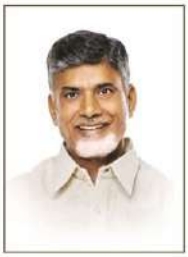


A fruitful synergy between the academia and industry in the endeavour of curricula restructure will surely help in benefitting the undergraduate students towards their better employability.

Sri.Nara Chandrababu Naidu
The Hon'ble Chief Minister

Restructured courses will unleash new enthusiasm among our undergraduate students and empower them with tremendous confidence and employability.

Sri.Ganta Srinivasa Rao
The Hon'ble Minister for Human Resources Development

Restructuring of courses are in consonance with the University Grants Commission's new curricular framework and will meet the expected outcomes of Rashtriya Utchthar Siksha Abhiyan (RUSA)

Sri.Adityanath Das, IAS
Principal Secretary, Higher Education

The AP State Council of Higher Education is seriously committed to the cause of the betterment of higher education and this step of restructuring will be the first step towards attaining this utmost important objective of APSCHE.

Prof.S.Vijay Raju
Chiarman, APSCHE

A holistic and comprehensive exercise has been undertaken with the complete involvement of industrial experts, the fruits of it are the new restructured and market oriented courses

Sri.G.S.Panda Das, IAS
Commissioner of Collegiate Education & State Project Director, RUSA

INDEX

FOREWORD

"What we know and what we have experienced determines what we believe; what we believe shapes how we think and how we act"

BACKGROUND:

Knowledge can be updated and competence developed through internal activities ranging from specially designed courses. In order to develop market oriented thinking and acting, knowledge about the market must be acquired and applied.

Higher Education shall be responsive to the changing social needs by offering new courses from time to time. The new state of Andhra Pradesh is making rapid strides in new areas of development. As the new generation of market needs emerge our undergraduate educational institutions need to restructure the existing courses and equip students to meet the specialized needs. In view of this necessity, the Commissionerate of Collegiate Education proposed to evolve new generation market oriented courses in selected Government Degree Colleges. It is planned to start the new courses from 2017-18.

WHY?

"A sales-oriented company is very internally focused and looks to sell products that the company is successful at making. A marketing-oriented company is externally focused on the consumer's wants and needs."

In yester years, Higher Education is only thought as a commodity sold by an institution. 'What we offer you take!' was the approach. Needless to say, a student of Higher Education previously has to go by what is available. Now the realistic perception, as per the changing trends is 'need satisfaction'. Now the Government of Andhra Pradesh strongly believes that a student has to be market ready and to be a person who satisfies the need of the society at large.

The syllabi of courses are to be prepared keeping in view the subject specific academic needs and market requirements to make the courses socially and market relevant.

OBJECTIVE:

The main objective is to introduce job or market oriented knowledge and skills for empowering the existing undergraduate B.A, B.Com and B.Sc programs and to make them ready for jobs through involvement of industry from the beginning.

THE NEED:

Most of the colleges are still offering only conventional courses with only knowledge oriented syllabus. The number of government autonomous colleges is growing with a high scope for effectively running market oriented courses. Most of the government colleges are now better equipped with developed infrastructure, well equipped computer and other science labs, ICT support, MANA TV, e-classrooms,

JKC etc. A new generation of market needs have emerged in recent years. Therefore it is the best time to introduce such market oriented courses

THE METHOD:

One of three domain courses of the UG Programs will be replaced with a Job-Oriented course through the UGC 'scheme of restructuring of courses'

PROGRESS:

- The Commissioner of Collegiate Education constituted a core committee for this purpose in his office and guided them in the action plan.
- Subject committees were constituted with 45 Lecturers from 12 base (conventional) subjects, for identifying and designing new market oriented courses
- The first meeting was conducted on 7th November 2016 in the Commissionerate where the idea was explained by the Commissioner and action plans for further course of action were finalized.
- The Subject Committee members went around the local industry, organizations, professionals, commercial outlets etc. across most of the state and discussed market needs, job opportunities and related requirements for designing new courses in the months of November and December 2016.
- The Committees compiled and streamlined the information collected in the formats prescribed by the Commissioner.
- 35 new market oriented courses and their requirements were tentatively identified for BA, BSc and BA programs by the subject committees. The preparation of their syllabi-curricula has been initiated.
- The second meeting for subject committees was conducted on 19.1.2017 at AL College, Vijayawada where the information collected was discussed within the subject committees and the requirements were consolidated
- The market needs, job areas for UG students and the course requirements will be discussed by the subject committees with the representatives of industry, organizations, professionals and official experts and will be in this meeting
- Based on this interface meeting proceedings, the draft of syllabi-curricula for the proposed new market oriented courses was prepared and submitted to the AP State Council of Higher Education.

- AP State Council of Higher Education constituted subject committee experts of Universities to make changes if necessary and approve the syllabi.

- The syllabus approved by the subject experts of Universities are submitted back to the APSCHE on 15th April 2017.

- With the constant support from APSCHE and the Universities, the syallbus of 29 market oriented courses were approved and ready to be offered to the students from the current academic year 2017 – 2018.

I place on record my deep sense of gratitude to the officials of APSCHE, the University subject experts.

I whole heartedly thank my team of subject experts and my officers of Academic Cell for the pains they undertook to make this humongous task a reality.

G. S. PANDA DAS IAS
Commissioner of Collegiate Education &
A.P. State Project Director, RUSA

COMMITTEE ON RESTRUCTURING OF COURSES TO SUIT THE NEW GENERATION NEEDS

Chairman
Sri. G. S. Panda Das IAS
Commissioner of Collegiate Education
&
State Project Director, RUSA

Convenor
Dr. K. V. Ramana Rao
Principal, GDC

Coordinator
Dr. P. Anil Kumar
Academic Officer

Member Secretary
Sri. G. Srirangam Mathews
Andhra Loyola College (Autonomous)

Joint Director
Dr. G. Geetanjali

Academic Cell of CCE
Dr. Ch. Mastanaiah – Academic Guidance Officer

Academic Officers
Smt. A. Rosalind
Smt. Vimala Rodhe
Dr. K. Satyalatha
Dr. G. Srinivas
Dr. M. Vishnu Prakash
Sri. P. Venugopala Rao

