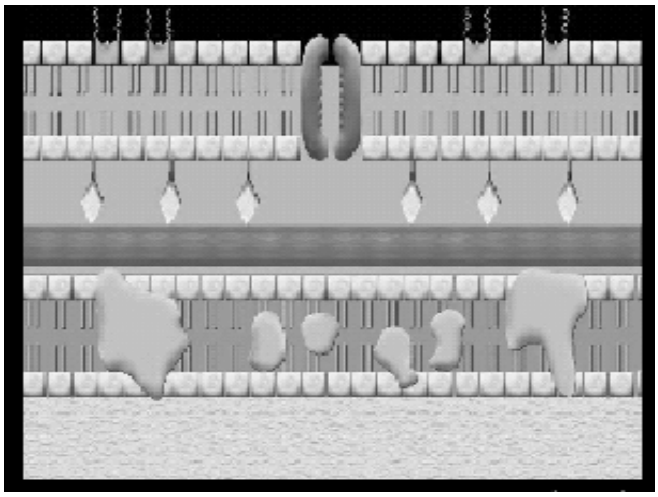
MLS 4460 and 4460L Diagnostic Microbiology

Diagnostic Microbiology Quiz 1 20 points total

1. Give the temperature, time and pressure used for autoclaving unused (freshly made) media (3 pts) **SLO 1.12**
2. Compare and contrast sterilization with disinfection. **SLO 1.14**
3. List an example for each of the following (1 pt each) **SLO 1.11**
    a. PPE
    b. Engineering control
    c. Work practice control
4. An organism that requires 5% CO2 to grow is called _____? **SLO 2.2**
5. Thayer Martin media is used to promote the growth of gonorrhoeae from a genital culture. Explain how, using the terms supportive, enriched, selective and differential. (2 pt) **SLO 2.1**
6. Oh, no! Your Med Tech student just spilled 5 ml of glacial acetic acid. Where would you turn to find out how to clean it up? **SLO 1.4**
7. How is chocolate agar different from blood agar? **SLO 2.4**
8. An organism grows on a MacConkey plate and makes a neon pink colony. What color colony will it make on a Hektoen plate? **SLO 2.4**
9. Endotoxins are most commonly associated with what type of Gram stain? **SLO 4.4**
10. Sequential steps in phagocytosis take place in which of the following order: **SLO: 4.6**
    a). Chemotaxis, attachment, ingestion, killing
    b). Physical encounter, colonization or survival, microbial entry, invasion, and dissemination
    c). Complement attachment, inflammation, cytokine delivery, resolution
    d). IgM synthesis, fibrinolysis, IgG synthesis, anaphylactic shock

12. Using the cartoon below:
    a. identify the gram stain of the organism
    b. label the murein layer
    c. what is the arrow pointing to?

SLO: 6.2



13. Name three host populations that are at increased risk for infection. **SLO 4.2**
14. If the iodine was inadvertently omitted during a Gram stain, what color would both Gram positive and Gram negative organisms be? **SLO 6.10**
15. What is the difference between incidence and prevalence (2 pt)? **SLO 4.1**

Diagnostic Microbiology Exam 1
All questions are worth 2 points unless otherwise indicated, total of 60.

1. Describe the mode of action of a beta lactam antibiotic (2 points) **SLO 7.3.**
2. A technologist sets up a throat swab on a BAP-SXT plate. The following day, there is 3+ growth of a beta hemolytic gram positive cocci that is catalase negative. Give the genus and species, and describe how you know what it is. (2 points) **SLO 11.6**
3. A gram positive catalase positive cocci grows from a urine culture. It is resistant to bacitracin. Which of the following tests/IDs are correct? (2 pts) **SLO 8.12**
    a). + CAMP test = Streptococcus agalactiae
    b). + coagulase test = Staphylococcus epidermidis
    c). resistance to novobiocin = Staphylococcus saprophyticus
    d). negative PYR = Enterococcus
2. What 2 organisms would be **appropriate** to QC (quality control) the following tests: (2 pts each). Use your flowchart, or you could get it wrong.
    a. catalase **SLO 7.12**
    b. coagulase **SLO 7.13**
    c. hippurate hydrolysis **SLO11.6**
    d. bile esculin **SLO 12.7**
    e. PYR **SLO 11.6**
    f. sodium desoxycholate **SLO 12.7**
3. State the name of the organism responsible for the disease listed below, and state 2 tests that will be positive in the schema to identify it: (2 pts each)
    a. Rheumatic Fever **SLO 11.4**
    b. rapid onset of food poisoning after a picnic, no fever **SLO 7.9**
    c. honeymoon cystitis **SLO 8.9**
    d. neonatal meningitis **SLO 11.7**
    e. scalded skin syndrome **SLO 7.9**
4. What is the purpose of using a 0.5 McFarland Standard when testing antibiotics? **SLO 8.10**
5. What antibiotic is used to determine if a Staph aureus culture is MRSA? **SLO 7.16**
    a) Methicillin
    b) Oxacillin
    c) Vancomycin
    d) Penicillin
6. Describe how to differentiate Staph epidermidis from Staph saprophyticus **SLO 8.12**
7. A wound specimen arrives in the lab, taken from a 3 year old boy who was bitten by a dog. The culture grows the following: Gram positive cocci in clusters, catalase positive, coagulase positive. What happens next? (2 pts) **SLO 7.15**
    a. report as Staphylococcus aureus
    b. perform a bacitracin, if sensitive report as Streptococcus pyogenes
    c). perform a Vogues Proskaur to discriminate S. aureus from S. intermedius
    d). perform a microdase to discriminate Stomatococcus from Micrococcus

8. A new company, Johane Labs created a rapid test for Enterococcus. They performed their test on 200 cultures known to be positive and 200 cultures known to be negative. They published the performance characteristics in the table below. Determine the sensitivity and specificity of the rapid test. (2 pts) **SLO 9.7; 9.8**

	Rapid test positive	Rapid test negative	Total
Culture positive	190	10	200
Culture negative	40	160	200
Total	230	170	400

9. List the three common methods used to differentiate Group D strep from Enterococcus, and include the expected results for each. (4 points) **SLO 12.1**
10. A gram stain on a positive blood culture shows gram positive cocci in chains. Christina Iglesias, MT (ASCP) subcultures the blood to a sheep blood plate and incubates it overnight in a CO_2 incubator. There is no growth after 48 hours on the plate. This indicates: (2 pts) **SLO 12.9**
    a). the organism is a facultative anaerobe, possibly Streptococcus pyogenes
    b). the organism requires a supplement of vitamin B6, possibly Abiotropia
    c). the organism is Streptococcus agalactiae, and should be set up on MacConkey
    d). the organism is probably the skin contaminant Staphylococcus epidermidis
11. A three year old is brought to his pediatrician with blood in the urine and edema. The child previously had a sore throat. The physician suspects which syndrome? (2 pts) **SLO 11.9**
    a) Toxic shock syndrome
    b) Scalded skin syndrome
    c) Glomerulonephritis
    d) Scarlet fever
12. Propose a flowchart that can be used to differentiate beta-hemolytic gram positive cocci that are catalase negative. (2 pt) **SLO 11.10**
13. Which enzyme in Staphylococcus renders penicillin inactive? (2 pts) **SLO 7.10**
    a) Hyaluronidase
    b) Lipase
    c) Staphylokinase
    d) Beta-lactamase
14. A large transparent beta hemolytic Streptococcus is isolated from a urine culture. The technologist is unsure which group to check for so she sets up the following tests and gets the following results: (2 pts) **SLO 11.9**

    SXT-resistant, Bacitracin-resistant, CAMP test shows a large arrowhead shaped zone of hemolysis, and hippurate is hydrolyzed. What is the identification?
    a) Lancefield group B Streptococcus
    b) Lancefield group C Streptococcus
    c) Lancefield group A Streptococcus
    d) Lancefield group D Streptococcus

15. A BAP set up from a child with a sore throat grew beta hemolytic colonies that were very small in relation to the zone of hemolysis. What do you suspect? (2 pts) **SLO 11.9**
    a) Streptococcus pyogenes
    b) Streptococcus pneumoniae
    c) Streptococcus milleri
    d) Enterococcus
16. A sputum culture shows many alpha hemolytic colonies. Which test should the technologist set up to determine if they are potential pathogens or normal flora?. (2 pts) **SLO 12.3**
    a) Bile esculin slant
    b) Sodium desoxycholate
    c) SXT disk
    d) PYR
17. What antibiotic disk can be used to give a presumptive ID of Streptococcus pyogenes from a throat culture? (2 pts) **SLO 11.6;11.9**
18. Aerococcus is usually a contaminant, but can cause infection in a susceptible host. What organism does it mimic, and how can it be distinguished? **SLO 12.7**
    a. Enterococcus; PYR negative
    b. Streptococcus pyogenes; SXT sensitive
    c. Enterococcus; LAP negative
    d. Streptococcus pyogenes; Bacitracin resistant

Organism spelling: epidermidis, aureus, saprophyticus, pyogenes, agalactiae, pneumoniae, enterococcus, Aerococcus, Pediococcus, Leuconostoc, milleri.

Diagnostic Microbiology Lab Practical Exam-1

1. Perform a Staphaurex on this organism. Assume that this is a pure culture. Report the result. **SLO 9.4. Organism is S. aureus.**
2. Perform a gram stain on the provided slide, and report the result. **SLO 6.6. E. coli used, gram negative rod.**
3. Perform a PYR on this organism, and report the result. **SLO 10.2. Organisms Enterococcus.**
4. Observe the colony morphology on this plate. Name 2 tests that should be used to identify this pathogen. **SLO 12.2; 12.3. Organism is Streptococcus pneumoniae.**
5. Perform a catalase test on this organism and report the result. **SLO 7.12. Staph aureus organism.**
6. A gram positive coccus grew from a UTI, and was gamma hemolytic. It was catalase negative, PYR positive. Examine the two other test results, and report them here. Identify the pathogen. **SLO 12.4; 12.5; 12.7. Positive results for Enterococcus.**
7. A patient from a nursing home had a nares culture done to look for MRSA. Examine the plate, and determine if this patient needs further work-up. State your reasoning. **SLO 7.14. Used Mannitol salt plate that had pink colonies. Staph aureus will have yellow**.
8. Examine the plate provided. What two organisms are used to demonstrate this CAMP factor? **SLO 10.2. Positive CAMP test.**
9. Examine the plate of Streptococcus pyogenes provided, and note the enhanced hemolysis by the "stab" mark. Why does this happen? **SLO 10.1, 11.5.**
10. A technologist set up a hippurate test to distinguish Group B from non Group B strep. Observe the result, and determine which Group it belongs to. **SLO 10.2. Negative result.**

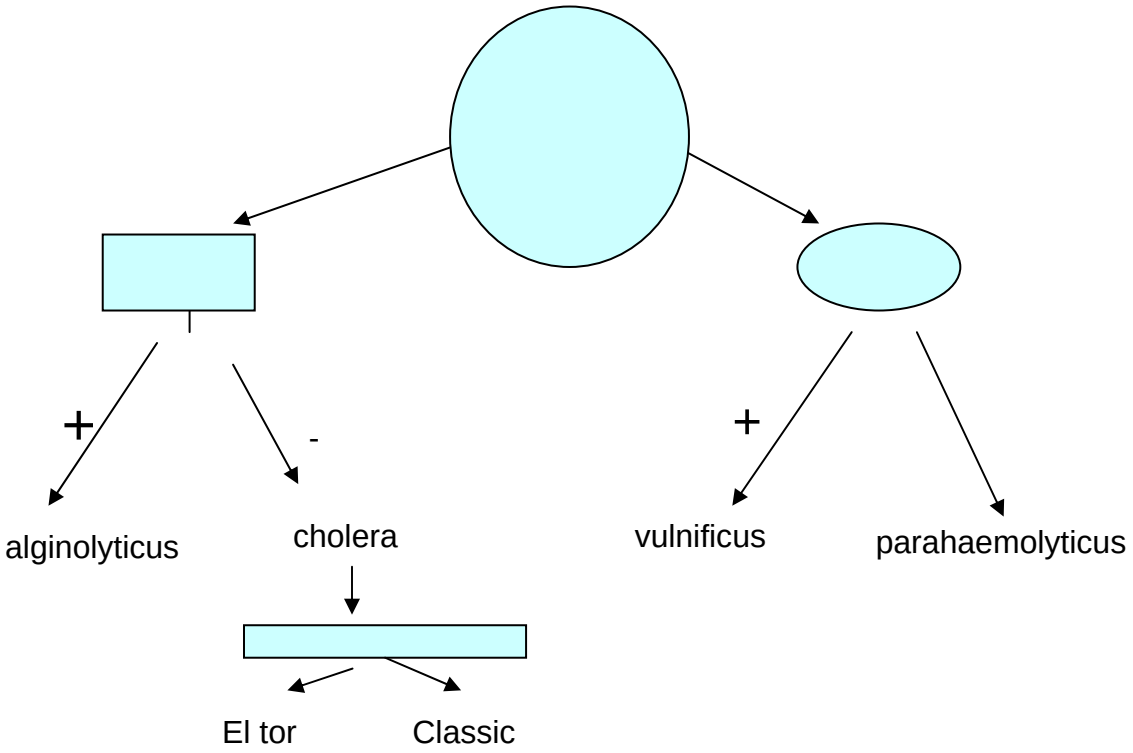
Diagnostic Microbiology Exam 2 Written Exam worth 74 points

1. Describe LIA agar, giving a time course of a Lysine decarboxylator, and a Lysine deaminator. Use the appropriate shortcut terms. (6 pt) **SLO 18.1, 18.2**
2. Explain the appropriate collection of a urine for culture from a circumcised male who is an outpatient. (5 pt) **SLO 19.6**
3. State an alternate method to screen a urine for infection besides a culture. State 2 types of media that should be used together to grow the usual suspects. (3 pts) **SLO 19.9, 19.13**
4. On what basis are the Enterobacteriaceae serogrouped? List the 3 antigens, and draw a picture showing their location. Indicate which one(s) is heat stable. (4 pt) **SLO 17.4**
5. Yersinia enterocolitica causes mesenteric lymphadenitis. It has also been implicated in post-transfusion complications, coming from a contaminated blood bag. Explain why this organism in particular can cause this outcome. (2 pt) **SLO 20.12**
6. Match the Shigella to their O serotypes, using A, B, C, D: (4 pt) **SLO 20.7**
   _____ Shigella dysenteriae
   _____ Shigella flexneri
   _____ Shigella boydeii
   _____ Shigella sonnei
7. What is the rationale for including a SMAC plate in a stool culture? (2 pt) **SLO 17.2**
8. An organism grew K/A on a KIA slant, and was ONPG positive. What enzyme is it lacking _____. (2 pt) **SLO 18.12**
9. What reagent is added to a "negative" nitrate test to detect residual nitrate? _____ (2 pt) **SLO 16.8**
10. Is the oxidase test positive or negative for the following organisms (4 pt) **SLO 16.1, 21.1, 21.4, 21.5**
    _____ E. coli
    _____ Proteus mirabilis
    _____ Aeromonas hydrophilia
    _____ Campylobacter jejuni
11. Which in this series is the correct order of positive results for Salmonella typhi infections? (3 pts) **SLO 20.6**
    a). blood, stool, urine
    b). stool, urine, blood
    c). stool, blood, urine
    d). urine, blood, stool
12. An organism was inoculated into a Triple Sugar Iron Agar (TSI) tube and gave the following reactions: (3 pts) SLO **18.12**

Alkaline slant	No H2S
Acid butt	No gas produced

    This organism most likely is
    a) Klebsiella pneumoniae
    b) Shigella dysenteriae
    c) Salmonella enteritidis
    d) Escherichia coli

13. Complete this chart on Vibrio, filling in the discriminating tests. (4 pts) **SLO 21.9, 21.1**



14. What temperature is recommended for optimal recovery of Campylobacter fetus subspecies jejuni? (3 pts) **SLO 21.3**
    a) 25°C
    b) 35°C
    c) 37°C
    d) 42°C
15. A diarrheic stool sample is left in a refrigerated environment for several hours before it is cultured. Which of the following organisms is the least likely to survive this environment? (3 pts) **SLO 20.8**
    a) Salmonella sp.
    b) Shigella sp.
    c) E. coli 0157 H7
    d) Yersinia enterocolitica
16. The identification of a small, curved, gram-negative bacillus seen on a direct smear of gastric tissue is most likely to be (3 pts) **SLO 21.7**
    a) Campylobacter jejuni
    b) Vibrio parahaemolyticus
    c) Aeromonas hydrophila
    d) Helicobacter pylori

17. A stool specimen is submitted for culture from a patient with gastroenteritis, nausea, and vomiting. A gram-negative rod grows on thiosulfate citrate bile salts sucrose agar (TCBS) as large green colony types. Additional test characteristics include (3 pts) **SLO 21.1**

    TSI K/A Hydrogen sulfide negative
    Oxidase positive
    Catalase positive
    Nitrate positive
    Lysine positive
    O129 susceptible
    The most probable presumptive identification of this isolate is

    a) Aeromonas hydrophila
    b) Salmonella typhi
    c) Vibrio parahaemolyticus
    d) Yersinia enterocolitica

18. You have identified a potential Shigella sp. using biochemical reactions. Upon typing with individual antisera, you see no agglutination. Which of the following is the appropriate course of action? (3 pts) **SLO 20.8**
    a) Report the isolate as a non-typable Shigella strain
    b) Report that "no enteric pathogens isolated"
    c) Prepare a suspension of the isolate, boil, and repeat the serotyping
    d) Repeat the serotyping using flagellar antiserum
19. Non-lactose fermentation and H2S production of an organism is demonstrated on Hektoen enteric (HE) agar by the production of what color of colony? (3 pts) **SLO 20.1**
    a) green and black
    b) blue
    c) yellow and black
    d) red
20. Yersinia enterocolitica is (3 pts) **SLO20.11**
    a) motile at 37º c, nonmotile at 25º c
    b) biochemically inactive
    c) nonmotile at 37º c, motile at 25º c
    d) oxidase-positive and ornithine-positive
21. You are employed by a microbiology laboratory in a small rural hopsital and have only conventional biochemical methods available for identification of microorganisms. You have isolated either a swarming Proteus mirabilis or a swarming Proteus vulgaris. Which of the following tests would be most useful in differentiating between the species? (3 pts) **SLO 17.13**
    a) phenylalanine deaminase only
    b) lysine decarboxylase only
    c) mio only
    d) mrvp only
    e) citrate agar only

22. A stool culture from a 10-month-old child suffering from bloody mucoid diarrhea grew the following on primary isolation media:

HE	green colonies
XLD agar	clear colonies

Which of the following tests are most appropriate, in order of performance, in the identification of the isolate? (3 pts) **SLO 17.13**

a) oxidase, TSI, LIA, MIO, Salmonella serologic typing with the polyvalent
b) TSI, MIO, MRVP, urea
c) LIA, MIO, PD, MR
d) oxidase, TSI, LIA, MIO, Shigella serologic typing with the polyvalent

23. An arm wound specimen submitted for culture grew non-lactose-fermenting organisms on MAC. Given the following biochemical reactions, what is the genus and species? (3 pts) **SLO 17.13**

PD	negative
TSI	K/A G H2S positive
C	negative
LD	positive
MIO	positive/positive/positive
Rh	negative
VP	positive

a) Edwardsiella tarda
b) Proteus vulgaris
c) E. coli
d) Citrobacter freundii

<u>Diagnostic Microbiology Practical Exam 2 for Enterobacteriaceae:</u> 26 points

1. Perform a colony count, and report in CFU/ml using the calibrated loop beside the plate for guidance. **SLO 19.10**
2. Name this agar. What special incubation conditions are required? What 2 organisms grow a bulls eye on this, and how do you tell them apart? **SLO 22.1**
3. Name this agar. Name another type of media that can be used instead. List three organisms that prefer this plate, and special incubation conditions for each. **SLO 21.3**
4. Record the colony characteristics from this pure culture, both plates. Name 4 organisms this may be, and tell how to distinguish them. **SLO 22.7, 22.13**
5. This organism is ONPG positive. Give a reasonable diagnosis and O antigen serotype. **SLO 20.7, 20.9, 22.7**
6. These citrate slants were set up correctly. State an organism that will give each of those results and a caveat to this test. **SLO 16.6**
7. Perform an oxidase on the organism provided. (Moisten a piece of filter paper with a drop of the reagent. Apply some growth to the filter paper, and read result in 10 seconds.) List 2 caveats to this test. **SLO 16.9**
8. This is the same organism on two plates and one slant. Make an interpretation as to which sugars this organism ferments, and which sugars it does not ferment. **SLO 18.12**
9. Examine the results of the ONPG and urea slant provided. Can this be *Klebsiella pneumoniae? (2 pts)* **SLO 16.13, 17.13, 17.17, 18.15**

Diagnostic Microbiology Exam 3

Instructions

- Use a scantron form to record the answers for questions 1-22. These are worth 2 points each.
- For questions 23-25, use the figure provided.
- The first 7 students can begin the practical. Take your NCCLS documents with you. Practical questions begin at number 30.

1. A urine culture from a patient suspected of having a urinary tract infection yielded greater than 100,000 CFU/ml of a *Proteus mirabilis.* The organism swarmed on the BAP. How should you interpret the zone size of this organism if you performed the Kirby-Bauer disk diffusion antimicrobial susceptibility? **SLO 27.9**
   a) You should reinoculate the organism and the disks onto MAC because this will eliminate swarming.
   b) The swarming area should be measured as the growth zone
   c) The results of the test are invalid, and the patient should be treated empirically.
   d) The thin film of the swarming area should be ignored.
2. An organism isolated from the surface of a skin burn is found to produce a diffusible green pigment on Mueller-Hinton agar. Which of the following would be the most likely characteristics of the isolate? **SLO 30.8**
   a) oxidase negative and sensitive to most antibiotics
   b) oxidase positive and resistant to most antibiotics
   c) oxidase negative and resistant to most antibiotics
   d) oxidase positive and sensitive to most antibiotics
3. Which of the following describes *Stenotrophomonas maltophilia?* **SLO 30.11**
   a) ferments maltose
   b) oxidizes maltose
   c) assimilates maltose
   d) is destroyed by maltose
4. All of the following features are typical of *Acinetobacter* species EXCEPT **SLO 30.12**
   a) are oxidase negative
   b) are non-motile
   c) fermenters of carbohydrates
   d) do not reduce nitrates to nitrites
5. Beta-lactamase is **SLO 27.6**
   a) an enzyme produced by penicillin-sensitive *staphylococcus aureus*
   b) the active part of the penicillin molecule
   c) an enzyme that confers susceptibility to penicillin
   d) an enzyme that inactivates penicillin
6. You are reading a MIC for ampicillin. The dilution series are 128 mcg/ml, 64 mcg/ml, 32 mcg/ml, 16 mcg/ml, etc. The tubes are turbid from the 0.5 mcg/ml to the 16 mcg/ml tube. The growth control and sterility control tubes are clear. The MIC is **SLO 29.2**
   a) 16 mcg/ml
   b) 32 mcg/ml
   c) unreportable; there is no growth in the growth control
   d) unreportable; there is no growth in the sterility control

7. In the Kirby Bauer disk diffusion test, if the density of the inoculum used to seed a plate for an antibiotic susceptibility test is less than the standard, the zone diameter will show which of the following after proper incubation? **SLO 27.10**
    a) increased size
    b) decreased size
    c) no change in size
8. In the Kirby Bauer disk diffusion test, if the plates used for the antibiotic susceptibility test are thicker than the recommended thickness of 3-5 mm, the zone diameter will show which of the following after proper incubation? **SLO 27.10**
    a) increased size
    b) decreased size
    c) no change in size
9. If the antibiotic disks are out of date when performing the kirby bauer disk diffusion test, the zone diameter will show which of the following after proper incubation? SLO **27.10**
    a) increased size
    b) decreased size
    c) no change in size
10. Occasionally when an MIC is performed, an end point is produced that is not clear-cut. The term used to describe heavy growth at lower concentrations, followed by one or more wells that show greatly reduced growth in the form of a small button or light haze, is known as **SLO 29.6**
    a) trailing
    b) synergism
    c) antagonism
    d) indifference
11. When treating a patient with a highly toxic drug, which serum should be monitored for drug concentration**? SLO 30.4**
    a) predose
    b) postdose
12. Which of the following HACEK organisms is associated with infections that occur as a result of fights between humans ("clenched fist wounds") and human bites **SLO 31.4**
    a) C*ardiobacterium hominis*
    b) *Eikenella corrodens*
    c) *Kingella* sp.
    d) *Actinobacillus actinomycetemcomitans*
13. Which of the following describes *Shewanella putrefaciens?* **SLO 30.14**
    a) causes web rot in ducks
    b) produces pyocyanin
    c) produces pyoverdin
    d) produces hydrogen sulfide

14. An organism is isolated from the endotracheal tube of a patient receiving chemotherapy. The gram-negative coccobacillus grows on bap and produces clear, colorless colonies on MacConkey. the isolate is non-motile, oxidase-negative, and biochemically inactive. which of the following best describes this organism? SLO **31.3**
    a) S*tenotrophomonas maltophilia*
    b) P*seudomonas aeruginosa*
    c) A*cinetobacter lwoffii*
    d) A*cinetobacter baummanni*
    e) *Eikenella corodens*
15. The blood culture from a patient diagnosed of having myelogenous leukemia grows gram-negative rods that appear pleomorphic and bizarre-shaped, like "tear-drops". The organism grows abundantly on blood and chocolate agar on high humidity and CO_2 environment. It fails to grow on MacConkey agar. The isolate from this patient diagnosed with endo-carditis may likely be: **SLO31.4**
    a) C*ardiobacterium hominis*
    b) C*apnocytophaga ochracea*
    c) B*urkholderia pseudomallei*
    d) B*urkholderia cepacia*
    e) *Kingella kingae*
16. A gram-negative rod is isolated from a burn patient. The organism produces a bluish green pigment on BAP, CHOC, and MAC and has a fruity odor. Other characteristics are: **SLO 30.8**

TSI	K/no change
Oxidase	positive
O/F	glucose oxidative
Motility	positive

    The most probable genus is
    a) A*cinetobacter*
    b) P*seudomonas*
    c) S*tenotrophomonas*
    d) *Serratia*
17. A gram-negative rod is isolated from a hand wound caused by a bite from a pet dog. The following characteristic reactions were observed: **SLO31.1, 31.2**

Oxidase:	positive
Catalase:	positive
TSI:	K/A
Motility	negative
MAC	no growth

    Which of the following would be the most likely etiologic agent?
    a) T*oxocara canis*
    b) P*asteurella multocida*
    c) A*eromonas hydrophila*
    d) *Pseudomonas aeruginosa*

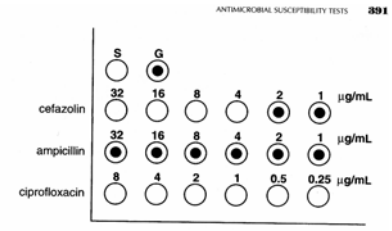
Match the following drug to its classification, mark on the scantron form as well.
SLO 27.1

18. _____ Aminoglycoside
19. _____ Penicillin
20. _____ Trimethoprim
21. _____ Fluoroquinolone

A. Cell wall synthesis
B. Folic acid metabolism
C. Protein synthesis
D. DNA gyrase

22. The gene that confers resistance to oxacillin is the **SLO 29.4**
    A. mecA gene
    B. vanA gene
    C. lacZ gene
    D. ESBL gene

Use the figure to answer the following questions (23-25)

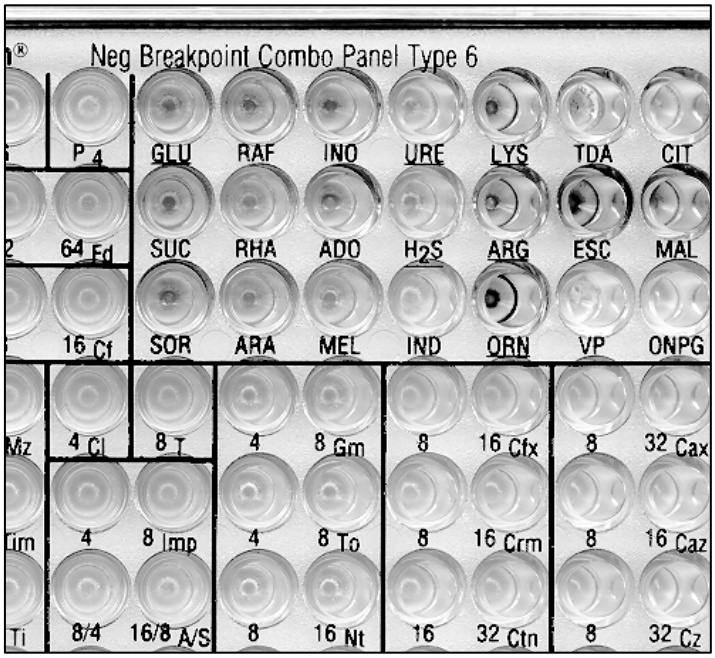


23. What is the MIC for cefazolin? (2 pts) **SLO 29.2**

24. What is the "G" well for? (2 pts) **SLO 29.2**

25. Use the ciprofloxacin wells, and draw in "skipped wells". (2 pts) **SLO 29.7**

26. Use the figure below, and draw in the results of an organism that is resistant to Gentamicin (Gm) (3 pts) **SLO 29.4**



27. Draw an E-test that shows an MIC of 16 ug/ml. (3 pt) **SLO29.5**
28. Compare and contrast TSI and OF media. (3 pt) **SLO 30.15**
29. Compare and contrast MIC with MBC (6 pt) **SLO 29.8**

Practical:

30. Interpret the results of this O/F pair (3 pt) **SLO 30.15**
31. Interpret the results of this O/F pair (3 pt) **SLO 30.15**
32. Interpret the results of this O/F pair (3 pt) **SLO 30.15**
33. Use a ruler to read the zone of inhibition for RA (Rifampin) on this plate of Proteus vulgaris. (3 pt) **SLO 27.9**
34. Use a ruler to measure the zone of inhibition for CTX from plates 27A and 27B. Give one explanation for the discrepancy. (5 pt) **SLO 27.9, 27.10**
35. Read the zone of inhibition for SAM (Ampicillin/Sulbactam) on this plate. What is the rationale for using both of these drugs together? (4 pt) **SLO 27.9**
36. Read the zone of inhibition for NA (Naladixic acid) on this plate. Interpret whether it is sensitive, intermediate or resistant using the NCCLS document. (3 pt) **SLO 27.9**
37. Read the zone of inhibition for CTX (Cefotxime) on this plate, and interpret whether it is S, I or R. (3 pt) **SLO 27.9**
38. Examine the 4 plates shown. Which of these is appropriate for performing a Kirby Bauer on the fastidious Haemophilus influenza? (2 pt) **SLO 27.12**
39. List 3 special conditions that are used when testing for methicillin resistance in Staph. (6 pt) **SLO 27.11**

Diagnostic Microbiology Exam 4

Use a scantron to answer the following 20 questions

1. Which of the following tests provides a rapid and accurate method for determining the X-Factor requirement of *Haemophilus* species? **SLO 36.5**
   A) urea
   B) hippurate hydrolysis
   C) porphyrin
   D) nitrate
2. Spinal fluid was collected from a cancer patient undergoing chemotherapy suspected of having meningitis. The bacteriology laboratory reported that the spinal fluid contained many WBCs and many intracellular and extracellular gram-negative encapsulated rods. The organism could be? **SLO 40.7**
   A) *Listeria monocytogenes*
   B) *Corynebacterium diphtheriae*
   C) *Neisseria meningitidis*
   D) *Klebsiella pneumoniae*
3. A farmer was taken to the emergency room with complaints of severe respiratory problems. A sputum sample was sent to the laboratory. The isolated organism is an aerobic gram-positive no motile rod with a cylindrical spore. This organism is the causative agent of "wool sorter's disease". It is most likely---- **SLO 41.2**
   A) *Bacillus anthracis*
   B) *Bacillus cereus*
   C) *Bacillus subtilis*
   D) *Clostridium tetani*
   E) *Clostridium perfringens*
4. The organism that produces a disease characterized by the presence of a pseudomembrane in the throat and the production of an exotoxin that is absorbed into the system with a lethal effect is ? **SLO 39.12**
   A) *Streptococcus pyogenes*
   B) *Staphylococcus aureus*
   C) *Corynebacterium diphtheriae*
   D) *Streptococcus pneumoniae*
5. A gram-variable, pleomorphic small rod was isolated from a cerebrospinal fluid specimen. The organism produced a beta-hemolytic colony on blood agar, Voges Proskauer positive, sodium hippurate positive, tumbling motility, and dark colonies on bile esculin. This organism is probably? **SLO 40.7**
   A) *Haemophilus influenzae*
   B) *Escherichia coli*
   C) *Listeria monocytogenes*
   D) *Erysipelothrix rhusiopathiae*
6. The production of H_2S is one characteristic used to differentiate which of the aerobic gram-positive bacilli? **SLO 39.10**
   A) *Corynebacterium*
   B) *Lactobacillus*
   C) *Erysipelothrix*
   D) *Nocardia*
   E) *Listeria*

7. The carbohydrate fermentation pattern of a gram-negative coccus isolated in pure culture from a spinal fluid sample taken from an acutely ill patient is as follows: **SLO 37.8**

    Maltose: positive
    Sucrose: negative
    Glucose: positive
    Lactose: negative

    Based on the results shown above, which of the following is the identification of the isolated organism?

    A) *Neisseria gonorrhoeae*
    B) *Neisseria lactamicus*
    C) *Neisseria meningitidis*
    D) *Moraxella catarrhalis*

8. An infant in the newborn nursery becomes ill with meningitis. Culture of the CSF yields small catalase negative, beta hemolytic colonies on sheep blood agar. In Gram stain, the organism showed gram positive cocci. Other tests performed were: **SLO 40.7**

    Bacitracin disc =
    Hippurate hydrolysis +
    6.5% NaCl =
    Bile esculin hydrolysis =
    CAMP test +

    Which of the following is the most likely identification?

    A) *Listeria monocytogenes*
    B) *Staphylococcus aureus*
    C) Group B streptococcus
    D) Group D streptococcus
    E) *Enterococcus* species

9. A 9-year-old child is admitted with symptoms of meningitis. A Gram stain of the cerebrospinal fluid reveals gram-positive cocci in chains and in pairs. After 24 hours of incubation, alpha-hemolytic, small, gray, moist colonies with a concave center are found on the BAP and CHOC. Which of the following biochemical results would be most representative of this isolate? **SLO 40.7**

    A) Optochin disk positive; BE negative
    B) CTA glucose positive; CTA maltose positive; ONPG negative
    C) Pyr positive; BE negative
    D) CAMP test positive; BE negative

10. Which of the following *Neisseria* can be rapidly ONPG positive? **SLO 37.9**

    A) *N. meningitidis*
    B) *N. gonorrhoeae*
    C) *N. sicca*
    D) *N. lactamica*

11. Which of the following has been implicated in "fried rice" food poisoning syndrome? **SLO 41.3**
    A) *Listeria monocytogenes*
    B) *Bacillus cereus*
    C) *Staphylococcus aureus*
    D) *Bacillus subtilis*
12. A small gray-appearing, slightly alpha-hemolytic colony resembling a *Streptococcus* on BAP is isolated from a culture of cellulitis from the hand of a butcher. The direct smear showed many WBCs and short gram-positive rods. The isolate was catalase negative, produced a small amount of H_2S along the stab line in TSI. In soft gelatin agar it produced a "bottle brush" appearance laterally from the stab line. The organism may be identified as **SLO 39.10**
    A) *Listeria monocytogenes*
    B) *Corynebacterium jekium*
    C) *Erysipelothrix rhusiopathiae*
    D) viridans streptococci
13. *Neisseria gonorrhoeae* would have which of the following biochemical characteristics? **SLO 37.6**
    A) glucose +, maltose –, sucrose –, lactose –
    B) glucose +, maltose +, sucrose –, lactose +
    C) glucose +, maltose +, sucrose –, lactose –
    D) glucose –, maltose –, sucrose –, lactose –
14. A gram-negative pleomorphic coccobacillus is isolated from the eye of a 4-year-old child that shows conjunctivitis. The organism grows on chocolate agar medium but no growth is obtained on blood agar. The organism isolated will demonstrate which of the following biochemical features? **SLO 36.1, 36.2**

	X	V factor	Hemolysis	Porphyrin test
A)	+	=	=	=
B)	+	+	=	=
C)	=	+	+	+
D)	+	+	+	=
E)	=	=	=	=

15. The gram-stained smear of samples taken from a painful genital ulcer believed to be sexually transmitted showed the presence of short gram-negative bacilli. The organism requires high concentration of heme for growth but not NAD. Which of the following species is most likely the etiologic agent of this infection? **SLO 36.1, 36.2**
    A) *Haemophilus aphrophilus*
    B) *Haemophilus parainfluenzae*
    C) *Haemophilus aegyptius*
    D) *Haemophilus haemolyticus*
    E) *Haemophilus ducreyi*

16. Which of the following is *not* a characteristic of *Legionella pneumophila*? **SLO 38.1**
    A) pale-staining, slender gram-negative, non-spore-forming rod
    B) fastidious intracellular organism
    C) requires L-cysteine for growth
    D) can grow on MAC at 42ºC
17. *Haemophilus influenzae biogroup aegyptius* causes **SLO 36.6**
    A) purulent conjunctivitis and Russian purpuric fever
    B) "pinkeye" and Brazilian purpuric fever
    C) purulent conjunctivitis and chancroid
    D) none of the above
18. Which of the following media is most appropriate for the isolation of *Gardnerella vaginalis?* **SLO 37.4**
    A) Thayer-Martin agar
    B) Columbia colistin-nalidixic acid agar
    C) New York City agar
    D) modified Thayer-Martin agar
19. After 2 weeks of minor respiratory symptoms, a 13-month-old girl became febrile and irritable. She was examined by her pediatrician, and ampicillin was initiated. The child became worse and was admitted to the hospital 3 days later with a clinical diagnosis of meningitis. The spinal fluid revealed small, gram-negative, pleomorphic rods on direct smear in addition to 1200 WBCs /mm. The organism was identified as *Haemophilus influenzae* by culture. The child was given intravenous ampicillin and 12 hours later a repeat spinal fluid specimen revealed the same results. Three hours later the child died. What further laboratory tests should have been performed? **SLO 36.17**
    A) oxidase
    B) catalase
    C) beta-lactamase
    D) TSI, MIO, citrate, and lysine
20. A 45 year old Hispanic male who works in a meat-packing factory downtown presents to the ER with history of intermitten fever, chills, sweats and malaise for the past few days. Small faintly staining gram negative rods are isolated from bone marrow aspirate. The following charcteristics are observed: **SLO 36.12**

    CO2 required
    H2S produced
    Urease +
    fails to grow in thionin
    grows in basic fuchsin

    Which of the following is the most likely identification?
    A) Bacillus anthracis
    B) Bacillus cereus
    C) Brucella abortus
    D) Corynebacterium ulcerans

Diagnostic Microbiology Final Exam

Use a scantron for the following questions. Each question is worth 2 pts.