Special Officer
Dr. John Cornelius

SUBJECT COMMITTEES				
S.NO	**Subject**	**Name of the Lecturer**	**College**	**Place**
1	Mathematics	Papayya Sastry	GDC	Jaggampet
	Statistics	Chittibabu	GDC	Ramachandrapuram
		Dr.K.Venkata Rao	GDC	Alamur
2	Physics	M.Rajeswara Rao	GDC	Bheemunipatnam
		Sravan Kumar	Dr.VS Krishna	Vizag
		M. Ravi Kumar	GDC(M)	Ananthapur
3	Chemistry	Dr.M M Pacha	P R College(A)	Kakinada
		V.V. Prabhakara Rao	Arts College	Rajahmundry
		KARSS Prasad	GDC	Vizag
		P.Kiran Kumar	GDC	Yelamanchili
		Y.Sivachandra	GDC (W)	Ananthapur
		Venkata Rao	SRR&CVR	Vijayawada
4	Botany	A. Srinivasa Rao	P R College(A)	Kakinada
		J. Rama Prasad	GDC	Vijayawada
		G. Ranganatha	GDC	Dhone
		Ramana Rao	GDC	Ravulapalem
5	Zoology	Samuel David Raju	Dr.VS Krishna	Vizag
		N.Sreenivas	P R College(A)	Kakinada
		S. Siva Prasad	GDC(W)	Chittoor
		Chakrapani	GDC	Vidavalur
		Srrangam Mathews	Loyola College	Vijayawada
		P.Anil Kumar	O/O CCE	Vijayawada
6	Computers	Siva Prasad	Dr.VS Krishna	Vizag
		Saheda Akthar	GDC(W)	Guntur
		Kavitha	GDC	Repalle
		G D Rajendar	GDC	Pattikonda
7	English	I. Vijaya Babu	Dr.VS Krishna	Vizag
		Srisaila Sastry	Arts College	Rajahmundry
		A. Rosalind	SWGDC	Kanchikacherla
		K.Vijayababu	GDC(W)	Guntur
8	Telugu	K.Karunasree	DK GDC(W)	Nellore
		K.Sundareswara Rao	GDC(M)	Kadapa

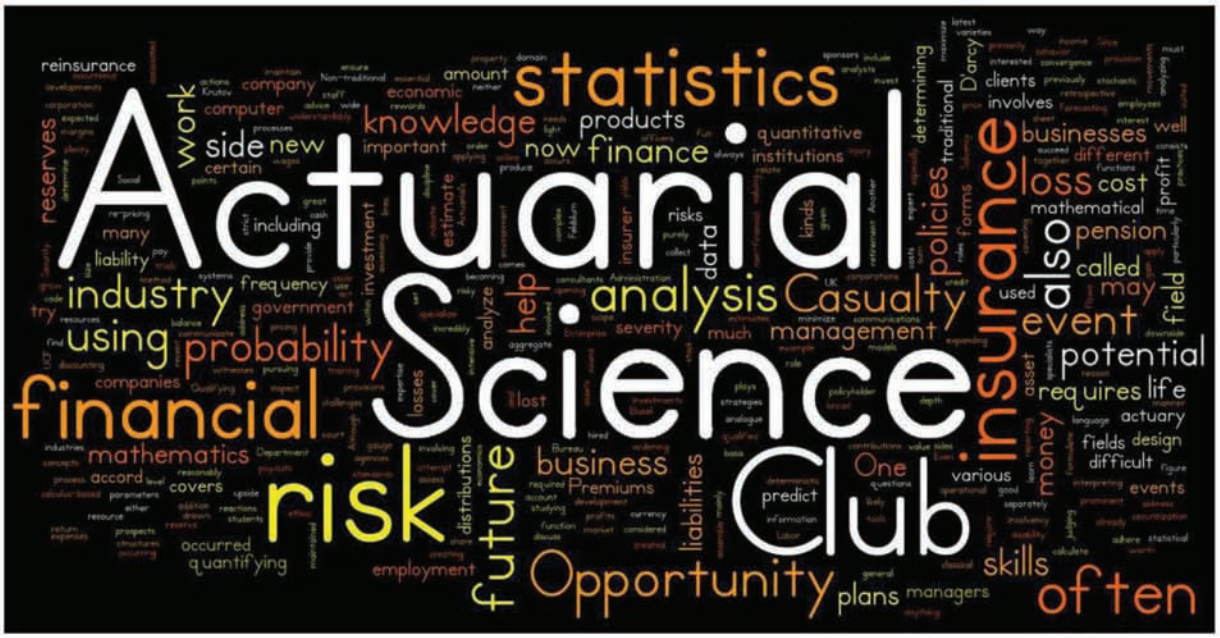
		Ch.Kurmaiah	GDC	Ravulapalem
		V.Sridhar	GDC	Nandikotkur
		K.Sujatha	GDC(W)	Guntur
9	History	Susheel Rao	GDC	Vijayawada
		J.Krishnaprasad Babu	Jawahar Bharati	Kavali
		D.Anjaneyulu	GDC(W)	Ongole
		R.Prasada Reddy	GDC	Dharmavaram
10	Economics	V.Vigneswara Rao	Dr.VS Krishna	Vizag
		S.Ramanjaneyulu	GDC	Vinukonda
		K.Venkateswara	SJGC	Kurnool
11	Political Science	KJL Narayana rao	Dr.VS Krishna	Vizag
		P. Babjee	Arts College	Rajahmundry
		Nagaratnamma	GDC	Aluru
		K. Malakondaiah	GDC	Kandukur
		P. Hari Prasad	GDC(M)	Kadapa
12	Commerce	J.Panduranga Rao	P R College(A)	Kakinada
		Ch.Ramakrishna	GDC	Mandapeta
		K.Srinivasa Rao	GDC	Ravulapalem
		K.Venu Gopala Rao	GDC(W)	Guntur
		R.Janardana sastry	GDC	Guntakal

Commissionerate of Collegiate Education		
Industry Persons who attended the Academia Industry Interface Meeting		
S.No	**Name of the Industrialist representative**	**Subject**
1	GSRK Prasad	Vice Chairman, CII
2	Sri. M.Balaram, DD, Fisheries	Aqua culture
3	Sri. Ramachandra Raju, IIT	Aqua culture
4	Dr.Vara Prasad	Radiology
5	Sri.Rama Krishna Raju, TP Gudem	Organic Farming
6	Sri.Srinivas, DM NEDCAP	Solar Energy
7	Sri.Ramakrishna, EFFTRONICS	Electronics
8	Dr.Rajendra Prasad, Bezawada Diagnostic Centre	Diagnostic Microbiology
9	Mr.Murali, NGO	Management
10	Sri.K.Jaya Raju	Journalism
11	Sri.Naga Babu, Auditor	Office Management
12	Sri.Durga Prasad, Westin College	Hotel Management
13	Sri. Prasad (A/C)	Electrical Appliances
14	Sri.Ajay Kumar, DIC	Manufacturing Industry
15	Dr.Devala Rao	Drug manufacturing
16	Sri.B.Chandrasekhara Rao (A/C)	Electrical Appliances
17	Dr.Prasad AYUSH, Nuna	Medicinal Botany
18	Dr.RVSK.Reddy, Tanuku	Horticulture
19	Dr.Siva Nagi Reddy	History & Archaeology
20	Sri.Natraj, LIC	Actuarial science
21	Sri.Niscal, MD, SKYWAY Travels	Travel Management
22	Sri.Samuel Janardhan, The Hindu	Journalism
23	Sri.H.L.Baji Baba, Hinduja Global Solutions	English Communication
24	Sri.Susarla Ramesh, The Hindu	Writing Skills in English
25	Sri.P.Sridhar, PRO	Journalism
26	Sri.Ratan Kumar, Thomas Cook	Tourism Management
27	Dr.Srinivasa Reddy	Writing History