1. Which two organisms might be considered as contaminants in a BLC. **SLO 46.11**
    A. Staph epidermidis and E. coli
    B. Propionibacterium acnes and Prevotella spp.
    C. Staph aureus and Bacteroides fragilis
    D. Staph epidermidis and Propionibacterium acnes
2. What is the appropriate anticoagulant for Blood Cultures? **SLO 46.7**
    A. Sodium polyanethol sulfonate because it inhibits phagocytosis and complement
    B. EDTA because it inhibits bacterial enzymes by chelating calcium and magnesium
    C. Sodium heparin because it inhibits thrombin formation
    D. Sodium fluoride because it inhibits glycolysis by the bacteria
3. Three sets of blood cultures were collected on John Smith. One anaerobic bottle grew small gram positive rods that had clumped like Chinese letters, but the other bottles grew nothing. The isolate was indole positive and catalase positive. What is the likely identification? **SLO 46.11**
    A. Corynebacterium diptheriae
    B. Propionibacterium acnes
    C. Eubacterium sp.
    D. Bacillus sp.
4. The proper blood to broth ratio for blood cultures is: **SLO 46.13**
    A. 1:2
    B. 1:1
    C. 1:20
    D. 1:10
5. A positive aerobic blood culture bottle shows chaining gram positive cocci in the gram stain, but no growth on the subculture to BAP. The technologist should: **SLO 46.17**
    A. Suspect Mycoplasma, and examine colonies under a microscope for Fried egg appearance.
    B. Suspect Peptostreptococcus, and grow the BAP anaerobically.
    C. Suspect nutritionally variant Strep and supplement the subculture with pyridoxal.
    D. Suspect Neisseria species and subculture to chocolate agar.
6. The automated blood culture detection system "Bacti-Alert" detects bacterial growth by monitoring **SLO 46.9**
    A. Sample turbidity
    B. Sample hemolysis
    C. Sample radioactivity
    D. Sample CO2 production
7. The most important consideration when collecting a blood culture is: **SLO 46.19**
    A) aseptic technique
    B) the puncture site
    C) minimizing the number of sticks
    D) the amount of blood collected

8. The order in which cleansing solutions are applied to the patient's arm before and after the collection of a blood culture is: **SLO 46.19**
    A) soap, alcohol, and iodine
    B) alcohol, iodine and alcohol
    C) iodine, alcohol, and soap
    D) alcohol, alcohol, and iodine
9. After collection, blood cultures and delivered to: **SLO 46.19**
    A) Blood Bank
    B) Hematology
    C) Serology
    D) Microbiology
10. Some blood culture collection systems contain a resin to: **SLO 46.19**
    A) prevent clotting
    B) inactivate antibiotics
    C) concentrate the microorganism
    D) remove skin contaminants
11. Three blood cultures from a patient requiring ASAP administration of antibiotics are collected: **SLO 46.19**
    A) every 30 minutes
    B) before, during, and after the antibiotic is administered
    C) immediately from three different sites
    D) before, during, and after the fever spikes
12. When blood is inoculated in blood culture bottles using a butterfly apparatus, the: **SLO 46.19**
    A) anaerobic bottle is inoculated first
    B) safety device is activated first
    C) aerobic bottle is inoculated first
    D) volume of blood inoculated is increased
13. An anaerobic, spore forming, nonmotile gram positive bacillus isolated from a deep wound of a leg is most probably: **SLO 49.17**
    A) Francisella tularensis
    B) Clostridium perfringens
    C) Bacillus anthracis
    D) Bifidobacterium sp.
14. An organism grew on a series of plates with this pattern: **SLO 49.3**
    - BAP: no growth
    - CNA: no growth
    - MAC: no growth
    - anaBAP: grey, double ring of hemolysis
    - anaPEA: grew, beta hemolysis
    - LKV: no growth

    This organism is most likely:
    A) Clostridium perfringens
    B) Bacillus megaterium
    C) Proteus mirabilis
    D) Bacteroides fragilis

15. An organism grew on a series of plates with this pattern: **SLO 52.3**
    - BAP: no growth
    - CNA: no growth
    - MAC: no growth
    - anaBAP: white colonies with gamma hemolysis
    - anaPEA: white colonies with gamma hemolysis
    - LKV: white colonies with gamma hemolysis

    This organism would most likely be:
    A) Bacteroides fragilis
    B) Clostridium difficile
    C) Propionibacterium acnes
    D) Actinomyces israelii
16. A lung abscess shows no growth on aerobic plates, but a large amount of gram-negative bacillus on anaerobic blood agar and LKV plates. The organism fluoresces a brick-red color under UV, but loses its fluorescence and turns a brown-black color as it ages. Which might it be? **SLO 52.3, 52.6**
    A) Bacteroides fragilis
    B) Prevotella melaninogenica
    C) Fusobacterium species
    D) Porphyromonas species
17. An anaerobic gram negative bacillus was isolated from an intra-abdominal abscess. The bacilli had rounded ends and were vacuolated. The organism was resistant to kanamycin, vancomycin and colistin, and produced black colonies on BBE. What is the most likely id? **SLO 52.3**
    A) Prevotella melaninogenica
    B) Fusobacterium nucleatum
    C) Porphyromonas species
    D) Bacteroides fragilis
18. The optimal wound specimen for culture of anaerobic organisms should be: **SLO 48.7**
    A) A swab of lesion obtained before administration of antibiotics.
    B) A swab of lesion obtained after administration of antibiotics.
    C) A syringe filled with pus, obtained before administration of antibiotics.
    D) A syringe filled with pus, obtained after administration of antibiotics
19. Which organism is considered to be anaerobic staph? **SLO 52.1**
    A) Peptococcus
    B) Peptostreptococcus
    C) Veillonella
    D) Proprionibacterium
20. Which of the following organisms would be described as this?
    A faintly staining gram negative coccobacillus, oxidase +, urease + within 15 minutes, inhibited by basic fuchsin. **SLO 58.6**
    A) Brucella suis
    B) Clostridium botulinum
    C) Francisella tularensis
    D) Yersinia pestis

Fill in the scantron with the molecular method that utilizes the following reagents. 2 points each. **SLO 47.4, 47.6, 47.14**

A. LCR
B. TMA
C. bDNA.

21. Reverse transcriptase
22. Promoter primer
23. rRNA
24. biotinylated oligonucleotide
25. capture probe
26. acridinium ester
27. scaffold
28. RNA polymerase

Record the remaining answers on the exam paper.

29. List three distinct mechanisms that can be used to prevent contamination in the molecular lab. 2pts. **SLO 47.11**

30. Scrutinize this DNA sequence. Write a 10-mer than can be used as a primer to make it double stranded. 2 pts **SLO 47.12**

ATTTTCCCGGGATACATAGATAGATAAATTTAAAAA

31. Match the following organism with the disease that it causes. 2 pt each, **SLO 54.4, 56.3, 57.2**

☐ Rickettsia prowazekii	1. PPLO
☐ Rickettsia rickettsii	2. Lymphogranuloma venereum
☐ Rickettsia tsutsugamushi	3. Ornithosis
☐ Coxiella burnetii	4. Rat Bite Fever
☐ Borrelia recurrentis	5. Rocky Mountain Spotted Fever
☐ Rockalimea quintana	6. Scrub typhus
☐ Ehrlichia canis	7. Trench Fever
☐ Streptobacillus moniliformis	8. Q fever
☐ Chlamydia psittaci	9. Epidemic typhus
☐ Borrelia burgdorferi	10. Ehrlichiosis
☐ Mycoplasma pneumonia	11. Lyme disease
☐ Chlamydia trachomatis	12. Relapsing Fever

Short answer Questions:

32. What is the role of methylene blue in an anaerobic chamber? 2 pts. **SLO 48.9**
33. What is the causative agent for pseudomembraneous colitis? 2 pts SLO **49.7**
34. At Westmoreland Hospital (where I worked 15 years), all synovial (joint) fluid cultures are plated to BAP, Chocolate, MAC, CNA, anaBAP and LKV. What is the rationale for using these plates – organize your response and be thorough. 6 points. **SLO 48.12**
35. Select a molecular method that we discussed (not PCR), and explain it in depth, with respect to testing for Chlamydia. (6 pts). **SLO 47.4, 47.6**

Affective domain performance evaluation in university-based courses

Students will be evaluated by the instructors at the midterm and end of each course. The midterm evaluation is meant to serve as a counseling instrument and deficiencies will be discussed by the student and faculty. The final evaluation will be included in the calculation of the final course grade as indicated in the respective course outlines.

_____ Attendance and Punctuality
- 0 Late or absent on a weekly basis
- 1 Consistently late, disrupts class when arriving
- 2 Noticeable absences but contacts instructor to make up work and explain absence
- 3 Has only preexcused absences and lateness
- 4 No more than 1 excused absence and lateness

_____ Organization
- 0 Disorganization resulting in unreliable results
- 1 Poorly organized, interferes with other students work flow
- 2 Some problems resulting in slow reporting of results
- 3 Adequate organization, acceptable results
- 4 Very well organized and efficient, accurate results

_____ Ability to Follow Instructions
- 0 Does not follow verbal or written instructions, insists on doing things own way
- 1 Follows written but not verbal instructions
- 2 Asks questions without thinking, instructions must be repeated
- 3 Follows most instructions, asks appropriate questions
- 4 Follows instructions very well

_____ Application of Previous Learning
- 0 Fails to apply previous learning
- 1 Very noticeable inconsistency applying previous learning
- 2 Some inconsistency applying previous learning
- 3 Adequate application of previous learning
- 4 Good application and deductive reasoning

_____ Independent Work
- 0 Fails to work independently, disturbs other students
- 1 Relies on other students to get work done
- 2 Asks questions of other students rather than instructor
- 3 Adequate independence
- 4 Exceptional independence

_____ Safety
- 0 Does not follow lab safety guidelines in regard to work area, materials and specimens
- 1 Fails to consistently follow lab safety guidelines, does not leave a clean work area
- 2 Follows lab safety guidelines, work area usually clean, materials not returned properly
- 3 Follows lab safety guidelines, clean work area, usually returns materials
- 4 Conscientiously follows lab safety guidelines, clean work area, all materials returned

_____ Accuracy
- 0 Needs constant supervision to prevent errors
- 1 Makes more errors than expected
- 2 Accuracy acceptable for most procedures
- 3 Rarely makes errors
- 4 Is consistently accurate

_____ Manual Dexterity
- 0 Seems unable to achieve acceptable results
- 1 Awkward but should improve with practice
- 2 Generally good technique, steady improvement and some natural aptitude
- 3 Shows above average aptitude for mastering techniques
- 4 Unusual skill in mastering techniques, real natural aptitude

_____ Initiative
- 0 Demonstrates no intellectual curiosity, does no advance preparation, does bare minimum on assignments
- 1 Some intellectual curiosity, has difficulty getting started on assignments, needs prodding, asks many irrelevant questions
- 2 Demonstrates average intellectual curiosity, does advance preparation when specifically assigned, no attempt to seek additional information
- 3 Demonstrates intellectual curiosity by asking frequent relevant questions, interested in Awhy@ as well as Ahow@, prepares in advance
- 4 Demonstrates marked intellectual curiosity and enthusiasm, does additional preparation and reading, looks for additional work assignments

_____ Interpersonal Relations
- 0 Tactless, frequently upsets others, does not accept constructive criticism
- 1 Indifferent, no particular interest in class activities or constructive criticism
- 2 Occasional disruptive behavior, accepts some constructive criticism, shows improvement in communication skills
- 3 Above average communication skills, accepts constructive criticism and attempts to make corrections
- 4 Exceptional communication skills and ability to relate to people, seeks advice and constructive criticism

Frequency of Student Evaluations: University Based Courses

Course	Quizzes	Lecture Exams	Lab Practicals	Lab Note Book Submissions	Other Assignments*
MLS 4305 Hemtology I /Lab -16 weeks	12	4	2	2	1
MLS 4460 Diag Micro-I/Lab -16 weeks	1	5	4	17	0
MLS 4334 Hemostasis & Thrombosis/Lab - 6 Weeks	5	2	1	1	0
MLS 4462 Medical Microbiology/Lab-12 Weeks	11	4	1		
MLS 4625 Clinical Chemistry I/Lab-6 Weeks	0	2	2	11	2
MLS 4220 Urinalysis/Body Fluids I/Lab -6 Weeks	0	4	3	0	0
MLS 4630 Clinical Chemistry II/Lab-10 Weeks	2	3	02	10	1
MLS 4291 Molecular Diagnostics/Lab -6 weeks	0	3	0	1	0
MLS 4550 Immuno-hematology I/Llab-10 Weeks	15	3	2	2	1
MLS 4505 Serology/Lab 6 Weeks	5	2	1	1	1
MLS 4705 Special Clinical Topics-6 Weeks	3	2	-	-	1

*** Other Projects include written or oral presentations ion selected topics**

Each year, one class of students complete the university based courses in December and begin hospital clinical rotations in following January. At the completion of the fall semester courses students are given a day long session 'Orientation to Hospital Rotations '

On this day students are given a mid-term comprehensive exam which includes all areas of the clinical laboratory sciences (hematology, microbiology, chemistry, immunohematology, serology, phlebotomy, lab safety and other miscellaneous items). This exam is given on a self assessment basis (not included in calculation of grades). Student scores in this examination are evaluated by faculty to assess strengths and weaknesses in the university based instruction and to make needed changes for improvement.

Frequency of Evaluation: Clinical Rotations: 29 weeks, 40 hrs/week

Rotation	Number of Weeks	Written Exams	Unknowns / Practicals	Affective Domain Evaluation Midterm	Final
Hematology	4	4	1-2	Yes	Yes
Coagulation	1	1	No		
Urinalysis	1	1	No		
Gen Microbiology	5	5	3-5	Yes	Yes
TB, Mycology	1	1	No		
Parasitology	1	1	No		
Gen Chemistry	5	5	Variable	Yes	yes
Special Chemistry	2	2	No		
Serology	2	2	No	Yes	
Immunohematology	4	4	4	-	Yes
Phlebotomy	1	1	No	-	Yes
Miscellaneous week	1	1	No	Final Evaluation	

In Hematology and Immunohematology rotations the exam given at the end of the 4 th week consists of 50 questions from the reading assignment for week #4 and 50 comprehensive questions; in General Microbiology and Clinical Chemistry the exam given on the 5 th week consists of 50 questions from the reading assignment for week # 5 and 50 comprehensive questions.

UNIVERSITY OF WEST FLORIDA CLINICAL LABORATORY SCIENCES PROGRAM

PROFESSIONAL EVALUATION FORMS

The following forms are used for performance evaluations and are maintained by the Education Coordinator at each clinical site:

Mid-Rotation Evaluation Form
Final Evaluation Form
Phlebotomy Evaluation Form

Student's Evaluation of Department Form
(Included in Standard 18, Program Evaluation)

The **Phlebotomy Evaluation Form** will be completed after the first week of Phlebotomy.

The **Mid-Rotation Evaluation Form** and the **Final Evaluation Form** will be completed by the Department Supervisor to evaluate the student's performance in each of the four major rotations in the laboratory. At the end of each rotation and upon consultation with the teaching technologists, each supervisor will give this written assessment to the **Education Coordinator**. It will be placed in the student's file. Upon completion of the final practical and written exam at the end of each lab rotation, these evaluations will be shown to the student, upon request, by the Education Coordinator.

1. **Hematology 4 weeks**
2. **Microbiology 7 weeks**
3. **Blood Bank 4 weeks**
4. **Chemistry 7 weeks**
5. **Immunodiagnostics/Serology (Optional)**

Student must demonstrate/achieve a minimum level of C in each category (acceptable performance) on these final reports.

After periodic reviews and repeated warnings, **if a student fails to achieve an acceptable level of performance in the laboratory, the student's training will be interrupted**. The matter will be brought before the program faculty and appropriate action will be taken as deemed necessary by the situation on an individual basis.

The **Student's Evaluation of the Department Form** will be completed by the student at the end of each of his/her five major rotations.

THE UNIVERSITY OF WEST FLORIDA
CLINICAL LABORAORY SCIENCES PROGRAM
MID-ROTATION EVALUATION OF STUDENTS PERFORMANCE IN A DEPARTMENT

Name: _____ Department: _____ Date_____

Mid-Term Evaluations should be completed for the following Clinical Rotations:
1. Hematology
2. Microbiology
3. Blood Bank
4. Chemistry
5. Immunodiagnostics/Serology

Key: A (Excellent); B (Good); C (Average); U (Unsatisfactory)

Cognitive, Psychomotor, and Affective Domains	A	B	C	U
1. Attendance and Punctuality Arrives on time Begins work promptly				
2. Professional Appearance Neatness and cleanliness of clothes, shoes, hair General grooming				
3. Professional Attitude and Behavior Maintains pleasant, courteous demeanor Willingness to assist individuals, including those with individual differences Cooperative, willing to accept instruction and constructive criticism of work				
4. Professional Performance (Application of Knowledge) Ability to apply theory to practical work Displays advance reading, preparation, and reasoning ability Maintains work quality and quantity under stress				
5. Professional Performance (Accuracy and Dexterity) Rarely makes errors, consistently accurate Accomplishes his/her share of work load Good manual technique; Ease of using mechanical devices				
6. Initiative, Interest in Work, Inquisitiveness Seeks additional information regarding the lab procedures and instruments Demonstrates intellectual curiosity and enthusiasm Performs routine assigned, works hard, has scientific curiosity Ability to go ahead without specific directions each time				
7. Interpersonal Relationships Works as a team member Functions well with others in a teacher/student setting Exceptional ease and ability in relating to co-workers and laboratory consumers				

8. Integrity Admits to error or mistakes Follows procedures without shortcuts Shows consistent attention to detail				
9. Judgment (Reaction under stress) Calm, capable of performing duties and able to handle emergency situations well Good judgment followed by appropriate actions				
10. Leadership Self-confidence Self-expression (verbal and written) Organizational skills Project management and completion				

To the Evaluator:

If the student is rated unsatisfactory and needs improvement in any of the above categories, this matter should be discussed with the student and suggestions for improvement offered.

The student who is performing satisfactorily should be commended and encouraged to continue the good work.

Suggestions/Comments: _____

_____

_____

Signature of Student: _____ Date: _____

Signature of Evaluator: _____ Date: _____

Revised Jan 2006

THE UNIVERSITY OF WEST FLORIDA
CLINICAL LABORATORY SCIENCES PROGRAM

FINAL EVALUATION OF THE STUDENT'S PERFORMANCE IN A DEPARTMENT

Name: _____Rotation:_____ Date: _____

Final Evaluations should be completed for the following five Clinical Rotations:
1. Hematology
2. Microbiology
3. Blood Bank
4. Chemistry
5. Immunodiagnostics/Serology

Grades: Written Exam 1._____2._____3._____4._____5._____6._____7._____

Practical Exam 1._____2._____

Performance Grade _____ (Total numerical score of the 10 performance variables)

CIRCLE APPROPRIATE NUMERICAL SCORE in EACH CATEGOTY

1. **Professional Performance...Application of Knowledge**:
   (Consider coordination of practical application and theory, reasoning ability, intelligence, and advance preparation.)
   2. Makes very little effort to correlate theory with practical lab work.
   4. Sometimes able to apply theory.
   6. Adequate theoretical knowledge; usually applied it to work.
   8. Above average in ability to use theory in practice.
   10. Unusual ability to apply theory to practical work.
2. **Professional Performance...Organization of Work**:
   (Consider inventiveness and imagination in carrying out assignments, general management, volume of work, use of time, and dependability.)
   2. Cannot organize or complete assignments.
   4. Always needs help to organize and complete assignments.
   6. Adequate organizer, but produces small volume of work in allotted time.
   8. Effective combination of work assignments. Produces necessary volume of work for experience.
   10. Exceptionally effective combination of work assignments. Can complete large volume with accuracy and help with other assignments.

3. Professional Performance...Accuracy: (Consider record of technical performance.)

2. Needs constant supervision to prevent errors.
4. Makes more errors than expected at this stage of training.
6. Accuracy acceptable for stage of training.
8. Rarely makes errors.
10. Is consistently accurate.

4. **Professional Performance...Manual Dexterity: (Consider awkwardness, techniques, ease of using mechanical devices.)**

2. Seems unable to achieve acceptable techniques.
4. Awkward, but probably can improve with practice.
6. Generally good technique. Steady improvement. Some natural aptitude.
8. Shows above-average aptitude for mastering techniques.
10. Unusual skill in mastering techniques. Real natural aptitude.

5. Interest*:* (Consider willingness, enthusiasm, motivation, participation, and interest in profession.)

2. Demonstrates no intellectual curiosity. Does no advance preparation. Accepts lab assignments with reluctance. Gives appearance of being bored. Defensive, complaining.
4. Some intellectual curiosity. Vacillates from average performance and interest to poor performance and interest.
6. Demonstrates average intellectual curiosity. Does advance preparation and outside work when specifically assigned. No attempt to seek additional information.
8. Demonstrates intellectual curiosity by frequent questions. Does advance preparation and some additional study. Seeks to know "why" as well as "how". Shows enthusiasm.
10. Demonstrates marked intellectual curiosity and enthusiasm. Seeks information by additional reading, listening, and attending non-required seminars and lectures. Interested in learning as much as possible about the department.

6. **Initiative: (Consider ability to see things to do, resourcefulness, independence, achievement, imagination.)**

2. Seems to avoid responsibility even of assigned work; lazy.
4. Had difficulty "getting started" on assignments - needs prodding.
6. Does only assigned work, but does it well.
8. Works hard, sometimes beyond specified job demands. Seeks supplemental assignments.
10. Exceptional resourcefulness in taking on extra duties. Has scientific curiosity.

7. **Interpersonal Relationships: (Consider tact, ability to make others at ease, attitudes towards others.)**

2. Tactless and frequently upsetting behavior towards other people.
4. Indifferent, distant. Shows no particular effort toward better communication.
6. Shows development in ability to handle people and situations well.
8. Above average in ability to handle people and situations well.
10. Demonstrates exceptional ease and ability in effectively relating to the people on the job.

8. **Technologist - Staff Relationship: (Consider willingness to work with people in various capacities, adaptability.)**
   2. Unwilling to cooperate. Makes little effort to cooperate with anyone.
4. When convenient. Often indifferent to relationship with staff.
   6. Usually pleasant and courteous.
   8. Consistently tries to maintain good relationship. Adjusts to different personalities easily.
   10. Unusually cooperative with everyone.
9. **Reaction under Stress: (Consider reactions in various situations when stress is likely, personal adjustment, handling a difficult situation, and maturity.)**
   2. Unresponsive. Does not demonstrate emotional stability. Unable to perform duties under stress.
   4. Excitable, handles emergency situations poorly. Easily depressed or elated.
   6. Excitable, but capable of performing duties and of handling emergency situations.
   8. Calm, well balanced, capable of performing duties and able to handle emergency situations well.
   10. Exceptional ability to handle difficult situations. Good judgment followed by appropriate actions.
10. **Judgment: (Consider ability and foresight in handling situations tactfully and making decisions in everyday work.)**
   2. Unable to handle situations even after being told "how" and "what".
   4. Had difficulty in handling problems. Must be told "how" and "what" each time. Does not think through problems.
   6. Able to handle situations after some direction is given.
   8. Skillful judgments and planning.
   10. Makes unusually sound decisions in handling work.

Total Numerical Score for Performance in Department_____

Summary: Please rate the student as a potential employee.

A. Would not hire this person under any circumstances (give reasons below).
B. Has not achieved basic entry level of competence. Needs more instruction/practice before allowed to work independently.
C. Fulfilled the basic requirements and with experience has the potential to develop into an average "all-around" employee.
D. Would be an above-average employee. Has remarkable abilities to become a competent, conscientious worker in any department.
E. Exceptional ability. Managerial/supervisory potential. Has creative/original thinking and will progress rapidly and rise above others in any professional setting.

ADDITIONAL COMMENTS: **(Include potential for teaching or supervising.)**

_____Date_____Department _____
Signature of Instructor

_____ _____
Signature of Student Date Revised Jan 2006

THE UNIVERSITY OF WEST FLORIDA
Clinical Laboratory Sciences Program

EVALUATION OF STUDENTS PERFORMANCE IN PHLEBOTOMY

Name: _____ Supervisor: _____ Date_____

Key: A (Excellent); B (Good); C (Average); U (Unsatisfactory)

Cognitive, Psychomotor, and Affective Domains	A	B	C	U
1. Attendance and Punctuality Arrives on time Begins work promptly				
2. Professional Appearance Neatness and cleanliness of clothes, shoes, hair General grooming				
3. Professional Attitude and Behavior Maintains pleasant, courteous demeanor Willingness to assist individuals, including those with individual differences Cooperative, willing to accept instruction and constructive criticism of work				
4. Professional Performance (Application of Knowledge) Ability to apply theory to practical work Displays advance reading, preparation, and reasoning ability Maintains work quality and quantity under stress				
5. Professional Performance (Dexterity, Specimen Collection, Patient Identification)) Rarely makes errors, consistently accurate Accomplishes his/her share of work load Good manual technique; Ease of using mechanical devices Confirms identity of the patient, labels properly Draws adequate specimen 95% of patients attempted Adheres strictly to established protocol unless situation demands otherwise Shows flexibility and common sense in obtaining specimen in difficult situations				
6. Initiative, Interest in Work, Inquisitiveness Seeks additional information regarding the lab procedures and instruments Demonstrates intellectual curiosity and enthusiasm Performs routine assigned, works hard, has scientific curiosity Ability to go ahead without specific directions each time				
7. Interpersonal Relationships Works as a team member Functions well with others in a teacher/student setting Exceptional ease and ability in relating to co-workers and laboratory consumers				

8. Integrity Admits to error or mistakes Follows procedures without shortcuts Shows consistent attention to detail				
9. Judgment (Reaction under stress) Calm, capable of performing duties and able to handle emergency situations well Good judgment followed by appropriate actions				
10. Executive Function Self-expression (verbal and written) Organizational skills Leadership				

To the Evaluator:

If the student is rated unsatisfactory and needs improvement in any of the above categories, this matter should be discussed with the student and suggestions for improvement offered.

The student who is performing satisfactorily should be commended and encouraged to continue the good work.

Suggestions/Comments: _____

_____

_____

_____

_____

Signature of Student: _____ Date: _____

Signature of Evaluator: _____ Date: _____

Revised Jan 2006

UNIVERSITY OF WEST FLORIDA-CLINICAL LABORATORY SCIENCES PROGRAM

CLINICAL ROTATIONS

EDUCATION COORDINATOR'S CHECKLIST FOR STUDENT'S PERFORMANCE EVALUATIONS

Student's Name_____ Year of Training _____

CLINICAL ROTATION	SUPERVISOR'S EVALUATION
Hematology	
Week 2 - Midterm Evaluation	
Week 4 - Final Evaluation	
Immunohematology	
Week 2 - Midterm Evaluation	
Week 4 - Final Evaluation	
Microbiology	
Week 3 - Midterm Evaluation	
Week 5 - Final Evaluation	
Clinical Chemistry	
Week 3 - Midterm Evaluation	
Week 5 - Final Evaluation	
Immunodiagnostics/Serology – Final Evaluation	
Phlebotomy Evaluation	

Standard 10: Specific Publications

Following are the specific publications in which items in Standard 10A-M are included.

1. The University Catalog (Submitted)
2. Handbook for Clinical Laboratory Sciences Majors (Submitted)
3. Program Brochure (Submitted)
4. The University Student Handbook (Student Life) (Submitted)
5. Website: http://uwf.edu/clinicallabsciences/
6. Information Packet mailed to student inquiries or given during initial visit for academic advisement. (Included in the following pages)
7. Application Form for selection into clinical year (Included in Standard 11)
8. Hospital Rotations Manual (too large to submit, will be available on-site).

Standard 10:

The Matrix to identify the specific publications in which items in Standard 10A-M are included.

	University Catalog	Handbook For CLS Majors	Application Form	Website	Academic Advisement Material	Hospital Rotations Manual
Program Mission Statement		X		X		
Program Goals and Competencies		X		X		
Course Objectives				X		X
Applied Education Assignments						X
Admission Criteria, Academic and Nonacademic	X	X			X	
A list of Course Descriptions	X			X		
Names and academic rank or title of the program director and faculty	X	X		X		
Causes for Dismissal	X	X				
Rules and Regulations	X	X	X			
Listing of Clinical Facilities	X	X		X	X	
Essential Functions		X	X	X		
Policies and Procedures when applied experience cannot be guaranteed		X				

ITEM # 6

Information Mailed in response to Student inquiry or given during the initial visit for Academic Advisement (Pages 378-384)

May 3, 2006,

Thank you for your interest in UWF's Clinical Laboratory Sciences Program. The Faculty and Staff of Clinical Laboratory Sciences Program wish you a rewarding experience and much success in your educational and employment goals for the future.

Since you are a student who is interested in Bio-Medical Sciences I am writing to let you know the Clinical Laboratory Sciences Program at University of West Florida has been in existence for over years and has a tradition of excellence in preparing students for a rewarding career in clinical laboratory sciences such as Hematology, Diagnostic Microbiology, Clinical Chemistry, Clinical Immunology and Immunohematology.

A B.S degree in clinical laboratory sciences not only prepares you as a qualified professional to enter the job markets in bio-medical technology; but also provides a strong basis for graduate (PhD Programs in Cellular & Molecular Biology) or advanced professional studies to become a Physician, Physician Assistant, Pathology Assistant, Veterinarian, Pharmacist and so on.

While you are planning for your future it is always a good strategy to explore all the options available in your areas of interest. So I strongly urge you look into this degree program which makes you eligible for entry into a wide array of bio-medical technology fields. I ask that you give me a call as soon as possible to make sure that you will have all the prerequisites for clinical year of our program. I can be reached at (850) 474-2988. Looking forward to seeing you. Best wishes.

Sincerely,

Swarna Krothapalli, MS, MT (ASCP)
Associate Professor and Program Director

THE UNIVERSITY OF WEST FLORIDA
CLINICAL LABORATORY SCIENCES DEGREE REQUIREMENTS

Freshman/Sophomore Years

Lower Division Requirements	**SH**
English/Humanities (15Hrs)	
ENC 1101 English Composition I*	3
ENC 1102 English Composition II*	3
Humanities Elective (Literature) **	3
Humanities Elective (Fine Arts) **	3
Humanities Elective (Values) **	3
Social Sciences/History (9Hrs)	
XXX XXXX Historical	3
XXX XXXX Behavioral	3
XXX XXXX Socio/Political	3
Math (6Hrs)	
MAC1105 College Algebra***	3
STA2023 Statistics***	3
Science Prerequisites (26Hrs)	
ZOO 1010 General Zoology/Lab	4
PCB 2131 Cell Biology/Lab****	4
PCB 4703 Human Physiology****	3
CHM 2045 General Chemistry I/Lab	4
CHM 2046 General Chemistry II/Lab	4
CHM 2210 Organic Chemistry I/Lab	4
CHM 2211 Organic Chemistry II/Lab	4
MLS 3031 Intro Clin Lab Sci (elective)	2

Following is a partial list of courses which meet the General Studies requirements. For a complete list see current UWF catalog.

Humanities – Literature	**SH**
* LIT 1110 Great Books I -	3
* LIT 1120 Great Books II -	3
* LIT 2010 Introduction to Prose Fiction -	3
* LIT 2030 Introduction to Poetry -	3
Humanities - Fine Arts	
* ARH 1010 Intro to Art History -	3
* ART 2003C Visual Arts Experience -	3
* MUL 2110 Music in West. Civilization -	3
* THE 2000 The Theatre Experience -	3
Humanities - Contemporary Values & Expressions	
* PHI 2010 Intro to Philosophy -	3
* PHI 2603 Ethics in Contemp Society -	3
* REL 2000 Intro to Religion -	3
* SPC 2016 Basic Communication Skills -	3
Social Sciences - Historical Perspectives	
* AMH 2010 United States to 1877 -	3
* AMH 2020 United States Since 1877 -	3
* EUH 1001 Western Perspectives I -	3
* EUH 1002 West Perspectives II -	3
Social Sciences - Behavioral Perspectives	
* ANT 2000 Intro to Anthropology -	3
* DEP 2004 Human Dev Across Life Span -	3
* PSY 2012 General Psychology -	3
Social Sciences -Socio-Political Perspectives	
* ECO 2013 Princ of Economics Macro -	3
* POS 2041 American Politics -	3
* SYG 2000 Intro to Sociology -	3
* POS 2041 American Politics -	3

**** Fulfills Gordon Rule writing requirement***
***** From these courses students must choose two which fulfill the Gordon Rule writing requirement. See your advisor for clarification.***
******Fulfills Gordon Rule math requirement***
*******The two course sequence of Anatomy & Physiology I and II may be substituted for these.***
Foreign language requirement: Students must have either 2 years of the same foreign language in high school or 2 semesters in college.

JUNIOR YEAR

Summer	SH	Fall	SH	Spring	SH
HSC 3550 Pathophysiol	3	BCH 3033 Biochem I/Lab	4	MLS 4460 Diag Micro I/Lab	4
		PCB 3063 Genetics/Lab	4	MLS 4305 Hematol I/Lab	4
Other Prerequisite (if any)		MCB 3020 Microbiol/Lab	4	PCB 4233 Immunology/Lab	4
			12		12

SELECTION OF CANDIDATES FOR CLINICAL YEAR

X Clinical year of the Clinical Laboratory Sciences Program has limited access. Enrollment is limited to 20 students per class. Only one class is selected each year, during the spring semester.

X Admission into the University as a Clinical Laboratory Sciences major **does not** guarantee selection into the clinical year.

X Students should apply for entry into the clinical year during the spring semester in which they are taking Hematology I and Diagnostic Microbiology I.

X Eligibility is limited to those students who have completed all of the prerequisite courses with a minimum GPA of 2.5. A student with a GPA between 2.0-2.5 will be considered if showing strength in other criteria and space is available.

X Eligible students are required to submit an application, as well as three letters of recommendation to the Program Director to be considered for selection into the clinical year.

X Student selections are completed by April 1st, and the clinical year begins during the first week of May.

X Student selection is based on evaluation of the application form and references, completion of prerequisite courses, GPA, other merit recognition, and an interview with the selection committee.

Students not selected may complete a B.S. degree in Biology and apply again for clinical year selection the following year.

Important Dates:

Application deadline:	First Week in February
File completion date:	Second Week in February
Interviews:	Early March
Notification of selection:	First Week in April

Note: Meeting the established minimum standards does not guarantee admission into the clinical year.

CLINICAL YEAR CURRICULUM

Selected students begin the clinical year during the first week of May, and complete the course work listed below over a period of four semesters.

University-Based Courses

Summer Semester:	**SH**	**Fall Semester:**	**SH**
MLS 4625 Clinical Chem I/Lab……	3	MLS 4630 Clinical Chem II/Lab……	3
MLS 4220 Urinal/Body Fluids I/Lab	2	MLS 4990 Molecular Diagnostics……..	2
MLS 4334 Hemo/Thrombosis/Lab…….	2	MLS 4705 Special Clinical Topics…….	1
MLS 4462 Medical Micro I/Lab…….	4	MLS 4505 Serology/Lab……	2
	11	MLS 4550 Immunohematology I/Lab	4
			13

Students must maintain a minimum grade of 'C ' in each of the above courses in order to proceed to the hospital laboratory courses.

Hospital-Based Courses

In January, upon successful completion of the above courses, students will be placed in individual clinical rotations at one of the university's clinical affiliates. Hospital training is 29 weeks long, including one week off during Spring Break. Students are required to attend 40 hours per week, Monday through Friday, while undergoing advanced practical training in the clinical laboratory. Clinical rotations are divided approximately into the units listed below. Students should register for the corresponding university courses in order to receive college credit.

Hospital Clinical Rotations	**# Weeks**	**University Course**	**SH**
		Spring Semester:	
Diagnostic Microbiology……	5	MLS 4821L Diagnostic Microbiology II…...	4
Hematology & Coagulation……	5	MLS 4822L Hematology II…….....	4
Clinical Chemistry…….	5	MLS 4820L Clinical Chemistry III……	4
		Summer Semester:	
Sp Chemistry & TB/Mycology……...	3	MLS 4824L Special Clinical Methods……	2
Immunohematology & Serology…….	6	MLS 4823L Immunohematology II……...	4
Urinalysis, Parasit. & Phlebotomy….	3 .2	MLS 4825L Urinalysis & Body Fluids II…..	
Miscellaneous & Makeup……..	1	N/A	
Spring Vacation…….	1	N/A	
Total	**29 Weeks**		**20 SH**

During the last week of July, students are given a series of comprehensive exams and review sessions in preparation for the national certification and state licensure exams. Upon graduation students are awarded a Bachelor of Science Degree in Clinical Laboratory Sciences and are eligible to take the ASCP and NCA certification exams which lead to national certification and State licensure as a medical technologist.

SAMPLE - HOSPITAL CLINICAL ROTATION SCHEDULE

January through July; Monday - Friday; 7:00 a.m. - 3:30 p.m. (40 hours per week)

WEEK	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4
1	Phlebotomy	Phlebotomy	Phlebotomy	Phlebotomy
2	Microbiology 1	Chemistry 1	Blood Bank 1	Hematology 1
3	2	2	2	2
4	3	3	3	3
5	4	4	4	4
6	5	5	Hematology 1	Coagulation 5
7	TB Mycology 6	Sp. Chemistry 1	2	Urinalysis
8	Parasitology 7	Sp. Chemistry 2	3	Blood Bank 1
9	Chemistry 1	Serology 1	4	2
10	2	2	Urinalysis	3
11	3	Urinalysis	Coagulation	4
12	4	Coagulation	Microbiology 1	Chemistry 1
13	5	Hematology 1	2	2
14	Sp Chemistry 1	2	3	3
15	----------SPRING BREAK----------			
16	Sp Chemistry 2	3	4	4
17	Serology 1	4	5	5
18	Serology 2	Microbiology 1	6	Sp. Chemistry I
19	Blood Bank 1	2	7	Sp. Chemistry 2
20	2	3	Chemistry 1	Serology 1
21	3	4	2	2
22	4	5	3	Microbiology 1
23	Urinalysis	6	4	2
24	Coagulation	7	5	3
25	Hematology 1	Blood Bank 1	Sp. Chemistry 1	4
26	2	2	Sp. Chemistry 2	5
27	3	3	Serology 1	6
28	4	4	2	7
29	----------Miscellaneous/Make Up Week----------			

Expenses

Students should refer to the current UWF catalog for tuition fees, housing costs and other expenses common to all university students. In addition, Clinical Laboratory Sciences students have special costs. The following amounts are approximations: health checkup and immunization, $100.00, background check: $80.00, certification and license $400.00; lab coats and other items for clinical laboratory work, $100.00.

Health and Immunization Status Requirements

Students who are selected into the clinical year will begin the professional program during the first week of May (first day of classes for Summer Semester). Before this beginning date, students are required to submit a Status of Health and Immunization Form signed by their physician. As part of this requirement, they are asked to provide proof of immunity or vaccination for Rubella, Hepatitis B and Herpes Zoster. The cost of these requirements is approximately $100.00. Students are also required to provide proof of health insurance coverage.

Hospital Assignments

Currently, The University of West Florida is affiliated with the following hospitals for students' clinical laboratory rotations:

X West Florida Hospital, Pensacola
X Baptist Hospital, Pensacola
X Sacred Heart Hospital, Pensacola
X Fort Walton Beach Medical Center, Fort Walton Beach
X Bay Medical Center, Panama City
X Shands Health Care System (2 hospitals in Gainesville; 1 hospital in Jacksonville)

Students will be placed at a hospital closer to their residence when possible. In general, the program's primary objective is to place all selected students at clinical sites. Based on class size and availability of slots, the program reserves the right to place students at a given hospital. Under these considerations students must accept the assignment made by the Program Director.