28	Sri.Vishwanad/ Ranjini, KARADI Path Education	English
29	V.Venkateswarulu, Pushpanjali Agri Input Technology	Organic Farming
30	Dr.Trimurthulu, Laila Nutraceuticals	Medicinal Botany
31	Sri. Gouri Shankar, Techno Track	Solar Energy
32	Sri.Dharmendra, NEDCAP	Solar Energy
33	Sri.Ramesh, Bhavan Printers	Printing Technology
34	Dr.V.Naga Lakshmi	IMIS Pharma,Vijayawada
35	Dr.D.Sriniwas	Manphar pharma,Vijayawada
36	Dr.R.V.S.K.Reddy	Dr.Y.S.R.Horticultural University
37	P. Mahesh Kumar & P.Dinesh Kumar	Eliment Multimedia
38	A.Harish Nath	Sambodhi Tech Solutions
39	M.Sai Ram	WebSamrat Technologies
40	Mrs.Ranjani	Karadi Path
41	Mr.Viswanath	Karadipath
42	Mr.V.Sreedharan	HSBC
43	Dr.A.Kaliprasad	Economics & Statistics
44	Dr.D.Dakshina Murthy	Economics & Statistics
45	Dr.Y V Suryanarayana	Adult Education
46	Dr.G.Devalarao	Pharmaceuticals
47	Dr.K.Ravi Kumar	Acturial Science
48	P.Nataraj	Tourism Management
49	Dr.E.Sivanagi Reddy	Cultural Centre
50	Sri Nistal	Skyway

List of New Courses and their Combinations			
S.No	**Conventional Subjects**	**Subject Combinations**	**New Market Oriented Subjects**
1	Maths-Statistics	Maths, Statistics	Actuarial Science
2		Maths, Statistics	Econometrics
3		Accountancy, Economics	Applied Statistics
4	Physics	Physics, Maths	Renewable Energy Management
5	Computers	Computers, Statistics	Data Science
6		Maths, Computers	Multimedia
7		Maths, Electronics	Internet of Things
8		Maths, Physics	Web Enabled Technologies
9		Maths, Computers	Cloud Computing
10	Chemistry	Maths, Chemistry	Industrial Chemistry
11		Maths, Chemistry	Analytical Chemistry
12		Maths, Chemistry	Cement Chemistry
13	Botany	Chemistry, Botany	Organic Farming
14		Chemistry, Botany	Horticulture
15		Chemistry, Botany	Seed Technology
16	Zoology	Chemistry, Zoology	Aquaculture Technology
17		Chemistry, Zoology	Sericulture Management
18		Chemistry, Zoology	Paramedical Science
19	History	English, History	Tourism & Travel Management
20		Economics, Politics	Archaeology
21		English, History	History Writing
22	Pol. Science	Economics, Politics	Office Management & Secretarial Practice
23		History, Political Science	Journalism & Mass Communication
24	English	History, Political Science	English for Digital Age
25	Telugu	History, Political Science	Functional Telugu

ACTUARIAL SCIENCE



B.Sc. Actuarial Science (Subject) Course Structure

Recommended Combination: Mathematics Statistics & Actuarial Science

Semester	Paper	Paper	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
Semester I	Paper-I	Business Economics	6	5	25	75	100
Semester II	Paper-II	Financial Mathematics	6	5	25	75	100
SECOND YEAR							
Semester III	Paper-III	Basics of Financial Accountancy	6	5	25	75	100
Semester IV	Paper-IV	Survival Models	6	5	25	75	100
THIRD YEAR							
Semester V	Paper-V	Basics of Life Contingency	5	5	25	75	100
	Paper-VI	Business Communication	5	5	25	75	100
Semester VI	Paper-VII	Mortality based Actuarial statistics Or Inference based Actuarial Statistics	5	5	25	75	100
Semester VI	Cluster-1	Life contingency-1	5	5	25	75	100
		LifeContingency-2	5	5	25	75	100
		Project	5	5	25	75	100
	Cluster-2	Principles of Insurance	5	5	25	75	100
		Practice of Insurance	5	5	25	75	100
		Project	5	5	25	75	100

Actuarial Science Proposed Syllabus

Semester- 1

Business economics Paper-I

Unit-I Hours:12

Nature and scope of economics –Concepts of Demand and Supply – Elasticity of demand – price, income, cross.

Unit-II Hours:12

Cardinal and Ordinal approaches – Law of Diminishing Marginal utility – Indifference curve – Consumer's equilibrium– Consumer surplus.

Unit-III Hours:12

Market forms – Perfect and Imperfect Markets –Features of various markets – Monopoly, Monopolistic Competition, Oligopoly – Notion of Controlled and Administered prices.

Unit-IV Hours:12

Concepts of Payback period – Average Annual Rate of return – Net Present Value – Internal Rate of Return criterion – Elements of Social Cost Benefit analysis.

Unit-V Hours:12

National income and social accounts – concept and measurement of national income – Introduction to Macro economic policy and Money and monetary institutions…. RBI, Commercial banks – Concept of Insurance, Stock exchanges, SEBI, IRDA.Nature, characteristics and phases of Trade cycles – Control of Trade Cycles.

References:

1. CT-7 study material of Institute of Actuaries of India

2. Ackley (1976) Micro Economics – Theory and policy, Macmilan publishing company, Newyork.

3. Gupta S.B(1994), Monetary Economics, S.Chand& Co., New Delhi.4. Heijdra B.J. and F.V.Ploeg (2001) Foundations of Modern Economics, Oxford university Press, Oxford.

Actuarial Science Proposed Syllabus

Semester- II

Financial Mathematics Paper-II

Unit-I Hours:12

Simple and Compound interest, Compound interest tables, Present Value, Normal and Effective rates of interest, Effective rate corresponding to a nominal rate and Vice-Versa, Discount and Discounted value, Varying rates of interest, Equation of Value, Equated time of payment.