For more information contact:

Swarna Krothapalli, MS, MT (ASCP)
Program Director, Clinical Laboratory Sciences
University of West Florida
11000 University Parkway
Bldg. 58, Room 79
Pensacola, FL 32514
(850) 474-2882
E-Mail: skrothap@uwf.edu

THE UNIVERSITY OF WEST FLORIDA
Clinical Laboratory Sciences Program
Suggested Plan of Study

FRESHMAN YEAR

FALL	**SH**
ENC 1101 English Composition I…….	3
ZOO 1010 General Zoology/Lab……..	4
MAC 1104 College Algebra……..	3
XXX xxxx Humanities/Fine Arts……..	3
	13

SPRING	**SH**
ENC 1102 Eng Composition II……...	3
EUH xxxx Social Sciences/History…….	3
CHM 2045 Chemistry I/Lab……..…	4
XXX XXXX Humanities/Values……...3	
	13

SUMMER	**SH**
CHM 2046 Chemistry II /Lab…….	4

SOPHOMORE YEAR

FALL	**SH**
CHM 2210 Org Chemistry I/Lab…….	4
PCB 2131 Cell Biology/Lab*…….	4
PCB 4703 Human Physiology*……..3	
	11

SPRING	**SH**
XXX xxxx Social Sci/Behavioral……..3	
CHM 2211 Org Chemistry II/Lab……..4	
XXX xxxx Social Sci/Political Sci……3	
XXX xxxx Humanities/Literature……..3	
	13

SUMMER	**SH**
HSC 3550 Pathophysiology……...3	
STA 2023 Statistics……..	3

Foreign Language Requirement: Students, who have not completed 2 years of the **same** foreign language in high school, or 2 semesters at a previous college, must meet this requirement prior to graduation.

JUNIOR YEAR

FALL	**SH**
BCH 3033 Biochemistry I / Lab……..	4
MCB 3020 Microbiology / Lab……4	
PCB 3063 Genetics/Lab……...4	
	12

SPRING	**SH**
PCB 4233 Immunology/Lab……,	4
MLS 4460 Diag Micro I / Lab…… .	4
MLS 4305 Hematology I / Lab…… 4	
	12

CLINICAL (SENIOR) YEAR-University-based courses

SUMMER	**SH**
MLS 4625 Clinical Chemistry I/Lab……...3	
MLS 4334 Hemo & Thrombosis/Lab……	2
MLS 4462 Medical Microbiology/Lab…....4	
MLS 4220 UA/Body Fluids I/Lab……2	
	11

FALL	**SH**
MLS 4630 Clinical Chemistry II/Lab…...4	
MLS 4550 Immunohematology I/Lab…..4	
MLS 4505 Serology/Lab……..4	
MLS 4990 Molecular Diagnostics……...2	
MLS 4705Special Clinical Topics…...…1	
	12

CLINICAL (SENIOR) YEAR - Hospital -based courses

SPRING	**SH**
MLS 4820L Clinical Chemistry II……...	4
MLS 4822L Hematology II……..	4
MLS 4823L Immunohematology II……..4	
	12

SUMMER	**SH**
MLS 4821L Diagnostic Micro II……..4	
MLS 4824L Special Clinical Methods..4	
MLS 4825LUrinalysis/Body Fluids II…..4	
	12

*The two course sequence of Anatomy & Physiology I and II may be substituted for these.

Letter and Information Mailed to a to a 4+1 Student Inquiry (Pages 385-386)

Dear Student,

Thank you for your interest in the Clinical Laboratory Sciences Program at University of West Florida. UWF's CLS Program is accredited by National Accrediting Agency for Clinical Laboratory Personnel (NAACLS). The Program has been in operation since 1970. Over the years this program has built a tradition of excellence in preparing students for a rewarding career in clinical laboratory sciences.

A B.S degree in Clinical Laboratory Sciences from an accredited program prepares you as a Board Certified Clinical Laboratory Scientist or a Medical Technologist, who is qualified for employment in a wide variety of laboratory settings. Clinical laboratory professionals are also uniquely qualified for employment in sales, education, training, information technology, regulation compliance, and related functions in bio-medical technology or pharmaceutical manufacturing industries.

In addition, a B.S. degree in clinical laboratory sciences provides a strong foundation to go to a graduate school, medical school or other advanced professional studies to become a Physician Assistant, Pathology Assistant, Veterinarian, Pharmacist and so on. The versatility and portability of this highly marketable qualification sets it apart from a degree in basic sciences such as Biology or other life sciences.

University of West Florida's CLS Program offers only a degree, not a certificate, upon completion of the Program. As a student with a Bachelor's degree, you must first apply and be admitted to the University as a second-**undergraduate-degree-seeking-student**, with Clinical Laboratory Sciences as your major.

Students with a Bachelor's degree, seeking to obtain entry into clinical year of the program are traditionally referred to as 4+1 students. These students have either already completed the biology and chemistry prerequisites for selection into clinical year or they should plan to complete them at UWF prior to acceptance into the clinical year of the Program.

The enclosed 'curriculum outline' document has the prerequisite course requirements, procedure and criteria for selection into clinical year, clinical course listings, structured degree plan for the clinical year; and other needed information. Please review this material and call to set up an appointment for academic advisement. Call or contact Ms. Victoria Dubose, our office administrator (850) 474-2882 or email vdubose@uwf.edu for an appointment. Looking forward to seeing you. Best wishes.

Sincerely,

Swarna Krothapalli, MS. MT (ASCP)
Associate Professor & Program Director

THE UNIVERSITY OF WEST FLORIDA
CLINICAL LABORATORY SCIENCES PROGRAM
4+1 DEGREE PLAN

Course Requirements for the Student with a B.S. Degree in Biological or Chemical Sciences

An individual with a B.S. degree in Biology, Microbiology, Biomedical Sciences, Pre-professional Studies, or related field, or who is a senior about to complete one of those degrees prior to entering The University of West Florida, may be eligible for selection into the clinical year of the Clinical Laboratory Sciences Program if the following prerequisites **or their equivalents** have been completed.

PREREQUISITE COURSES

Biology	**SH**	**Chemistry**	**SH**
BSC 1010 General Zoology/Lab	4	CHM 2045 Chemistry I/Lab	4
PCB 2131 Cell Biology/Lab	4	CHM 2046 Chemistry II/Lab	4
PCB 4703 Human Physiology	3	CHM 2210 Organic Chemistry I/Lab	4
HSC 3550 Pathophysiology	3	CHM 2211 Organic Chemistry II/Lab	4
STA 2023 Statistics	3		
PCB 3063 Genetics/Lab	4	**Clinical Laboratory Sciences**	
MCB 3020 Microbiology/Lab	4	MLS4305 Hematology I/Lab	4
PCB 4233 Immunology/Lab	4	MLS4460 Diag Micro I/Lab	4
BCH 3033 Biochemistry I/Lab	4		

It is important to note:

XStudents who are applying for the clinical year must be enrolled in Hematology & Diagnostic Microbiology in the spring semester. These courses are offered during the spring semester only.

XSince only one class is selected per year (during Spring), a deficiency of even one of the above courses will delay entry into the clinical program by an entire year. It is very important that you contact the Program Director as soon as possible to discuss your degree plan.

XIf you are outside the Pensacola area you should explore the possibility of completing any deficiencies of the above courses prior to your arrival at UWF. Contact the Program Director to make sure that these courses will meet UWF requirements.

You **must** be first admitted to University of West Florida as a Clinical Laboratory Sciences major **before** you are eligible to apply for clinical year selection. Applications for admission to the university may be obtained from the Office of Admissions, (850) 474-2230 or on-line. The admission process may take 8 to10 weeks or possibly longer. Clinical year selection is a separate process conducted by the Clinical Laboratory Sciences Program. Clinical Laboratory Sciences

majors may obtain clinical year application packets from the program office during fall semester.

Remaining pages of this document are same as for 3+1 student included in previous pages.

The University of West Florida - Clinical Laboratory Sciences
Academic Advisement –Initial Visit
Work Sheet for a Degree Plan

Name _____ **Transfer or FTIC**_____
SS NO: _____ **Entering Degree, if any:** _____
Address: _____ **Gordon Rule- Writing:** _____
_____ **Gordon Rule- Math:** _____
Tel N0: _____ **Foreign Language:** _____
E Mail: _____ **Multicultural Requirement:** _____
Date of Entry-UWF _____ **CLAST:** _____

General Studies Requirements		**Fall 06**	**Spring 07**	**Summer 07**	**Fall 07**	**Spring 08**	**Summer 08**
English/Humanities (15 Hrs)	**SH**						
ENC 1101 English Composition I*	3	X					
ENC 1102 English Composition II*	3		X				
English/Humanities Elective (Literature)**	3					X	
English/Humanities Elective (Fine Arts)**	3			X			
English/Humanities Elective (Values)**	3		X				
Foreign Language Requirement							
Foreign Language I	4	X					
Foreign Language II	4		X				
Social Sciences/History (9 Hrs)							
XXX xxxx Historical**	3						X
XXX xxxx Behavioral**	3				X		
XXX xxxxx Socio/Political**	3					X	
Math (6 Hrs)							
MAC 1105 College Algebra***	3	X					
STA 2023 Statistics***	3						X
Lower Division Science Prerequisites (24 Hrs)							
ZOO 1010 General Zoology /Lab	4	X					
PCB 2131 Cell Biology/Lab	4				X		
PCB 4703 Human Physiology	3					X	
CHM 2045 General Chemistry I/Lab	4		X				
CHM 2046 General Chemistry II/Lab	4			X			
CHM 2210 Organic Chemistry I/Lab	4				X		
CHM 2211 Organic Chemistry II/Lab	4					X	

***** Gordon Rule Writing: Must complete 6 sh of English course work
** Gordon Rule Writing: 6 sh of additional course work with writing skills
*** Gordon Rule Math Requirement: 6 sh of Math (Coll Algebra & a higher math course)

UPPER LEVEL SCIENCE PREREQUISITES **Core Science Courses**	**19 SH**	**Fall 08**	**Spring 09**	**Summer 09**	**Fall 09**	**Spring 2010**	**Summer 2010**
BCH 3033 Biochemistry I/Lab	4	X					
PCB 3063 Genetics/Lab	4	X					
HSC 3550 Pathophysiology	3	X					
MCB 3020 Microbiology/Lab	4	X					
PCB 4233 Immunology/Lab	4		X				

Selection into Clinical Year - Projected Entrance*:* <u>Spring 2009</u>

CLINICAL CURRICULUM -

University-Based Courses	**31 SH**		**Spring 09**	**Summer 09**	**Fall 09**		
MCB 4460 Diagnostic Microbiology I	4		X				
MLS 4305 Hematology I/Lab	4		X				
MLS 4220 Urinalysis/Body Fluids I	2			X			
MLS 4625 Clinical Chemistry I	3			X			
MLS 4462 Medical Microbiology/Lab	4			X			
MLS 4334 Hemostasis & Thrombosis	2			X			
MLS 4630 Clinical Chemistry II	3				X		
MLS 4191 Molecular Diagnostics	2				X		
MLS 4550 Immunohematology I	4				X		
MLS 4505 Serology	2				X		
MLS 4705 Special Clinical Topics	1				X		

Hospital-Based Courses	20 SH					Spring 2010	Summer 2010
MLS 4820L Clinical Chemistry III	4					X	
MLS 4882L Hematology II	4					X	
MLS 4821L Diagnostic Microbiology II	4					X	
MLS 4823L Immunohematology II	4						X
MLS 4825L Urinalysis/Body Fluids II	2						X
MLS 4824L Special Clinical Methods	2						X

Total Number of Hours Required for the Degree: 127 SH (for 4 year students)
Number of Hours to be completed: Variable for Transfer Students
Graduation: Last Saturday in July
Certification Exam/s: I st Week of August
St Of Florida Temp License: I st Week of August
St of Florida Regular License: By the end of August
Signature, Student: _____Date: _____

Signature, Academic Advisor; _____Date: _____

Standard 11:

Describe how Academic Standards and Essential Functions are provided to prospective students and made available to the public

Academic Standards and Essential functions required for admission into the program are widely published in the Program Publications listed in essential 10. Prospective students receive in person or in mail an information packet containing: a) program Brochure, b) Student Handbook, c) a Curriculum Outline showing the required courses as well as criteria and procedure for selection into the clinical year of the program. Students who are admitted to the University and come to the department for initial academic advisement also receive the same information. Students who have progressed to the fall semester of the junior year of the program apply for admission into the clinical year. The Application form includes a document entitled >Essential Functions=. Along with their application, students are required to submit this form completed with their signature indicating an awareness of the essential functions and policies for progression in and completion of the program.

Admission to the University- Policies and Procedures

For a review of the policies and procedures for admission to the University please refer to the 2006-2007 University of West Florida catalog, pages 16-22. Students who are admitted to the University can declare a Major in Clinical Laboratory Sciences at the time of admission or if undecided, at a later date. CLS majors may enter the University through any of the following routes:

- Admitted as a freshman after graduation from a high school.
- Transfer students **with an Associate of Arts (A.A.) degree** from a Florida Public Community College or a 4 year (public) institution. These students have fulfilled the university=s General Studies requirements and completed the CLAST requirement.
- Transfer students **with out an Associate of Arts (A.A.) degree** from a Florida Public Community College or a 4 year public institution. These students are subject to UWF's General Studies requirements and CLAST requirement
- Transfer students **with Associate of Science (A.S.) degree** from a Florida Public Community college or a 4 year public institution. These students usually have deficiencies in general studies requirements. They must fulfill deficiencies in General Studies as well as CLAST requirement at UWF.
- Transfer students from **Florida non-public institutions and non-Florida institutions.** These students are subject to the University=s General Studies and CLAST requirements.
- Students with a B.S. degree from a regionally accredited institution; in-state including UWF, or out of state. They must first apply and be admitted to the university as a **second-undergraduate-degree- seeking student**, before they can apply for admission into the clinical year of the program.
- **International students**: must apply and be admitted to the University according to the policies and procedures listed in the catalog. After the admission evaluation is completed, a plan for the B.S degree in clinical laboratory sciences will be prepared by the Program Director, based on the student's status as a first or second bachelor's degree seeking student.

UWF's Clinical Laboratory Sciences Program offers only a B.S. degree in Clinical Laboratory Sciences and does not offer a Certificate.

Foreign Language Requirement: Florida Statutes require that all students seeking their first bachelor=s degree meet the foreign language requirement of 2 years in high school or 2 semesters (8-10 sh) in college, of the same language. Transfer students with A.A degree from a Florida Public Community College who have not met the requirement may be admitted to the upper division of the Program, but must demonstrate competency prior to graduation with a baccalaureate degree.

Common Program Prerequisites: Students entering most bachelor's degree programs at any Florida public institution must successfully complete a set of lower division courses specified as "Common Prerequisites" for the selected program**.** Common prerequisites for the Clinical Laboratory Sciences program are previously listed in Curriculum- Standard 9B.

Upper-Division Status: The following criteria must be completed to achieve the upper- division status:

- $ Admission to the University
- $ 60 semester hours of academic credit
- $ Declaration of a major
- $ General Studies requirements
- $ Gordon Rule requirements
- $ CLAST requirement
- $ Foreign language requirement

Admission to the Clinical Year of the Program-Policies and Procedure

Limited Access Program Designation: The Clinical Laboratory Sciences Program at University of West Florida is designated by State University System as a limited access program. The criteria for selective admission are applied equally to all the students listed as clinical laboratory sciences major regardless of their entry category as listed above. Admission to the University as a CLS major does not guarantee selection into the clinical year.

Policies and Procedures for Selection in to The Clinical Year: Upper-division students who have completed the prerequisites in Biology and Chemistry, and who are presently enrolled in MLS 4305 Hematology I and MLS 4460 Diagnostic Microbiology I during the Spring semester are eligible to apply for entry into the clinical year**.** Eligible students are required to submit an application form, three letters of recommendation, and other supportive documentation by Feb 1. File completion and documentation deadline is usually around Feb 15. The files are reviewed by the selection committee, made up of members from the University faculty and the Education Coordinators from the hospitals. The application files are screened for eligibility and the eligible candidates are invited for a personal interview with the selection committee members. Interviews are usually conducted during the second week of March, prior to Spring Break. Candidates are ranked according to their qualifications and performance in the interview, each criterion ranked on a scale of 1 to 5 (1 = Poor; 5 = excellent). Selection Committee finalizes the ranking and makes the recommendations to the Program Director to accept, defer, or deny admission to each of the applicants. The students are informed about their selection status by April 1. Selected students receive a document detailing the rules, regulations and requirements for students entering the clinical year. Students are asked to acknowledge their acceptance by signing and returning the signature page of this document.

APPLICATION PACKET GIVEN TO THE STUDENTS

Selection into the Clinical Year of the Clinical Laboratory Science Program at the University of West Florida

Application Policies, Procedures and Instructions

1. Submit an application and required documents materials by the **first Monday in February**
   To: Swarna Krothapalli, Program Director
   Clinical Laboratory Sciences Program
   University of West Florida
   11000 University Parkway
   Building 58, Room 79
   Pensacola, Florida 32514-5751

2. Complete the Application Form for Selection into Clinical Year. If you are not currently a student at University of West Florida, complete the Application for Admission to the University and submit required documentation and fees. You must first be admitted to the University in order to be considered for admission into the clinical year of the Program.
3. Using the Reference Forms in the application packet, request a minimum three (3) letters of recommendation to be directly sent to the Program Director. Two letters must be from academicians and one from an employer or someone (not a relative or friend) who knows you personally.
4. If you are not currently enrolled at UWF, forward official transcripts for all colleges and universities you have attended directly to the Program Director (in addition to the UWF Office of Admissions).
5. International students must have their foreign credentials evaluated by one of the evaluation agencies listed in UWF catalog. The student must first be admitted to University in order to be considered for admission into the clinical year of the Program.
6. Eligible applicants will be invited for a personal interview by the Selection Committee.

Selection Criteria

1. The Clinical Laboratory Sciences Program at University of West Florida is a limited access program; that is, the enrollment is capped at 20. Applicants must be in good academic standing with a minimum overall GPA of 2.5 on a 4.0 scale, and they must have completed (or in progress) all prerequisite courses and other graduation requirements prior to beginning of the clinical lab training program.
2. Candidates are evaluated for selection on the basis of GPA, academic record, references, notable accomplishments, background check status and their performance in the personal interview.
3. UWF and the CLS Program encourages applications from qualified students regardless of gender, culture, religion, ethnic background, age, marital status or disability.
4. Students with disabilities may petition for substitution of admission requirements, provided such substitution does not significantly alter the nature of the training in clinical laboratory sciences or the essential functions of a clinical laboratory scientist on the job.

University of West Florida-CLS Program
Application for Selection into Clinical Year

Complete the following application form and submit along with 3 recommendation letters to the Program Director.

Application Deadline: February 1

I. Personal Data:

Name: _____
(Last) (First) (Middle)

_____ _____ _____ _____ Social
Security Number Date of Birth Sex Race

_____
Nationality Native Language

Current Address: _____
Street

_____
City State Zip

Phone: Home /Cell _____ Phone-Work_____ Email: _____

Permanent Address:

_____
Street

_____
City State Zip

Phone: _____ Email: _____

List any other names under which your education records are filed.

_____

Type of Student: ____ UWF native student (entered UWF as a freshman)

____ A.A. transfer from a Florida Public Community College

____ Transfer from other university/college

____ Second Undergraduate Degree

II. Education: List in chronological order every college or university you have attended.

Name and Location	Dates of Attendance	Major	Degree/year

Current Academic Classification: Junior ____ Senior ____ Second undergraduate degree: ____

III. Course Work: Indicate courses completed at the time of application or <u>their equivalent courses</u> by listing the semester hours of credit and checking the "complete" column. Indicate the planned date for completion of other courses.

General Studies Requirement Completed Yes _____ No _____
Have an A.A. degree from a Florida Public Community College Yes _____ No _____
Foreign Language Requirement Met Yes _____ No _____
CLAST Completed Yes _____ No _____
Multicultural Course Requirement Met Yes _____ No _____

<u>Science and Math Prerequisites</u>:

(Following or Equivalent courses)	**SH**	**Completed**	**In Progress**
MAC 1105 College Algebra	___	___	___
STA 2023 Statistics	___	___	___
ZOO 1010 Gen Zoology/lab	___	___	___
PCB 2131 Cell Biology ***and***	___	___	___
PCB 4703 Human Physiology	___	___	___
OR			
BSC 1085 Anat and Physio I /Lab and	___	___	___
BSC 1086 Anat & Physiology II	___	___	___
CHM 2045 Gen Chem I/Lab	___	___	___
CHM 2046 Gen Chem II/Lab	___	___	___
CHM 2210 Organic Chem I/Lab	___	___	___
CHM 2211 Organic Chem II/Lab	___	___	___
PCB 3063 Genetics/Lab	___	___	___
HSC 3550 Pathophysiology	___	___	___
BSC 3033 Biochem I/Lab	___	___	___
PCB 4233 Immunology/Lab	___	___	___
MCB 3020 Microbiology/Lab	___	___	___
MLS 4460 Diag Micro I/Lab	___	___	___
MLS 4305 Hematology I/Lab	___	___	___

IV. Work Experience: (Include volunteer work and military experience)

Employer	Type of Work	Dates of Employment

Are you currently licensed as a health professional in the State of Florida? Yes _____ No _____
If yes, name the profession _____
Current license number _____

V. List any awards, scholarships or special recognitions you have received (in college, as well as others):

_____
_____
_____
_____

VI. Activities: (clubs, hobbies, volunteer work, etc.)

_____
_____
_____
_____

VII. References:

Name **Address** **Relationship**

1. _____

2. _____

3. _____

VIII. If you are selected into the clinical year of the Program you will be required to apply and eligible for receiving approval as a Clinical Laboratory Sciences Program Trainee by BCLP (Board of Clinical Laboratory Personnel) of State of Florida. The following questionnaire is part of the application for trainee license. If you answered yes to any of the following questions please provide documentation of adjudication and evidence of restoration of civil rights, when applicable.

a. Regardless of adjudication, have you ever been convicted of a violation of or pled *nolo contendere* to any federal, state, local statute, regulation or ordination, or entered into any

plea, bargain or settlement, relating to a misdemeanor or felony? Yes_____ No_____

b. Have you ever been convicted of, or entered plea of guilty, *nolo contendere*, or no contest, to a crime in any jurisdiction other than a minor traffic offense? You must include misdemeanors and felonies, even if adjudication was withheld by the court so that you would not have a record to of conviction. Driving under influence or driving while impaired is not a minor traffic offense for purposes of this question. Yes _____ No _____

c. In the last 5 years, have you been enrolled in, required to enter into, or participated in any drug or alcohol recovery program or impaired practitioner program? Yes _____No _____

d. In the last 5 years, have you been treated for or had a recurrence of a diagnosed mental disorder or impairment? Yes _____ No _____

e. In the last 5 years, have you been treated for or had a recurrence of a diagnosed physical impairment? Yes _____ No _____

f. In the last 5 years, have you been treated for or had a recurrence of a diagnosed addictive disorder? Yes _____ No _____

g. Have you ever had a license disciplined for sexual misconduct or committed any act in any other state that would constitute sexual misconduct? Yes ____ No _____

h. Have you had any application for professional license, or any application to practice, denied by any state board or other governmental agency of any state? Yes ____ No _____

i. Have you ever had any professional license or license to practice revoked, suspended, or any other disciplinary action taken in any state? Yes ____ No _____

j. Have you been refused a license to practice, or the renewal thereof in any state? (The intent of this question does not pertain to the failure of previous examination) Yes ____ No ____

IX. Briefly explain why you want to become a Clinical Laboratory Scientist (Please type and attach a separate page).

_____

_____

X. Waiver /Release of Information:

I understand that it is necessary for the University of West Florida Clinical Laboratory Sciences Program to share my application documents with selection committee members. I hereby authorize the Program to release to the selection committee members and affiliate hospitals any information which is material to my application.

I understand that it is my duty and responsibility as an applicant for selection into clinical year of the training program to supplement my application after it has been submitted and when any material change in my circumstances or conditions occur which might affect my eligibility for training.

I hereby swear that I have carefully read the questions in forgoing application and have

answered them completely and accurately. I declare that my responses are true and correct. I understand that if I furnished any false information in this application such action constitutes cause for denial or withdrawal of selection into the clinical year of the Program.

Signature: _____ Date: _____

Print Name _____

XI. I have read the attached document entitled "Statement of Essential Functions" and have accurately provided the required information. I confirm that the above given statements are true and accurate, and I agree to inform the Director of the Clinical Laboratory Sciences Program should any of the information change prior to entry into the clinical Program.

Signature: _____ Date: _____

Print Name: _____

XII. Statement of Understanding:

I realize that with satisfactory completion of the clinical experience, including training at University of West Florida and the hospital, I will be eligible to take the certification examination/s in Clinical Laboratory Sciences. I realize that the opportunity to be trained at a UWF affiliate does not entitle me to a job at that hospital.

If I am accepted into the clinical program for Clinical Laboratory Sciences at University of West Florida, I understand the responsibilities and confidentiality expected of me. I realize that physicians will rely on the accuracy of my work in diagnosing diseases and treating patients. Because the quality of my work affects the health and even the life of patients, I agree to perform my clinical laboratory assignments with extreme care, thoroughness and accuracy. I also understand that I will have access to confidential information concerning patients, and agree not to discuss this information with anyone not authorized to receive it.

I understand that The University of West Florida reserves the right to dismiss a student for personal misconduct, academic cheating, incompetence, violation of UWF or Hospital regulations, and/or unsatisfactory grades. I shall read and adhere to the rules and regulations for acceptable conduct as described in the University's Student Handbook, the Handbook for Clinical Laboratory Sciences Majors and the hospital rotation manual.

Signature: _____ Date: _____

Print Name: _____

The University of West Florida
Clinical Laboratory Sciences Program
Statement of Essential Functions

Purpose: The purpose of this document is two-fold:

1. To assure that the students applying for selection into the clinical year of the Program are cognizant of the essential functions and abilities necessary to perform adequately and to succeed in the Clinical Laboratory Sciences Program; and to be proficient in duties and responsibilities of a clinical laboratory scientist upon graduation.

2. To assure that the Clinical Laboratory Sciences Program, whenever applicable or feasible, provides the necessary accommodation/s to students with disabilities to enable them to perform the essential functions and achieve student learning outcomes in each area of instruction.

First, read the accompanying document, "Essential Functions", which defines each standard and gives some examples of the necessity for each function. Then read each item on the list below. Indicate your ability to perform these essential functions of a Clinical Laboratory Scientist.

Communication

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Hearing

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Interaction

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Mobility

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Motor Skills

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Problem Solving

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Self Care

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Olfaction

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Temperament

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

Vision

___ I am capable of meeting these requirements
___ I am not capable of meeting these requirements
___ I am capable of meeting these requirements with the following accommodations*:
_____
_____

I have received, reviewed and understand the standards necessary to perform the essential functions of the Clinical Laboratory Scientist. I have indicated areas where I may need accommodation.

Signature: _____ Date: _____

Please print Name: _____

The University of West Florida- Clinical Laboratory Sciences Program
Standards for Essential Functions

This should provide students in the Clinical Laboratory Sciences program an overview of the requirement of the course of study. The examples of activities are based upon typical tasks performed by medical laboratory workers.

FUNCTION	STANDARD	EXAMPLE ACTIVITY
Communication	Ability to interact with others in English, both verbally and in legible written form. Ability to read English.	Keep accurate records. Read and write procedures. Read and follow instruction in manufacturer's inserts. Explain procedures and results to patients, health care providers, coworkers.
Hearing	Ability to gather information aurally or to adapt	Recognize instrument signals, alarms. Use telephone.
Interaction	Ability to interact with individuals or groups from a range of social, cultural, emotional and intellectual backgrounds	Establish and maintain rapport and trust with patients, coworkers, other health care professionals and general public.
Mobility	Ability to move from room to room, and to maneuver in small places, e.g. around instruments, between beds, benches, etc.	Move around hallways, laboratory, patient room, storage areas as necessary.
Motor Skills	Demonstrate/possess gross and fine motor skills to operate dials, switches, pipeting devices, smoothly inoculate agar, and to assist patients.	Reach and manipulate equipment, reagents and supplies. Assist patients as necessary.
Self Care	Ability to present a professional appearance as a lab repre-sentative. Maintain own health, hygiene and safety on the job.	Observe safety/OSHA policies. Practice Universal precautions.
Olfaction	Demonstrate sufficient olfactory sense to maintain environmental safety.	Use odors to assess specimens, tests, instrument malfunction and smoke in case of fire. Maintain a safe work environment.
Temperament	Ability to work in high stress work place environment.	Perform duties in emergency situations; in situations with time and manpower constraints and high stress conditions.
Vision	Ability to accurately perform and assess laboratory procedures requiring microscopic examination as well as gross visual examination.	Distinguish colors and opacity. Discern fine agglutination, precipitation. Resolve 1 micron objects using a bright field microscope. Identify cells, parasites and other elements in microscopic procedure for diagnosis.

Clinical Laboratory Science Program
Student Selection into Clinical Year
Reference Form

To the Applicant: Complete the upper portion of this form and send it to the person who has agreed to provide evaluation, along with a stamped envelope addressed to:

Swarna Krothapalli, Program Director
The University of West Florida
Clinical Laboratory Sciences Program
11000 University Parkway
Building 58, Room 79
Pensacola, Florida 32514

NAME: _____
(last) (first) (middle) (maiden)

ADDRESS: _____
(street) (city) (state) (zip)

----------APPLICANT MUST NOT WRITE BELOW THIS LINE ----------

To the Evaluator: The student named above is applying for selection into the clinical year of the Clinical Laboratory Sciences Program at The University of West Florida. Your evaluation of the applicant will assist the Selection Committee in identifying students who are qualified to complete the Clinical Laboratory Sciences Program. Under Florida law, this reference form will become part of the student's application and must be made available to the student, parent or guardian upon request. Your assistance with this important process is greatly appreciated.

1. How long, how well and in what capacity have you known the applicant?

_____
_____
_____
_____

2. Please indicate the class rank of the applicant. _____

3. Are there any special reasons why you think the applicant would be a good Clinical Laboratory Scientist? If so, explain.

_____
_____
_____
_____

4. Please check one box in each row which most accurately describes your evaluation of the applicant according to the attributes listed in the left column.

I. Industry: Willingness to work hard	Lazy, little or no effort	Seldom completes required work	Ordinarily does required work	Works regularly, occasionally does extra work	Unable to evaluate
II. Thoroughness: Accuracy, carefulness, exactness	Careless, work always incomplete	Work sometimes completed, usually inaccurate and carelessly done	Work generally completed, reasonably accurate	Careful work, accurate, completed on time	Unable to evaluate
III. Manual dexterity: Ability to perform manual techniques	Very awkward, unable to perform manual skills satisfactorily	Awkward, able to perform manual skill satisfactorily with extra practice	Performs manual skills well, occasional problem	Performs manual skill exceptionally well	Unable to evaluate
IV. Initiative, intellectual curiosity, originality, willingness to attempt new ideas	Seldom originates any work, follows others	Sometimes attempts new ideas	Often initiates new ideas and projects	Marked ability to think for him/herself, carries out ideas	Unable to evaluate
V. Reliability: dependability, honesty, responsibility	Unreliable, irresponsible	Often unreliable, irresponsible	Has to be prompted, reliable on most occasions	Very reliable and responsible	Unable to evaluate
VI. Cooperation: ability to work with others, adaptable, tactful, agreeable	Disagreeable, antagonistic	Slow to respond, unwilling to help	Tends to be agreeable and willing to help	Does well in team work, agreeable	Unable to evaluate
VII. Communication skills: Ability to transmit knowledge orally and in writing	Ineffective, unable to transmit information	Frequent difficulty transmitting information	Adequate, usually able to transmit information	Effective, no difficulty transmitting information	Unable to evaluate
VIII. Emotional Control: poise, moodiness, temperament, timidity, emotionalism	Very poor control of emotion, little self confidence	Moderately well balanced, occasionally loses self control, moderate self confidence	Well balanced, poised, good control of emotions, usually confident	Unusual poise and self confidence	Unable to evaluate
IX. Intellectual capacity: Intelligence, natural ability to succeed in academic effort	Very slow to learn	Needs to make extra effort to keep up	Average intelligence	Above average intelligence, quick to grasp subject	Unable to evaluate
X. Prospect as Clinical Laboratory student	Should not attempt Clinical Laboratory Sciences Program	Will have some difficulty	Should have average success	Should do well	Unable to evaluate
XI. Recommendation	Not recommended	Recommended with reservations	Recommended	Strongly recommended	Unable to evaluate

5. Do you know of any circumstances which would make it inadvisable for the applicant to enter the field of clinical laboratory science? If yes, please explain.

_____

_____

_____

6. Additional comments: (A separate letter may be attached)

_____

_____

_____

_____

_____

NAME: _____

TITLE: _____

INSTITUTION: _____

ADDRESS: _____

_____

_____ _____

Signature Date

Student Background Checks

Beginning with the clinical year class of 2005 background check report is included as a requirement for application process. This requirement is included in the affiliation agreements with all of our clinical affiliates. The UWF Program has selected "My Background Check" as a vendor for this service (mybackgroundcheck.com). At a cost of $ 69.95 to the student, the following package is selected for meeting the JCAHO requirements as specified by our HCA affiliates. This package seems adequate for all other affiliates too. The Package includes:

- Criminal Search (Previous 7 years or up to 5 criminal searches)
- Social Security Verification
- Employment Verification to include reason for separation and eligibility for re-employment for each employer
- OIG List Excluded Individuals/Entities
- GSA List of Parties Excluded from Federal Programs
- Violent Sexual Offender and Predator Registry Search
- U.S. Treasury, Office of Foreign Assets Control (OFAC), List of Specially Designed National (SDN)

Applicable State Exclusion List, if one.

Selection Committee

1. The Selection Committee is made up of:
   A. UWF Program Faculty - Clinical site Coordinator
   B. UWF Program Faculty Member
   C. Hospital Education Coordinator
   D. Hospital Education Coordinator
   E. Hospital Education Coordinator
   F. Hospital Education Coordinator
2. The Selection Committee reviews the application files and conducts the personal interviews in March of each year. The selected candidates and alternates will be announced about the first week of April.

Selection Criteria:

Criteria for selective admission into a limited access program include indicators of a) intellectual ability, b) academic performance, c) creativity, or talent to complete required work within the program. Accordingly, the following selection criteria for admission in to the clinical year of the program are established and utilized:

1. Completion of prerequisite courses in biology, chemistry and mathematics
2. Completion of all other graduation requirements
3. Ability to perform essential functions required of a Clinical Laboratory Scientist
4. A Grade Point Average of 2.5 or above
5. Recommendation Letters
6. Career goals and objectives
7. Scholarships, Awards, Community service
8. Other evidence of leadership potential
9. A clear Background Check
10. Performance in the Interview

Include here Hard Copies (2 Pages) of Backgorund check Application Form

University of West Florida
Program in Clinical Laboratory Sciences
Interviews for selection into clinical year
Thursday, March 30, 2006

Selection Committee Members Present:

Steve Smith:	UWF Clinical Site Coordinator	
Sherman Bonomelli:	UWF Faculty	
Rosina Cunningham:	Education Coordinator,	Baptist Hospital
Valerie Tomlinson:	Education Coordinator,	Sacred Heart Hospital
Marcia Dumas:	Education Coordinator,	West Florida Hospital
Esther Scott:	Education Coordinator,	Fort Walton Beach Medical Center

Student Applicants Interviewed:

1.	9: 00-9:20	Saunders, Katie
2.	9:20- 9:50	Thompson, Christi
3.	9:50-10:10	Nguyen, Linh
4.	10:10-10:30	Peterson, Tiffany
5.	10:30-10:50	Engle, Christine
	11:00-12: 30	Lunch for committee members
6.	12:30-12:50	Marks, Jennifer
7.	12:50-1:10	Antilla, Cynthia
8.	1:10-1:30	Augustin, Johane
9.	1:30-1:50	Cockerham, Derik
10.	1:50-2:10	Ryanczak, Michele
11.	2:10-2:30	Getachew, Aklile
12.	2:30-2:50	Marshall Jessica
13.	2:50-3:10	Perez, Nicole

UNIVERSITY OF WEST FLORIDA
Clinical Laboratory Sciences Program
Selection into Clinical Year
Student Interview Form

Introductions:

Interview Questions:

Interviewer: _____

Introduction: When did you first hear about clinical laboratory sciences as a profession? What was it that attracted you to this field?
Have you considered any professions other than clinical laboratory sciences?

Interviewer: _____

Qualifications/Self Assessment: What do you think are important characteristics of a clinical laboratory scientist?
What do you consider to be your best attributes which will help you succeed in this career?

Interviewer: _____

Knowledge about the job: Have you done your homework regarding the job opportunities, employment outlook, pay scales and working conditions of a clinical laboratory scientist? Tell us what you know.

Interviewer: _____

Interests: Tell us about your extracurricular activities and hobbies.
How do you prioritize your time?

Interviewer: _____

Current event: What is the most recent medical current event that you have read about?

Interviewer: _____

Supervision: If you were the Education Coordinator for the hospital and one of the students is habitually late; how would you handle that situation?

Interviewer: _____

Management: If you were the Program Director and you needed to place one of several students in a hospital that was a distance away, how would you do that fairly?

Interviewer: _____

Adaptability to varying situations: Suppose one day you find yourself being trained by a clinical laboratory scientist other than the one you are used to working with and you feel this technologist is being overly critical of your work. How would you handle this? (How do you handle criticism?)

Interviewer: _____

Ethics/Integrity: You notice that the technologists in your training hospital are not doing certain procedures exactly the same way you learned them here at the university or you notice a deviation from standard procedure. How would you handle this? (How do you deal with ethical issues?)

Conclusion:

Is there anything you would like to tell us that you didn't get a chance to while answering these questions? Do you have any questions for us?

The University of West Florida
Clinical Laboratory Sciences Program

Evaluation of Student for Entry into Clinical Training

STUDENT NAME _____ DATE _____

	5	4	3	2	1		Weight Factor	Total
Grades						X	8	
References						X	5	
Interview						X	6	
Other						X	1	
						X	Total =	

KEY

Grades:

3.6 - 4.00	Outstanding	5
3.0 - 3.49	Above Average	4
2.5 - 2.99	Good/ Average	3
2.0 - 2.49	Fair/Can improve	2
<2.0	Unacceptable	1

Other:

Merit awards/other degrees	5
Scholarships, other awards	4
Made it this far	3

References:

5 Excellent, with specific references to Clinical Lab Sciences

Good to excellent general references	4
Bland/non-committal or missing a reference	3
Negative comments or one contains a non-recommendation	2
All references contain negative recommendations	1

Interview Criteria:

Appearance/poise
Communication/self expression
Motivation & reasons for becoming MT
Knowledge of the profession
Reaction to stress
Leadership potential
Future goals
Understanding of health professions
Self assessment - potential/performance
Extracurricular activities

Comments:

_____

_____

Clinical Year Selection- Cover Letter to the Student

March 31, 2006

Dear Student,

The members of the Selection Committee have been uniformly impressed with your knowledge, goals and commitment to become a Clinical Laboratory Scientist. I am pleased to inform you that you have been selected as a candidate for clinical training during the year 2006-2007. This selection if conditional and is contingent upon your successful completion of the prerequisite course work currently in progress and other graduation requirements.

Please read the enclosed document entitled **"Requirements for Students Enrolled in the Clinical Year"** and indicate your acceptance of selection as a candidate for clinical training by returning the form with your signature. This form must be returned to the Program Director no later than April 7, 2006.

The course work required for Clinical Laboratory Sciences students in the clinical year for the summer and fall terms is listed below. See your advisor to ensure that all other requirements for graduation are met. Congratulations and best wishes.

Sincerely,

Swarna Krothapalli, MS, MT(ASCP)
Associate Professor and Program Director

Enclosures

You should register for the following courses in summer and fall 2006

Summer 2006	**SH**
MLS 4220 UA/BF I /Lab…….....2	
MLS 4625 Clinical Chemistry I/lab….3	
MLS 4334 Hemo & Thromb/Lab…….2	
MLS 4462 Medical Micro I/Lab...…...4	
	11

Fall 2006	**SH**
MLS 4630 Clinical Chemistry II/lab…….3	
MLS 4191 Molecular Diagnostics ……2	
MLS 4550 Immunohematology I/lab…….4	
MLS 4505 Serology/Lab……. 2	
MLS 4705 Special Clinical Topics…. …..1	
	12

University of West Florida
Clinical Laboratory Sciences Program

REQUIREMENTS FOR STUDENTS ENROLLED IN THE CLINICAL YEAR

Attendance:
The clinical year of the Clinical Laboratory Sciences Program is 15 months (four semesters) in length. The starting date for the Class of 2006-2007 is May 15, 2006 and will end on August 11, 2007. The first two semesters (May-December) will be spent at the university, and the last two semesters (January-July) will be spent at one of the clinical affiliates. Attendance in all the scheduled lectures, laboratory sessions, clinical rotations, workshops, seminars and other training-related activities is mandatory. Attendance and punctuality are of utmost importance in professional training and will be strictly enforced during the clinical year. It is important to note that clinical rotations at the hospital are on a 40 hour per week basis and students in clinical rotations do not follow the University calendar for spring break and semester breaks.

Dress Code:
While on campus, or at the clinical site, students are expected to dress in a professional manner. Shorts, halter tops, cut-off jeans and other such incomplete clothing are not acceptable. A lab coat and closed toe shoes with socks or stockings must be worn at all times while in the clinical laboratory, both at the university and the hospital. In addition, each student should follow the instructions regarding dress code of the assigned hospital laboratory.

Health Status Forms:
Students selected for the clinical year of the Program must provide a completed "Statement of Health and Immunization Form" as soon as possible after selection into the clinical year. You will be provided with this form with the next two weeks. You should have the general health status exam and initiate Hepatitis B vaccination (if not already immunized) as soon as possible after you receive the documents**. TB skin test must be taken within three months prior to entry into clinical rotations (no sooner than October 1)**. Completed forms and proof of completion of Hepatitis B and Varicella immunization/immunity must be provided no later than December 2, 2006.

Health Insurance:
Students enrolled in the clinical year of the Program must provide proof that they are covered by a health insurance policy. This may be a personal policy or family coverage. Proof may consist of a copy of your insurance card or a similar document which verifies that you are covered by a health insurance policy. Submit this to the Program Director no later than the first day of classes, summer semester, 2006.

Background Check:
You have already completed this requirement.

Clinical Site Assignments:

The UWF Clinical Laboratory Sciences Program is currently affiliated with eight hospitals: Baptist Hospital, Sacred Heart Hospital and West Florida Hospital in Pensacola; Fort Walton Beach Medical Center in FWB; Bay Medical Center in Panama City; Shands at University of Florida and Shands at AGH in Gainesville; and Shands Hospital in Jacksonville. Each student will be assigned to one of these clinical sites by the Program Director. In making clinical-site assignments every consideration will be given to the student's place of residence / distance from the clinical site, student's personal and financial circumstances and any other relevant factors presented by the student. Program's priorities are to be able to place all of the admitted students at clinical sites and to the extent possible, place student/s at all clinical sites each year. Following due deliberation of all the factors involved, clinical site assignments are made and students are notified of the assignments by the end of June each year. **Once the decisions are made students are required to accept the clinical site assigned by the Program Director, who will take into consideration any special circumstances presented by the student for his/her choice of a hospital.**

Laboratory Safety:

Students enrolled in the clinical year of the program will agree to strictly adhere to and practice all of the established safety procedures at the university and at the clinical facility. This includes reading all the safety information provided and adhering to safe practices in laboratory work, as mandated by OSHA standards and universal standards/ precautions. By accepting the University's offer for clinical training the student acknowledges the inherent risk in handling human blood, body fluids, tissues and other specimens which are potentially biohazardous. The student shall also hold the responsibility for personal safety and prevention of exposure to blood borne pathogens through practicing safety measures in clinical laboratory work.

Confidentiality:

Students in the Clinical laboratory Sciences Program shall agree to abide by the Code of Ethics of Clinical Laboratory Scientists, which states:

> **"Realizing that the knowledge obtained concerning patients in the course of my work must be treated as confidential, I hold inviolate the confidence placed in me by the patient and the physician."**

Academic and Professional Integrity:

Clinical Laboratory Sciences students are required to conduct themselves at all times in a manner appropriate to the dignity of their chosen profession. This decrees that honesty, integrity, and reliability in their academic and clinical work are absolutely crucial. By their acceptance of UWF's offer for clinical training, students acknowledge their willingness to uphold the finest traditions of health care professions by placing the patient's welfare ahead of every other consideration of expediency or personal convenience. Students enrolled in the CLS Program must also abide by the Student's Code of Conduct as described in the UWF Student Handbook and the policies addressed in the Handbook for Clinical Laboratory Sciences Majors.

Students should maintain a grade of "C" or better in each of the MLS courses, including Hematology I and Diagnostic Microbiology I, in order to progress to the next phase of the program. Deficiencies in academic performance and/or failure to adhere to the established professional policies will result in dismissal from the training program. (See attached document entitled "Professional Policies").

Seminars, Special Projects and Other Assignments:

Beginning with the summer semester students in the clinical year will be required to attend continuing education programs (sometimes scheduled on evenings and weekends). Since the program officials undertake the responsibility of offering the most comprehensive body of knowledge in clinical laboratory sciences during the clinical year, students are expected to meet this challenge by making the clinical training requirements their number one priority. **By signing the attached acceptance form, the student is acknowledging that requirements in this professional training go beyond the regular scheduled class hours and that he/she is willing to meet all the training requirements as scheduled by the faculty.**

University of West Florida Clinical Laboratory Sciences program

PROFESSIONAL POLICIES

IMPROPER CONDUCT AND DISCIPLINARY ACTIONS DURING THE HOSPITAL ROTATION

SEE STANDARD 12 PAGE: 432

University of West Florida
Clinical Laboratory Sciences Program

ACCEPTANCE/ SIGNATURE FORM FOR CLINICAL TRAINING

Instructions to the student: Please indicate your response by checking in the appropriate space. **This form must be signed and returned to the Program Director as soon as possible but no later than April 12, 2006.**

- I have read the enclosed document entitled "Requirements for Students Enrolled in the Clinical Year". I have also received a copy of the UWF "Handbook for Clinical Lab Science Majors" which provided me with all the pertinent information regarding the Program's policies and procedures.

- I agree to abide by the "Requirements for Students Enrolled in the Clinical Year" and the rules and regulation of the clinical affiliate to which I am assigned for advanced training. I agree to practice all laboratory safety practices and accept the responsibility for prevention of my exposure to blood borne pathogens through appropriate precautions.

- I agree to submit a "Statement of Health and Immunization Form" and proof of health insurance coverage for the period I am enrolled as a student in the clinical year of the Program.

- I agree to provide a background check report, as required by the program.

- I agree not to hold the University of West Florida liable if, due to unavoidable circumstances such as a scheduling problem with a clinical affiliate, my hospital rotations are delayed beyond January, 2007 and my graduation is delayed beyond July, 2007.

____ I accept your offer for clinical training during the year 2006-2007. I agree to accept the clinical site to which I am assigned by the Program Director.

____ I do not accept your offer for selection into the clinical year.

Signature: _____ Date: _____

Print Name: _____

Describe how admission to the Program is made in accordance with clearly defined and published practices of the institution

Admission to the Clinical Year of the Program is made in accordance with the clearly defined policies and practices of the University.

- Students must first be admitted to the University.
- Based on the admission evaluation of student transcripts and other factors, student receives a degree plan listing the course work to be completed during each semester until graduation.
- During the first contact with the Program student also receives the published information with reference to items A-M in standard 10.
- Student's progress towards selection into the clinical year is closely monitored through academic advisement sessions.
- As the student advances to enrollment in the MLS courses (Hematology and Diagnostic Microbiology, special permission required) he/she receives the packet of documents for application into clinical year.
- The Program is authorized by the State as a Limited Access Program, with defined criteria and reasons for granting limited access status.
- Students are informed of the Limited Access Status of the program and the competitive basis for the selection into the clinical year early in the enrollment period.
- Each year the Program is required (through the university) to submit a Limited Access Program Report, giving details of the number of applicants, gender, race, reasons for non-selection (if any qualified students are not selected), reasons for attrition, and so on.
  A copy of this report for 2005-2006 is included in the following pages.
- The Program adheres to the institutional policies and principles of Equal Access/Equal Opportunity for all qualified students, with no regard for gender, race, religion, ethnicity, culture or disability unrelated to the essential functions.

Include Here **Hard Copies of the The Limited Access Report Forms**

Standard 12: Description

Rules and Regulations for Acceptable Conduct; and how they are distributed

Academic Setting-On Campus Courses:

Rules and Regulations are distributed to students at 1) by the University and 2) by the CLS Program

1. University of West Florida Student Handbook: UWF students receive this handbook at the time of admission, as part of the orientation to the University. This publication has articles relating to all aspects of student's life on campus including UWF Student Code of Conduct (pages 23-27), disciplinary actions and student's appeal process. This handbook is available at: http://www.uwf.edu/judicialaffairs/ or http:/www.uwf.edu/president/policies. A copy of this Handbook is submitted along with this self study. Students enrolled in the Clinical Laboratory Sciences Program are subject to these rules and regulations.

The following information is required by the University to be placed on each course syllabus:
"The Student Code of Conduct sets forth the rules, regulations and expected behavior of students enrolled at the University of West Florida. Violations of any rules, regulations, or behavioral expectations may result in a charge of violating the Student Code of Conduct. It is the student's responsibility to read the Student Code of Conduct and conduct themselves accordingly. You may access the current Student Code of Conduct at http://www.uwf.edu/judicialaffairs".

2. Handbook for Clinical Laboratory Sciences Majors, which was revised and reprinted in 2006**,** is distributed to students at various contact points with the Program. It has a section titled: "Program Policies, Rules and Regulations" (Pages 26-30). This section clearly describes the code of ethics, professional policies, academic policies, criteria for pass/fail/and progression; and causes for dismissal from the program. A copy of this handbook is submitted along with this self study.

As previously described in Standard 11, at the time of selection into the clinical year, students are given 2 documents titled: **a) Requirements for students enrolled in the clinical year, b) Improper conduct and disciplinary actions during the hospital rotation**. Students are required to indicate their understanding and acceptance of these rules by returning an acceptance form with their signature.

Course Syllabi: Students receive rules and regulations governing acceptable academic and non-academic conduct in the university-based courses at the beginning of each course as part of the course syllabus.

Clinical Setting- Hospital-based Clinical Rotations

In the clinical year of the program at UWF students spend 3 semesters on campus and 2 following semesters at a clinical site. During the 3 semesters of campus-based clinical laboratory courses students receive a thorough indoctrination in rules and regulations governing acceptable conduct in both academic and clinical settings. The university-based faculty believes strongly in the need to prepare students for a smooth transition into clinical rotations at the hospital. For a final round of emphasis on rules of conduct at the hospital laboratory, each year during the last day of the fall semester, those students who have successfully completed the campus-based clinical program are

given a day long orientation to hospital rotations. Education coordinators from our local clinical sites are invited to attend this session and participate in a question/answer session with the students. Prior to this scheduled event, students are required to purchase a **"Hospital Rotations Manual"** prepared by the University faculty, in collaboration with the hospital education coordinators**.** Hospital bound students once again receive a presentation on the academic and professional policies and procedures for clinical rotations. Students acknowledge their understanding and acceptance of these rules and regulations by signing a form which is placed in their files.

Orientation to the Hospital and to the Clinical Laboratory: During the first day or during the first week of their clinical rotations students receive orientation to the hospital along with the new employees. They are also given an orientation to the clinical laboratory, usually by the education coordinator. Students receive instructions related to rules and regulations for acceptable conduct, as well as the details pertaining to what constitutes unacceptable conduct in their role as a student trainee at that institution. An example agenda follows:

UNIVERSITY OF WEST FLORIDA MEDICAL TECHNOLOGY PROGRAM
ORIENTATION TO THE HOSPITAL LABORATORY ROTATIONS
Friday, December 15, 2005

8:00 - 9:30	**Clinical Rotations and Academic Policies** Mrs. Swarna Krothapalli, Program Director
9:30. - 9:45	Break
9:45 - 11:00	**Clinical Rotations General & Professional Policies** **Overview of Clinical Rotation Manual** Dr. Steve Smith, Clinical Site Coordinator
11:00 -12:00	**Introduction of Education Coordinators** Rosina Cunningham, B.A.; MT (ASCP) Baptist Hospital Valerie Tomlinson CLS (NCA) Sacred Heart Hospital Marcia Dumas, B.S.; MT (ASCP) West Florida Hospital Esther Scott, B.S.; MT (ASCP) Fort Walton Beach Medical Center
12:00 - 1:00	Lunch with Faculty
1:00 -300	Student Mid-Term Self-Assessment Examination (Computerized Test)
1:00 - 3:00	**Education Coordinators /UWF Faculty Meeting**

Students are required to purchase a copy of the 'CLS Program-Clinical Rotations Manual' from UWF Bookstore prior to attending this orientation. This manual should be placed in a loose leaf binder with dividers and brought to the orientation session. This is your work-study syllabus.

Standard 12: Documentation
University Based Courses- Rules and Regulations

Syllabi for all of the university-based courses contain the following rules, regulations and expectations:

Expectations for Academic Conduct/Plagiarism Policy: (Excerpt from UWF Student Code of Conduct)

As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity, personal and institutional, is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.

Academic Misconduct - UWF Catalog 2006-2007 Page 74

Violations by a student of any of the following actions that constitutes an offense will result in disciplinary action. Fraudulent or deceptive action involving academic matters, including:

1. **Cheating.** The unauthorized giving or taking of any information or material on academic work considered in the determination of a grade.
2. **Plagiarism.** The act of representing the ideas, words, creations or work of another as one's own
3. **Bribery.** The offering, giving, receiving or soliciting of anything of value to influence a grade.
4. **Conspiracy.** Planning with others to commit any form of academic misconduct.
5. **Misrepresentation.** Any action or omission with intent to deceive a teacher so as to affect a grade.

Classroom Behavior: (from UWF Student Handbook 2006-2007)

University of West Florida faculty is responsible for establishing and implementing appropriate academic standards as well as reasonable behavior standards for each class. Disruptive classroom conduct, a violation of the UWF Student Code of Conduct, is defined as individual or group conduct of a nature that interrupts or interferes with educational activities, infringes upon the rights and privileges of others, results in the destruction of property or is otherwise prejudiced to the maintenance of order. Violations should be reported to the Dean of Students for adjudication through the Student Conduct System.

Information included in MLS Course Syllabi

Class Policies: (Programmatic)

Strict adherence to the following will be a requirement for the completion of this course.

1. **Attendance**: Attendance is mandatory in all lecture and laboratory sessions. The Student is required to keep absences to a minimum. Student is allowed 3 absences from class during the semester. These should be reserved for and taken only due to unavoidable circumstances or reasons such as illness or special family events. The instructor should be informed in advance for planned or scheduled absence. In case of an emergency or unexpected circumstances, the student should inform the instructor, as soon as possible: a) the reason for absence, b) seek assistance in completing the class work missed. Make-ups will be at the discretion of the instructor based upon the nature and justification of absence.
2. **Punctuality:** Students are required to be in class on time. Tardiness on more than 4 occasions during the semester is unacceptable and student will be given a warning if habitual tardiness is observed.
3. **Postponement of Exam:** Student will be permitted to postpone exam once during the semester, due to an emergency or ill health. Repeated requests for postponement of exams or quizzes are subject to warning and appropriate corrective action.
4. **Make-up Tests:** Make-up tests will not be given. At the beginning of each laboratory, a short quiz will be given on the material covered during the previous week. Missed quizzes and **assignments that are not submitted on time will receive zero points.** It is the student's responsibility to seek make-up labs or exams which are missed due to unavoidable circumstances.
5. **Reading Assignments**: Assigned reading should be completed before the corresponding lecture and lab.
6. Students are expected to attend all scheduled field trips and program associated activities.
7. The material of this course is clinical and technical, so if you miss a class it cannot be made up through a textbook or classmates' notes. Attendance is absolutely essential to meet the objectives of this course.
8. Your performance evaluation during this course will include not only the written and Practical exams and assignments but also development of behavior and attitude appropriate for hospital rotation. For example: Attendance, punctuality, work habits, lab safety, neatness, accuracy, organization of time and manual dexterity.
9. During this course, you will be working with clinical material: human blood and body fluids. All such material is potentially infectious. A strict adherence to the established safety precautions in the laboratory will not only eliminate the risk of infection but will also prepare you for future clinical laboratory work at the hospitals.
10. Keep in mind that in the future, you will be tested repeatedly for your knowledge and application of material covered in this course; not only during your hospital rotation, but also in the National Certification/Licensure examinations. So, it is essential you gain a sound knowledge of theory and practicum of the hematology for future application and practice.
11. For this reason I strongly suggest that you keep an organized, up-to- date file of all the material gathered during this course for future use.

12. I wish to have an on-going, one-to-one communication with you, to monitor your progress, help clear your doubts, and assist you in every way to make this learning experience not only challenging but also enjoyable. Make use of this opportunity (free access to my time and assistance) to your full advantage as you need it.

Rules and Regulations for Acceptable Conduct in CLS Classroom/Student Laboratory:

The following conduct is strictly prohibited in the classroom / laboratory; non-compliance will result in appropriate disciplinary action:

1. Eating, drinking, smoking, chewing gum, or applying makeup and other such activities.
2. Use of abusive or threatening language and rudeness to instructors and/or classmates.
3. Refusal to follow instructions and overt defiance of rules and regulations.
4. Boisterous, loud and /or prolonged personal conversations or discussions while in the classroom / laboratory.
5. Failure to follow instructions regarding dress code:
    a. Close toed shoes, no high heels, must be worn at all times
    b. Minimum possible exposure of bare skin is permitted (skirts or dresses without stockings, etc)
    c. Shorts and sleeveless tops are prohibited
    d. Long hair must be tied up or contained to prevent contamination or entanglement
6. Habitual sleeping and /or inattentiveness during class /laboratory.
7. Arriving in class under the influence of alcohol or non-prescription medications.
8. Use of cell phones and other electronic gadgets.
9. Conducting personal business during training hours
10. Unauthorized, excessive or unprofessional use of equipment / supplies
11. Failure to follow instructions with regard to use of classroom computers:
    Classroom computers should be used only for educational purposes and applications.
    Do not personalize them or abuse them in any manner.
    Do not down load music, watch movies, cruise the web for inappropriate material, play games or use classroom computers for other non-academic activities.
    Do not alter or pirate the software programs.
    Do not add unauthorized software (i.e, game programs).
    Personal files shall be kept on students' (H) drive; not on the desk top.
    Security for these files is entirely student's responsibility.
12. Unauthorized saving, downloading or printing of exams, quizzes, and any other regulated material.

Student Laboratory- Safety Rules and Regulations

These rules are devised for your own safety as well as the safety of your fellow students, teaching assistant and instructor. Violation of any of these safety precautions will result in deduction of points from your laboratory performance grade. Repeated violation of these rules will result in the student's removal from the laboratory. There is little danger of health hazards in a clinical laboratory when all individuals practice good, careful work habits.

1. Laboratory coats must be worn at all times within the laboratory.
2. Gloves must be worn when working with blood, serum, or other potentially infectious specimen. CDC's Recommendations for Prevention of HIV Transmission in health care settings should be read and strictly adhered to in the clinical lab.
3. Shoes must be worn and must be closed toe (no sandals or thongs).
4. Skirts or dresses worn without stockings are prohibited. Shorts and sleeveless tops are prohibited.
5. Do not lick labels, chew pencils or put any objects into the mouth. Do not mouth pipette.
6. Take extra care and every precaution to avoid spillage, creation of aerosols and contamination of antisera.
7. If there are any breaks in the skin, a bandage must be applied before putting on the gloves. Remember, you will be handling patient specimens, commercial cells, and anti-sera which should be treated as possible infectious material.
8. Contaminated needles and broken glassware shall be discarded into a special, designated container. Never dispose of needles or broken glassware into the waste baskets. Report any needle sticks or cuts to instructor immediately.
9. All specimens will be disposed of into biohazard bags and autoclaved before disposing. This includes all material from laboratory procedures. Any spills of specimens and/or control sera should be reported and the area cleaned with a disinfectant (10% bleach). No specimens should be poured down the sink or disposed of into waste baskets. Always disinfect your work area before leaving the lab.
10. Any spills should be reported and the area cleaned up promptly with a disinfectant.
11. At the end of each laboratory session, clean your work area with 10% bleach solution.
12. Always wash hands with an antiseptic soap after handling blood or other specimens. Immediately wash hands if they come in contact with any specimen or control sera. Wash hands when leaving the laboratory area.
13. Know the location of the eye wash station, fire extinguishers, and safety showers.
14. Always work in a fume hood with the blower on when using flammable solvents or chemicals whose vapors are toxic. Wear protective gloves when working with known skin irritants or carcinogens.
15. Wear protective goggles and gloves whenever preparing a solution containing strong acids or alkalies.

Standard 12: Documentation
Clinical Rotations – Rules and Regulations
Excerpt from Hospital Rotation Manual

GENERAL POLICIES:

Breakage Fee: The hospital does not charge the student a breakage fee. If breakage does become excessive, the student will be cautioned and if the breakage continues, the student will then be assessed a breakage fee. Intentional neglect and habitual carelessness in handling equipment, instruments, and supplies will be causes for dismissal.

Bulletin Board: Students are responsible for checking the bulletin board for changes in scheduling or other matters concerning the laboratory and their training.

Coffee Breaks: A 15 minute break may be taken in the morning and in the afternoon, if time permits, and if approved by the department supervisor or technologist in charge of the particular section the student is working in.

Conferences: Periodic conferences will be held between the Education Coordinator and the students. Conferences between the students and the university faculty will be held during the weekly faculty visits. Students are encouraged to call a university faculty member or the Program Director about any concerns that may arise in between visits.

Counseling: When a student has problems, either personal or connected with his/her clinical rotations, he/she should consult the Education Coordinator. The Education Coordinator will help solve these problems or give the student direction in order that the problem may be solved. All conversations concerning personal problems between the student and Education Coordinator are privileged and will be treated as confidential.

Designation of a Student: An individual undergoing training at the hospital will be classified as a "Medical Technologist Trainee" for a period of 7 consecutive months. During this time the student will be instructed and supervised in all phases of the clinical laboratory.

Training Schedule: Students will have a 40 to 44 hour work week. These hours will be devoted to observing, performing and practicing various laboratory procedures. Hours will generally be from 7:00 a.m. to 3:30 p.m. or 8:00 a.m. to 4:30 p.m. with 1/2 hour for lunch. These hours vary to fit the teaching needs of the assigned laboratory. All of the above mentioned hours are a part of the student's training program.

The student should bear in mind that he/she will be in a working clinical laboratory and that duty schedules will vary from time to time so that he/she may observe and perform special technical procedures. This may include, on occasion, a late evening or night session.

Collection of Blood: Students will be trained in the techniques of phlebotomy for 1 week and then as the student's confidence and technique improve she/he will be performing the phlebotomy independently for an additional approximately 30 hours during the course of the training.

Entrance Date: Hospital training begins the first week in January and lasts for 29 consecutive weeks.

Food and Beverages: Eating, drinking and/or smoking are restricted to the designated areas. Eating is prohibited in all sections of the Clinical Laboratory. No food or beverage items are to be stored in the laboratory refrigerators.

Holidays: Generally students do not work on holidays or weekends, but the hospital reserves the right to ask the student to be on duty in unusual circumstances. Students are also given a Spring Break of 1 week approximately midway through the rotation. Medical Technology students do not get time off for the semester break between Spring and Summer semesters while they are at the hospitals.

Hospitalization Insurance: Students are responsible for furnishing their own hospitalization insurance. This is a requirement and must be taken care of before entering the training.

Parking: Students should park their cars only in assigned parking lots, as instructed during orientation.

Incident Report Forms: Students are required to fill out an incident report form when an accident or incident occurs. These reports should be filled out in triplicate and given to the Education Coordinator or section supervisor. The following situations will require incident reports:

(1) Accidents concerning the patient - Misidentifications
(2) Accidents concerning the student - Needle Sticks
(3) An error made by the student in patients' test results

Any question regarding incidents should be referred to the Education Coordinator.

Department Supervisor: Each department in the clinical laboratory is under the supervision of a licensed Medical Technologist. In each lab rotation you are under the direct supervision of that section supervisor. At the end of each rotation your performance in that department will be evaluated by this person after consultation with the teaching technologists.

Library: All textbooks, journals, and other technical material in the library are available for the use by the student. Books may be checked out of the library by the student but must be signed out according to library policies. A listing of books that cannot be checked out will be posted in the library. Standard library courtesy should be observed in using this material.

Lunch Hour: Students are allowed 1/2 hour for lunch while on duty. This time must be taken during the noon period from 11:00 a.m. to 1:00 p.m. The time cannot be any earlier or later in the day. The lunch break should be taken in accordance with the work flow in the department and the supervising technologist should always be notified. If a student wishes to leave the building for lunch, permission from the Education Coordinator must be obtained.

Meals: Students must pay for their own lunches. They may bring their lunch and eat in the cafeteria or lab lounge. Students are advised not to disturb other students in another section in the middle of a procedure so as to go to lunch in a group.

Policy Interpretation: Student medical technologists will observe and adhere to the policies set forth in this handbook. Situations not covered in this handbook should be referred to the Education Coordinator or university faculty for clarification.

Reading Material: While on duty, students will read only technical literature or material that pertains to their internship in medical technology. Novels, newspapers, crossword puzzles or magazines will not be read while on duty.

Reporting Test Results: Initially students will not have authorization to report patient results in the Laboratory Information System (LIS). Later they may be allowed to enter data under direct supervision and clearance of a technologist. Students will not report results that have not been checked and initialed by either the laboratory supervisor or the medical technologist in charge of the laboratory at that time. Information concerning the patient's case history, condition and laboratory

reports must be treated as privileged information and must not be discussed outside the laboratory or with the patient or any of the patient's family.

Sick Leave: Students are allowed to take off a **total of three days** due to sickness or injury without penalty. Absence from training in excess of this time must be made up according to the Education Coordinator/Section Supervisor. If an illness persists and student is unable to return to his duties within a reasonable period of time, the student's training may be terminated. Every attempt will be made to accommodate extenuating circumstances. When the student is sick, he/she must notify the Education Coordinator and the Section Supervisor as early as possible so arrangements can be made to accommodate the daily schedule. After returning from sick days, the student should consult the Education Coordinator as soon as possible.

Policy for Make-ups: When the student uses up the 3 days of sick leave, further absences must be made up immediately after returning by working on Saturday and/or Sunday. Unexcused absences, when not made up according to this policy, will result in termination of the rotation.

Suggestions: Students are encouraged to offer suggestions or constructive criticism concerning their training program and/or other matters concerning the laboratory. These suggestions should be in writing and submitted to the Education Coordinator or the university faculty.

Time Off: Absence not covered by holidays or sick leave is considered unexcused time. This is subject to disciplinary action unless previous permission is obtained from the education coordinator.

Time Sheets: Each student will be responsible for signing the time sheets, coming into and leaving the hospital. If for some reason you should leave the building at noon time or any other time of the day for a personal reason, record the time of your going and returning on the back of your time card. This will be kept as a permanent record of your attendance.

Time Usage: Except for designated break periods and exam taking, students are required to be present in the laboratory at all times. Effective utilization of time (i.e., to be engaged in the learning processes) even during the slow work flow periods is absolutely essential for UWF students.

Work (After Hours): Students who wish to work after regular hours of training (weekends/nights) in the laboratory will be hired as jobs become available. Students are eligible to and are encouraged to work in a given department upon successful completion of their rotation in that department. **However, they are required to notify and obtain approval of the Education Coordinator and the University faculty, in order to ensure that the after hours work will not interfere with the student's academic performance.** Upon Program faculty's approval and the recommendation of the departmental supervisor, the students are hired by the Laboratory Manager. This work is compensated at the current rate of pay for a laboratory assistant. During these work hours the student is under the direct supervision of a staff clinical laboratory scientist. The student is not allowed to turn out the results unless first checked and initialed by the supervising technologist. Students will not be permitted to have any job in or outside the hospital unless approved by the Education Coordinator and the University faculty member in charge of the rotation. Students are allowed to work after regular hours of training only when they maintain the required academic performance.

Students who commit themselves to after hours work are expected to maintain a minimum C average or higher and be in good academic standing. When a student fails to make a minimum 73 percent in a given test, she/he will receive a warning to limit the number of work hours. If the student fails to improve in the next exam, the faculty reserves the right to ask the student to discontinue work, until their grades meet the required criteria. Failure to follow this policy will result in appropriate disciplinary action determined on an individual basis.

POLICY FOR MATERNITY/PATERNITY LEAVE

A student will be given two weeks leave of absence from scheduled classes and laboratories for childbirth during the clinical year. This leave may be taken immediately before and/or after childbirth, based upon the individual's circumstances. The faculty will make every effort to facilitate the make-up of the laboratories and exams missed during this period. It is the student's responsibility to keep up with reading assignments and other information given during missed lecture sessions. It is also the responsibility of the student to contact the appropriate faculty member as soon as possible after the childbirth, and plan a course of action to make up for the classes and exams. This may require attendance on weekends/evenings as deemed necessary.

If for clinical reasons more time is needed, consideration may be given to extend the leave for one more week, upon a request from the student. Since it will not be possible to make up absences beyond three weeks, the student will be required to withdraw from courses during that semester and complete the course work/clinical rotations during the next year. Placement for clinical rotations during the following year is contingent upon the availability of clinical rotation slots and will be decided by the Selection Committee.

Regarding this policy, the program officials reserve the right to make decisions based on individual student's circumstances and the program's best interests. In general, student will not be allowed to bring the newborn baby to the clinical laboratories or classes for full time attendance. It is the student's responsibility to make appropriate child care arrangements before they return to classes.

Standard 12: Documentation
Clinical Rotations – Rules and Regulations
Excerpt from Hospital Rotation Manual

ACADEMIC POLICIES:
The **COURSE OF PRACTICAL TRAINING** at the hospital is an integral part of The University of West Florida's Clinical Laboratory Sciences Program, as a NAACLS (National Accrediting Agency for clinical Laboratory Sciences) approved curriculum.

The hospital rotations include all the major sections of the clinical laboratory except histology and cytology. The practical training at the hospital consists of 29 weeks of technical and professional instruction fro 8 hours/day, M-F, 40 hours/week. No formal lectures will be given during this period but students are required to participate in all the continuing education and review programs offered by the hospital, the university and professional organizations in the area.

This 29 week period is divided as follows:	
	Number of Weeks
Hematology	4
Coagulation	1
Urinalysis	1
Microbiology	5
TB/Mycology/Parasitology	2
Chemistry	5
Immunohematology	4
Special Chemistry/Serology	4
Phlebotomy	1
Spring Vacation	1
Miscellaneous - Make Up	1
Total	29

During this period, the student should register for the following course work at the University		
Spring Semester: January – April		**SH**
MLS 4822L	Hematology II	4
MLS 4820L	Clinical Chemistry II	4
MLS 4823L	Immunohematology II	4
		12
Summer Semester: May - July		
MLS 4821L	Diagnostic Microbiology II	4
MLS 4825L	Urinalysis/Body Fluids II	2
MLS 4824L	Special Clinical Methods	2
		8
	Total	20

Clinical (Hospital) Laboratory Rotations
In each section of the laboratory, the student will work under the direction of the supervisor or an assigned staff technologist. Each rotation period will be primarily devoted to the development of technical skills and understanding the theory of action and reaction for the proper performance of the various tests and procedures offered in that section. The section supervisor or the technologist in charge will make work assignments; give informal bench lectures, practical demonstrations, assistance and criticism.
The student is required to perform and record at least the minimum number of test procedures to the satisfaction of the teaching technologists. Theory will be briefly explained whenever appropriate, but emphasis will be placed on practical instruction to include:

- Specimen requirements; specimen handling and processing.
- Methods of analysis/Instrument operation/minor trouble shooting.
- Detection of errors and methods for avoidance/correction.

- Methods of reporting results.
- Principles and practices of quality assurance/quality improvement as applied to Pre-analytical, Analytical and Post-analytical components.
- Application of safety to lab practice.
- Application of governmental regulations and standards as applied practice.
- Principles of interpersonal and interdisciplinary communication and team-building skills.

Development of technical proficiency is of paramount importance. During slack periods in the lab, student should study to become familiar with non-routine procedures; send out specimen protocols, procedure manuals and instrument manuals. At the end of each rotation period, students should be able to perform independently as a clinical laboratory scientist demonstrating minimum entry level skills in the completed area. Students should also acquire a working knowledge of non-routine procedures, communication channels in case of emergency instrument break downs, and professional judgment to detect and correct an error without undue delay.

Supervision of Students

The student is at all times under the guidance and supervision of the **Education Coordinator.** While rotating through the various sections of the clinical laboratory, the student is under the direct supervision of the teaching clinical laboratory scientist or supervisor of that section of the laboratory. The section supervisor is responsible for the student's practical training. The training is also supplemented by academic bench lectures by the supervisor and/or the technologist.

It is the responsibility of the section supervisor to ensure that the student is being given adequate instruction and practical experiences while in that section. He/she reports the progress of the student to the education coordinator and also submits a written evaluation at the end of the student's departmental rotation.

The student is at no time to be without supervision. Direct supervision is the responsibility of the section supervisor. When the section supervisor is off, supervision of the student is to be carried out by a designated clinical laboratory scientist. The student can at no time operate independently and turn out test results that have not been checked and approved by a supervisor.

The student's objective is to learn a technique well enough to carry out the procedures without supervision. Responsibility for presenting each technique to the student in a systematic manner rests with the clinical laboratory scientist in charge of the laboratory section. The ultimate responsibility for acquiring knowledge and practical skills must, of course, rest with the student.

Reading Assignments and Exam Schedules:

Detailed reading assignments and week by week exam schedules are given in the student manual.

The student is primarily responsible for following and adhering to this schedule. He/she should inform the Education Coordinator promptly, if any changes are needed.

Policy on Postponement of Scheduled Exams

Students must adhere to the exam schedule as listed in this manual as closely as possible. If due to unavoidable circumstances the student is unable to take the exam on schedule, the following policy must be followed:

1. Students can request to postpone a scheduled exam **only twice** during the hospital rotation period. (See Postponement of Exam Request Form)
2. These two exemptions should be used most discretely, i.e., only in cases of emergencies or unavoidable absences.
3. After the two chances to reschedule an exam are used up, the student will receive zero points for the next exam not taken on time.
4. This situation will result in failure of that rotation and the need to repeat the rotation which can only be done if another time slot becomes available.

Final Grade

The final grade in each section will be an average (%) of the points earned in all the scheduled written and practical exams. Each exam will be graded and discussed with the student each week. Final grade will not appear on the transcript until the completion of hospital rotations (at the end of the summer semester).

Grading System:

A	95 - 100	B-	80 – 82	D+	64-67
A-	90 – 94	C+	77 – 79	D	61-63
B+	87 – 89	C	73 – 76	F	60 or below
B	83 - 86	C-	68-72		

Academic Requirements- Pass/Fail/Progression

During each clinical rotation a minimum score of 7o % is required in each weekly examination. A minimum cumulative grade point average of 2.0 (C) is required for successful completion of each rotation. When a student fails to make the minimum required percentage of points (70%) in a weekly exam she/he will be given a warning and should show improvement in the next exam. Student who earns less than 70% in two consecutive exams in any given section will be placed on probation. Students on probation return to good standing by raising their GPA to 2.0 or above during the term of probation. Failure to bring up the grade to a cumulative 2.0 GPA during the term of probation may lead to academic suspension.

If minimum competency requirement is not met and a student receives a final grade of D or F in any one of the major areas of the clinical rotation, the student will not: a) graduate on time, b) be eligible to take for national certification, c) be eligible for state of FL license and d) most likely be able to repeat the clinical rotations (unless in extenuating circumstances).

If an individual fails to successfully complete one or more clinical rotations with a minimum grade of C, he/she may be given one additional chance to repeat the rotation during the next academic year it a clinical rotation slot is available. If the student successfully completes the rotation the second time, he/she will graduate and be eligible for national certification and state licensure. If the student is unsuccessful during his/her second attempt, the student will be

permanently dismissed from the program.
The education coordinator will meet with each student to review and discuss the student's performance and offer counseling as needed. The University program faculty will periodically meet with each student to review and discuss their progress and offer assistance as needed.

Withdrawal/Dismissal from the Program

Students may be asked to withdraw from the training for the following reasons:

1. Repeated failure to make required minimum grades in clinical course work
2. Failure to achieve entry-level job competencies in laboratory work
3. Academic cheating and/or dishonesty in performing laboratory work.i.e, altering lab test results or reporting results on tests which are not done
4. Repeated violations of lab safety rules
5. Noncompliance with established rules of the Program, the University or the Hospital

Final Week of Clinical Rotations

During this week, students are given a unique opportunity to work two evening shifts on Monday and Tuesday and then schedule the remainder of the week in a department where they have a special interest. The final week schedule will include:

Monday and Tuesday:	Evening shift (3-11)
Wednesday:	Final Comprehensive Examination
Thursday:	Department of choice
Friday:	Department of choice

The student is required to consult the Education Coordinator regarding specific assignments during this week.
This week can also be designated as the make-up week, to fulfill deficiencies or weak performance during the regular rotations.
Spring Break is scheduled at a mid point in the 29 week hospital rotation. It does not coincide with the University's Spring Break. This gives the student a time for rest and relaxation. It can also be used for make-up work due to illness or preplanned events.
Student Leave for illness or personal reasons is permitted (up to three days). Make up is required. (See Student Leave Request Form)

Final Comprehensive Examination

A written comprehensive examination based on the format used by certification exams will be given during the final week of hospital rotations. This examination contains 200 multiple choice questions from all the areas of clinical laboratory including education methods, supervision and management. The number of questions will be equally distributed among the five major areas: clinical chemistry, hematology/coagulation, clinical microbiology, immunohematology, clinical iimmunology and lab practice.
Students are required to obtain a minimum passing score in order to successfully complete the program. The minimum passing score for this exam is set at 70%, i.e., 140 correct answers out of a total of 200.

Standard 12: Documentation
Clinical Rotations – Rules and Regulations
Excerpt from Hospital Rotation Manual

PROFESSIONAL POLICIES

Appearance: The students should take pride in their personal appearance and always dress neatly and conservatively.

Dress Code: The dress code of medical technology students will be consistent with that of the staff technologists of the laboratory. The purpose of this dress code is to provide safe, consistent, and professional standards for the laboratory personnel.

1. A clean laboratory coat is required. At no time is the laboratory coat to be taken off while working in an analytical section. The coat will be completely buttoned for safety and neatness.
2. Appropriate and clean shoes are to be worn in the laboratory. The shoes are to have "non-skid" soles and low heels for safety. Open-toed shoes are prohibited.
3. In order to avoid exposure due to accidental breakage and/or spills of biohazard materials, socks or hose must be worn at all times in the laboratory.
4. Name tags will be worn and visible at all times.
5. Hands and fingernails will be clean at all times.
6. Hair will be combed and brushed, with longer hair pulled back away from his/her eyes for safety reasons.
7. No gum chewing while in the training facility.
8. There will be no primping in the work areas or patient areas.
9. Jewelry and perfume products should be kept to a minimum.
10. Particular care must be taken regarding personal hygiene.