Unit-II Hours:12

Repayment of loan by uniform instalments when the frequency of instalments is the same as that with which interest is convertible, Repayment of loan by uniform instalments consisting of both interest and principle repayment, when the frequency of instalment is different from that with which interest is convertible, Redemption of Loans by a sinking fund, Lender's sinking fund, Further consideration on redemption of loan, Capital redemption policies, Office premiums, Surrender Value.

Unit-III Hours:12

Nominal and Effective rates of Discount, Average interest yield on the life fund, Money weighted rate of return, Time weighted rate of return and linked internal rate of return,.

Unit-IV Hours:12

Column l_x , Column d_x , Column q_x , Column p_x , The probabilities of survival and death, Stationary population, L_x , T_x , Curtate expectation of life, Complete expectation of life, Central death rate M_x , Selection and select rates, Ultimate table, Aggregate table. Construction of Mortality tables, Stages involved in construction of mortality table, The data to be used, Period of investigation, Unit of investigation, The method of investigation, Census method, application of census method to life office data, Determination of exposed to risk and deaths.

Unit-V Hours:12

Life Assurance premiums-General Considerations, Assurance benefits-Pure Endowment assurance, Endowment assurance, Temporary Assurance or Team assurance, Whole life Assurance, Double Endowment assurance , Increasing Temporary Assurance, Increasing Whole life Assurance, Commutation functions D_x , C_x , M_x , and R_x , Expressions for present values of assurance benefits in terms of Commutation functions, Fixed term (Marriage) Endowment, Educational annuity plan.

Suggested Readings:

1) An Introduction to Mathematics of finance by J.J.McCUTCHEON and W.F.SCOTT
2) Acturial Mathematicas by Bowers Gerber Hickman Jpmes Nesbitt

Actuarial Science Proposed Syllabus

Semester- III

Basics of Financial Accountancy Paper-III

Unit-I Hours:12

Need for Accounting- definition, features, objectives, functions, systems and bases and scope of accounting - Book keeping and Accounting - Branches of Accounting - Advantages and limitations – basic terminology used - Accounting concepts and conventions. Accounting process - Accounting cycle - Accounting equation – classification of accounts – rules of double entry book keeping

Unit-II Hours:12

identification of financial transaction – journalizing – posting to ledgers, balancing of ledger accounts – computerized accounting. Meaning and features - creating of an organization – types of vouchers. Sub division of journal-preparation of subsidiary books including different types of cashbooks – simple cash book, cashbook with cash and discount columns, cashbook with cash, discount and bank columns, cashbook with cash and bank columns and petty cash book.

Unit-III Hours:12

Trial Balance meaning, objectives, methods of preparation – Final Accounts meaning, features, uses and preparation of manufacturing, trading account, profit & Loss Account and balance sheet – adjusting and closing entries. Funds flow and cash flow statements uses and limitations – concept of cash construction of cash flow statement as per accounting standard, meaning of ratio analysis

Unit-IV Hours:12

classification of ratio analysis–computation and interpretation of different accounting ratios – liquidity, profitability turnover ratios and solvency ratios

Unit-V Hours:12

Life insurance companies–preparation of revenue accounts profit and loss account balance sheet and valuation of balance sheet.

Suggested Readings:

Principles and Practice of Accounting R.L. Gupta & V.K. Gupta Sulthan Chand &sons
Accountancy – I, S.P. Jain & K.L Narang ,Kalyani PublishersAccountancy – I,
Tulasian,TataMcgraw Hill Co Financial Accounting – Dr.V.K.Goyal , Excel Books

Introduction to Accountancy, T.S.Grewal ,S.Chand and CO Accountancy – I, Haneef and Mukherjee, tataMcgraw Hill co Advanced Accountancy – Arulanandam, Himalaya publishers

Advanced Accountancy-I, S.N.Maheshwari&V.L.Maheswari, Vikash Publishing co. Financial Accounting, Ashok Banarjee, Excel Financial Accounting, Warren, Cengage

Actuarial Science Proposed Syllabus

Semester-IV

Survival Model Paper-IV

Unit-I Hours: 12

Principles of modeling: Need, benefits and limitations of models,stochastic and deterministic models, discrete and continuous state spaces and time sets, suitability of model, short tem and logn term properties of a model,analysiing the output of a model.

Unit-II Hours:12

Concepts of Survival Models:The distribution and density functions of the random future lifetime, the survival function, the force of mortality or hazard rate and derive relationships between them, Laws of mortality like Gompertz and Makeham, the distribution and density functions of the curtate future lifetime random variable.

Unit-III Hours:12

Truncation, Censoring mechanisms: Right censoring, Left or interval censoring, random censoring, informative and noninformative censoring, Tipe one and two sensoring, Likelihood construction for censored and truncated data, Kaplan-Meier model, Nelson Aalen model, Cox proportional hazard model, Breslow's approximations to the partial likelihood estimator.

Unit-IV Hours:12

Maximum likelihood estimator of transitions intensities in Binomial and Poisson model and their mean-variances, advantages and disadvantages of multiple state models and the binomial models, including consistency, efficiency, simplicity of the actuarial estimators and their distributions, application to practical observations and generality.

Unit-V Hours:12

Initial and central exposed to risks, graduation, purpose and methods of graduation, testing goodness of fit and testing smoothness of a set of graduated estimates, statistical test for comparing a set of crude estimates and a standard table or a set of crude estimates and a set of graduated estimates, effect of duplicate policies on estimates.

References

U K Institute of Actuaries core reading for subject CT4-Models.
Klein J.P. and Moeschberger, M.L.(2003) Survival Analysis: Techniques for Censored and Truncated Data 2nd Edition, Springer Verlag, New York, Klugman, S.A.(June 2003), "Estimation, Evaluation, and Selection of Actuarial Models".
Dick London (1997), Survival Models and their Estimation, second edition, ACTEX publications.
Cox, D.R. and Oakes, D.(1984) Analysis of Survival Data, Chapman and Hall, NewYork.

Actuarial Science Proposed Syllabus

Semester-V

Basics of Life Contingencies Paper-V

Unit-I Hours:12

Probability for the Age-at-Death, the survival function, time- until-death for a person aged *x,* curtate-future-lifetime, force of mortality. Life tables, relation of life table functions to the survival function, life table example. The deterministic survivorship group, other life table functions,

Unit-II Hours:12

assumptions for fractional ages, some analytical laws of mortality, some analytical laws of mortality, select and ultimate tables. Insurances payable at the moment of death: level benefit insurance, endowment insurance, deferred insurance, varying benefit insurance.

Unit-III Hours:12

Insurances payable at the end of year of death, relationships between Insurances payable at the moment of death and the end of year of death, recursion equation, commutation functions.

Unit-IV Hours:12

Single payment contingent on survival, continuous life annuities, discrete life annuities, life annuities with mthly payments, commutation function formulas for annuities with level payments, varying annuities.