The above dress code falls under the category of rules and not policies; therefore, the above statements are firm and will be enforced. Inappropriately attired students will be sent home.

Gifts: It is not ethical for students to accept gifts from a patient or visitor.

Professional Conduct: Proper attitude and conduct are essential for a successful professional career.

Demonstration of professional qualities such as attendance, punctuality, initiative, judgment, utilization of time, application of knowledge will be evaluated after each clinical rotation.

The department supervisor will complete a **Mid-Rotation Evaluation Form and a Final Evaluation Form.**

Be cognizant of the offenses that are considered improper conduct (See Professional Policies, Improper Conduct during Hospital Rotations). Improper conduct, depending on the gravity of the offense, may be grounds for dismissal from the clinical rotation.

Standard 12: Documentation
Clinical Rotations – Rules and Regulations

UNACCEPTABLE CONDUCT AND DISCIPLINARY ACTIONS DURING THE HOSPITAL ROTATION

OFFENSE	FIRST OFFENSE	SECOND OFFENSE	THIRD OFFENSE	FOURTH OFFENSE	FIFTH OFFENSE
1. Unexcused absence	Verbal warning	Verbal warning	Written warning	Written warning	Dismissal
2. Unexcused / habitual tardiness	Verbal warning	Verbal warning	Written warning	Written warning	Dismissal
3. Smoking or eating in unauthorized areas	Verbal warning	Verbal warning	Written warning	Written warning	Dismissal
4. Use of abusive or obscene language	Verbal warning	Written warning	Dismissal		
5. Rudeness to patients	Verbal warning	Written warning	Dismissal		
6. Incorrect identification of patients or labeling of specimens	Verbal warning	Written warning	Dismissal		
7. Acting in a manner that endangers patients or coworkers	Written warning	Dismissal			
8. Threatening or fighting with an employee, patient or visitor	Written warning	Dismissal			
9. Unethical use of hospital supplies or equipment	Written warning	Dismissal			
10. Report to work intoxicated, or being on duty while intoxicated	Written warning and 5-Day suspension	Dismissal			
11. Documented, repetitive errors in lab tests performed	Dismissal				
12. Falsifying records (logbook, computer, etc)	Dismissal				
13. Insubordination, refusal to comply with reasonable instructions from an authorized supervisor	Dismissal				
14. Leaking of privileged information and confidentiality	Dismissal				
15. Consuming intoxicants or non-prescribed drugs on hospital premises	Dismissal				
16. Academic cheating	Dismissal				

Following is an excerpt from University of West Florida Student Code of Conduct

Website:
http://uwf.edu/JudicialAffairs/documents/StudentCodeofConduct2006.07.pdf

Standard 13

Maintenance of Student Records:

The University of West Florida Office of Admissions and Office of the Registrar maintain the permanent student records in a fully computerized system of the State University System (SUS) of Florida; served by the North West Regional Data Center (NWRDC) located in Tallahassee. Each university faculty member has access (through an ID and Password; and student=s name or social security number) to student records for the purposes of academic advisement and monitoring student=s progress towards graduation.

In the Registrar's Office current permanent hardcopy files are kept in a secure, fireproof file room. Additional storage (for students who have not been enrolled for 5 years or more) used is microfiche which is stored in a file room and also has a copy in a secure vault in Mississippi.

The UWF Records Management Department, located in building 48 (ext. 2693), is the unit of the university responsible for implementing and directing the state's mandated records management program. The University Records Management Liaison Officer (RMLO) coordinates the activities of the department and all records management activities at UWF. http://uwf.edu/registrar/retention.htm

The University and the Clinical Laboratory Sciences Program fully comply with the policies of the State University System of Florida as determined by the federal and state laws. Family Educational Rights and Privacy Act of 1974 (FERPA) and >Florida Statutes Chapter 228-Educational Records= govern the security and maintenance of student records.
Student Records Security and Retention Manual may be accessed at:
http://uwf.edu/registrar/ferpa.htm

Clinical Laboratory Sciences Program Office maintains a hard copy file on each CLS major admitted to the University through out the period of student=s stay in the Program. A second hard copy file is opened at the time of student=s application for admission to the clinical year. Both files are maintained in the Program Office under lock and key. After graduation the student files are archived in the Program Office and are kept for an indefinite period.

Education Coordinators at the clinical sites maintain an active file on each student placed at that hospital for the duration of the clinical rotations. Upon graduation the student files are archived at the hospital laboratory. In the case of some clinical affiliates, due to a lack of available space and security, the student files are returned to the University Program Office where they are permanently stored.

Items Maintained in Student Records:

University Computer	**Program Office**	**Clinical Site Student File**
Application/Documents	Academic Advisement Record	Name, address, telephone number
Transcript Evaluation	Degree Plan/ Updates/Changes	Emergency Contact Information
Admission decision	Academic Action Records	Health form
Acceptance letter	Personal Counseling Records	Immunization Form
Student Demographics	Complaints /Resolution Record	Background check report
Transfer Transcripts	Selection into Clinical Year files	Proof of Health Insurance
Registration records	Application	State FL Trainee License
Drop / add forms	Recommendation letters	OSHA/HIV-AIDS certificates
Student Registration	Essential Functions Form	Grade recording sheet
Grade Completion Review	Background Check Record	Seminar evaluations /grade
Student's Enrollment Record	Interview /selection decision	Incident report forms
Financial Aid Records	Acceptance Letter	Affective Domain Evaluations
	Health Record	Correspondence
Counseling records	Immunization Record	Counseling Records
Fee Collection Records	Proof of Health Insurance	
Graduation Check List	State FL Trainee License	
Disciplinary actions /Appeals	Grades for hospital courses	

Standard 14

Information and Access to Health Care Services

The Student Health Center is a Medical Out-Patient Clinic, located on campus to provide medical care for all currently enrolled students, their spouses, and children. Staff includes an RN Director, Doctor, Nurse Practitioner, Physician Assistant, two nurses and three office staff. Service is available on a walk-in or appointment basis. Minimal charges are assessed for laboratory tests. Open 8:00 am to 5:00pm, Monday through Friday. The university physician or Physician Assistant holds a clinic each day when classes are scheduled. Students requiring medical attention at other times may be seen by the nurse on duty or referred to their family physician or to the emergency room of one of the area hospitals.

Safeguards for Health and Safety of Faculty and Students

The following steps are taken to protect the health and safety of faculty and students:

- The Clinical Laboratory Sciences Program Classroom/Laboratory complex is fully equipped with safety devices to include a Biological Safety Hood, a Chemical Hood, Fire Extinguishers, Eye Wash Stations with Showers and a Fire Alarm System.
- The Program and the University maintain compliance with OSHA Blood Borne Pathogens Standards. CLS Program faculty are offered, free of cost, the Hepatitis B immunization shot series.
- In case of an exposure to potential biohazard material the University provides follow up testing services free of charge to faculty/staff. Students are provided emergency care following an incident, the cost of follow up testing and care being student's own responsibility.
- The laboratory is supplied with all types of personal safety equipment and devices required by OSHA standards for blood borne pathogens, to include lab coats, gloves, safety goggles, face shields, biohazard bags for lab waste disposal, containers for disposal of sharp objects, bleach, bactericidal hand washing soap and so on.
- During the first lab session of each university based course students are given video presentations, oral instructions, and written protocol for lab safety practices. The safety rules are enforced without exception during each lab period.
- No eating, drinking or smoking is permitted in the lab. Students are not permitted to wear shorts or sleeveless tops to the lab periods. Lab coats and gloves must be worn during laboratory practice.
- Students selected into the clinical year of the program are required to submit a health fitness form signed by a physician. Students are required to have Hepatitis B and Varicella immunization and TB skin test. The University requires proof of Rubella antibody titer or immunization at the time of admission to the university.
- Students are also required to provide proof of health insurance coverage prior to their entry into the hospital rotations.
- During the university-based course >Special Clinical Topics'> students are given a formal 2 hour presentation on OSHA Blood Borne Pathogen Standards and a 4 hr presentation on HIV/AIDS. These are mandated by state regulations for health care professionals. Students receive a certificate of attendance for each of these programs, which are included in their hospital rotation files.

$ Students entering the clinical rotations attend the respective hospital=s new employee orientation and once again receive the required OSHA safety instructions. Personal Protective Equipment and other safety equipment is provided to the students by the clinical affiliates.

$ Employee health services at each affiliate review the student health forms to ensure that all required immunizations are current and in keeping with the hospital policy.

Emergency Medical Care

While on campus, students receive care for minor emergencies at the student health center. Members of the campus security force are trained in CPR and emergency first aid. The campus is serviced by the Escambia County Emergency Services following a call to 911.

At the clinical affiliates students have access to the employee health services and emergency medical services. In case of accident or exposure to infectious material the student's health and safety is protected by the same procedures followed for an employee of the hospital. However in most circumstances, both at the University and at the clinical sites, the student=s health insurance must cover the costs incurred for emergency and follow up care needed. This policy regarding availability of emergency health care for students is included in the affiliation agreement with each clinical site.

UWF Student Health Services -Immunizations

REQUIREMENTS

All Students are required to show proof of having the following immunizations prior to registering for classes:

- MMR (Measles): 2 separate injections of MMR vaccine after the first birthday.

All students living on campus are also required to show proof of having had the following immunizations, or sign a waiver refusing the vaccines:

- Hepatitis B - 3 separate injections
- Meningitis - 1 injection

These vaccines are available in the Student Health Center or may be obtained through student's personal physician.

The following vaccines are also available in the Health Center:

- Flu (Influenza) vaccine - Offered annually during winter semester.
- Hepatitis A vaccine
- TD-Tetanus Diptheria vaccine - Recommended every 10 years.
- Chicken Pox - 2 doses, 12 months to 12 years of age.

At the conclusion of student selection process (into clinical year) the following 3 page document is given to students, after they have submitted the signed Acceptance Form and Signed Essential Function Form.

University of West Florida
Clinical Laboratory Sciences Program
Clinical Laboratory Sciences Students Selected into Clinical Year 2006-2007
Requirements for Health Immunization Form

Students who are selected into the clinical year of the program are required to submit the enclosed **"Statement of Health and Immunization Form"** completed by a licensed, practicing physician. This involves a physical examination and an update on immunizations.

A cost estimate for the procedures at the UWF Health Services Center is included for your information. However you may choose any other provider for these services.

The date lines for initiation and completion of the required process are as follows:

1. Begin the process as soon as possible. Ask the health care provider for a copy of the partially completed form (the physician examination) and submit to the Program Director by June 1, 2006.

2. Hepatitis B Immunization requires 3 shots, given at the time intervals of 0, one month, and 6 months. Initiate the process early enough (no later than June 1, 2006) to complete the vaccination by no later than December 1, 2006. If you were immunized for hepatitis B in the past, provide proof or have an antibody titer done on your serum.

3. Varicella immunization is a requirement. Proof of an existing antibody titer may be substituted for vaccination.

4. The TB skin test should be taken **within 3 months** prior to the beginning of clinical rotations at the hospital on January 2, 2007. In other words you should **not** get a TB skin test prior to October 2, 2006.

5. A fully completed Health and Immunization Form must be submitted by the **first Monday in December**. Students who fail to complete these requirements will not be placed into clinical rotations at the hospital.

6. Appointments at the UWF Health Center are limited in the month of December. You must make your appointments early in the semester in order to have your form completed in time.

UWF- Clinical Laboratory Sciences Program
Clinical Laboratory Sciences Students Selected into Clinical Year 2006-2007
Requirements for Health Immunization

UWF Health Center Charges

Following is a list of the costs for the physician and laboratory tests required for the University of West Florida Clinical Laboratory Sciences Program Students entering into the 2006-2007 clinical year:

Physical	$ 15.00	
CBC with Differential	$ 4.00	
Chemstrip	$ 5.00	
TB Skin Test	Free	
Tetanus	Free	
*Hepatitis vaccine series (3)	$ 60.00	(20.00 per shot)
*Varicella vaccine	$ 65.00	(just require one shot)
Total	**$149.00**	

***The Hepatitis B and Varicella vaccine series must be paid for in cash when the vaccine is ordered.**

Hepatitis antibody titers: $8.75; Varicella antibody titers: $22.00

Students may call the UWF Health Center, Building 63, 474-2172, 8:00 - 5:00, to schedule an appointment for a physical and/or lab tests.

University of West Florida -Clinical Laboratory Sciences Program
Statement of Health and Immunization Form

Name: _____ Date: _____

MEDICAL HISTORY: _____

_____

PHYSICAL EXAM Height _____ Weight _____ Pulse _____ Resp. _____ BP _____

HEENT: _____

Visual: _____

Hearing: _____

Heart: _____

Lungs:_____

Abdomen: _____

Skin: _____

Extremities: _____

Neuro: _____

GYN (History): _____

General State of Health: Excellent _____Good _____Comments:_____

_____

_____

LABORATORY DATA

CBC: HGB _____ HCT _____ WBC _____ PLTS _____

URINE: PROTEIN _____GLUCOSE _____

IMMUNIZATION DATA

Measles _____ Rubella _____ (Immunization Date or Titer)

Tetanus Toxoid (Booster date) _____

Varicella _____ (Immunization Date or Titer)

Hepatitis B (1) _____ (2) _____ (3) _____ (Immunization Date or Titer)

TB Skin Test (Date) _____ If positive Chest X-ray date: _____

Physician's Name (Please Print): _____

Physician's Signature: _____Date: _____

Add dress: _____

_____

Standard 15: Guidance Available to Assist Students

UWF Counseling Center

Provides personal, vocational, couples and educational counseling to students free of charge. Psychologists are available to help students with problems including depression, test anxiety, vocational indecision, relationship difficulties, sexual dysfunction, interpersonal conflict, identity confusion, substance abuse, stress management or other personal difficulties which may impede a student's academic progress. Information regarding a person's contact with the center is confidential.

The center sponsors Living Well Workshops on various topics, including stress and time management, romantic relationships, interpersonal and personal functioning and vocational development. The center also answers student's questions in a biweekly column.

CLS Program: Academic Advisement and Guidance

Prospective students: Both in quality and quantity the Clinical Laboratory Sciences Program at the University of West Florida provides excellent student services in the areas of academic advisement, career guidance and personal counseling. The program faculty are committed to help the student to succeed in the very intense and demanding curriculum of clinical laboratory sciences. From the day of inquiry to the day of graduation, students receive much personal attention and prompt response to their questions or problems. Over the years the program has established contacts with a network of academic advisors at area high schools, junior colleges, veteran=s affairs offices and vocational rehabilitation centers. In many instances students make contact with the program office even before they are admitted to the university. At the first meeting the prospective student is given a handbook, the curriculum outline, an explanation of the clinical rotations, and a thorough explanation of the program policies, including the selection procedure for admission into the clinical year. A transcript evaluation, followed by a degree plan, is made in consultation with the student. The student is also assisted with the University admission procedures and registration for courses.

Enrolled Students, Preclinical: The faculty provides advisement and counseling to the majors in freshman, sophomore and junior years on a periodic basis depending on the needs of the student. The faculty has no class room contact with these students until they begin to take the MLS courses in the spring semester of their junior year. However the advisors monitor their progress carefully and provide academic advisement and/or assistance for registration, resolution of class time conflicts, drop/add, withdrawal, fee refunds, repeating courses, grade forgiveness requests, appeals related to probation/ suspension/ reinstatement; and write letters of support for financial aid and related issues.

Enrolled Students; Clinical: Students in the clinical year of the program receive daily assistance and advisement from the faculty. Given the small class size and the close proximity of faculty offices and the classroom/laboratory complex in which all the university-based clinical courses are taught, the students are in close touch with the instructors. The faculty member in charge of the laboratories is available on a full-time basis for assistance or for extra practice in laboratory procedures. Students are frequently in faculty offices seeking advisement on academic, professional and/or career issues. Students receive timely assistance in applying for the State Trainee License and completing the health requirements such as Hepatitis vaccination and purchasing health insurance

coverage. The faculty are in close touch with the students on a daily basis and thus are ready to assist in case of personal problems. Students are advised in confidential sessions and are referred to the university counseling center for professional counseling, when deemed necessary.

Students in Clinical Rotations: The university faculty member serving as the Clinical Site Coordinator is in touch with the students at clinical sites through frequent personal visits, telephone conversations and/or email. Students receive excellent support services from this faculty member. Guidance is available on a daily/ weekly basis, as needed. Student=s progress in the early days of clinical rotations is closely monitored and problems are resolved without delay. The Education Coordinators at clinical sites are excellent mentors, advisors and counselors to the students in clinical rotations. We are very fortunate in having such professionals with a personal interest in student's education and welfare at the clinical sites.

Confidentiality and Impartiality in Dealing with Student Problems

The Program faculty and staff maintain a strict confidentiality of student records, grades, personal problems and disciplinary actions. The Program complies with the rules and regulations pertaining to fair practices in grading, evaluation, selection procedures and grievance resolution. Impartial treatment of students with implementation of uniform standards in the classroom and the laboratory is of utmost importance to the Program faculty. Students are encouraged to communicate well and freely express their reservations or problems in a given situation to seek an impartial resolution without delay.

Standard 16: Distribution of Appeals Procedures

Students receive information regarding student grievance system and appeals procedures at various points of entry during their course of study:

1. C**LS Program Handbook for Majors**: Students receive a copy at the first time of contact with the Program Faculty/ Program Office for academic advisement. The handbook contains a brief description appeals procedure.

2. **UWF Student Handbook**: During University Orientation to new freshman and transfer students. The student grievance system and appeals procedures are described in UWF Student Handbook and explained during the orientation sessions for new students.

3. **University Catalog**: Students receive a copy at the time of admission to the University. Various appeals procedures are listed in the catalog.

4. **CLS Program- Hospital Rotations Manual**: Students purchase a copy of this book prior to the beginning of clinical rotations at the hospital. During the Orientation to Hospital Rotations (Last day of the fall semester in December) students are given instruction and an opportunity to discuss rules, regulations, appeals procedures and related matters through Q & A sessions with education coordinators from hospitals.

Standard 16: Documentation for Appeals Procedures and Due Process Policies

Clinical Laboratory Sciences Program Handbook for Majors (Page 30)
Appeal Procedure

For information of sanctions and procedures for violations of UWF's academic or non academic conduct codes, students should refer to the UWF Student Handbook (Student Life). While a student is at the University, those procedures will be followed in the event of an alleged violation.

During hospital laboratory rotations students should follow appropriate procedures to appeal grade conflicts or for finding a solution for other complaints / problems. The following procedures are strongly recommended:

- Bring the problem to the attention of the clinical education coordinator at the Hospital.
- If the problem is not resolved within a reasonable time, notify the clinical site coordinator (faculty member who is in charge of clinical rotations).
- If the problem is not solved at this level, notify the Program Director to seek resolution.

If the decision/resolution made by the Program Director is not acceptable, the student may appeal to the Dean of College of Arts & Sciences, through the Chairperson of the Department of Biology, for further review and resolution of the matter according to the established procedures of the University.

Standard 16:
Documentation for Appeals Procedures and Due Process Policies

UWF Catalog 2006-2007 Page 44

Appeal for Late Fee Assessment and Refunds Student appeals for late payment of fees, refunds of tuition, and other charges after the refund deadline are referred to the University Fee Appeals Committee. All appeals should be submitted in writing, with attached supporting documentation, to the University Registrar. Fee appeals forms are available in that office. The University Fee Appeals Committee reports to the Vice President for Academic Affairs who has final authority over all appeals for late payment of fees.

The filing of an appeal before the Fee Appeals Committee does not extend the due date for fees, tuition loans, VA deferments or other charges while awaiting a decision by the Committee. Such charges not paid by the due date will be assessed the late payment fee. All questions regarding fee appeals should be directed to the Office of the Registrar at (850) 474-2244.

UWF Catalog 2006-2007 Page 60

Grade Appeal

Students should consult the Student Life Handbook for information regarding the grade appeal process. Grade appeals for courses cross-listed with another department within another college will be heard through the college housing the department, regardless of the departmental affiliation of the faculty member teaching the course.

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Page 60: Reinstatement

Students placed on academic suspension may request reinstatement after being away from the University one semester. The request for reinstatement must be directed to the college dean suspending the student at least two weeks in advance of the first day of classes of the semester for which reinstatement is requested. In addition, students not attending UWF the previous three semesters must file an application for readmission with the Office of Admissions. Students reinstated from suspension may apply for a change of major. Approval is granted by the chairperson of the prospective department.

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Appeal and Waiver Policies

Students, who wish to make a grievance, including grade appeals, should review the Student Grievance System in the Rights & Regulations section of the UWF **Student Life handbook**. The process of handling student non-academic grievances is also detailed in the current issue of the **UWF Student Life handbook.** Appeals to be considered by the Academic Appeals Committee must be made in writing and submitted to the Office of the University Registrar. Students should secure required recommendations (signatures from the advisor, department chair and/or college dean) prior to submission. Students who wish to further appeal a decision made by the Academic Appeals Committee must do so in writing. This request should be in the form of a letter (including any new information) stating they are appealing the Committee's decision, and should be addressed to the Office of the Provost/Vice President for Academic Affairs (submitted to the Office of the Registrar).

Standard 16: Documentation

Appeals Procedures and Due Process Policies-Student Appeals Procedure Chart
UWF Student Handbook 2006-2007: Pages 32

Nature of Appeal	Committee/Person Designated to Hear Appeal	Format	Time Limit/Deadline to Submit Appeal	Submit Appeal To:
Academic Probation or Suspension	Academic Standard Committee of your college	Oral discussion, then in writing, see Student Grievances	2 weeks after written notification from Dean	Dean's Office of appropriate college
Admission or Readmission Undergraduates	University's Admission Committee	In writing	End of Drop/Add Period	Director of Admissions Bldg 18h
Admission or Readmission – Graduates	Faculty Committee Appointed by Dean of College	In writing	End of Drop/Add Period	Appropriate Dean of College
Assessment of refund of Tuition or Fees	University Appeals Committee	In Writing-Forms available in Registrar's & Cashier's Office	Within 6 months of close of academic term of appeal	Financial services or Registrar's office
CLAST	CLAST Appeals Committee	In Writing	One semester prior to projected graduation	Registrar's office
Discrimination due to race , gender, disability	Director of Human Resources	In Writing	180 Days	Director of Human Resources
Financial Aid	Financial Aid Satisfactory Progress Appeals Committee	In Writing	None	Financial Aid Office
Grade Appeals	Faculty member, Dept Chair, Dean of College, VP Academic Affairs	Oral discussion, then in writing, see student grievances	3 months after semester ends	Faculty member
Housing Fines	Director of Housing	In writing or by appointment	None	Director of Housing
Immunization requirements	Dean of Students	In writing or by appointment	Prior to registration for classes	Dean of Students
Late Withdrawal from Class or University	Academic Appeals Committee, then to Provost	In Writing-Forms available in Registrar's Office	3 months after semester ending	Registrar's office
Library fines	Head of Circulation Dept, The Assoc Director of the Library	By phone , in person, or in writing	None	Head, Circulation Dept-UWF Library
Parking Violations and Fees	Parking Violations Appeals Board	In writing ,Forms available at UWF Police	Within 7 days of violation	UWF Police
Registration Appeals	Registrar or Assoc Registrar, then to Assoc Vice Provost for Enrollment Services	In writing or by appointment	Late Registration: by the end of 3 rd week of classes Drop/Add. Grade Forgiveness: Last Day of class fro semester	Registrar's Office
Residency	Associate Vice Provost for Enrollment	In writing or by appointment	Last day of registration for requested semester	Associate Vice Provost for Enrollment
Student Conduct	Vice President for Student Affairs	In Writing , see code of Conduct	Within 15 days of Notification of Sanction	Vice President for Student Affairs
Student Organization	Vice President for Student Affairs	In Writing	None	Vice President for Student Affairs

V. OPERATIONAL POLICIES

Standard 17

17 A. Programmatic Announcements

UWF's CLS Program is announced in UWF publications, Program publications and on UWF Web Sites. The announcements and advertisements of the Program accurately reflect the program offered. A list of these publications is given in Standard 10 and copies of these publications are submitted along with the self-study. The NAACLS name is included in every publication, handout and promotional material produced and distributed by the Program. NAACLS name and contact information is included in:

A. UWF 2006-2007 Catalog (submitted) See Page 109
B. CLS Program Handbook (submitted) See Page 31
C. UWF CLS program Website: http://www.uwf.edu/clinicallabsciences/

Students are informed about:

a) NAACLS Standards
b) Purpose and benefits of NAACLS accreditation
c) Students' eligibility to take national Board Certification Exam when they successfully complete the accredited Program
d) Accreditation process

17 B. Statement of Non-Discrimination in Student Recruitment and Admissions

UWF Catalog Page 9: One if its listed goals is to "attract and inspire a diverse and talented student body committed to uncompromising academic excellence".

UWF Catalog Page 16: "University of West Florida encourages applications for admission from qualified students regardless of gender, culture, religion, ethnic background, age, marital status, or disability".

CLS Program Handbook for Majors Page 17: Admission to clinical year: non-discrimination Statement.

The institution's recruitment and admission policies are in compliance with all applicable governmental regulations and requirements of the University's accrediting agencies.

Clinical Laboratory Sciences Program's recruitment and admission policies / procedures are in accordance with the Equal Opportunity/Equal Access motto of the University. The Program recruits and selects students for general admission as well as for admission into the clinical year of the program with no regard for race, religion, color, creed, gender, age, national origin, or disability unrelated to the essential functions of professional practice. Students are recruited and admitted based on their interest, career goals, academic ability, potential for success, and commitment to serve the patient through their knowledge and skills in laboratory medicine.

Statements of non-discrimination and equal opportunity may also be seen on UWF Web site and Program Web sites.

17 C. Statement of Non-Discrimination in Faculty Recruitment and Employment Practices

UWF 2006-2007 Catalog Page 2: "The University of West Florida is an Equal Opportunity /Affirmative Action Institution. The University is committed to the principles of equal opportunity. Programs, activities, and services, and all terms and conditions of employment of the university are offered with equal access to all persons without regard to race, color, ethnicity, religion, gender, sexual orientation, age, national origin, or disability".
Faculty recruitment and employment policies are non-discriminatory and are in accordance with the existing governmental regulations and regulations of SACS (Southern Association of Colleges and Schools) as well as the other accrediting agencies of the individual programs.

17 D. Publication of Academic Credits and Costs to the Student

Credit hour requirements: Academic credits required for completion of the degree are included in the **University Catalog (page 109).**
They are also included in Program Brochure, Student Handbook and on the Program Web Site.
Each publication and handout given to students clearly shows the total academic credits required to complete the program. During the initial contact and first academic advisement session with a faculty advisor the student is given a curriculum outline and a degree plan clearly showing how many semester hours are required for completion of the degree. Transfer students receive a degree plan up-front showing exactly the number of courses and credit hours required to complete the degree. The degree plan also clearly shows how long (how many semesters) it will take for a student to complete the program, so that they can plan for financial resources needed.

Tuition and Fees, payment methods and schedules: General information regarding tuition and fees; and 2005-2006 estimated, full time student budget, in-state versus out of state fess, and all other details are given in **UWF Catalog (page 39).**

Special cost estimates for the clinical year of the Program are given to students in the **Program Student Handbook (Page 21)**. These costs include: health check up and hepatitis immunization, application fees for national certification examinations; trainee license and permanent license from state of Florida, background check, text books, manuals and other required instructional materials. This information is not only published and given to the students at entry point, but is also reiterated several times during classes, advisement and orientation sessions throughout the course of study.

17 E. Student Withdrawal and Tuition Refund

Policies and procedures for student withdrawal and refunds of tuition and fees are published in the **University Catalog (pages 39-44).** The Program faculty advisor also provides this information during advisement sessions and assists the student in late withdrawal or refund appeals when justified by the student=s personal circumstances.

17 F. Levels of Clinical Laboratory Science Programs Offered

Only one program, at the level of Clinical Laboratory Scientist (MT / CLS) is offered at the University of West Florida.

17 G. Award of the Degree - Policy Statement

The Program=s course of study culminates in the award of a B.S degree in Clinical Laboratory Sciences. Bachelor's degree requirements may be found on page 79 of the UWF Catalog. UWF Clinical Laboratory Sciences Program is exempt from the 120 credit hour rule for degree completion in the Florida State University System. CLS Program requires 127 semester hours for degree completion.

UWF's CLS program does not offer a certificate program

Students who enter the program with a baccalaureate degree are subject to the requirements for AAdditional Bachelor=s Degrees @ listed on page 79 of the University Catalog. They are officially listed as "Second Undergraduate Degree Seeking Students" and are unofficially referred to by the program as 4+1 students. Second undergraduate degree seeking students must be admitted to the University prior to their admission to the clinical year of the program.

In either case (1st degree or 2nd degree), it is the policy of the University that granting of the degree is not contingent upon the student=s passing any type of external certification or licensure examination/s. Student is awarded a BS degree upon successful completion of the degree requirements, regardless of performance in the professional certification examination.

CLS Program Student Handbook Page 23: The policy statement indicating that the issuing of the degree is not contingent upon the student's passing an external certification exam is included.

17 H. Process in Which Student Complaints Are Handled

UWF's CLS Program has an excellent record of student advisement and mentoring processes. Due to the personal care and attention students receive as well as due to the special quality of the students the Program encounters very few complaints which require a formal process of grievance resolution.

The majority of student complaints are informally resolved through hearing the student's complaint and providing relief to the student, whenever possible, without a compromise in Program's academic integrity, principles of fairness and rules of conduct.

At the beginning of the clinical year, students are given a set of instructions regarding how to proceed with a complaint resolution. This document is included below.

When necessary, student complaints are handled in a formal manner, according to the University of West Florida's grievance system, as described in the **UWF Student Handbook on pages 34-35. An** excerpt of this document is also included in the **CLS Program's Hospital Rotations Manual**; and is given below.

Standard 17 H. Documentation

University of West Florida-Program in Clinical Laboratory Sciences
Policy for Student Complaints / Resolution

The faculty and staff of the Clinical Laboratory Sciences Program are dedicated to provide the best possible education and training to the enrolled students. It is also a priority of the program officials to maintain a positive and problem-free environment which is conducive to learning and achievement of student's goals. It is our policy and desire to prevent or immediately rectify any potential impediments to student's learning and achievement. In order to enable the Program to resolve any student complaints with expediency and efficiency, students are asked to follow the following guidelines:

- If an incident, academic or non-academic, occurs in or out of the classroom, have a frank discussion with the faculty member who is in charge of the setting in which the incident occurred. Explain the nature of your problem and give an opportunity for the faculty or staff member to explain / resolve / remove the cause of your complaint.

- If the problem is not resolved, or continues to occur, seek an appointment with the Program Director and have an open discussion of your problem/difficulty. According to the nature and seriousness of your complaint, the Program Director may ask you to submit a written complaint giving details or may undertake to resolve the issue informally. An informal resolution is always desirable and beneficial to all parties involved.

- If the problem is not resolved or an explanation is not given with in a week of your lodging the complaint with the Program Director, submit a written complaint and related documents to the chairperson of the Biology Department and Director of School of Allied Health & Life Sciences.

- If the complaint is not or cannot be resolved at the department /division level, it will be forwarded to the Dean of the College of Arts & Sciences.

- If the complaint is a grade dispute or of other academic nature the complaint will be forwarded to the University Academic Standards Committee.

- If the complaint is regarding a non-academic issue, the Dean will follow established protocol of the University for grievance resolution, which usually includes appointment of a committee to examine the issue and render a judgment.

- For further details the student is referred to a current copy of publication titled "University of West Florida Student Planner and Handbook", to the section on "Student Grievance System".

Standard 17 H. Documentation

STUDENT GRIEVANCE SYSTEM
Excerpt from UWF Student Handbook (Page 34-35)

Purpose. The Student Grievance System provides students the opportunity to bring complaints to the attention of the University personnel and to receive a fair hearing and a prompt disposition of the grievance.

Definition. A grievance is defined as a complaint or dissatisfaction occurring when a student thinks that any condition at the University affecting him/her is unjust, inequitable, or creates unnecessary hardship. Such grievances include but are not limited to mistreatment by any University employee; discrimination; problems with student or academic services; and contested grades for courses, academic probation, suspension, readmission actions, or other academic matters.
These grievances do not include matters which have been determined through procedures prescribed for the Student Conduct System.

Exclusions. Excluded from the process are grievances concerning:
1. Discrimination - grievances related to charges of discrimination due to race, sex, age, or handicap should be directed to the Equal Opportunity Coordinator.
2. Fees - grievances concerning the assessment or refund of tuition and fees shall be directed to the Fee Appeals Committee.
3. Financial Aid - grievances related to financial aid shall be directed to the Financial Aid Appeals Committee.
4. Parking and Traffic - grievances related to parking or traffic regulations shall be made to the designated police representative, and appeals to the Parking Violation Appeals Board.

Step 1. Step 1 requires an oral discussion between the student and the person(s) alleged to have caused the grievance. The student should meet with the person(s) as soon as practical after becoming aware of the condition which is the basis for the grievance. If the student considers the response to this discussion to be unsatisfactory, he/she should initiate the action outlined in Step 2.

Step 2. Step 2 requires the student to submit a written petition within five (5) calendar days after receiving notification of the Step 1 decision to the immediate supervisor of the person alleged to have caused the grievance.
The written petition should include:
1. The student's name, local address and phone number;
2. The name and office of the individual by whom the student feels aggrieved;
3. A concise statement of the event(s) being petitioned;
4. A statement of action previously taken to resolve the issue;
5. The results of these actions;
6. The disposition desired by the student.

The supervisor or designee may take testimony, receive evidence, provide other affected persons the

opportunity to submit written statements, and make or receive offers of settlement, stipulations and adjustments.

The supervisor or designee will render a written decision to the student within five (5) calendar days of the date the petition was filed or within a time limit mutually agreed upon by the parties.

Step 3. Any student who is not satisfied with the response after completing Steps 1 and 2 may present the grievance in written form to the appropriate Dean, Vice President or designee within 5 calendar days after receiving notification of the Step 2 decision. The Dean or designee will refer grievances concerning alleged academic misconduct to the Academic Standards Committee.

The student shall be informed of the Step 3 decision within five calendar days of the date the petition was filed or within a time limit mutually agreed upon by both parties.

All petitions filed shall be adjudicated to finality even if the aggrieved is no longer a student at the time of the proceeding.

Appeal: The President of the University or designee shall be the final appeal but only after the prescribed grievance process has been exhausted. The President or designee shall review the matter and decide what action, if any, should be taken.

17 I. Availability of the Program Evaluation Information

Program evaluation information, including graduation, placement and any certification pass rates will be made available to NAACLS upon request.

V. PROGRAM EVALUATION

Standard 18: Description of the Formal Evaluation Plan

Several methods and mechanisms are employed for continually and systematically reviewing the effectiveness of the program in achieving its goals and mission. Assessment of the unit effectiveness in delivering an academic program of excellence is a continuous and on going process. It is done at different times at different levels, with the overall objective of providing the best possible curriculum and services to the students and to the community. The program is evaluated by the students, the university administrators, external agencies, graduates/alumni, employers of graduates and by a community based advisory committee.

Student Evaluation of Campus-based MLS courses: Students evaluate each course and each instructor at the end of the semester. A copy of the summary of student evaluations is given to the faculty member. These evaluations are used by the faculty member for self assessment and to make the necessary changes for improvement of the course/instruction. Student evaluations are included in the annual assessment of faculty performance by the university administration. Quality of instruction is given a major consideration in decisions regarding faculty tenure, promotion, merit pay, retention or dismissal. A few years ago the State University System of Florida, in a joint effort with the Student Government Association established common criteria for course/instructor evaluations by students. The results are published and available to the public at the library of each university.

Student Evaluation of Hospital-based clinical rotations: Students evaluate their training at the end of each rotation. They also complete a final evaluation of the Program prior to graduation. Student evaluations are reviewed by the faculty and the education coordinators. During the fall meeting of faculty and education coordinators, students' comments and suggestions are discussed. Based on the group discussion, changes are made in the program policies or procedures, to be implemented during the next year=s clinical rotations.

Student Scores and Pass Rates on external examinations are closely monitored and evaluated. Based on the Program's performance (our students' scores) as compared to the national mean scores in each area tested, changes are made in the instruction /evaluation materials and methods. Whenever a weakness in student performance in a given area is detected steps are taken by the corresponding instructor to strengthen the SLOs and student's achievement of these objectives. Curriculum changes are made according to the additions or deletions made in the ASCP/AMS Technical Curricula. Updates in Exam Content Outlines of ASCP-BOR, and NCA, are followed to best prepare our students for these exams as well as for performance on the job.

Recent Graduates are asked to provide feedback regarding the effectiveness of the Program in preparing students for employment in the field. A questionnaire is sent to graduates of the Program approximately 12-18 months after graduation. The rate of response is variable from year to year, especially when the graduates leave the area. The feedback is used in identifying the program=s strengths and weaknesses. The program faculty review and discuss the input from graduates. Comments from past graduates have a cumulative rather than individual impact on our evaluation. Repeated comments or suggestions are weighed and acted upon to improve the program. Frequently

we receive truly satisfying testaments to the effectiveness of this program from our program=s alumni. Invariably they express a great satisfaction with the strength of our curriculum. They acknowledge that though it was very intense, hard and demanding while going through the program, it prepared them with a strong foundation of scientific knowledge, enabling them to accept new challenges and advance in their careers.

Employers of Recent Graduates are surveyed to assess their satisfaction with the preparation of our graduates for entry level job performance. Prior to graduation, students are asked to sign a form giving the program officials permission to seek this input from their employers and this permission form is enclosed along with the survey request. Even so, the rate of return in these surveys is very poor due to the employer institutional policies not to release employee performance evaluation to external sources. Since a majority of our graduates are employed by our clinical affiliates, their satisfaction with the quality of preparation of our graduates is a testament to the effectiveness of the program. Though written feedback is not readily forthcoming from employers, it is generally acknowledged by employers in the region of Northwest Florida as well as in the State of Florida that UWF CLS Program graduates are well trained in not only academics, but also in professional behavior.

The UWF CLS Program Advisory Committee is composed of 25 + members who are leaders and professionals in various walks of life in the Pensacola/Northwest Florida community. This group has individuals from all the major healthcare facilities, community colleges, high schools, and other institutions. The committee meets once a year on the campus. Among other things, this group serves as an Oversight Committee for assessing the overall effectiveness of the program in serving this community and the region, for advising the UWF administration on health related program needs of the region, and as a public support system spreading the word about the program among the community and prospective recruits. Committee members include lab managers and education coordinators from the clinical affiliates.

University of West Florida - Academic Programs Review is conducted, under the auspices of the University Board of Trustees (BOT), in cycles of 5-7 years. The process includes a self study and site visit by a team of internal and external consultants selected by the University. The most recent review of the Program was conducted in 2001, in a pilot study then under development by the State University System. Subsequently, as the SUS System's Board of Regents was dissolved and the public Universities in Florida became semi-autonomous institutions with a local Board of Trustees, the Academic Programs Review process was revised to be conducted by university. The next CLS Program Review is scheduled to coincide with the current NAACLS program Review in 2006-2007. The UWF Program Review has similar components to the NAACLS review with an emphasis on additional data required by the State pertaining to enrollment, number of degrees awarded, ratio of FTIC students /Transfer students, etc. This review is also highly beneficial in that it provides an assessment of the needs and effectiveness of the program in the overall mission of the State University System. According to the previous program Review Reports the UWF Clinical Laboratory Sciences program was rated highly in the quality of curriculum, faculty, clinical sites, organization and operation of the program.