Unit-V Hours:12

Recursion equations, complete annuities-immediate and apportionable annuities-due.

Text Books

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.

Books for References

1. David, C. M., Dickson, Mary R. Hardy and Howard, R. waters.(2009). Actuarial Mathematics for Life Contingent Risks. Cambridge University Press.
2. Deshmukh, S.R. (2009). Actuarial Statistics, Universities Press India.

Actuarial Science Proposed Syllabus
Semester-V
Business Communication Paper-VI

Unit-I Hours:12

Nature and scope of communication – Introduction- Functions of Communication-Role of a Manager-Communication-Role of a Manager Communication Basics- Communication Networks

Unit-II Hours:12

communication-Barriers to Effective Communication. Tips for effective internal communication – Internal Communication (Beyond the organizational Hierarchy)

Unit-III Hours:12

Effective in managerial communication --Strategies for improving organizational communication INTRODUCTION –Forms of non-verbal communication-interpreting non – verbal massages

Unit-IV Hours:12

Tips for effective use of non –verbal communication-verbal communication. Cross cultural communication-elements of cultural communications

Unit-V Hours:12

Principals of effective business writing – purpose of writing-writing style-role of communication-business correspondence principals of effective business writing.

Anjaneesath Referil – Business communication
Sankirtan Bodhi – Business communication
Bharma Adhikar – Business communication

Actuarial Science Proposed Syllabus

Semester VI (Optional-1)

Mortality based Actuarial statistics Paper-VII

Unit-I Hours:12

Rates and Ratio's in Mortality- Exposed to Risk Aggregate Rates- Life Year and other rate Intervals

Unit-II Hours:12

Select Rates – Multiple Decrement Tables – Its role in Actuarial Statistics

Unit-III Hours:12

Principles and Purposes of Graduation – The Graphic Method - Graduation by reference to a Standard table.

Unit-IV Hours:12

Compression of Rates of Selection – Social and Economic factors in Mortality – Population Structures and Projections – Age Sex Pyramid

Unit-V Hours:12

U.K. Assured lives and Annuitants Mortality.- The English life Tables – Individual Policy Sickness Experience – Indian Assured Lives Mortality.

Recommended Books:

1. Benjamin, B and Pollard: Analysis of Mortality and other Actuarial Sciences Published by Heinemann: Chapters 1,10,11,12,15,19.
2. Special Note: Exposed to Risk using the Direct and Census methods including mortablity rates by age and Multiple Decrements.
3. Special Note: Population Structures and Projections -1990 Edition
4. English Life Tables No. 14-1980/82 HMSC

Actuarial Science Proposed Syllabus

Semester-VI

Inference based Actuarial Statistics (Optional-2) Paper-VII

Unit-I Hours-12

Warning's Result- Compound Distribution – Branching Process – Poissonian Process – Linear Population Process

Unit-II Hours-12

Linear Combination of Random Variables – Chebyshev Inequality Central Limit Theorem – Special Distributions.

Unit-III Hours-12

Descriptive Statistics – Inferential Statistics – Estimation of Method of Moments – Properties of Estimation.

Unit-IV Hours-12

Confidence Intervals – Single Sample Problems – Two sample Problems – Paired problems.

Unit-V Hours-12

Testing of Hypothesis – Single sample Problems – Two Sample problems – Chi square Tests - Bayesian Methods

References:

1. Gray, J.R: Probability (Chapters 1,2,3,4,5, and 8)
2. Larson, H.J.: Introduction to Probability Theory and Statistical Inference. Published by Wiley.

Actuarial Science Proposed Syllabus
Semester-VI
Cluster – 1 Optional-1

Life Contingency- 1

Unit-I Hours:12

Probability for the Age-at-Death, the survival function, time- until-death for a person aged *x,* curtate-future-lifetime, force of mortality. Life tables, relation of life table functions to the survival function, life table example. The deterministic survivorship group, other life table functions,

Unit-II Hours:12

assumptions for fractional ages, some analytical laws of mortality, some analytical laws of mortality, select and ultimate tables. Insurances payable at the moment of death: level benefit insurance, endowment insurance, deferred insurance, varying benefit insurance.

Unit-III Hours:12

Insurances payable at the end of year of death, relationships between Insurances payable at the moment of death and the end of year of death, recursion equation, commutation functions.

Unit-IV Hours:12

Single payment contingent on survival, continuous life annuities, discrete life annuities, life annuities with mthly payments, commutation function formulas for annuities with level payments, varying annuities.

Unit-V Hours:12

Recursion equations, complete annuities-immediate and apportionable annuities-due.

Text Books

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.

Books for References

1. David, C. M., Dickson, Mary R. Hardy and Howard, R. waters.(2009). Actuarial Mathematics for Life Contingent Risks. Cambridge University Press.
2. Deshmukh, S.R. (2009). Actuarial Statistics, Universities Press India.

Actuarial Science Proposed Syllabus

Semester-VI

Cluster – 1 Optional-2

Life Contingency- 2

Unit-I Hours:12

The random future loss under an assurance or annuity contract, state the principle of equivalence, Notations and formulae of net premium for common life insurance contracts, Fully Discrete Premiums, True m-thly payment premium, Commutation functions, increasing and decreasing Benefit premiums, Profits contract, Types of bonus, Calculating net premiums for with-profit contracts.

Unit-II Hours:12

Prospective and Retrospective Reserves, Net future random loss for reserves, Conditions for equality of prospective and retrospective Reserves, Fully Continuous Benefit Reserves, other formulas for fully Continuous Benefit Reserves.

Unit-III Hours:12

Fully Discrete Benefit Reserves, Benefit Reserves on a Semi-continuous basis, Benefit Reserves based on True m-thly Benefit premiums, Net Premium Reserves, Thiele's Differential Equation, Death strain at risk(DSAR), Expected death strain(EDS), Actual death strain (ADS), Mortality profit, Mortality profit on a portfolio of policies, Calculating net Reserves for with-profit contracts.

Unit-IV Hours:12

Analysis of Benefit Reserves**,** Benefit Reserves for General Insurances, Recursion Relations for Fully Discrete Benefit Reserves, Benefit Reserves at Fractional Durations. List the type of expenses incurred in writing a life insurance contract, Describe the influence of inflation on the expenses, Define the gross future loss random variable for the benefits and annuities using equivalence principle.

Unit-V Hours:12

Joint distribution of Future Lifetimes, The Joint-Life Status, The Last-Survivor Status, More Probabilities and Expectations, Dependent Lifetime Models: Common Shock, Insurance and Annuity Benefits: Survival Status, Special Two-Life Annuities, Reversionary Annuities, Simple Contingent Functions.

Text Books

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.

References

1. UK Institute of Actuaries core reading for subject CT5-Contingences.
2. Robin Cunningham, Thomas N. Herzog, Richard L. Models for Quantifying Risk, 4th Edition, ACTEX Publications, 2011.
3. Dickson, David C. M., Hardy, Mary R. and Waters, Howard R., Actuarial Mathematics for life contingent risks, International series on actuarial science, Cambridge 2009.4. Deshmukh S. R., An Introduction to Actuarial Statistics, University Press, 2009
4. Life Contingencies by Aliestar Neil

Actuarial Science Proposed Syllabus

Semester-VI

Cluster – 2 Optional-1

Principles of Insurance

Unit-I Hours-12

Risk Management: Meaning of risk and distinguish between different types of risks, Risk analysis and risk management techniques, Concept of risk retention for individuals.

Unit-II Hours-12

Insurance Market: Indian insurance market, role of intermediaries: agents, brokers; role of specialists: surveyors, medical examiners, third party administrators(TPA); role of regulator and other bodies.

Unit-III Hours-12

Insurance Customers: Concept of Insured customer, different types of customers, concept of customer mindset and customer satisfaction, importance of ethical behavior.

Unit-IV Hours-12

Insurance Contract: Notion of insurance contract, significance of principle of insurable interest, principles of indemnity, principles of subrogation and contribution, principles of utmost good faith, concept of proximate cause.

Unit-V Hours-12

Insurance Terminology: Concept of life and non-life insurance, terms specific to life insurance, terms specific to non-life insurance.

References:

1. Principles of Insurance, IC-01, Insurance institute of India.
2. Principles of Insurance and Banking, Dr. S.S. Kundu,Dr. B.S. Bodla

Actuarial Science Proposed Syllabus

Semester-VI

Cluster – 2 Optional-2

Practice of Insurance

Unit-I Hours-12

Practice of Life Insurance: Introduction, Over view of Indian insurance market, growth of insurance business in india, liberalization of Indian insurance sector, organizational structure of LIC.

Unit-II Hours-12

Premiums and bonuses: Concept of premium, different types of premiums, factors involved in the calculation of premium, concept of bonus.

Unit-III Hours-12

Plans of Life Insurance: various life insurance plans, importance of ULIPs, importance of riders, industrial life insurance, benefits of MWP, importance of key-man insurance, importance of health insurance.

Unit-IV Hours-12

Annuities: Concept of annuity, analysis of different types of annuity plans, advantages and disadvantages of annuity.

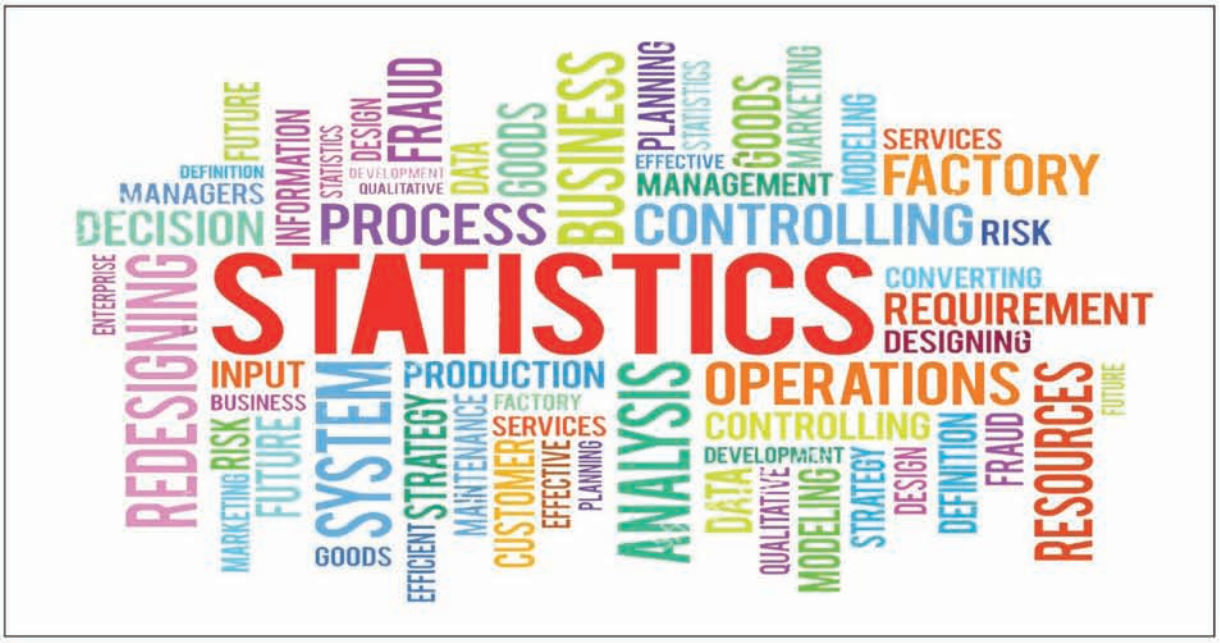
Unit-V Hours-12

Group Insurance: Importance of group insurance, different group insurance schemes, group insurance classifications, features of group insurance schemes, group superannuation schemes, group leave encashment scheme, group insurance scheme in view of EDLI, social security scheme.

Reference:

1. Practice of Life Insurance IC-02, Insurance institute of India.
2. Theory and Practice of Insurance, J. François Outreville.

BASIC APPLIED MATHEMATICS



B.A. Basic Applied Statistics (for Non-Mathematics Students) Course Structure

Semester	Paper	Paper	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
Semester I	Paper-I	Elementary Mathematics	4	3	25	75	100
Semester I	Paper-I	Practicals	2	2	0	50	50
Semester II	Paper-II	Descriptive Statistics	4	3	25	75	100
Semester II	Paper-II	Practicals	2	2	0	50	50
SECOND YEAR							
Semester III	Paper-III	Theory of Probability	4	3	25	75	100
Semester III	Paper-III	Practicals	2	2	0	50	50
Semester IV	Paper-IV	Probability Distributions	4	3	25	75	100
Semester IV	Paper-IV	Practicals	2	2	0	50	50
THIRD YEAR							
Semester V	Paper-V	Statistical Inference	3	3	25	75	100
	Paper-V	Practicals	2	2	0	50	50
	Paper-VI	Sampling Techniques	3	3	25	75	100
	Paper-VI	Practicals	2	2	0	50	50
Semester VI	Paper-VII	Operation Research (or) Demography	3	3	25	75	100
	Paper-VII	Practicals	2	2	0	50	50
Semester VI	Cluster 1	Applied Statistics	3	3	25	75	100
		Practical	2	2	0	50	50
		Computer Applications	3	3	25	75	100
		Practical	2	2	0	50	50
		Project	5	5	25	75	100
	Cluster 2	Official Statistics and Design of Experiments	3	3	25	75	100
		Practical	2	2	0	50	50
		Mortality and Actuarial Statistics	3	3	25	75	100
		Practical	2	2	0	50	50
		Project	5	5	25	75	100

*Recommended Combination: Economics, Political Sci/History & Basic Applied Statistics

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-I

Elementary Mathematics Paper –I

Unit-1: 12 Hours

Concept of sequences and series, fundamentals of sets and functions, types of functions; solution of simultaneous linear equations, quadratic equations.