Academic Learning Compacts (ALC) and Quality Enhancement Program (QEP)
In 2004, the Florida (DOE) Board of Governors adopted resolutions requiring all universities in the State University System to adopt, through their Boards of Trustees, **Academic Learning Compacts** for their baccalaureate degree programs.

Each university was called upon to construct and publish clearly defined policies and procedures for developing, implementing, and reviewing Academic Learning Compacts and associated activities.

UWF Core Student Learning Outcomes/University-Level Domains. At UWF, each baccalaureate and graduate degree program is expected to define program-level Academic Learning Compact core student learning outcomes for each of the following domains:

- Content- concepts, theories, and frameworks of the discipline.
- Critical Thinking- information management, higher-level cognitive skills, problem solving, creativity.
- Communication /Literacy - written (reading and writing), spoken (listening and speaking), quantitative, technological, and other communication skills as appropriate to the discipline.
- Integrity/Values - decision making, academic integrity, professional standards for discipline integrity.
- Project Management - project planning and execution pertinent to the discipline.
- Discipline Specific Skills- in addition, degree programs may present student learning outcomes representing special outcomes that distinguish program completers not identified in the five domains listed above. (CLS Program added a category in Hazard and Risk management, to implement and evaluate student learning outcomes in laboratory safety and prevention of medical (laboratory) errors).

Quality Enhancement Plan (QEP):
During the same period of development of the ALCs, the University was engaged in SACS (Southern Association of Schools and Colleges) accreditation reaffirmation effort. As an essential part of the reaffirmation of SACS accreditation the University developed a quality enhancement plan. The ultimate aim of the University of West Florida's Quality Enhancement Plan is to maximize student learning and attain learning goals.

As part of this plan, each individual program that contributes to student learning will (a) identify a clear set of student learning outcomes at the program and associated individual course/activity levels, (b) develop methods of assessing whether students have achieved the outcomes, and (c) review and modify the instructional component of programs/activities to ensure that appropriate strategies are being used to help students achieve the desired outcomes.

Accordingly, the Clinical Laboratory Sciences Program has developed an Academic Learning Compact and a Quality Enhancement Plan, which is currently in the initial stages of implementation.

The Program's Academic Learning Compact is included as part of its QEP described in the following pages. The ALC may also be found in Standard 9A- Program Goals and Competencies.

Program in Clinical Laboratory Sciences- Assessment Plan for Academic Learning Compacts: 2005-2007

B.S. in Clinical Laboratory Sciences: Prototype for Direct Assessment Based on Embedded Instruments

The Clinical Laboratory Sciences Program proposes utilizing this approach to evaluate the B.S. in Clinical Laboratory Sciences Degree Program in fall 2005, as described in the following sections. Feedback from analysis of data collected in 2006 will be used to refine this process in spring 2007. The curriculum map shows the SLO areas as they apply to the core Clinical Laboratory sciences Classes. Embedded assessments will be instituted and evaluated, and varied in the future to rotate through other courses. The Clinical Laboratory Sciences Program has identified the following specific course assignments to be utilized for assessing related programmatic SLOs for the term of 2005-2007:

B.S. Clinical Laboratory Sciences	**Associated Programmatic SLO-area and Selected Course Assignment to be Utilized for Embedded Assessment**					
Capstone Pathway Course Name	**Content**	**Critical Thinking**	**Communication**	**Integrity/Values**	**Project Management**	**Hazard and Risk Management**
ASCP Board of Registry Exam	Examination					
Clinical Chemistry 1		Selected Lab Practical				
Clinical Chemistry 2			Journal Club Presentation			
Special Clinical Topics				Ethics exercise		
Special Clinical Methods					Student Seminar	
Immunohematology						Lab Safety Practical

The following faculty have been identified for facilitating the implementation of the initial prototype of this plan:

- Immunohematology…… Mrs. Swarna Krothapalli & Mr. Sherman Bonomelli
- Clinical Chemistry 1 & 2…… Dr. Kristina Behan
- Special Clinical Topics……Dr. J. Steve Smith
- Special Clinical Methods…… Dr. Kristina Behan and Dr. Steve Smith

In the following sections, initial drafts of rubrics for evaluating specific assignments within these courses in accordance with emphasized programmatic SLOs within the B.S. Clinical Lab Sciences Program are provided. The faculty identified above will utilize and refine these rubrics over the course of the 2005-2007 academic years. Results of their efforts will be combined with initial analysis of indirect assessment methods and discussed at a department-wide assessment meeting in November 2006.

INDEX OF APPENDICES

APPENDIX A

Clinical Laboratory Sciences

Mission Statement

The Clinical Laboratory Sciences program offers a baccalaureate degree of highest quality in clinical laboratory sciences, enabling the graduates to develop successful careers in bio-medical technology fields and to pursue advanced degrees in related fields. The faculty of the program strive to advance the knowledge, technology, and education methods in clinical laboratory sciences; to maintain clinical affiliations with local and regional health care facilities and serve as a source of well qualified personnel to staff their clinical laboratories; and to promote and enhance the public's knowledge regarding the profession of clinical laboratory sciences and the UWF Clinical Laboratory Sciences Program.

Student Learning Outcomes

UWF's Clinical Laboratory Sciences Program graduates should be able to do the following:

Content

- Recognize and apply concepts, principles, and theories from the sciences that underlie clinical lab skills (e.g., biochemistry, pathophysiology)
- Apply methodological principles from clinical courses
- Recognize and apply principles of quality assurance
- Use medical terminology accurately
- Describe career opportunities available in clinical laboratory science, including opportunities in independent practice
- Articulate frontiers of knowledge in chosen profession

Critical Thinking

- Distinguish abnormal from normal results
- Interpret and evaluate clinical procedures and results
- Make and confirm sound diagnostic conclusions
- Predict clinical course following diagnosis
- Conduct research using appropriate literature
- Select and apply appropriate statistical procedures to evaluate data

Communication

- Select, operate, and maintain appropriate strategies for recording and reporting results
- Communicate effectively with other medical professionals and service providers
- Interact effectively with patients using calm and reasoned judgment and sensitivity to patient characteristics
- Make professional oral presentations of findings

Integrity/Values

- Articulate appropriate professional responsibility for patient's welfare
- Recognize and adhere to applicable professional regulations, ethical standards, and program's code of conduct
- Advocate for effective, timely, accurate, and cost effective service to demonstrate commitment to patient's welfare
- Maintain confidentiality of patient information

Project Management

- Correlate results from various procedures with management of patient's condition
- Research, develop, and perform new laboratory procedures and evaluate effectiveness
- Enact principles of best practice for lab management
- Enact principles of best practice for human resource management

Hazard and Risk Management

- Recognize and describe principles and regulations regarding lab safety
- Practice lab safety procedures and protocols
- Identify and prevent medical error or minimize consequences of medical error.

Job Prospects for Medical Technology Graduates

Clinical Lab Scientist in:	Section Supervisor/Specialist	Clinical Laboratory Manager
Clinical Chemistry	Public Health Lab Scientist	Clin Lab Education Coordinator
Hematology/Hemostasis	Crime Lab Scientist	Blood bank Administrator
Diagnostic Microbiology	Lab Technical Supervisor	Lab Outreach/Marketing Officer
Immunohematology	Biotech Industry-Sales Rep	Quality Assurance Officer
Serology/Immunology	Biotech Industry-Training Rep	Information Systems Manager
Molecular Diagnostics	CLS Program Faculty	Clinical Lab Consultant
Toxicology	Pharmaceutical Lab Scientist	Regulatory Compliance Officer

Find Out More about Clinical Laboratory Sciences Program at UWF:
uwf.edu.clicallabsciences

APPENDIX B

Sample Syllabus with SLO Statements Linked to Program ALC Components

Course: MLS 4630/4630L Clinical Chemistry –II
Instructor : Dr. Kristina J. Behan
Term: Fall 2005

Student Learning Outcomes

The Academic Learning Compact for the Clinical Laboratory Sciences Program emphasizes the six dimensions of Content, Critical Thinking, Communication, Integrity/Values, Project Management and Hazard and Risk Management. Student Learning Outcomes and their respective ALC components follow:

Following the lab and lecture components of this class, the successful student will be able to:

- Correlate laboratory analytes with the organ(s) of origin, and with the predominant pathophysiology associated with abnormal results. **ALC: Content. Assessment by Exam.**
- List the common therapeutic drugs whose levels are monitored, along with the rationale for monitoring. List the most common drugs tested in clinical toxicology, and interpret the nomograms associated with overdose and therapy. Correlate tumor markers with the most likely types of cancer and interpret ROC curves. **ALC: Content. Assessed by exam**.
- Accurately perform relevant manual and automated laboratory testing, and interpret the result within the context of quality control and patient presentation. **ALC: Content, Critical thinking, Project management. Assessed by lab report.**
- Compare and contrast the immunodiagnostic methods of EIA, ELISA, FPIA, EMIT and nephelometry. Compare and contrast the methods of fluorometry, chemiluminescence, spectrophotometry, atomic absorption photometry. **ALC: Content. Assessed by exam.**
- Incorporate Clinical Chemistry results with Hematology, Coagulation, Microbiology, Immunohematology and Serology results and to the patient presentation to determine the big picture, in the form of case studies. **ALC: Critical Thinking and Project Management. Assessed by exam.**
- Identify the journals of the clinical laboratory scientist, and lead the discussion of a research paper for the class using a professional presentation in PowerPoint. **ALC: Communication, Project Management, Critical Thinking. Assessed by presentation and scored by a published rubric.**
- Describe the molecular defects that are associated with a number of diseases, including sickle cell anemia, cystic fibrosis and cancer. Discuss and perform the conventional methods when appropriate and correlate them with molecular methods. **ALC: Content. Assessed by exam.**

APPENDIX C1

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: ASCP Board of Registry Exam Results

Program: B.S. Clinical Laboratory Sciences
Emphasized Programmatic SLOs: Content
Tangible Course Product to be evaluated: Scores from ASCP Board of Registry Exam

Suggested Implementation for Embedded Assessment:
Select one content area from each instructor. Evaluate each students score in that area relative to a passing score of 400. Below 400 is unsatisfactory, 400-550 is satisfactory, 551 and above is very good to excellent. Due to the limited enrollment in this discipline, all of the students should be included in this assessment. Complete the following rubrics and note characteristics contributing to your rating in the comment section below the rubrics:

CONTENT-BASED SKILLS TO BE ASSESSED in 2006-2007 (Sub-disciplines listed below will be rotated on a three year basis)	Total number taking exam for first time	Unsatisfactory (%)	Satisfactory (%)	Very Good-Excellent (%)
Student was able to identify and use the concepts, principles, and theories that constitute the core sub-disciplines of Microbiology.				
Student was able to identify and use the concepts, principles, and theories that constitute the core sub-discipline of Hematology.				

General characteristics leading to ratings of UNSATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of SATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT, including reflections by instructor and comparison to course grades for individuals:

_____

_____

Attach a reflective commentary that will lead to quality enhancement.

APPENDIX C2

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: Clinical Chemistry I

Program:	B.S. Clinical Laboratory Sciences
Course in Capstone Pathway:	Clinical Chemistry I
Instructor:	Dr. Kristina Behan
Emphasized Programmatic SLOs:	Critical Thinking
Tangible Course Product to be evaluated:	Case Study Analysis

Suggested Implementation for Embedded Assessment:
Students will create a case study of a patient with diabetes mellitus, with laboratory values, and predict a clinical course of disease. Due to the limited enrollment in this discipline, all of the students should be included in this assessment. Record the total number of students, and the number that fell into each category. Grade the assignment as you would normally; note characteristics contributing to your rating in the comment section below the rubric:

CRITICAL THINKING BASED SKILLS TO BE ASSESSED **Total number of students evaluated _____**	Unsatisfactory (D/F)	Satisfactory (C)	Very Good-Excellent (A/B)
Students were able to identify the appropriate diagnostic tests utilized in management of the disease			
Student was able to distinguish normal from abnormal results and make sound diagnostic conclusions.			

General characteristics leading to ratings of UNSATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of SATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT, including reflections by instructor and comparison to course grades for individuals:

_____

_____

Attach a reflective commentary that will lead to quality enhancement.

APPENDIX C3

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: Immunohematology I

Program:	B.S. Clinical Laboratory Sciences
Course in Capstone Pathway:	Immunohematology-I
Instructor:	Mr. Sherman Bonomelli
Emphasized Programmatic SLOs:	Hazard & Risk Management
Tangible Course Product to be evaluated:	Lab Safety Practical/Specimen Collection and Handling procedures

Suggested Implementation for Embedded Assessment:
Students are required to write a laboratory procedure manual for this class. Procedures should include mechanisms to promote laboratory safety. Students are required to practice lab safety procedures during regular sessions and during lab practicals. Due to the limited enrollment, all students should be included in this assessment. Record the total number of students, and the number that fell into each category. Grade the assignment as you would normally; note characteristics contributing to your rating in the comment section below the rubric:

HAZARD & RISK MANAGEMENT SKILLS TO BE ASSESSED **Total number of students evaluated _____**	Unsatisfactory (D/F)	Satisfactory (C)	Very Good-Excellent (A/B)
Student identified and utilized the appropriate PPE and Engineering controls for a phlebotomy; student utilized appropriate work practice controls.			
Student followed accepted protocol in sample collection, as assessed using the phlebotomy checklist provided in lab manual.			

General characteristics leading to ratings of UNSATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of SATISFACTORY, including reflections by instructor and comparison to course grades for individuals:

_____

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT, including reflections by instructor and comparison to course grades for individuals:

_____

_____

Attach a reflective commentary that will lead to quality enhancement.

APPENDIX C4

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: Clinical Chemistry II

Program:	B.S. Clinical Laboratory Sciences
Course in Capstone Pathway:	Clinical Chemistry –II
Instructor:	Dr. Kristina Behan
Emphasized Programmatic SLOs:	Critical Thinking, Communication
Tangible Course Product to be Evaluated:	Journal Club Presentation

Implementation for Embedded Assessment:
Complete the following rubric and note characteristics contributing to your rating in the comment section below the rubrics. Use the student form of the grading rubric to guide assessment. Due to the limited enrollment, all students should be included in this assessment. Record the total number of students, and the number that fell into each category. Comments below will be used to guide improvements in teaching and assessment.

COMMUNICATION-BASED SKILLS TO BE ASSESSED **Total number of students evaluated _____**	Unsatisfactory (D/F)	Satisfactory (C)	VG-Excellent (A/B)
Communicates effectively with peers using vocabulary and analysis appropriate for the audience. Speaks fluidly, is able to pronounce diseases, medications and tests. Demonstrates mastery of the jargon.			
Articulates peer review in a professional and respectful manner.			
Uses PowerPoint as a tool, not a crutch. Entire talk is not printed on slides. Maintains eye contact with audience during most of the talk, uses appropriate speaking volume. Speed of delivery is appropriate for teaching. Respects minimum and maximum time allotments.			

CRITICAL THINKING-BASED SKILLS TO BE ASSESSED	Unsatisfactory (D/F)	Satisfactory (C)	Very Good-Excellent (A/B)
Defines the correct clinical issue of the paper. Gives insightful analysis of the conclusions of the study with respect to the Clinical Laboratory Sciences. Requires minimal instructor input for interpretation.			
Discusses tables and figures from the article in appropriate depth, drawing on alternate sources for background. Demonstrates skill in discussing the statistics found in the paper.			

General characteristics leading to ratings of UNSATISFACTORY:

_____

_____

General characteristics leading to ratings of SATISFACTORY:

_____

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT:

_____

_____

Attach a reflective commentary that will lead to quality enhancement.

APPENDIX C5

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: Special Clinical Topics

Program:	B.S. Clinical Laboratory Sciences
Course in Capstone Pathway:	Special Clinical Topics
Instructor:	Dr. Steve Smith
Emphasized Programmatic SLOs:	Integrity/Values
Tangible Course Product to be evaluated:	Ethics Exercise

Implementation for Embedded Assessment:
Complete the following rubric and note characteristics contributing to your rating in the comment section below the rubrics. Use the student form of the grading rubric to guide assessment. Due to the limited enrollment, all students should be included in this assessment. Record the total number of students, and the number that fell into each category. Comments below will be used to guide improvements in teaching and assessment.

INTEGRITY/VALUES SKILLS TO BE ASSESSED (Select one assessment in place in your course that is reflective of medical ethics. Edit items below as needed to fit the Integrity/Values aspect of your course.) **Total number of students evaluated _____**	Unsatisfactory (D/F)	Satisfactory (C)	Very Good-Excellent (A/B)
Student articulates appropriate professional responsibility for patient's welfare			
Student advocates for effective, timely, accurate and cost effective service to demonstrate commitment to patient's welfare.			
Student maintains confidentiality of patient information			

General characteristics leading to ratings of UNSATISFACTORY:

_____

_____

General characteristics leading to ratings of SATISFACTORY:

_____

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT:

_____

Attach a reflective commentary that will lead to quality enhancement.

APPENDIX C6

B.S. Clinical Laboratory Sciences –Embedded Assessment Instrument: Special Clinical Methods

Program:	B.S. Clinical Laboratory Sciences
Course in Capstone Pathway:	Special Clinical Topics MLS 4824L
Instructor:	Dr. Steve Smith & Dr. Kristina Behan
Emphasized Programmatic SLOs:	Project Management and Critical Thinking
Tangible Course Product to be evaluated:	Seminar Presentation

Implementation for Embedded Assessment:

Complete the following rubric and note characteristics contributing to your rating in the comment section below the rubrics. Use the student form of the grading rubric to guide assessment. Comments below will be used to guide improvements in teaching and assessment. Count the number of students that fall into each category.

PROJECT MANAGEMENT SKILLS TO BE ASSESSED	Unsatisfactory (D/F)	Satisfactory (C)	VG-Excellent (A/B)
Student was able to correlate results from various procedures with management of patient's condition.			
Student was able to research new laboratory procedures and evaluate effectiveness.			
CRITICAL THINKING-BASED SKILLS TO BE ASSESSED	Unsatisfactory (D/F)	Satisfactory (C)	Very Good-Excellent (A/B)
Defines the correct clinical issue of the topic; Requires minimal instructor input for interpretation			
Discusses tables and figures presented in appropriate depth, drawing on alternate sources for background.			

General characteristics leading to ratings of UNSATISFACTORY:

_____

General characteristics leading to ratings of SATISFACTORY:

_____

General characteristics leading to ratings of VERY GOOD-EXCELLENT:

_____

Attach a reflective commentary that will lead to quality enhancement.

Standard 18: Documentation

1). Sources and Frequency of Feedback

Evaluator/s	Time of Evaluation	Number
Students	At the end of each course at the University	11 lectures and 10 Laboratory courses
Students	At the end of each major clinical rotation at the hospital	6 rotations per student
Students	At the end of clinical year, prior to graduation. (Exit Survey)	Once per Year
Faculty /Education Coordinators	Faculty Meetings	Once each semester, minimum 2 per year
Graduates	12-18 months after graduation	Once per each class
Employers	12-18 months after graduation of the student	Once per each class
National Board Certification Exam/s	July-September	Program Performance Reports once or more from each agency
CLS Program Advisory Committee	Committee Meeting in Fall semester	Once per year or as needed
UWF Academic Programs Review	Fall and Spring of a given academic year	In cycles of 5-7 years
NAACLS Program Review	Fall and Spring of a given academic year	In cycles of 5-7 years
Other Surveys	As needed	Occasionally

EVALUTION OF CLINICAL ROTATIONS BY THE STUDENT

CLINICAL ROTATION	STUDENT'S EVALUATION OF THE CLINICAL ROTATION
Hematology	
Imunohematology	
Microbiology	
Clinical Chemistry	
Immunodiagnostics/Serology	
Phlebotomy	

Standard 18: Documentation

2) Survey/Feedback/Evaluation Forms

A. University of West Florida Student Assessment of Instruction

B. Student's Evaluation of Training in a Clinical Rotation

C. Final Evaluation of the Program by the Graduating Student (Exit Survey)

D. Survey of Recent Graduates for Program Evaluation/Feedback

E. Survey of Employers of recent Graduates

F. Survey of the Advisory Committee Members

G. Feasibility Survey for Development of a Certificate Program in Molecular Diagnostics

UNIVERSITY OF WEST FLORIDA-CLINICAL LABORATORY SCIENCES PROGRAM

A. STUDENT'S EVALUATION OF A UNIVERSITY-BASED COURSE

Incude a copy of
UWF student evaluation form for on campus courses

UNIVERSITY OF WEST FLORIDA- CLINICAL LABORATORY SCIENCES PROGRAM
B. STUDENT'S EVALUATION OF TRAINING IN A CLINICAL ROTATION

STUDENT: _____ DATE_____

DEPARTMENT (Circle)... Phlebotomy / Hematology / Microbiology / Blood Bank / Chemistry

I. The Clinical Instructor	**Sometimes**	**Often**	**Always**
Was well prepared and organized			
Presented topics clearly			
Presented material relevant to the rotation			
Was available to discuss issues related to the rotation			
Encouraged student questions and comments			
Answered questions			
Communicated effectively			
Showed respect for students			
Provided useful feedback on performance			
II. Instruction Methods			
Assignment of tasks was appropriate			
Department policies and procedures were stated and clarified			
Additional study aids were provided to support the rotation (reviews, case studies, slides, unknowns, etc)			
Feedback from examinations was timely			
Feedback from professional evaluations was timely			
Personnel in this department hold a positive attitude toward students and teaching			

ADDITIONAL COMMENTS:

_____

_____

_____

THE UNIVERSITY OF WEST FLORIDA-CLINICAL LANBORATORY SCIENCES PROGRAM

C. Final Evaluation of the Program by the Graduating Student (Exit Survey)

Clinical Site_____ Year of Graduation_____2006

Please rate the following using the scale:

1 = Poor 2 = Fair 3 = Good 4 = Very Good 5 = Excellent

I. **FACULTY SUPPORT**

1.	Academic advisement/counseling……..1	2	3	4	5
2.	Career advisement/counseling……1	2	3	4	5

II. **DISSEMINATION OF INFORMATION / POLICIES AND PROCEDURES**

1.	Explanation of degree plan…… 1	2	3	4	5
2.	Explanation of clinical year requirements……. 1	2	3	4	5
3.	Written material covering program structure…… 1	2	3	4	5
4.	Written material covering clinical rotations……. 1	2	3	4	5
5.	Explanation of clinical year selection process……1	2	3	4	5

III. HOW WELL DID THE FOLLOWING UNIVERSITY COURSES PREPARE YOU FOR THE CORRESPONDING CLINICAL ROTATION?

1.	MLS 4305 Hematology I / Lab…….. 1	2	3	4	5
2.	MLS 4460 Diagnostic Microbiology / Lab…….1	2	3	4	5
3.	MLS 4462 Medical Microbiology / Lab……1	2	3	4	5
4.	MLS 4334 Hemostasis & Thrombosis / Lab…….. 1	2	3	4	5
5.	MLS 4625 Clinical Chemistry I /Lab……. 1	2	3	4	5
6.	MLS 4630 Clinical Chemistry II / Lab…….. 1	2	3	4	5
7.	MLS 4550 Immunohematology / Lab…….. 1	2	3	4	5
8.	MLS 4505 Serology / Lab ……1	2	3	4	5
9.	MLS 4220 Urinalysis & Body Fluids / Lab……1	2	3	4	5
10.	MLS 4705 Special Clinical Topics……1	2	3	4	5
11.	Overall academic preparation for Clinical ……1 Rotations	2	3	4	5

IV. EVALUATE THE QUALITY OF INSTRUCTION IN CLINICAL ROTATIONS

1.	Organization of the clinical rotations	1	2	3	4	5
2.	Orientation to the clinical rotations	1	2	3	4	5
3.	Helpfulness of the clinical education coordinator	1	2	3	4	5
4.	Supervision and support of clinical training by University coordinator	1	2	3	4	5
5.	Phlebotomy rotation	1	2	3	4	5
6.	Hematology/Coagulation/UA rotation	1	2	3	4	5
7.	Clinical Chemistry rotation	1	2	3	4	5
8.	Immunodiagnostics/Serology rotation	1	2	3	4	5
9.	Microbiology rotation	1	2	3	4	5
10.	Blood Bank rotation	1	2	3	4	5

V. EVALUATE THE PROGRAM's EFFECTIVENESS IN YOUR:

1.	Preparation to function as an entry-level clinical laboratory scientist	1	2	3	4	5
2.	Preparation for national certification exam/s	1	2	3	4	5
3.	Development as a clinical laboratory scientist in the areas of professional behavior and work habits	1	2	3	4	5
4.	Expanding your horizons in scientific knowledge and desire for life long learning	1	2	3	4	5

VI. EVALUATE THE DOMAINS OF THE ACADEMIC LEARNING COMPACT

(Rate how well you believe the Program helped you master the following skills :)

Recognize and apply concepts and principles from the sciences that underline clinical laboratory skills (e.g. Biochemistry, Immunology, Genetics, and Pathophysiology)

1 2 3 4 5

Apply methodological principles from clinical courses; recognize and apply principles of quality assurance

1 2 3 4 5

Use medical terminology correctly

1 2 3 4 5

Distinguish normal from abnormal results

1 2 3 4 5

Interpret and evaluate lab procedures and results
1 2 3 4 5

Select and apply appropriate statistical procedures
1 2 3 4 5

Conduct research using appropriate literature
1 2 3 4 5

Communicate effectively with other medical professionals and service providers
1 2 3 4 5

Make professional oral presentations of findings
1 2 3 4 5

Recognize and adhere to applicable professional regulations, ethical standards and the profession's code of conduct.
1 2 3 4 5

Correlate results from various procedures with management of patient's code of conduct
1 2 3 4 5

Research, develop, and perform new laboratory procedures and evaluate effectiveness
1 2 3 4 5

Recognize, describe, and practice principles of laboratory safety
1 2 3 4 5

VII. EVALUATE THE EFFECTIVENESS OF THE ENRICHMENT ACTIVITIES
(Give your input with respect to the domains of content, critical thinking, communication, integrity/values, project management, and hazard and risk management)

Journal Club:

Student Seminars:

Northwest Florida Blood Center:

NARRATIVE EVALUATION (University and Clinical Rotation)

University Program Strengths and Weaknesses

1. Didactic lectures (Strengths and areas needing improvement)
2. On-campus laboratories (Strengths and areas needing improvement)
3. Subjects that should be stressed more or less?
4. Which courses did you enjoy the most and why?
5. Which courses did you enjoy the least and why?
6. What changes, if any, should be made to the University Phase of the Program?

Clinical Rotations- Strengths and Weaknesses

1. Do you feel your University-based clinical courses adequately prepared you for your Clinical
   Rotations?
2. Do you feel your clinical lab training was inadequate in any area? If so, please explain and suggest possible remedies.
3. General comments on the helpfulness of the clinical laboratory scientists in your Clinical Rotations - Which departments in your clinical rotation did you enjoy the least? Suggestions for improvement:
4. Specific comments (kudos) on the helpfulness of specific clinical laboratory scientists: Which departments in your clinical rotation did you enjoy the most? Anyone you would especially like to commend?

OVERALL EVALUATION OF THE PROGRAM 1 2 3 4 5

ADDITIONAL COMMENTS AND/OR SUGGESTIONS

_____

_____

_____

_____

_____

_____

_____

THE UNIVERSITY OF WEST FLORIDA CLINICAL LABORATORY SCIENCES PROGRAM

D. SURVEY OF RECENT GRADUATES FOR PROGRAM EVALUATION

Dear Graduate,

Greetings from the faculty and staff of the CLS Program at UWF!

As you know, the University of West Florida's Program in Clinical Laboratory Sciences (formerly, Medical Technology Program) is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). In order to meet the accreditation agency's requirements as well as to meet our own standards of excellence in education and training of our students we send the enclosed survey form to our graduates approximately 12-18 months after graduation.

Please take a moment and reflect back on your training and help us to assess the effectiveness of the UWF's CLS Program in preparing you for the job market with entry level skills and in providing a foundation for your career advancement. Your response will enable us to define the strengths and weaknesses of the program. It will assist us in our efforts to keep the curriculum up-to-date and provides a measure whether the Program is successful in achieving its goals and objectives.

Enclosed is a questionnaire sent to recent graduates of the CLS Program at the University of West Florida. Please fill out and return the questionnaire as soon as possible. For your convenience a self addressed, stamped envelope is enclosed.

Thank you for taking the time to respond. Please keep in touch and let us know about your experiences and accomplishments in the profession. Your feedback will be most helpful to us and we look forward to hearing from you.

Sincerely,

Swarna Krothapalli, MS; MT (ASCP)
Associate Professor and Program Director

THE UNIVERSITY OF WEST FLORIDA CLINICAL LABORATORY SCIENCES PROGRAM

SURVEY OF RECENT GRADUATES FOR PROGRAM EVALUATION

A. Personal Data

Name:_____ Date: _____

Address: _____

_____

Telephone: _____ E Mail

_____

B. Employment Data

Current Employer _____ Length of Service _____

Type of Institution:

Hospital under 200 Beds: _____ Physicians's Office Laboratory _____

Hospital > 200 Beds: _____ Research Laboratory: _____

Reference Laboratory: _____ Other (please specify):_____

Employer's Address _____

_____

Your Position/Title: _____

_____

Work Schedule:

Shift: Days _____ Evening _____ Night _____

Hours: 8 Hour _____ 10 Hour _____ 12 Hour _____

Previous Employer (If applicable) _____

Type of institution (see categories above) _____

Length of Service _____

Area of Work _____

C. Program Evaluation

How would you rate the UWF CLS Program in reference to your preparation as a baccalaureate level clinical laboratory scientist?

Subject Matter Knowledge (Didactic)

	Excellent	Very Good	Adequate	Fair
Hematology……	_____	_____	_____	_____
Immunohematology…….	_____	_____	_____	_____
Clinical Chemistry……	_____	_____	_____	_____
Clinical Microbiology**…….**	_____	_____	_____	_____
Serology…….....	_____	_____	_____	_____
Urinalysis/Body Fluids……	_____	_____	_____	_____
Phlebotomy…….	_____	_____	_____	_____
Fundamentals of:				
Lab Management …..	_____	_____	_____	_____
Lab Safety…….	_____	_____	_____	_____
LIS……	_____	_____	_____	_____
Preparation for Board-Certification Examinations …	_____	_____	_____	_____

Practical Skills Learned in the Student Laboratories and Clinical Rotations (Psychomotor)

	Excellent	Very Good	Adequate	Fair
Hematology……..	_____	_____	_____	_____
Immunohematology……..	_____	_____	_____	_____
Clinical Chemistry……	_____	_____	_____	_____
Clinical Microbiology……..	_____	_____	_____	_____
Serology……	_____	_____	_____	_____
Urinalysis/Body Fluids……	_____	_____	_____	_____
Phlebotomy……..	_____	_____	_____	_____
Fundamentals of:				
Lab Regulation……	_____	_____	_____	_____
Lab Safety……	_____	_____	_____	_____
LIS……	_____	_____	_____	_____
Preparation for Board-Certification examinations….	_____	_____	_____	_____

Training /Emphasis in Development of Professional Characteristics (Affective Domain)

	Excellent	Very Good	Adequate	Fair
Attendance/Punctuality…….	_____	_____	_____	_____
Dress Code…….	_____	_____	_____	_____
Academic Integrity……	_____	_____	_____	_____
Professional Integrity……..	_____	_____	_____	_____
Professional Conduct…….	_____	_____	_____	_____
Patient Confidentiality……	_____	_____	_____	_____
Planning/Organization …….	_____	_____	_____	_____
Meeting Deadlines ……...	_____	_____	_____	_____
Communication Skills ……	_____	_____	_____	_____
Inter-Personal Skills ……	_____	_____	_____	_____
Continuing Education ……	_____	_____	_____	_____

Comments/Recommendations for the UWF CLS Program - Education and Training

1. In preparing clinical laboratory scientists for today's job markets, what are the major strengths of the UWF CLS Program?

2. What are the areas which need improvement?

3. Did you find yourself lacking any entry level job competencies upon entering employment?

4. What are your suggestions on ways to improve education and training in the areas considered
   less that adequate?

5. Which instructional activities or methods did you consider the most effective for learning?

Lectures _____	Reading assignments _____
Laboratory exercises _____	Manuals/Handouts _____
Hospital rotations _____	Case Studies _____
Frequent Quizzes/Examinations_____	Journal Club presentations _____
Seminar presentations _____	Classroom Discussions _____

6. What other instructional activities or methods can you suggest as being helpful?

7. List the factors in the clinical training which most specifically helped you feel confident in your area of employment.

8. Do you belong to a national professional organization? If yes, which one?

9. Do you read at least one professional journal on a regular basis? If yes, which one?

Over all Effectiveness of the Program

Excellent	Very Good	Adequate	Fair
_____	_____	_____	_____

Thank you for your assistance. Please keep in touch and keep us informed of your progress.

If you are engaged in any specialized, cutting edge, professional endeavors we would like to post it on the Program's WEB Page. Send us the information along with your permission.

Best wishes from the Faculty and Staff of the Clinical Laboratory Sciences program at University of West Florida.

THE UNIVERSITY OF WEST FLORIDA- CLINICAL LABORATORY SCIENCES PROGRAM

E. SURVEY OF EMPLOYERS OF RECENT GRADUATES

Dear xxxxxxx,

Since 1986 University of West Florida's Clinical Laboratory Sciences Program (formerly Medical Technology Program) has been accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Most recent renewal of accreditation was in year 2000, at which time the Program was re-accredited for a period of seven years. We will be reviewed by NAACLS in academic year 2006-2007.

In order to meet the accrediting agency's requirements, as well as to maintain our own standards of excellence, we seek input from employers of our graduates approximately 1-2 years after graduation.

According to our information _____, a graduate of the class of 2005 is (or until recently was) employed at your institution.

Please assist us in the assessment of effectiveness of our Program in preparing the graduates for entry level employment in clinical laboratories by providing your feedback. I have enclosed a form for you to complete, along with a stamped self-addressed envelope. Thank you for your assistance in our Program evaluation process and in maintaining our accreditation.

Sincerely,

Swarna Krothapalli, MS; MT (ASCP)
Associate Professor and Program Director

P.S. Please note that we are not asking you to share the specific information regarding the employee's job performance. We only need your input regarding the overall quality of their education and training. A permission form from the graduate is enclosed.

Enclosures

THE UNIVERSITY OF WEST FLORIDA CLINICAL LABORATORY SCIENCES PROGRAM

PERMISSION TO OBTAIN TRAINING EVALUATION BY EMPLOYERS OF GRADUATES

Name (Please print) _____ SSN: _____

To Whom it Concerns:

As a recent graduate of the University of West Florida Clinical Laboratory Sciences Program, I give my permission to the UWF CLS Program officials to request and obtain an evaluation of my performance as a Clinical Laboratory Scientist from my current employer. This permission is given solely to assist the Program in its self-evaluation. The information gathered is to be used only for purposes of accreditation and other program reviews; and for improvement of quality in curriculum and other program services.

Signature: _____ Date: _____

THE UNIVERSITY OF WEST FLORIDA- CLINICAL LABORATORY SCIENCES PROGRAM

SURVEY OF EMPLOYERS OF RECENT GRADUATES

Name of Graduate/Employee _____

Name of the Institution: _____

Areas of Employment _____ Shift _____

Give an appropriate rating in each area listed below:

Technical Performance:

	Excellent	Very Good	Adequate	Fair
Theoretical Knowledge……	_____	_____	_____	_____
Application of Knowledge (Clinical Correlation & Follow up)……	_____	_____	_____	_____
Skills in manual and automated analyses….	_____	_____	_____	_____
Ability to detect errors and take corrective action…….	_____	_____	_____	_____
Phlebotomy……	_____	_____	_____	_____
Specimen handling and processing……	_____	_____	_____	_____
Organization/Neatness in work……	_____	_____	_____	_____
Effective time utilization…….	_____	_____	_____	
Lab Safety Practices……..	_____	_____	_____	_____

Professional Performance

	Excellent	Very Good	Adequate	Fair
Attendance and Punctuality……..	_____	_____	_____	_____
Dependability ……..	_____	_____	_____	_____
Professional Appearance……..	_____	_____	_____	_____
Attitude towards work and coworkers…….	_____	_____	_____	_____
Professional Ethics……	_____	_____	_____	_____
Initiative: Ability to be self-starting and self-reliant…….	_____	_____	_____	_____
Adaptability/Flexibility in-accepting new assignments……	_____	_____	_____	_____
Ability to make decisions and-take decisive actions……..	_____	_____	_____	_____
Leadership: Ability and willingness-to assume responsibility…….	_____	_____	_____	_____
Teaching/training students and-new employees……..	_____	_____	_____	_____

Overall Evaluation

A. List the areas of strength in UWF's Clinical Laboratory Sciences Program.

B. List the areas of weakness in preparation of students for job entry.

C. Give suggestions/recommendations to increase the effectiveness of the Program in preparing
students for today's work place.

_____ _____
Name of the Evaluator (print) Signature

_____ _____
Rank/Title Date

_____
Name of Organization

THE UNIVERSITY OF WEST FLORIDA- CLINICAL LABORATORY SCIENCES PROGRAM

F. Survey of the Advisory Committee Members

Advisory Committee Meeting
10-19-2005

Dear Advisory Committee Members,

The goals of the Medical Technology Program include the following:

- To maintain a nationally accredited program of excellence and provide a sound educational opportunity for students who seek a career in clinical laboratory sciences and/or biomedical technology.
- To provide continuing education programs in medical laboratory sciences and service as a source of academic information to the general public.

Please help us to improve our program by answering the following questions. Leave the completed survey in the meeting room this evening. Thank you for your comments.

1. How well do you feel the UWF program is servicing the needs of the health care industry in Pensacola? Please include suggestions for improvement.

    - In terms of the number of graduates
    - In terms of curriculum content
    - In terms of continuing education

2. What other academic program in the clinical laboratory related fields would you suggest for development, based on regional or national needs? (eg., Histology, Cytology, Molecular Diagnostics, etc.)

3. We currently sponsor a continuing education (CE) event once per year in Ft. Walton Beach, and our faculty present seminars at the Northwest Florida Laboratory Association Annual Convention. How better can we serve the continuing education needs of the clinical laboratory profession of your institution? Please tell us your preferred method for earning CE credits, and suggest topics, location, timing, etc.

4. What career paths are available for clinical laboratory sciences graduates aside from the conventional Med Tech to Supervisor route? (eg. in your hospital, in your experience, compared to your MT classmates)

5. In your experience and professional judgment, what Master's level degree programs would advance the career of a laboratory professional?

6. What strategies can you recommend for recruitment/retention of Medical Technology students?

University of West Florida Medical Technology Program

G. Feasibility Survey for Development of a Certificate Program in Molecular Diagnostics 2004

Dear Colleague,

The Medical Technology Program at the University of West Florida is conducting a feasibility survey regarding the need to develop a certificate program in Molecular Diagnostics. We would appreciate your input. Please complete the attached survey, refold to expose our address, and return by mail. You may also answer at the following website. Thank you. http://survey.uwf.edu/cutl/medtech/certificate.htm.