Unit-II: 12 Hours

progressions- AP,GP, HP; permutations, combinations, Binomial theorem and their related problems.

Unit-III: 12 Hours

Elementary Matrices: Definition and types of matrices, addition, subtraction, scalar multiplication of matrices.

Unit-IV: 12 Hours

Determinant of a matrix, Transpose of a matrix, inverse and rank of 3 X 3 matrices only. Solution of simultaneous linear equations by matrix methods- Cramer's Rule and Matrix Inversion methods.

Unit-V: 12 Hours

Differentiations: Derivatives of algebraic and exponential functions.. Maxima and minima of a function. Integration basics, Integration by parts and by substitutions.

Prescribed Books

1. Differential Calculus- Santhi Narayana.
2. Outlines of Matrices-Schaum.

Reference Books:

1)S.P.Gupta: Statistical Methods. Sultan Chand
2)S.C.Gupta and V.K.Kapur: Fundamentals of Mathematical Statistics. Sultan Chand.
3.Moulika Ganithamu Sambavyata - Telugu Academy.
4. Quantitative Techniques I- Sultan Chand Publication.

Practical's- Semester-I

Conduct any 6 Practical's.

1. Solution to Simultaneous Linear equations
2. Progressions- AP, GP, HP
3. Addition, Subtraction, Multiplication of Matrices.
4. Determinant of a Matrix
5. Solution of equations by Matrix methods.
6. Simple differentiation
7. Integrations

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-II

Descriptive Statistics Paper -II

Unit-I: 12 Hours

Introduction to Statistics: Statistics, Definition, application, scope, limitation, primary and secondary data, methods of collecting primary and secondary data. Statistical enquiry, questionnaire and schedule, Editing of data.

Unit-II: 12 Hours

Classification and tabulation: Classification of data, frequency distribution, rules of tabulation, simple and complex tables, single, double and manifold tables.

Unit-III: 12 Hours

Diagrammatic Representation: Bar diagrams, square, rectangle, pie-charts, Histogram, frequency polygon, ogives.

Unit-IV: 12 Hours

Measures of Central Tendency: Mean, Median, Mode, G.M & H.M, merits and demerits, finding median by graphic method, quartiles, deciles & percentiles.

Unit-V: 12 Hours

Measures of Dispersion: Range, Q.D, S.D, M.D, Coefficient of variation, Lorenz curve.

Text Books:

1. Statistical Methods-S.P.Gupta
2. Fundamentals of Mathematical Statistics- SC Gupta and V.K.Kapoor
3. 3.Moulika Ganithamu Sambavyata - Telugu Academy.

Reference Books:

4. Quantitative Techniques I-Sultan Chand Publication

Practical's- Semester-II

Conduct any 6 Practical's.

1. Bar diagrams
2. Pie diagrams
3. Histogram
4. Frequency Polygon.
5. Arithmetic Mean, Median, Mode, GM, HM.
6. Calculation of Quartile Deviation & Mean Deviation.
7. Calculation of CV and its comparisons.
8. Ogive curves

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-III

Theory of Probability Paper -III

Unit-I: 12 Hours

Attributes- Classes, 2x2, manifold classification, class frequencies, ultimate class frequencies, Contingency tables, association and independence of attributes, consistency of data, coefficient of colligation.

Unit-II: 12 Hours

Moments: Central and non-central moments, Sheppard's corrections for moments Skewness, kurtosis and their measures.

Unit-III: 12 Hours

Probability: Definitions of random experiment, outcome, sample space, event, mutually exclusive event, equally likely events, favourable events, classical, statistical and axiomatic definitions of probability. Addition and multiplication theorems for two events, Conditional probability. Baye's theorem statement and problem based on ot.

Unit-IV: 12 Hours

Random Variable: Discrete-Probability mass function, Continuous random variable-Probability density function, distribution function of a random variable and properties.

Unit-V: 12 Hours

Mathematical Expectation: Basic results & properties of M.G.F, C.G.F, P.G.F and C.F

Text Books:

1. S.P.Gupta: Statistical Methods . Sultan Chand
2. Sambavyata - Telugu Academy
3. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics.

Reference Books:

1. .Goon, Gupta and Das Gupta: Fundamentals of Statistics . Volume I .World Press.
2. . K.V.S. Sarma: statistics Made Simple: do it yourself on PC. PHI

PRACTICAL'S-SEMESTER-III

1. Coefficients of association and colligation
2. Non central moments
3. Central moments
4. Sheppard's corrections
5. Skewness and kurtosis
6. Baye's theorem-problems.

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-IV

Probability Distributions Paper –IV

Unit-I: 12 Hours

Discrete distributions: Binomial, Poisson, Geometric distributions-definitions,means, variances and applications of these distributions. Additive property if exists. Simple problems.

Unit-II: 12 Hours

Continuous distributions: Rectangular, Normal, exponential distributions-definitions and their properties.Simple problems.

Unit-III: 12 Hours

Curve fitting: principle of least squares-fitting of straight line, Parabola, exponential and power curves.

Unit-IV: 12 Hours

Correlation and Regression:Meaning, types, scatter diagrams, correlation-coefficient, Spearman's rank correlation, Regression lines, Regression coefficients and their properties.

Unit-V: 12 Hours

Interpolation: Need and meaning of Interpolation, Graphical method. Newton's and Lagrange's formula for Interpolation

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics.
2. Statistical methods- S.P.Gupta.

.Reference Books:

1. Saha Sambandham Vibhajana Siddhantamu Vol.- I & Vol. – II .Telugu Academy
2. Sambavyata - Telugu Academy
3. Sankyka Vislashanamu – Telugu Academy
4. .Goon, Gupta and Das Gupta: Fundamentals of Statistics . Volume I .World Press.

PRACTICAL'S- SEMESTER-IV

Conduct any 6 practicals

1. Fitting of Binomial by direct method
2. Fitting of Poisson distribution by Direct method
3. Fitting of Normal distribution by Ordinates method
4. Fitting of Straight line Or Fitting of Parabola
5. Fitting of $Y = a X^b$ Or Fitting of $Y = a b^x$ Or Fitting of $Y = a e^{bx}$
6. Correlation coefficient for ungrouped data
7. Regression lines.
8. Interpolation using Newton's and Lagrange's formulae

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-V

Statistical Inference Paper -V

Unit-I: 12 Hours

Statistical Inference:-Estimation: Definitions of population, sample, parameter, statistic, sampling distribution of a statistic, standard error.