1. Are you currently offering Molecular Diagnostic tests in your laboratory?
   □ Yes □ No (If No, go to Question 8)

2. Is your laboratory planning to increase its diagnostic molecular biology test menu within the next 3-5 years?
   □ Yes □ No □ Uncertain

3. Check the tests that are performed in your lab using molecular techniques. (Check all that apply).
   □ GC □ Chlamydia □ Mycobacterium □ CFTR
   □ HIV □ HCV □ Other _____

4. Check the molecular methodology methods that are in use in your lab. (Check all that apply).
   □ TMA □ PCR □ COBAS □ bDNA □ Western Blot
   □ LIPA □ LCR □ RFLP □ FISH □ GenProbe
   □ DNA sequencing □ Paternity/Forensic

5. Which department in your lab performs diagnostic molecular testing? (Check all that apply).
   □ Hematology □ Microbiology □ Chemistry □ Immunology/Serology
   □ Blood Bank □ Molecular Diagnostics □ Other _____

6. Who performs the molecular diagnostic testing in your laboratory? (Check all that apply).
   □ Generalist Technologist □ Supervisor
   □ Technologist /Supervisor who is certified in Molecular pathology
   □ Non-Med Tech Molecular Biologist

7. ASCP offers an exam for a Technologist in Molecular Pathology (MP, ASCP). Is your lab more likely to:
   □ Hire a professional that is certified as an MP (from inside or outside).
   □ Train an MT internally to perform molecular diagnostics.

8. Do you consider Board certification in Molecular Pathology a career step that would warrant a reward?

□ Yes □ No

9. Do you believe there is a need for the Medical Technology Program at UWF to develop and offer a post-baccalaureate certificate program for Medical Technologists?

□ Yes □ No □ Not sure, need more information

10. If UWF offers a 9-12 SH certificate program in Molecular Diagnostics, would you be interested in participating?

□ Yes □ No □ May be

11. What specific topics would you like to see included in the curriculum?

12. What hours are best for you to attend classes for a molecular diagnostic program?

□ Evening □ Day Time □ Weekend □ One day per week

13. Does your employer offer tuition reimbursement? If yes, please describe the education related benefits you receive at your institution.

□ No

□ Yes _____ _____

_____

14. If you work at a hospital, what is the size of your facility?

□ 500+ beds □ 200-499 beds □ 51-199 beds □ <50 beds

15. If you work outside a hospital, specify the type of laboratory:

_____

16. Name (optional) _____

17. Title (optional) _____

18. Place of employment (optional) _____

19. Phone number (optional) _____ email _____

Comments/Recommendations:

_____

_____

_____

—

Standard 19: Describe how outcome measures from the last three active years are considered in the program evaluation

Students' Performance on Certification Exams

Performance of graduates on the external examinations is considered a key indicator of program effectiveness. The University of West Florida Clinical Laboratory Sciences Program graduates have consistently performed well on the external examinations indicating the quality of curriculum, instruction and student evaluation methods in this program.

Evaluation begins early in the clinical year with program faculty closely monitoring the student's= performance on internal examinations. Students are evaluated frequently and feedback is provided without undue delay to reinforce the points they missed on each test. When necessary, tutorial assistance is provided by the instructor and/or through a computer program to reinforce the weakness in student=s learning. When a majority of students miss a question or an unknown in a practical the lecture and laboratory lesson content is modified and emphasis is placed on the topics missed. This kind of close monitoring of individual student=s performance on each examination results in the uniform success of our graduates on external examinations.

Until recently graduates were advised to take both ASCP-BOR and NCA exams. However, due to the increases in application fee and the resulting financial burden to the student, a majority of students are not taking the NCA exam. All of them take the ASCP exam, only few students choosing to take both. Since 1999-2000 the State of Florida discontinued the requirement for a separate exam for clinical laboratory personnel, endorsing the national certification exams for equivalency. The clinical year students graduate at the end of July and take the national certification exam in August – September. As soon as the results are posted on-line, the student pass rates and the mean scaled scores in each subsection are evaluated by the faculty.

In most years the Program has a 100% pass rate and the Program's mean scaled scores are above the national means. If our program's scores are below national level in any given subsection, modifications are made to the course/s involved. The syllabus is strengthened by adding additional material to lecture/lab instruction and the students' performance in the given area (for example: Antibody Identification in Immunohematology) is monitored through quizzes, practicals and case studies. Faculty carefully evaluates the program performance reports to identify the relative strengths and weaknesses in students' performance as a whole. Individual scores are analyzed to correlate the graduate=s performance to his/her grades in the internal examinations, performance in the clinical rotations, and other mitigating factors which may have contributed to the very high or very low scores. The effects of each individual student's performance on the overall program performance, in comparison with the national means, are discussed.

The Program=s mean scaled scores and the national mean scaled scores are compared. and the program=s standing in comparison with other programs in the nation is noted. Scaled scores from the current examination cycle and the previous examination cycles for the past 5 years are monitored and significant shifts or trends, if any, are noted. Performance of the current class of graduates is compared with the previous classes.
Mean scaled scores in a given content area are compared to the national means and scores in the previous exam cycles. Scaled scores in each content area are compared with the scores in the

previous exam cycles. If changes are significant, causes are explored and changes are implemented to improve the scores.

The Program=s mean scaled scores in sub-content areas are compared with the national means and with the scores in previous examination cycles. Internal comparisons are made between the current scores in sub-content areas and the scores from previous exam cycles. Upward or downward trends and shifts in each sub-content area are monitored.

Program Performance Data for the Past Three years

American Society for Clinical Pathology-Board of Registry (ASCP-BOR) - MT (ASCP) Exam

YEAR	Number of graduates	Number Passing	Pass Rate %	Mean Program	National -All Universities	National-All Programs
2006 July-Sep	15	15	100	508	487	494
2005 2005 July-Sep	10	10	100	527	493	497
2005 Oct-Dec	1	1	100	723	489	483
2004 July-Sep	10	10	100	529	481	493

National Credentialing Agency for Laboratory Personnel - CLS (NCA) Exam

YEAR	No of graduates	Number Passing	Pass Rate %	Mean Score Program	Mean Score National
2006	1	1	100	85.11	80.00
2005	—	—	—	—	—
2004	6	6	100	81.33	78.88

Board of Registry
Program Performance Report Summary

UNIVERSITY OF WEST FLORIDA
MEDICAL TECHNOLOGIST EXAMINATION: July - September 2006

UNIVERSITY OF WEST FLORIDA
MEDICAL TECHNOLOGY DEPARTMENT
11000 UNIVERSITY PARKWAY
PENSACOLA, FL 32514-5751

- **THIS IS A CURRENT CYCLE**
  Program Performance Summary includes the following parts:
- First time individual student scaled scores
- Repeater individual student scaled scores

The information contained in Program Performance Reports should be handled in a confidential manner which respects the rights of the individual whose scores are reported.

••••• First time individual student scaled scores

MINIMUM PASSING SCORE MPS: MCQ = 400

Performance of First Time Examinees										
Attempt	**Examinee Name**	**BBNK**	**CHEM**	**HEMA**	**IMMU**	**LO**	**MICR**	**UA**	**TOTAL**	**STATUS**
1	1	559	491	368	536	406	550	435	**483**	**PASS**
1	2	593	751	637	806	595	559	518	**639**	**PASS**
1	3	654	548	650	591	714	531	745	**611**	**PASS**
1	4	423	381	452	665	100	489	226	**425**	**PASS**
1	5	457	413	528	413	527	368	247	**430**	**PASS**
1	6	453	396	381	407	670	501	611	**456**	**PASS**
1	7	676	529	554	490	562	509	324	**537**	**PASS**
1	8	559	609	506	711	687	535	551	**573**	**PASS**
1	9	260	384	452	590	414	563	524	**445**	**PASS**
1	10	502	596	556	517	528	561	599	**555**	**PASS**
1	11	430	429	455	488	696	419	487	**457**	**PASS**
1	12	621	420	617	511	760	479	100	**521**	**PASS**
1	13	432	343	409	661	385	560	354	**438**	**PASS**
1	14	639	458	585	392	421	454	453	**503**	**PASS**
1	15	664	503	578	554	409	509	537	**549**	**PASS**

2006 ASCP- BOR Program Performance Report (July-September 2006)
Program and National subcontent area mean scaled scores - 15 students

	Program	Universities	National
BLOOD BANK			
ABO and Rh	517	537	526
Antibody screen and identification	561	515	511
Crossmatch and special tests	666	533	543
Blood donation, transfusion therapy, transfusion reactions and hemolytic disease of the newborn (HDN)	483	507	506
CHEMISTRY			
Carbohydrate/Acid base/Electrolytes	467	488	491
Proteins and other nitrogen containing compounds	536	488	491
Enzymes/Lipids/Lipoproteins	531	505	523
Special chemistry	409	489	505
HEMATOLOGY			
Erythrocytes and leukocytes	507	502	504
Other tests	536	491	505
Morphology and differential	578	528	515
Platelets and hemostasis	462	513	519
IMMUNOLOGY			
Immunity	528	496	499
Infectious diseases	617	495	506
MICROBIOLOGY			
General bacteriology and aerobic gram-positive cocci	500	505	510
Aerobic gram-negative bacilli	515	501	514
Gram negative cocci, gram-positive bacilli and anaerobes	529	474	478
Fungus, viruses mycobacteria and parasites	510	497	504
URINALYSIS AND OTHER BODY FLUIDS			
Urinalysis	450	485	501
Other body fluids	474	558	562
LABORATORY OPERATIONS	526	515	516

100 represents the minimum scaled score
999 represents the maximum scaled score

2005 ASCP- BOR Program Performance Report (October – December 2005)
Program and National subcontent area mean scaled scores - One Student

	PROGRAM	UNIVERSITIES	NATIONAL
BLOOD BANK			
ABO and Rh	999	516	499
Antibody screen and identification	895	495	496
Crossmatch and special tests	765	521	519
Blood donation, transfusion therapy, transfusion reactions and hemolytic disease of the newborn (HDN)	645	479	481
CHEMISTRY			
Carbohydrate/Acid base/Electrolytes	731	490	489
Proteins and other nitrogen containing compounds	999	495	488
Enzymes/Lipids/Lipoproteins	735	548	539
Special chemistry	614	490	486
HEMATOLOGY			
Erythrocytes and leukocytes	444	503	491
Other tests	692	559	539
Morphology and differential	445	520	505
Platelets and hemostasis	712	500	498
IMMUNOLOGY			
Immunity	493	501	490
Infectious diseases	692	488	501
MICROBIOLOGY			
General bacteriology and aerobic gram-positive cocci	891	524	511
Aerobic gram-negative bacilli	619	524	508
Gram negative cocci, gram-positive bacilli and anaerobes	100	502	491
Fungus, viruses mycobacteria and parasites	781	513	500
URINALYSIS AND OTHER BODY FLUIDS			
Urinalysis	724	492	482
Other body fluids	999	545	538
LABORATORY OPERATIONS	999	510	502

100 represents the minimum scaled score
999 represents the maximum scaled score

2005 ASCP- BOR Program Performance Report (July-September 2005)
Program and National subcontent area mean scaled scores- 10 Students

	PROGRAM	UNIVERSITIES	NATIONAL
BLOOD BANK			
ABO, Rh and compatibility testing and special tests	567	497	507
Antibody screen and identification	463	496	497
Hemotherapy	567	491	503
CHEMISTRY			
Carbohydrate/Acid base/Electrolytes	567	485	491
Proteins and other nitrogen containing compounds	574	489	495
Enzymes/Lipids/Lipoproteins	591	487	500
Special chemistry	440	483	487
HEMATOLOGY			
Erythrocytes and leukocytes	556	497	497
Other tests	717	525	511
Morphology and differential	551	515	518
Platelets and hemostasis	538	541	534
IMMUNOLOGY			
Immunity	518	489	499
Infectious diseases	568	553	553
MICROBIOLOGY			
General bacteriology and aerobic gram-positive cocci	423	517	524
Aerobic gram-negative bacilli	568	516	522
Gram negative cocci, gram-positive bacilli and anaerobes	418	524	524
Fungus, viruses mycobacteria and parasites	516	500	511
URINALYSIS AND OTHER BODY FLUIDS			
Physical and chemical urinalysis	562	523	534
Microscopic and complete urinalysis	656	522	529
Other body fluids	866	540	557
LABORATORY OPERATIONS	536	525	522

100 represents the minimum scaled score
999 represents the maximum scaled score

2004 ASCP- BOR Program Performance Report (July-September)
Program and National subcontent area mean scaled scores- 10 Students

	PROGRAM	UNIVERSITIES	NATIONAL
BLOOD BANK			
ABO, Rh and compatibility testing and special tests	653	507	511
Antibody screen and identification	483	488	492
Hemotherapy	469	492	507
CHEMISTRY			
Carbohydrate/Acid base/Electrolytes	561	482	493
Proteins and other nitrogen containing compounds	563	500	505
Enzymes/Lipids/Lipoproteins	424	515	511
Special chemistry	544	468	484
HEMATOLOGY			
Erythrocytes and leukocytes	589	501	504
Other tests	595	531	525
Morphology and differential	524	490	509
Platelets and hemostasis	411	499	518
IMMUNOLOGY			
Immunity	568	488	498
Infectious diseases	510	510	534
MICROBIOLOGY			
General bacteriology and aerobic gram-positive cocci	537	515	521
Aerobic gram-negative bacilli	519	504	517
Gram negative cocci, gram-positive bacilli and anaerobes	440	482	483
Fungus, viruses mycobacteria and parasites	468	492	502
URINALYSIS AND OTHER BODY FLUIDS			
Physical and chemical urinalysis	462	488	508
Microscopic and complete urinalysis	627	516	533
Other body fluids	592	570	582
LABORATORY OPERATIONS	592	501	507

100 represents the minimum scaled score
999 represents the maximum scaled score

Academic Learning Compact and Quality Enhancement Plan -Based Outcome Measures

During the past 2 years the Program developed and began implementation of the University's Quality Enhancement Plan (QEP) using the direct and indirect assessment of the Student Learning Outcomes (SLOs) described in the Academic Learning Compact of the CLS Program.

Critical Thinking – Reading the literature is an important skill for a laboratorian, but it requires a background in biostatistics and a familiarity with the journals of the trade. Journal club presentations have been embedded into Clinical Chemistry and Special Clinical Methods courses. Methods in Research Design/Literature Search are incorporated into the curriculum. Students discuss current topics in depth. They must be able to do a literature search using Pubmed or Medline as well.

Communication and Project Management
Our QEP is in the initial phases of implementation and assessment. Following are the results of assessment in the areas of "Communication and Project Management "areas of the SLOs in Academic Learning Compact

Quality Enhancement Plan – Clinical Laboratory Sciences Program

Focus: Improvement for Communication and Project Management

Date: July 10, 2005 Original Plan
June 23, 2006 Year 1 Implementation

Introduction: The CLS Program's Academic Learning Compact revolves around the areas of content, critical thinking, project management, biohazards and risks, and communication. Oral communication and project management are highlighted in three areas:

- Clinical Chemistry II – students give 1-2 presentations as journal clubs to their peers, and are shown the basic commands necessary to perform a PowerPoint presentation. This presentation has the payoff of a test grade.

- Clinical Rotations – students give a brief journal club to Dr. Steve Smith, the site coordinator. Format is a printed PowerPoint presentation and one to one talk. Each student must discuss six topics of clinical lab science.

- Clinical Rotations – students give a 20 -30 minute seminar on a topic of their choice to their peers, faculty and hospital personnel. Format to be followed is that of a TechSample, that is – a case study, followed by learning objectives, case analysis, and questions, presented as a PowerPoint. The payoff is that 2-3 points are added to the overall grade of Special Clinical Methods. Students and faculty assessed the talks with a score card, but all students were given the same grade.

Data in 2005: 12 students gave presentations at Baptist Hospital, Sacred Heart Hospital, and West Florida Hospital. Dr. Kristina Behan was able to attend 8 of these talks, and scored them using the following abbreviated rubric.

Table 1. 2005 Criteria

Point value	Explanation
10	Exceptional coverage of topic; professional work; relevant to profession
9	Expected quality of coverage, work and relevance
7	Good quality, lacks laboratory focus
6	Shows no insight, unimaginative
4	Wasted the audience time

Eight student presentations were graded using the above rubric, and compared to the student seminar evaluation forms (attached for example). The evaluation forms were collated and averaged, and are shown below. 10 is the top score in both rating systems.

Table 2. 2005 scores

Student	**Behan score**	**Student rating**
1	7	8.5 - 9
2	9	9-10
3	7	9-10
4	10	9-10
5	7	10
6	4	9-10
7	4	9-10
8	9	8-10

After reviewing each student's talk and their rating, nine problem areas were identified that could be improved by stating expectations and score using a detailed rubric. These are:

Table 3. 2005 Problems

Problem observed	**Improvement suggestion**
Insufficient preparation	Outline due 2-3 weeks prior to talk (graded)
Insufficient introduction to new topic	Consider the audience as students. Outline reviewed by advisor, with suggestions for improvement
Focus on patient disorder, no lab correlation	Clearly defined rubric stating SLO and objectives of the talk
No particular lab area specified in talk; general information	Topics must be focused on one clinical area, and approved in advance by the instructor for that area.
Nonprofessional appearance	Rubric to define attire
Length of talk	Rubric to define length
No new insight	Minimum references of textbook, class notes, 1-2 research papers or patient data, manufacturer information if relevant
Payoff for time involved in preparation is too low. No incentive for time commitment.	Since the expected time to complete this project is ~10 hours, this should be worth 200 points of the total points for the subject area.
Good reviews given for talks that wasted the audience time.	Peer review is a good method to learn critical thinking, but guidelines must be precise (students are notorious cheerleaders, but cheering does not facilitate learning). Rubric would improve students' ability to peer review and guide the presenter in designing their performance. Practice at rubric driven peer review will be started in Clinical Chemistry II.

Recommendation for improvement as of 2005:

1. Redefine the objective of this project: "The student and the audience will gain an insight into a laboratory aspect, be it through the platform of a department, a procedure, or a patient. The format will be …"
2. Define Student learning outcomes for this project, to include the following:
    a. Analyze a problem, a population or patient with respect to a lab department.
    b. Integrate multiple facets of the problem, e.g. patient history and lab results.
    c. Research the defined problem using legitimate and approved resources.
    d. Design a PowerPoint presentation that includes SLO, a case study, new information, and 5 study questions, 3 of which must be relevant to the lab.
    e. Communicate the presentation in a professional manner.

3. Design a meaningful rubric that is presented to the students during their orientation to the clinical year. This will include specific instructions, and designate a time of 20-30 minutes.
4. Provide topic suggestions; require topic approval, with a graded outline due 3 weeks prior to the talk. This will aid them in project management timeline.
5. Drop the peer review of the actual presentation. Standardize the grading using a rubric and one instructor who will view all talks.
6. Use instructors' TechSample publications as a go-by, since these are case studies with SLO and follow-up questions.
7. Students at a remote location will either deliver their talk when it is convenient for an instructor to visit, or during Review Week at the end of the semester.

2006 Data and results

1. Actual changes made
2. Student performance
3. Embedded assessments
4. Student feedback
5. Interpretation and Plan for 2007

1. Actual changes:

A. Students were given a list of acceptable topics and granted approval for other topics of interest.

B. The instructions were rewritten (Appendix A-1) and a rubric was posted (Appendix A-2) that specifically discussed deficiencies from the previous cycle.

C. Point value for the exercise was set at 0-5 extra credit points to be added to the final grade of Special Clinical Methods.

D. An embedded assessment instrument was devised to evaluate project management skills and critical thinking based skills (Appendix A-3).

E. Students were prepped for the presentations during Clin Chem I where they wrote short papers that were evaluated with rubrics, and allowed to improve the grade by rewriting to satisfy the rubrics. They were further prepared in Clin Chem II, wherein they gave journal club presentations that were pre-evaluated by peers and instructor with a rubric, allowing modifications to the final project.

F. Students were encouraged to peer review talks in advance, but were not reviewers of the other students' final performance.

2. Student performance

Students were evaluated in a number of ways, by the Rubric for their own score, using the ranking scale in Table 1 for content used in the 2005 evaluation and by the embedded assessment for project management in Table 2 and for critical thinking in Table 3.

Table 1 Evaluation of Content and relevance

Point value	Explanation
10	Exceptional coverage of topic; professional work; relevant to profession
9	Expected quality of coverage, work and relevance
7	Good quality, lacks laboratory focus
6	Shows no insight, unimaginative
4	Wasted the audience time

Table 2. Student scores in 2006

Student	**Behan score for content, out of 10**	**Grade received out of 5**
1	Te 10	5
2	Mg 9	4.8
3	Jb 10	5
4	Jc 10	5
5	Hs 10	5
6	Kh 9	4.9
7	Mr 9	4.8
8	KM 9	4.9
9	Js 7	4.5
10	Js 6	4.5
11	Sw 6	4.2
12	Bc 6	4.5
13	Nr 9	4.8
14	Bp 6	4.7
15	Sm 7	4.5

3. Embedded assessments

Table 3. Project Management

	Unsatisfactory	Satisfactory	Excellent	N/A
Student was able to correlate results from various procedures with management of patient's condition		4	9	2
Student was able to research new laboratory procedures and evaluate effectiveness	1	2	6	6

Characteristics leading to ratings of unsatisfactory: Student discussed historical procedures, and

stated the name of a new procedure but did not attempt to bring information into the talk.

Characteristics leading to ratings of satisfactory: Student performed at the level described in the rubric as "meets expectations".

Characteristics leading to ratings of excellent: Student evaluated findings from multiple facets, integrating results found in different departments. Student sought out expertise of supervisor and professors to have a deeper understanding of the issue.

NA: Not all of the talks dealt with new procedures or effectiveness. Not all talks dealt with patient condition.

Table 4. Critical Thinking

	Unsatisfactory	Satisfactory	Excellent	N/A
Student defines the correct clinical issue of the topic; requires minimal instructor input for interpretation		8	7	
Student discusses tables and figures presented in appropriate depth, drawing on alternate sources for background	1	5	9	

Characteristics leading to ratings of unsatisfactory: When discussing a figure, orient the audience to what the figure represents. In this case it was a biopsy, and the staining was not explained. This has the same effect as showing a graph and not explaining the axes.

Characteristics leading to ratings of satisfactory: Expected level of discussion. Generally able to discuss figures, but faltered or misinterpreted one figure. Talk to lab supervisor about the tables to be comfortable with them. Using phrases like "this figure just shows…" or "here's another figure to show…" clues the audience that you are uncertain of the significance of the findings. If you need the figure, be able to describe it in depth.

Characteristics leading to ratings of excellent: Material discussed was new to the audience and interpreted clearly. Appropriate length and understanding/explanation of case, lab results and figures. Case study was well developed and followed from start to end.

4. Student feedback

Students were asked to reflect on the seminar project with respect to project management and critical thinking skills, and to rank their feelings about their own performance. These are shown in Table 5.

Table 5A. Student survey results

	strongly disagree				strongly agree		% that agree	% that strongly agree
While preparing for and after completing my student seminar project, I felt that	1	2	3	4	5	NA		
1. I was able to correlate results from various procedures in the lab with the management of a patient's condition.		1	1	5	6		92%	85%
2. I was able to research new lab procedures and report on their effectiveness		4	1	3	4	1	67%	58%
3. I was capable of setting my own deadlines		3	1	3	6		77%	69%
4. I was able to define the correct clinical issue of the topic		2	1	4	6		85%	77%
5. I was confident in presenting figures and tables from the research		2	1	5	5		85%	77%
6. I was able to do a literature search using a scientific database		2	1	6	4		85%	77%
7. The rubric was helpful in the preparation of the talk	1	2	1	3	6		77%	69%
8. The point value of the project was adequate	6	2	3		2		38%	15%
9. I had sufficient background training from Journal Clubs in the hospital and Clinical Chemistry 2 assignments		1	2	3	7		92%	77%

Table 5B. Suggestions for improving the process from the students:

1. Too much going on from regular rotations to give proper attention to seminars. Increase the point value.
2. The previous presentations in class before the hospital rotations were just very good to help us preparing and practicing for the big seminar and for future professional presentations. The rubric is just phenomenal, because it gives us the perfect guidelines to accomplish an excellent presentation.
3. The seminars were time consuming and took away study time from the weekly tests. I would have preferred for it to count for more points as compensation, and the points to add to the area most needed.
4. I believe the seminars should be worth more points.
5. Give more points to this project due to the stress of the clinical rotation and trying to accomplish this task. Since research and creating this project takes so much time to prepare.
6. You spend so much time working on the seminar and trying to balance studying for clinicals it should be worth more points
7. Needed more points for the effort put into it. Should be able to put the points where you most need them.
8. No seminar

9. Needs to be worth more points due to amount of time put into it, especially with all of the other obligations during the rotations.

5. Interpretation and Plan for 2007

Summary of Project Management Skills ranked by instructor/students

Instructor: 100% of the students achieved a satisfactory to excellent rank in the ability to correlate results from various procedures with management of a patient's condition.
Students: 92% of the students agreed/strongly agreed that they were able to correlate those results.

Instructor: 93% were able to research new laboratory procedures and evaluate effectiveness.
Students: 67% of the students agreed/strongly agreed that they were able to research new lab procedures.

Summary of Critical Thinking Skills ranked by instructor/students

Instructor: 100% of students received satisfactory or excellent rank in the ability to define the correct clinical issue of the topic of the seminar, and required minimal input for interpretation.
Students: 85% of the students agreed/strongly agreed that they were able to define the correct clinical issue of the topic.

Instructor: 93% were able to discuss tables and figures in appropriate depth.
Students: 85% of the students agreed/strongly agreed that they were able to discuss the data in depth.

An overwhelming majority (92%) felt that they had received good training during Clinical Chemistry and Journal Club presentations, and most (77%) felt that the rubric aided them in the preparation of the talk. More than half of the students felt that there should be more points given for this extensive project, a view held by Dr. Behan as well.

After reviewing each student's talk and their rating, several opportunities for improvement were identified that could be addressed by stating expectations, rehearsal and score using a more detailed rubric. These are:

Table 6. Improvements for the following year

Problem observed	Improvement suggestion
Format of references was haphazard	Include examples in rubric for book, journal, website, or refer students to TechSample reference section as a go-by.
Topics were not all relevant to actual hospital experience	Create a criterion of "how is this addressed at your clinical site"; require/suggest a reference of lab personnel/supervisor, post in rubric
Many internet references	Push the .gov and .org references, limit others. Use textbook, journals, interviews, minimal internet
Figures not adequately referenced	Illustrate method to give credit for figures during Clinical Chemistry
SLO not kosher, and not tied to questions	Provide list of action words, give example of tie in, and rubric to address the value (Appendix A-5)
Seminars were not publicized	Good opportunity for free publicity. Plan ahead for this.
Glossing over data in figures and tables	Describe expectations in rubric; expect questions about your figures
Reading from slides	Emphasize bullets versus paragraphs; have lectern/podium and notes pages
Inexperience with laser/pointer	Practice in advance
Written assignment late or low quality	The value of the written assignment as an adjunct to this talk is questionable. It may be dropped.

SURVEYS: Indirect Measures of Program Evaluation / Evaluation of Student Learning Outcomes

Following pages include:

1. Results of Final Evaluation of the Program by Graduating Students (Exit Survey)

2. Results of Survey of Graduates: 2000-2004

3. Results of Survey of Employers of Graduates of 2000-2004

4. 2004 - Results of Feasibility Survey for Development of a Certificate Program in
   Molecular Diagnostics

5. 2005- Survey Responses from Advisory Committee Members

Final Evaluation of The program by Graduating Students (Exit Evaluation)

Each year, during the last week of July, the students who have just completed the clinical rotations at the hospitals return to the campus for a week of review sessions. During this week students complete a final evaluation form which was included in Standard 18.

The results of this evaluation are tabulated, summarized and discussed during the fall faculty /education coordinator's meeting, usually in December. Following are examples of these outcome measures. (Scale: 1= Poor 2 = fair 3 = Good 4 = Very Good 5 = Excellent)

REVIEW OF HOSPITAL ROTATION 2002-2003

Discussion of Student Evaluation Forms

Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5
Narrative Evaluations
- Didactic lectures...
  - Too long
- Laboratory...
  - Explain more tests that pertain to hospital
  - Instruments and reagents several times did not work
  - More up to date methods and equipment
- Clinical rotation
  - Update Chemistry study questions
  - Make questions based on textbooks that are required and used in class
- Enrichment Activities
  - NWBC...Suggest half day rotation
  - Journal Club..Not enough time to prepare
  - Student Seminars...Enjoyed the experience
- Overall
  - "Excellent program"
  - "Really enjoyed

REVIEW OF HOSPITAL ROTATION 2003-2004

Discussion of Student Evaluation Forms (scale 0-5)

Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5
Narrative Evaluations
- University Lecture & Laboratory (Strengths and Weaknesses)
  - Chemistry may need a different approach (better textbook and lectures could follow textbook more tightly)
  - Focus more on the current, up to date items, less on the ways of the past

Less emphasis on rare disease
Shorten lectures, more laboratory
Labs excellent
Some labs were not very helpful...too long (too much wasted time)
A good move was bringing automation in for chemistry
More focus on blood bank and multiple antibodies
Molecular techniques and materials should be more heavily emphasized
Chemistry and microbiology, visual aids and different methods of learning great

Narrative Evaluations (continued)
Hospital (Clinical) Rotation (Strengths and Weaknesses)
All techs went out of their way to help
Some OK, some not
Loving and caring people at Bay
Baptist was awesome
Couldn't be more pleased with hospital rotation
Sometimes workplace too busy, over tasked. Only a few assisting students
Gossip should not be displayed in front of student if they expect student to display a level of professionalism
Cumulative exam not accurate or up to date
Enrichment Activities
NWBC...
Useful to see daily activities
Not useful, not really organized
Change of scenery but didn't do anything applicable there
Poor planning for students
Good
Nice to see the faces behind the products
Journal Club..
Program could go on without it
Helpful
Prepared us for the seminar
Student Seminars...
Very useful
Helpful
Stressful, but helpful
Not enough points were given for the amount of time and effort
Nice change
Practicing public speaking is always helpful
Overall
"Thank you"

REVIEW OF HOSPITAL ROTATION 2004-2005

Discussion of Student Evaluation Forms (scale 0-5)
Faculty Support....4-5
Dissemination of Information / Policies and Procedures...4-5
University Preparation for Clinical Rotation....4-5
Quality of Instruction in Clinical Rotation...4-5
Program Effectiveness...5
Narrative Evaluations

University Lecture & Laboratory (Strengths and Weaknesses)

Blood bank well structured; Lectures thorough
Do whole semester on Blood bank
Stylish presentation in Micro and Chemistry
Less historic information; more real world
Use new technology in lab; need new equipment; need more space
Need cell washers
Less emphasis on old techniques
Structure Micro with greater emphasis on unknowns; more hands on Micro
Coagulation and Serology too short due to hurricane

Hospital (Clinical) Rotation (Strengths and Weaknesses)

Really felt prepared for rotation
Overall very helpful
Sometimes grading on rotations was too subjective
Some exams need revision
Chemistry at Baptist, so busy, little hands on, sometimes an attitude
Need more visits to FWB (felt like red-headed stepchildren)

Kudos:

Micro and Heme at Baptist
Lou Ann at WFH
Ken at SHH
Blood bank and Micro at FWB
All at Bay

Enrichment Activities

NWBC...
- Informative
- Could be half day

Journal Club..
- Helpful
- Tedious
- Informative

Student Seminars...
- Enjoyed
- Helpful
- Stressful

Overall

"Thank you"

Summary and a description of the actions taken based on the Exit Survey of the 2005 graduates

August 2005 graduates gave high marks for the overall quality and effectiveness of the program. In all of the criteria they were asked to assess, the Program was rated as 4 (Very Good) or 5 (Excellent).

It appears that the graduates find that the University phase of the Program prepares them well for clinical rotations at the Hospital. It was commented that the on campus labs need newer instrumentation and equipment. Students felt that more on-campus Phlebotomy training is needed. More hands on Microbiology with greater emphasis on identification of unknowns was recommended.

Actions to be taken:

- As in past years, the results of this survey will be discussed in a Faculty meeting which includes education coordinators from our clinical affiliates. Their input will taken regarding changes / improvements to be made in clinical rotations in 2006
- Based on the students' comments, Phlebotomy training will be enhanced to the extent possible on campus. Since we have no direct access to patient population this will not be easy but efforts will be made to increase the students experience in this area
- Faculty will review the needs for upgrading laboratory instruments and equipment. An effort will be made to procure funds from administration to purchase needed equipment.
- On campus Diagnostic Microbiology laboratory exercises will be enhanced to include more training in identification of unknown organisms

We will continue with student seminars and other special projects during clinical rotations

Survey of Graduates: 2000-2004 Number of Responses 11

Program Evaluation

How would you rate the UWF CLS Program in reference to your preparation as a baccalaureate level clinical laboratory scientist?

Subject Matter Knowledge (Didactic)

	Excellent	Very Good	Adequate	Fair
Hematology……	10	1	–	–
Immunohematology……..	10	1	–	–
Clinical Chemistry…….	6	3	1	1
Clinical Microbiology……	7	4	–	–
Serology…….....	6	4	–	–
Urinalysis/Body Fluids……	10	1	–	–
Phlebotomy……..	3	3	5	–
Fundamentals of:				
Lab Regulation……	6	4	1	–
Lab Safety……	6	5		
LIS……	3	3	3	2
Preparation for Board-Certification Examinations …	11	–	–	–

Practical Skills Learned in the Student Laboratories and Clinical Rotations (Psychomotor)

	Excellent	Very Good	Adequate	Fair
Hematology……	7	4	–	–
Immunohematology……..	6	5	–	–
Clinical Chemistry…….	5	5	1	–
Clinical Microbiology……..	8	2	1	–
Serology……	6	4	1	–
Urinalysis/Body Fluids……..	5	5	1	–
Phlebotomy…….	2	6	2	1
Fundamentals of:				
Lab Management ……	3	6	2	–
Lab Safety…….	3	7	1	–
LIS……	4	4	2	1
Preparation for Board-Certification examinations….	7	3	1	–

Emphasis on Development of Professional Characteristics (Affective Domain)

Excellent	Very Good	Adequate	Fair
6	3	2	

Comments/Recommendations for the UWF CLS Program - Education and Training

1. **In preparing clinical laboratory scientists for today's job markets, what are the major strengths of the UWF CLS Program?**
   - Focus on the skills needed for today's technology. The knowledge is given in a format that is great fro learning and for accumulating a good working knowledge. Repetition, Repetition, Repetition on goals needed to learn.
   - Dedication of the faculty members. Frequency of tests & quizzes in preparing for Boards. Excellent relationships with hospitals used for clinical rotations.
   - Subject matter was intense & covered extremely well. The importance of our position.
   - The professional standards that are upheld in the program. The professors and faculty and their high level of commitment to the program.
   - Having the cooperation of the local hospitals to allow clinical training
   - Depth of study of curriculum. Narrow focus on subject matter contained on certification exams.
   - Microbiology, Hematology and Chemistry
   - Very thorough teaching of the different subjects, excellent preparation for the certification examination.
   - Theory of testing, strong background in theory, helps in troubleshooting & preventing erroneous results being reported
   - Clinical Rotation.
   - Training in Hematology and Clinical Chemistry.
2. **What are the areas which need improvement?**
   - Clinical Chemistry's focus on how patient results will show tip offs on contamination, disease states, etc
   - I remember the chemistry labs seemed very outdated and useless.
   - Automation-more coverage since so much of the lab work is no longer manual.
   - Phlebotomy-more of it.
   - Coverage of new emerging technologies.
   - Maybe larger focus on practical skills (Psychomotor)
   - Immunohematology, this course should be a semester long, not 4 weeks course. I also suggest that serology should be taken before immunohematology. Serology could be taught during Diag Micro, Hematology semester.
   - Phlebotomy training, more space, especially for laboratory exercises, testing equipment (spectrophotometers, use of reagents that can always give reliable results (microbiology, chemistry).
   - Need analyzers in class rotations so we know a little about machines before we reach the hospitals.
   - Phlebotomy, needs more training.
3. **Did you find yourself lacking any entry level job competencies upon entering**

employment?

- No
- I would not say I was completely lacking competency, but my phlebotomy skills could have been stronger.
- A bit shy about phlebotomy rotations or requests. Other than that, no.
- No. I feel that UWF's program was a great training program that prepared me for the work force.
- No
- No
- No
- Even though I have some phlebotomy experience, I did not fee confident when facing patients, since we were not shown, or taught how to use and when to use, the many different gadgets available.
- No
- No
- The only area that was lacking was the little use of different LIS Systems.

4. **What are your suggestions on ways to improve education and training in the areas considered less that adequate?**
    - Give some helpful handouts of tips in all areas.
    - I understand chemistry labs are difficult to design since it is such an automated area and each hospital has its own instrumentation. We could have been taught more about QC and calibration and how important maintenance and troubleshooting of instruments can be. The hospital where I trained did not make us draw enough people for phlebotomy for me to feel completely competent.
    - Let students realize that automation is a large part, maybe use guest speakers like the one from Beckman covering hematology analyzer. It helps the students to relate the theories and concepts to what is actually going on with machines. (For ex: the chemistry analyzer).
    - Can't think of anything , except keep the high standards
    - It is very important to understand the complete process of how the blood gets from the phlebotomists to the techs. I suggest a few days, or a week, in the accessions area of the lab in the hospital to understand the ordering process, the receiving process and the distribution to the appropriate areas of the lab. A lot of errors occur during this process.
    - More labs or lab time, greater use of visual aids such as power point presentations, possibly longer clinical rotations to effectively expose the students to hands on experiences.
    - None
    - Get some analyzers
    - Advance the machinery

5. Which instructional activities or methods did you consider the most effective for learning? (Number indicates the number of graduates who checked the item).

Lectures ……	9	Reading assignments ……4	
Laboratory exercises …….	9	Manuals/Handouts…….6	
Hospital rotations ……..10		Case Studies…….....5	
Frequent Quizzes/Examinations….6		Journal Club presentations ……2	
Seminar presentations ……1		Classroom Discussions …….2	

- All the methods were good learning tools
- Clinical experience
- Methods used were most effective for the amount of material needed to learn.
- Flow charts for micro were great for theory work, but not useful in lab.

6. What other instructional activities or methods can you suggest as being helpful?

- Have current med techs present material as we would see it on the job, i.e.; results what to look for! Ask former students to present cases.
- I cannot think of any other methods.
- Guest lecturers
- In Immunohematology have students to present 5 -10 presentations on a subject matter or case study. Invite a blood bank tech to one of the lab sessions.

7. List the factors in the clinical training which most specifically helped you feel confident in your area of employment.

- Working one on one with a med tech who gave good tips on what to look for. Repetition, Repetition, on key things presented.
- My first job was third shift and I was the only employee there to run the lab. I had to be confident in all areas of the lab. I feel that my clinical training was more than adequate in preparing me for this experience, since I was taught to make quick, accurate, and independent decisions.
- Working on real patients (with supervision, of course) made me feel that I need to be more careful because this was the real thing and not practice.
- The hospital rotations help with my confidence level. They felt comfortable with my ability and did not "hover" over my every move.
- Specific one on one training with a medical technologist in each area of the rotations.
- The hospital rotation, subject presentation (seminar).
- I consider the ones used effective.
- Being introduced & familiarized with the instruments and the methods of lab.
- Working in the department, watching the techs working.
- Working with QC and calibrations really helped me in the chemistry rotation and it has helped tremendously on the job.

8. **Do you belong to a national professional organization? If yes, which one?**
   - Yes, ASCP
   - Yes. I belong to IACLS. I am currently the student Advisor and am running for Board member. (This is the Iowa state level ASCLS).
   - ASCP
   - ASCP
   - ASCP
   - Yes, ASCP
   - ASCP
   - Yes, ASCP
   - ASCP
   - NCA, ASCP

9. **Do you read at least one professional journal on a regular basis? If yes, which one?**
   - Yes, Lab Medicine
   - Yes. I still receive Advance and read it cover to cover twice a month
   - I do not subscribe personally. I read them (any one) that come through the lab.
   - Lab Medicine , CAP Today, Advance, Dark Report
   - No, only on occasion Lab Medicine
   - Yes, Advance, Lab Medicine and Medical Laboratory Observer
   - No
   - MLO, Advance
   - Advance
   - Advance
   - Yes, Advance has great articles.

Over all Effectiveness of the Program

Excellent	Very Good	Adequate	Fair
9	2	–	–

Survey of Employers: 2000-2004 No of Responses 18

SURVEY OF EMPLOYERS OF RECENT GRADUATES

Results of Evaluation/feedback

Technical Performance:

	Excellent	Very Good	Adequate	Fair
Theoretical Knowledge……	11	7		
Application of Knowledge (Clinical Correlation & Follow up)……	10	6	1	1
Skills in manual and automated analyses….	11	4	2	
Ability to detect errors and take corrective action……	10	4	3	1
Phlebotomy……. …. (Several N/A) ….	6	3	2	
Specimen handling and processing……	10	7	1	
Organization/Neatness in work……	11	3	3	1
Effective time utilization…….	11	6	1	
Lab Safety Practices……..	13	5		

Professional Performance

	Excellent	Very Good	Adequate	Fair
Attendance and Punctuality……..	14	4		
Dependability ……..	13	5		
Professional Appearance……..	12	5	1	
Attitude towards work and coworkers…….	11	5	2	
Professional Ethics……	11	5	2	
Initiative: Ability to be self-starting and self-reliant……	11	3	4	
Adaptability/Flexibility in-accepting new assignments……	12	5	1	
Ability to make decisions and-take decisive actions……..	10	5	2	1
Leadership: Ability and willingness-to assume responsibility……	10	7	1	
Teaching/training students and-new employees……..	8	6	4	

Overall Evaluation

A. List the areas of strength in UWF's Clinical Laboratory Sciences Program.

- Well educated personnel, well trained personnel, professional in all areas
- Very solid clinical and theoretical training
- The strength of the UWF Medical (Technology) Program is theoretical
- Willingness to perform periodic evaluation of the program
- Entire program is well organized and covers entire lab experience
- Theory
- As indicated on page 1 , _____is an excellent employee on both technical and professional performance
- Very good technical and theoretical training
- Students have a good knowledge of the various departments when they enter the hospital
- Excellent skills in set up and decision making.
- The student's theoretical knowledge
- _____'s theoretical knowledge is very good. The application of this knowledge is very good. _____ was well prepared for entry into the hospital laboratory setting
- Theoretical knowledge which gives a basis to build on
- Theoretical knowledge.
- Theoretical knowledge.
- Students usually come into the lab with good theoretical knowledge.
- Ms._____ was a very thoroughly prepared new graduate. She continued as an outstanding employee until her resignation in Oct 2003.

B. List the areas of weakness in preparation of students for job entry.

- None
- Phlebotomy Training , Clinical rotation is not adequate
- None noted
- None noted
- None that we know
- Would like to see more on regulatory issues
- Understanding they are coming to a " JOB". When scheduled for a rotation they are in that section only. Some are weak in understanding what the job is & their responsibility.
- Experience in Mycology and Mycobacteriology
- Attitude towards work, want more for less, not as willing to work hard, feel it is their due. This is my view of a new med tech in general, not just _____.
- I did not note any particular areas of weakness. With time and practical experience, _____ will mature into a very proficient and skilled technologist.
- None seen.
- Automated analyses. Phlebotomy of all ages. Clinical correlation of results between departments (how chemistry results correlate with hematology and coag results).

- Self confidence. Attitude towards work. Need to focus on completing work before going on breaks.
- Student's mechanical skills often need a lot of work. Handling pipets, making dilutions.
- None observed

C. Give suggestions/recommendations to increase the effectiveness of the Program in preparing students for today's work place.

- None
- Increase clinical rotation to 9/12 months. Due to staffing shortage at the hospitals I feel a designated UWF educational coordinator be based at the hospital
- Continue to improve the instrumentation training on campus
- Continue to impart need for taking responsibility for own work, dependability and reliability
- None
- Robotics/automation and molecular diagnostics
- More training in OSHA guidelines to address PPE's when to wear them and when not.
- Give students a more honest look at the work place (salaries, work hours…) What will be expected---If they could spend more time in the lab it might help.
- Obviously, since _____ trained at ---------- hospital she was mostly trained for our procedures which cut training time. As far as the other questions on this page please ask ____. She now works at _____ hospital.
- Provide a rotation through a small hospital lab.
- Allow students to have more hands on with automated instruments to include troubleshooting and methodology. More emphasis on quality control.
- Need additional experience in phlebotomy in case they work in a small facility. During their review week need to spend time in a different shift (i.e., 3-11 or 11-7 shift.
- If not already available perhaps course materials in management, meeting legal requirements of regulatory agencies and compliance issues.
- Keep up the good work!
- Prepare students /new graduates with some "real world issues". Negativity in the work place, male bashing, gender gaps, age differences ….

University of West Florida Medical Technology Program

Feasibility Survey for Development of a Certificate Program in Molecular Diagnostics 2004

This survey was bulk mailed and posted on the web. 29 people responded. 21 said they would be interested in this program.

SURVEY RESPONSES
UWF Medical Technology Program
Advisory Committee Meeting October 19, 2005

Dear Advisory Committee Members:

The goals of the Medical Technology Program include the following:

- To maintain a nationally accredited program of excellence and to provide a sound educational opportunity for students who seek a career in clinical laboratory sciences and/or biomedical technology.
- To provide continuing education programs in medical laboratory sciences and service as a source of academic information to the general public.

Please help us to improve our program my answering the following questions. Leave the completed survey in the meeting room this evening. Thank you for your comments.

1. How well do you feel the UWF program is servicing the needs of the health care industry in Pensacola? Please include suggestions for improvement.

- **In terms of the number of graduates**

1. We need more
2. Glad program is increasing to meet the need
3. Appears to be growing – keep up the good work!
4. Great
5. Could use more in all areas
6. Adequate
7. The number of graduates is adequate; program is limited in placing students for nternships
8. Increasing – but we need more!
9. Very good – any increase will be viable for graduates

- **In terms of curriculum content**

1. Would like to see more troubleshooting skills
2. To include molecular testing – would increase the value of the program
3. Good – keep expanding courses to embrace the technology as it changes
4. Great, stay updated with educational training of potential graduates and professionals
5. UWF has good curriculum
6. Include molecular biology
7. Curriculum content is excellent
8. Good
9. Very good – possibly include point of care testing lecture

- **In terms of continuing education**

1. Would like to see some offered in Pensacola
2. Specialty certification programs for clinical laboratory scientists – an asset to program
3. Excellent
4. Great
5. Needed for licensure. Also needed to keep us abreast of new tests in healthcare

6. Offer more CEUs in the local area
7. It is great the program offers continuing education – could it be expanded (2 days)?
8. I understand now about the CE program being held at Ft. Walton but we really would appreciate a program held here, as now I can no longer drive all the way to Ft. Walton (about 1 hour each way) and I really miss the program! I feel face to face interaction is much more rewarding than by computer
9. Very good – see the involvement in the field

2. What other academic program in the clinical laboratory related fields would you suggest for development, based on regional or national needs? (e.g., Histology, Cytology, Molecular Diagnostics, etc.)

1. No comment
2. Histology/Cytology technologists
3. Histologists are in great demand. Look at this.
4. Forensics?
5. All three are needed
6. The field is moving towards more molecular testing. DNA testing opened a window for laboratories to identify cellular structures, viruses, bacteria, etc. on a molecular level. This will be the wave of the future.
7. Molecular Diagnostics, computer information; databases, etc.
8. Sounds like everything's on track
9. Cytology, Histology, Data/Information utilization

3. We currently sponsor a CE event once per year in Ft. Walton Beach, and our faculty present seminars at the Northwest Florida Laboratory Association Annual Convention. How better can we serve the continuing education needs of the clinical laboratory profession in the region? (E.g. Topics, media, venue, timing, etc – include your preferred method for earning CE credits)

1. Suggest an internet or audio conference to obtain credit
2. CE that I can finish on my own time
3. Possible computer courses
4. Online, correspondence
5. I enjoy the meetings rather than computer
6. More seminars, possibly education packets with multiple choice tests that could be mailed in. Also, holding seminars within the local Pensacola hospitals may attract more health professionals.
7. No comment
8. I understand now about the CE program being held at Ft. Walton but we really would appreciate a program held here, as now I can no longer drive all the way to Ft. Walton (about 1 hour each way) and I really miss the program! I feel face to face interaction is much more rewarding than by computer.
9. Preferred method for most staff is online due to time constraints. Current events are very good and should be continued.

4. **What career paths are available for clinical laboratory sciences graduates aside from the conventional Med Tech to Supervisor route? (E.g. in your hospital, in your experience, compared to your MT classmates)**
    1. Laboratory information services (computer fields), quality management (QA)
    2. Have been involved in research at the university level
    3. Point of care coordinator
    4. Not known
    5. No comment
    6. FDLE, genetics lab, reference laboratory, research, sales, there are so many opportunities with a MT or CLS degree
    7. Alternate routes – instructor, education, point of care, risk management, ethics, computer information
    8. In my own experience, when I was at Duke as research assistant to the head of surgery – I worked in OR running the perfusion machine to perfuse chemotherapy. I saw patients and administered chemotherapy, ordered and evaluated Xray and labs. I administered a cancer education grant (for medical oncology residents) and evaluated their patients for drug protocols. I feel there are also jobs in environmental and commercial testing, as well as pure research. I realize most researchers have PhDs, but there are always things to be discovered and many lab people have PhDs.
    9. LIS coordinator, POC coordinator, education/QA/QI coordinator
5. **What Master's level degree programs would advance the career of a laboratory professional? (e.g. in your hospital, in your experience)**
    1. Any and all health related Masters Programs
    2. Public Health is a good start. Also Masters in Clinical Lab Sciences
    3. Microbiology, Specialist in Blood Bank
    4. Cutting edge programs
    5. No comment
    6. Business management, blood bank specialist
    7. Computer science – I would like to see a masters in clinical science offered
    8. Addressed during meeting
    9. MBA – emphasis on hospital medical finances
6. **What recruitment/retention strategies can you recommend?**
    1. Internet websites, changing the program to Clinical Laboratory Scientist will definitely help. Would like for Florida state licensure to change the name to CLS as well.
    2. Get students more involved in placement for clinical rotations
    3. We are trying at the hospital level to get salaries higher – many people leave the field for monetary reasons
    4. Begin at middle school/precollegiate level of the professional pipeline
    5. Going into high schools and earlier – impressing need for health care at young age
    6. Start with pre high school children. Also, career fairs. The medical technologists currently practicing in the field are the best recruiters for this program so networking with them is a positive influence.
    7. Promotions – let students notice benefits and career options
    8. Don't know
    9. Continue with exposure

Standard 20

Describe how the reviews of graduation and placement rates are analyzed and used in the program evaluation.

Each year one class of Clinical Laboratory Sciences Program students graduates during the last week of July or first week of August. While they are in clinical rotations, the Clinical Site Coordinator instructs and assists the students in application procedures for national certification, state licensure, graduation from the University, and for employment. The Program has the most effective built-in systems for screening, evaluation, feedback, warning and/or encouraging the students in their progression towards graduation, thereby having a very successful record of graduation rates.

Generally most of the students begin their search for employment in June or July. Most often they are recruited by the clinical site where they are going through clinical rotations. The Program Director and the Faculty also receive and disseminate information regarding job vacancies to the students, as soon as it becomes available. During this period the faculty members communicate with each other on a daily basis to monitor the placement of graduates and generally work towards facilitating a 100% placement. During the fall meeting of University Faculty and Education Coordinators, graduation and placement of students are discussed. Matters related to the changes and forecasts in employment patterns, the class sizes and the quality of students/graduates are discussed. The program=s effectiveness in meeting the supply/demand trends in the clinical laboratory and related employment sites is closely monitored.

The Clinical Laboratory Sciences Program Advisory Committee, in its annual meeting, also addresses the issues of graduation and placement of students. Most of the Committee members are in administrative positions in health and or education related facilities. They are very much interested in the short term as well as the long term needs for well educated and skilled clinical laboratory personnel in the local, regional, state and national markets. The enrollment data, graduation records, placement rates and employer satisfaction with UWF graduates are discussed and evaluated by this committee. Accordingly, suggestions and/or recommendations are made to enhance the effectiveness of the program in these areas.

During the past seven years the graduation and placement rates have been very good. Even going back to the beginning of the program in 1986 there has never been any reason for concern over graduation and placement rates. A majority of the students admitted to the clinical year have graduated and are gainfully employed in a variety of settings and occupations. On rare occasions the Program has made allowances for students with extenuating circumstances to delay graduation by one semester. All those students who have chosen to stay in the Pensacola/ Northwest Florida area have found employment. In recent years 2 graduates went to medical school, 2 of them joined active military as an officer (clinical laboratory mangers). To the best of our information 2 recent graduates chose not to seek employment and one graduate from the most recent class has not yet been placed. During the past seven years, out of 69 students who have graduated, 37 are employed in the local and regional laboratories. Another 20 are employed in clinical laboratories across the nation. Some of these graduates have advanced to highly responsible positions as supervisors, LIS officers, or QC/QA/Compliance officers. In general the job outlook is excellent with more vacancies than job seekers even in this area with a productive CLS Program.

Submit Reviews of Graduation and Placement Rates

Graduation and Placement Data (since last NAACLS review)

YEAR	Number Admitted to clinical Year	Number Graduated	Employed in the profession in Northwest Florida	Employed out side this region	Employed outside the field or went to graduate/ professional school	Info not available or not employed
1999-00	9	9	6	2	—	1
2000-01	6	6	3	3	—	—
2001-02	12	10	6	1	1	—
2002-03	10	7	5	1	—	1
2003-04	10	9	3	3	2	1
2004-05	12	12	5	6	1	—
2005-06	17	16	9	4	1	2

2001-02

- One of the students extended the degree plan for one more year and graduated in 2004.
- We lost one student to a fatal illness.

2002-03

- One of the students extended the degree plan for one more year and graduated in 2004.
- One student was called for active military duty from Reserves. She graduated in 2004.
- One student has dropped out due to personal problems.

2003-04

- One student dropped out due to pregnancy and relocation.

2005-2006

- One student dropped out due to lack of interest and changing major.

The University of West Florida Clinical Laboratory Sciences program is the major provider of laboratory personnel to the Northwest Florida region. The Program is regarded as a valuable resource by the local health care industry, as well as by the feeder community colleges and high schools. The University receives strong support for its CLS Program not only from its clinical affiliates but also from other health care organizations which are not directly involved in student education. The Program organizes/participates in a variety of recruitment activities including visits to area high schools and community colleges, hosting groups of prospective students in the on-campus student laboratory complex, and mailing recruitment materials to local/regional guidance counselors.

Standard 20:
Submit documentation of analysis showing how results are used in program evaluation.

As mentioned previously, the clinical year (senior year of the BS degree) of the UWF's CLS Program is approved by State of Florida as a Limited Access Program, with the number of students per class per year capped at 20.
Based on the enrollment/graduation history of the past 20 years our analysis shows the following facts:

- The Program has experienced a steady growth in enrollment since 1986 when the program was redesigned as a University-based CLS program with 19 majors in the pipe line.
- During the intervening years the number of majors fluctuated between 80 and 120, with the highest peak of 120 + seen during the late 1990's.
- The ups and downs of enrollment of CLS majors correlate with the general economy, more importantly, the job vacancy rates and salaries in health care industry.
- A majority of CLS majors are mid-entry level students; i.e., transfer students from community colleges, second career or career-changing students (retired military, voc-rehab, single mothers / married female students returning to college, etc). In recent years our share of freshman (FTIC) students declaring a CLS major is increasing, but not in significant numbers. We believe that in the future we should concentrate our efforts to attract this population of students into the program and into the profession.
- Our goal is to have a full class of 20 students/per year in the clinical year of the degree program. Our experience shows that usually less than ¼ of the majors in the pipe line (preclinical years) reach the eligibility for selection into the clinical year. During the last 5 years the number of students in clinical years reached a peak at 16 during 2005-2006.
- Currently there is a growing interest among prospective students to choose clinical laboratory sciences as a major in college. Due to the widespread availability of information on the internet, the current computer-savvy generation of students is getting to know about the excellent employment outlook and rising salaries in clinical laboratories.

Factors considered as impediments (to overcome) for the enrollment growth:

- The profession is still an unknown among the general public.
- The course of study requires an aptitude for hard core sciences, so only those students who have the ability and interest in sciences even take a look at this major.
- The able students with an aptitude for math/sciences flock towards more well known tracks such as pre-med, pharmacy, physical therapy or physician assistant, knowing fully well that the salaries are better.
- The chemistry and upper level biology courses tend to discourage/derail even motivated students, with a strong desire for a career in clinical laboratory sciences. Our chemistry department started offering tutorial and other measures for student success.

- In recent years we are facing a problem with students performing poorly in Immunology course, offered by our Biology department at the molecular immunology level. We requested that the Biology department offer a course in "Fundamentals of Immunology" as a more suitable prerequisite for our CLS students. We will keep monitoring this situation and hope to remedy this roadblock for our students to reach the clinical year.

The CLS Program faculty is relentlessly engaged in an analysis of our goals and outcome measures in the areas of enrollment/graduation/placement. Our analysis shows that:

- In spite of the limitations caused by factors beyond our control, the Program has been successful in recruiting qualified students and nurturing them through an intense program of study towards graduation.
- Placement rates are good for our graduates. Over the years, the Program has served the community well by meeting the needs of the regional health care industry for clinical laboratory personnel.
- Presently there is an increase in phone calls, emails (from prospective employers and employment agencies), and literature, which indicate that job opportunities exceed the number of graduates
- Increasing our enrollment to maximum capacity will benefit the Program, the University, the Profession and the Community.

Our goal is to increase the enrollment in clinical laboratory sciences at UWF to a level (about 120-150 majors), in order to have an enrollment of 20 students (maximum capacity) in the clinical year. Towards this goal, the Program has undertaken several steps to attract new students:

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- In 2002 we published a recruitment poster and targeted Panhandle and Alabama high school and community colleges.
- Bulk/group mailings of recruitment material were done again in 2003 & 2004.
- Recruiters from Central and South Florida came and gave presentations to our students on employment opportunities, job benefits, and so on.
- Forecasting an increase in the clinical year class sizes, and in anticipation of the need for additional clinical sites, we accepted the offer of Shands Health Care System in Gainesville, Florida, to be our partners in student training. Three students in the class of 2005-2006 were placed for their capstone practicum in Shands Hospitals (two in Gainesville and one in Jacksonville).
- During 2005-2006 a new Student Handbook and a new Program Brochure were developed and mailed to a large number of Florida Panhandle high school guidance counselors, and to community college advisors and biology faculty.
- In 2006, a "direct mail postcard advertising" was aimed at high school students who are within the service area of the University; and who took the PSAT and identified an interest in clinical lab sciences, microbiology, health related careers, pre-med or biomedical tracks.

Samples of these recruitment activities are included here in the following pages.

University of West Florida - Clinical Laboratory Sciences program

8/7/2006

Dear Guidance Counselor,

I'd like to introduce you and your students to an exciting career path. It is called Clinical Laboratory Sciences, and it is offered at the **University of West Florida**. Many students are interested in pursuing laboratory careers thanks to shows like CSI. Most students and unfortunately most guidance counselors are not aware that **hospital laboratory work** uses sophisticated methods and highly trained scientists to aid physicians in the diagnosis and monitoring of diseases. A very short list of examples includes:

- Monitoring the progression of **heart disease** - Clinical Chemistry
- Evaluating therapy for **leukemia** – Hematology
- Identifying a **Bird Flu** outbreak – Microbiology
- Crossmatching blood for **premature babies** - Blood Bank
- Detecting the **mutation** that causes Cystic Fibrosis - Molecular Diagnostics

This is a dynamic and demanding field. Clinical Laboratory Scientists must be well versed in Biology and Chemistry, as well as Information Technology. The University of West Florida has been training students in the NAACLS accredited Program in Clinical Laboratory Sciences since 1986. CLS majors spend 3 ½ years at the university, and the last 7 months of the program are spent doing an internship at an affiliated hospital. We have affiliated hospitals in Pensacola, Ft. Walton Beach, Panama City, Gainesville and Jacksonville. The program is challenging, but our results are sterling. Virtually 100% of the graduates at UWF have passed the national certification offered by the American Society for Clinical Pathology-Board of Registry.

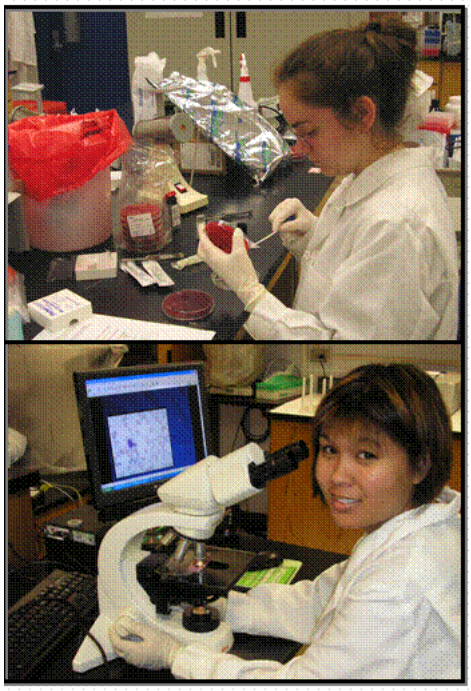
You may be aware that there is a critical shortage of health care workers nationwide. Clinical Lab Scientists are in so much demand that some hospitals are offering bonuses and student loan assistance. The shortage is due in part to low publicity – people don't know about our field. **We've enclosed our program handbook. Students and advisors can get a better handle on who we are and what we do by looking through the book.** Please encourage your health and science minded students to consider a career as a Clinical Lab Scientist. Visit our website at http://uwf.edu/clinicallabsciences. We welcome calls and visits from prospective students and their parents.

Sincerely,

Swarna Krothapalli, M.S., MT (ASCP)
Program Director
Associate Professor

Dr. Kristina J. Behan, PhD, MT (ASCP)
Associate Professor
(850) 474-3060

Recruiting Postcard mailed in 2006 to PSAT takers



Picture yourself with a B.S. degree in
Clinical Laboratory Sciences

- Microbiology and Immunology
- Transfusion Services
- Clinical Chemistry
- Hematology
- Molecular Diagnostics

Be part of the Health Care Team

www.uwf.edu/clinicallabsciences

University of West Florida

Standard 21: Program Evaluation and Modification

Describe how the results of program evaluation are reflected in the curriculum and other elements of the program

During the past seven years, based on the continuous and systematic program evaluation, few major and several minor changes have been made in curriculum and other elements of the Program. Following are a few examples:

ASCP-BOR Scores: Adjustments made in courses to beef up the content

The composite and individual scores of the registry reflect the strengths and weaknesses of the individual students, the course materials, and the faculty. An example of how we use the ASCP data is given here: In the area of Diagnostic Microbiology, even though overall scores were above national average, students showed a decrease in one component during the 2005 cycle. At the same time, students complained about the vagueness of some of the chapters of the textbook, even though it was the latest edition of that text. In 2006 a new textbook was put into use, and the university and hospital examinations were updated. Such adjustments are made in other areas as well, in which weakness is seen in students' scores in the external examinations. Students are surveyed at the completion of their clinical rotation in Microbiology (and all departments), and questioned as to whether or not they felt prepared for their hospital rotation. These indirect assessments are taken into account in revisions of the class for the following year.

Medical Microbiology has been taught by the same adjunct faculty member for many years. From 2005 on, she was not available to teach. We hired two other adjunct instructors to fill the years. We have requested a third faculty line to be the primary instructor for Clinical Microbiology and this request is under consideration by the administration. We believe that the addition of a third regular faculty line will allow an equitable distribution of teaching load, give some relief to the next program director, and provide time for faculty research and creative activities in the future. A single faculty member in charge of all three MLS courses in Clinical Microbiology (Diagnostic Microbiology-I and Medical Microbiology on campus; and Diagnostic Microbiology II – 7 weeks of clinical rotation at the hospital) will enhance the quality and consistency in delivery of the curriculum in this area.

E-learning: During the past 5 years a significant change has been made in instruction and evaluation of campus based MLS courses. All of these courses are converted into e-learning format, which is supported by the ITS (Information Technology Services) and ATC (Academic Technology Center) of the University. Instruction and evaluation is now conducted in a blended format. (classroom presentations blended with computer based and on-line instructional technology). Every lecture in every course is in power point format, available to the students on-line through e-learning. Course syllabi, course policies, expected student learning outcomes, study questions, case studies, home work exercises are all available to the students, as determined by the instructor, at home or in classroom. This conversion of courses into a blended technology format constitutes an enormous amount of time and work on part of the faculty during the recent 3-4 years. Current students have a distinct advantage in having the course materials so readily available to them in and out of the

classroom, which undoubtedly facilitates learning and retention of the subject matter.

Computer at each student's work station: In order to facilitate instruction/evaluation in a blended computer technology format, computers were placed in the classroom/lab in 2002. Since there were only 10 computers students had to share the computers in class work. In spring 2006 the old computers were replaced with 20 new Gateway computers. So the classroom is now equipped with a computer with internet connectivity at each student work station. The computer based work is integrated into lecture and lab sessions in all of the courses.

Laboratory Instruments and Equipment Purchases: As a result of our continuous assessment of the student laboratory needs several pieces of major and minor equipment/instrumentation were added in recent years. To improve training in clinical chemistry labs the old spectrophotometers were replaced with 10 brand-new Pointe 180 Spectrophotometers, which are designed for student lab instruction. We acquired a major chemistry analyzer (Dade Dimension) through donation from a hospital. A new hematology blood cell counter was purchased. New instruments and equipment were purchased for student training in molecular diagnostic methods. Currently the Dean has allocated approximately $ 30,000, over the next 3 years, to maintain/upgrade the laboratory instruments or equipment used in student labs. Through our own assessment as well as from the input received from students and graduates, the technology needs of our student laboratory complex are recognized and presented to the administration on a continuing basis. Overall, the student laboratory complex is relatively well equipped and functional in meeting the meeting the student training needs.

Program publications and recruitment strategies:
To increase enrollment is one of the major goals of the Program faculty. We constantly monitor the numbers and make every possible effort to recruit new students and retain the currently enrolled students. In 2003 a new poster was developed and mailed to student advisors at various high schools and community colleges in Northwest Florida and also in Central and South Florida. Mass mailings were also sent out in 2004, 2005 and 2006. In 2005-2006, we produced more CLS publications, including a handbook and brochure. These have also been mailed to Guidance Counselors at Florida High Schools. Recruiting postcards were directly mailed to High school students who took the 2005 PSAT and specified an interest in a health related field or CLS.

Phlebotomy Training
In the survey returns from exiting graduates, recent graduates and their employers, a frequently made comment pertains to deficiencies in students' phlebotomy skills. Faculty is aware of this need for improvement in this area and will continue to make efforts to improve training in this area. However,
since we have no direct access to patient population, the phlebotomy training in campus courses is somewhat limited in scope. Even so, the students are given adequate training to collect a blood specimen from a normal healthy subject by the time they complete the campus based course work. It appears that the students receive variable levels of phlebotomy training at different clinical sites, based on the individual lab's practices and time frames in blood collection. Beginning with clinical rotations in 2007, the faculty plans to make a special effort to standardize phlebotomy training at various institutions, by discussing this matter with the education coordinators at the hospitals and

taking necessary steps to evaluate the students' skills in specimen collection by the time of their graduation.

Lab Management / Communications / Laws and Regulations: Based on the input received from members of the advisory committee, as well as to add all the curriculum elements required by the latest NAACLS Standards the following areas are strengthened in the course MLS 4705 Special Clinical Topics and in other courses across the curriculum:

- Laboratory operations to include financial and human resource management
- Dynamics of health care delivery systems as they affect lab services
- Laws and Rules pertaining to laboratory accreditation, license and compliance
- Education methods and terminology to train/educate trainees, new employees and users of lab services
- Interpersonal and interdisciplinary communications
- Ethics and Professionalism and prevention of medical errors

Continuing Education: Florida licensees and recent CLS graduates are required to maintain CE credit, and the program hosts an annual event in concert with the Fort Walton Beach Medical Center. Surprisingly, attendance is less than overwhelming. We surveyed the attendees to determine how to better serve their needs, and found that many licensees get CE at work and on-line. A modification that we are making this year is to utilize the DOH licensee mailing list to directly market our program to a larger audience. Over 700 mailers were sent in 2006.

Examples of Significant Changes Resulting from Program Evaluation:

I. Development and implementation of a new course in molecular diagnostics

In 2001, following the trends in the professional practice, and also according to the input received from members of the advisory committee and other sources in the field, the Program began incorporating molecular diagnostic methods into the curriculum. This was largely made possible through the hiring in 2001 of a new faculty member, Dr. Kristina Behan, who had just received a PhD in Molecular Biology. During the next 4 years molecular diagnostics was included in various clinical courses taught by Dr. Behan (Clinical Chemistry I & II; and Diagnostic Microbiology I). We acquired several pieces of equipment (thermocycler, electrophoresis equipment, digital densitometer) and integrated concepts and practice into Clinical Chemistry and Diagnostic Micro.

Through the continued assessment of the curriculum needs (surveys of practicing professionals and Advisory Committee members) the faculty decided to carve out a new course dedicated to the teaching of molecular diagnostics out of the existing sequence of two clinical chemistry courses (BS degree in CLS, in State of Florida, is capped at 127 semester hours. State Law prohibits addition of new credit hours to an approved degree).

Previous	**sh**	**New - Effective Summer 2006**	**sh**
MLS 4625 & 4625L Clin Chemistry I-	4	MLS 4625 & 4625L Clin Chemistry I-	3
MLS 4630 & 4630L Clin Chemistry I -	4	MLS 4630 & 4630L Clin Chemistry II -	3
	8	MLS 4191 & 4191L Mole Diagnostics -	2
			8

In 2005 Curriculum Change Requests were submitted and the changes were approved by the University. Molecular Diagnostics course is being taught in fall 2006 for the first time.

The course description, syllabus and content are included in Standard 9B, Page 308
The data from surveys previously mentioned also revealed a need for, and an interest in, a Certificate Program in Molecular Diagnostics. A proposal was submitted to the administration and the development of this program is a possibility in the future. Our request for third (regular, full time) faculty line was also linked to this proposal. So the addition of a third faculty line will facilitate improvement in the existing teaching load/expertise areas of the curriculum, as well as make it possible to offer a certificate program in molecular diagnostics. We offer this as one of the major goals for enhancement of the Program in coming years.

Example of Significant Change Resulting from Program Evaluation:

II. Evaluation and Modification for Student Seminars

Student Capstone Seminar: Students are required to give a medical seminar during their clinical rotation. We have chosen this seminar as the capstone event for assessing 2 of the domains of the Academic Learning Compact**: Critical Thinking and Project Management.** Initially, the faculty met and discussed methods to improve the quality of the student seminars, which ranged from exceptional through good to an occasional seminar which is generic and failed to focus on Clinical Laboratory Sciences.

Dr. Behan devised a general rubric to classify the quality of the talks, and observed and scored 8 student seminars in 2005. (Scores and rubrics described in this summary can be found in a narrative in Standard 19). She determined that five out of eight could be improved by better training. She created a table of problems that were observed, along with suggestions to obviate the problems. Some of the problems, for example nonprofessional appearance, were easily addressed by creating an instructional rubric for the students with precise instructions.

Critical Thinking and Project Management skills of the students were analyzed using an embedded assessment that rated the ability of each individual student to correlate results from various procedures to the management of the patient's condition, and to discuss tables and figures in appropriate depth to an audience of their peers. Using these rubrics, it was apparent that some students did not fully grasp the full meaning of topics they were presenting. In order to improve students' ability to read and report research and interpret patient results, students are currently steadily introduced to communication and dissemination tactics through a series of assignments:

In Clinical Chemistry I, students are required to write 2 short case studies, which are evaluated with published rubrics. Students peer review each others' work prior to submission, which is a technique that improves their own work and another student's. This can be a big eye-opener for an average student. Following peer review, the student is allowed to rewrite for a higher grade.

In Clinical Chemistry II, students give a presentation on a journal article that is relevant to the class. They are coached in PowerPoint, and project management. This project has multiple deadlines, selecting a topic, writing an outline, doing a peer reviewed practice talk and then the final talk. The concept of self-enforced deadlines is reinforced here. Furthermore, the same grading rubric that will be used for their hospital seminar is applied, but in a "safer" zone, as they are able to readily meet

with the instructor beforehand to iron out details. Students give a practice talk in front of a small group of peers, which is not graded, but allows for comments and improvement. For example, a peer may say "I don't understand that concept; can you put it in a different context for me." Finally, the students give the presentation to the entire class.

During clinical rotations, Dr. Smith meets with students monthly and they have to present a journal article "Journal Club" to him, and discuss its impact. With respect to the capstone seminar, students are given a list of acceptable topics, and they can opt for another topic if it is approved. In summer 2006, the first cycle of students who had gone through this improved training also showed an improved product. Nine out of 15 students gave exceptional coverage of their topics. One student was invited to co-author an article based on her research. Students were invited to evaluate themselves in the domains of Critical Thinking and Project Management, and their evaluations were compared with Dr. Behan's evaluation:

Behan: 100% of students achieved a satisfactory to excellent rank in the ability to correlate results from various procedures with management of a patient's condition;
92% of the students agreed that they were able to correlate those results.

Behan: 93% of the students were able to research new laboratory procedures and evaluate their effectiveness;
67% of the students agreed that they were able to do so.

92% of the students felt that they had received good training during Clinical Chemistry and Journal Club presentations, and 77% of them felt that the rubric aided them in the preparation of the talk.

Current status of this project: reinforcement of progression in skills for the current students, with continuing monitoring and assessment, and improvement on finer details.

As may be seen in the detailed description of the QEP on Student Seminars (included in Standard 19) there is a significant improvement in communication/project management skills of the students. One exceptional outcome of this project is that in 2006, one of the students (who graduated in 2006) co-wrote a LabQ exercise with Dr. Behan.

SUMMARY / SELF ASSESSMENT

During the NAACLS review in 1999-2000 it was stated in the Self-Study Review Report that the University of West Florida's Medical Technology Program "appears to be well designed and administered, with students able to perform well on certification exams as well as ability to find employment".

The Site-Visit Report listed the following as "Areas of Strength":

- Dedicated Faculty
- Strong Administrative Support
- Well-equipped campus instructional laboratory
- Supportive clinical sites
- Tremendous community support for the Program

After seven years we are happy to report that the Program continues to be strong in all these areas and the state of the Program is still excellent.

During the past 7 years the program not only sustained its high quality, but also has grown stronger with added resources and additional clinical sites. Over these years the curriculum was updated as needed by the changes in technology and in the field practice of clinical laboratory sciences. Students continue to perform well- above the national means on the external examinations. The graduation and placement rates are excellent. Feed back from the recent graduates and their employers indicates a high level of satisfaction with the quality of our graduates' preparation for entry level competencies. Notes and letters from alumni of the Program are especially glowing with an appreciation of the strong knowledge base they acquired while going through this program. While acknowledging that a goal for achievement of excellence is a continuous never ending process, we are proud of these key indicators of the program's effectiveness and excellence.

Since the previous accreditation review in 1999-2000, the Program has obtained 3 additional hospitals as clinical affiliates, thus bringing the total number of clinical sites to 8. Shands Health Care System is a major health care provider in East and Central Florida. Shands at University of Florida and Shands Jacksonville are premier teaching hospitals with state-of- the art and cutting edge technology in laboratory services. We are pleased that UWF's Program is recognized for its quality and stability all across the state and that the recruiters from Shands Health Care System actively sought affiliation with our program. In the current environment of critical shortages of lab personnel, rising salaries and growing student interest in this profession, we are well poised for growth management with these additional clinical sites.

Support from our clinical affiliates as well as non-affiliate health care facilities remains as strong as ever. Health care industry in Northwest Florida is growing rapidly, with expansions of all the existing hospitals and additions of new physician groups. The UWF's Clinical Laboratory Sciences Program is recognized as a vital source of qualified clinical laboratory personnel. The program receives both moral support and material assistance from almost all the clinical laboratories in the region. We receive on a continuing basis expired reagents, test kits, equipment, study slides, case studies and information on the new technologies and so on. UWF alumni occupy not only a majority

of staff positions, but are also in positions of management and supervision all across the Northwest Florida and beyond. Many of them are also serving on the CLS Program Advisory Committee. The University faculty and the administration consider this community's support as a great asset and plan to nurture these partnerships in the future.

At present University of West Florida is in the process of building a School of Allied Health, concentrating on the areas of critical manpower shortages for health care industry in the region. In this newly established School of Allied Health, the Clinical Laboratory Sciences Program and BS in Nursing Program constitute the nucleus, CLS Program being the oldest and well established starship Program in health sciences at UWF. Looking to the future, with support from the administration the Program has the potential to offer new programs and services to meet the staffing needs of the local and regional clinical laboratories.

In this regard, a clear possibility is the offering of a certificate program in molecular diagnostics. This is especially an ideal goal, since the program is in Biology Department with a strong Cellular and Molecular Biology component in its offerings. Eventually the certificate program may be expanded into a BS degree program in molecular diagnostics. We have a large contingent of Biology majors who will be interested in such a degree.

While the current Program has an excellent record of sustained quality and productivity the following are the weaknesses which need to be addressed by the administration:

- The Program Director has too high a teaching load. In addition to the administrative responsibilities, this faculty member has to teach half of the clinical curriculum.
- Overall, the faculty are stretched so thin over a variety of "must be done" responsibilities which emanate from an accredited medical program that they do not have much time left for faculty development through research/scholarship/creative activities.
- The faculty has no time for substantial recruitment activities, while such activities are critical for enrollment. We have an excellent program and a wonderful profession, but there is a lack of information and incentives for bright students to consider this Program. We know how to increase enrollment in the Program, but have no time to do it.
- For 20 years the Program has performed its mission very well, but has not been given an opportunity to expand its Programs and Services. It deserves that chance.

Just the mere addition of one faculty line to the program could alleviate all these weaknesses; allow for growth into molecular diagnostics and provide an equitable opportunity for faculty development. We will just keep striving to achieve these goals.

Our future efforts will be concentrated not only in sustaining the degree of excellence that is so far achieved, but also in reaching for an outstanding and distinguished ranking among the peer institutions in the nation.

VII. Maintaining Accreditation

Standard 22: Program / Sponsoring Institution Responsibilities

A. Submitting the Self-Study Report, an Application for Continuing Accreditation, or a required Progress Report as determined by NAACLS

University of West Florida Clinical Laboratory Sciences Program complies with this requirement.

B. Paying Accreditation Fee, as determined by NAACLS

University of West Florida Clinical Laboratory Sciences Program is in compliance.

C. Informing NAACLS of relevant administrative and operational changes within 30 days. This includes change sin program official names, addresses, or telephone numbers affiliates, status (e.g., inactivity, closure) or location; and institution names.

University of West Florida Clinical Laboratory Sciences Program promptly notifies NAACLS of any changes in the program.

D. Complete an annual report prescribed by NAACLS and returning by established deadline

University of West Florida Clinical Laboratory Sciences Program fulfills this requirement annually.

E. Verifying compliance with these standards upon request from NAACLS

University of West Florida Clinical Laboratory Sciences Program will submit verification of compliance with the standards, if requested by NAACLS.