Unit-II: 12 Hours

Estimation-Criteria of a good estimator, Concept of unbiasedness, Consistency, Efficiency with simple examples, meaning of interval estimation

Unit-III: 12 Hours

Null and alternative hypothesis, level of significance, Type I and Type II errors, power of the test. Large sample tests for proportion (single & double), means (single & double), and standard deviations.

Unit-IV: 12 Hours

Small sample tests: Tests of significance based on chisquare, t and F, chisquare test for independence of attributes, t-test for single, double and paired tests,Variance Ratio test (F-test)

Unit-V: 12 Hours

Non-Parametric tests: Advantages, Disadvantages, sign test, median test and run test for two sample cases only.

Text Books: 1. Statistical methods-S.P.Gupta

2 Fundamentals of statistics-Goon Gupta and Das Gupta Vol I and Vol II

Reference Books:

1. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.
2. Applied Statistics-V.K.Kapoor & S.C.Gupta
3. Applied Statistics-Parimal Mukhopadhyay.

PRACTICAL'S- SEMESTER-V

1. Large sample tests-Mean(s)
2. Large sample tests-Proportion(s)
3. Small sample tests-t for Mean(s)
4. F-test for variance ratio
5. Chi square test for independence of attributes
6. N.P.tests-Run test, Median test, Sign test.

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-V

Sampling Techniques Paper -VI

Unit-I: 12 Hours

Sampling theory: Population, sample, sampling versus census, sample survey meaning, Sampling and Non-sampling errors, Limitations of sampling

Unit-II: 12 Hours

Sampling Methods: Principle steps in a sample survey. Types of sampling- Simple random sampling, Stratified random sampling, Systematic sampling.

Unit-III: 12 Hours

Simple Random Sampling method: SRSWR, SRSWOR, Random number table method and lottery system method. Sample mean is an unbiased estimate of population mean, sample mean of variance.

Unit-IV: 12 Hours

Stratified Random Sampling: Meaning of stratified random sampling, merits and demerits. Definitions of Proportional and Optimum allocations.

Unit-V: 12 Hours

Systematic Random Sampling: Definition of systematic random sampling. Comparison of SRSWOR (problem), stratified and systematic samplings.

Text Books: 1. Statistical methods-S.P.Gupta

2 Fundamentals of statistics-Goon Gupta and Das Gupta Vol I and Vol II

Reference Books:

1. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.
2. Applied Statistics-V.K.Kapoor & S.C.Gupta
3. Applied Statistics-Parimal Mukhopadhyay.

PRACTICAL'S- SEMESTER-V

Conduct any six practicals

1. Estimation of Population mean in SRSWR
2. Estimation of population variance in SRSWR
3. Estimation of population mean in SRSWOR
4. Estimation of population variance in SRSWOR
5. Comparison of SRSWOR with optimum and proportional allocations
6. Comparison of SRSWOR, stratified and systematic samplings
7. Laspeyre, Paasche, Fisher indices.

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Operations Research (Option-1) Paper -VII

Unit-I: 12 Hour

Definition and scope of operations research, phases and models in OR. Linear programming problems, formulation of LPP, solving the LPP by graphical method.

Unit-II: 12 Hour

Transportation problem, definition of transportation problem, TPP as a special case of LPP, feasible solutions by North-West, Matrix minimum and VAM methods.

Unit-III: 12 Hour

Game theory- two person games, pure and mixed strategies, zero sum games finding solutions in 2x2 and 2xM games.

Unit-IV: 12 Hour

Assignment problem- formulation and description of assignment problem and its variations. Assignment problem, traveling salesman problem. Optional solution using Hungarian method.

Unit-V: 12 Hour

Sequencing problem – elements of sequencing problem with jobs on two machines and their solution.

Reference Books:

1. Operations Research, S. Kalavathi, Vikas publishing house Pvt Ltd.
2. Hamdy A. Taha (1987): Operations Research – An Introduction, 4/e, Prentice Hall of India,Private Ltd, New Delhi.
3. Hillier F S and Libermann G J(2002): Introduction to Operations Research, 7th Edition, McGraw Hill
4. Kanti Swarup, P.K. Gupta and Man Mohan(2004): Operations Research, Sultan Chand and Sons, New Delhi.

Practicals:

1. Solving LPP by graphical method
2. Solving the TP by NWCR, matrix minimum and VAM methods
3. Game theory – obtaining saddle point and pure mixed strategies
4. Finding solution for 2x2 and 2xm games
5. Optimal solution for assignment problem
6. Solving sequencing problem for jobs on two machines.

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Demography (Option-2) Paper -VII

Unit-I: 12 Hours

Introduction of demography nature and scope. Brief history of the development of demographic work in India. Evolution of indian census 1872 – 1981 rates and ratios standardization of rates.

Unit-II: 12 Hours

Techniques of measuring mortality factors effecting mortality

Unit-III: 12 Hours

Techniques of measuring fertility – factors effecting fertility

Unit-IV: 12 Hours

Life tables, components of RT and its uses.

Unit-V: 12 Hours

Population growth medels – linear, exponential.

Reference books:

1. B.D. Misra, The study of population
2. D.J. Bogue: Principles of demography
3. Sarma P.V.S.: Statistical techiniques in population studies (Telugu Academy)

PRACTICALS:

1. Calculation of crude death rate, crude birth rate, sex ratio, child women rate
2. Drawing of age sex pyramid
3. Measures of mortality – infant mortality standardized mortality rate
4. Measures of fertility general fertility rate, age specific rate, total fertility rate
5. Gross reproduction rate and net reproduction rate
6. Life tables
7. Growth models linear
8. Growth models exponential the end.

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Applied Statistics (Cluster-1, Paper-1) Paper -VIII

Unit-I: 12 Hours

Vital Statistics: Meaning, definition, uses, source of vital statistics – registration method, Census method Death rates-, crude death rates – age specific death rate, standardized Death rates Birth rates- – crude birth rate, age specific fertility rate, general fertility rate, Total fertility rate. Reproductive rates: Gross reproductive rate and net reproductive rate – life tables and abridged life tables.

Unit_II 12 Hours

Time series**:** Meaning components, trend- graphical, semi-averages, straight line, parabola, moving average methods. Seasonal indices methods- simple averages –ration to trend, ratio to moving average , link relatives methods.

Unit-III 12 Hours

(SQC): Importance of SQC in industry – Concept of chance and assignable causes of variation, Natural tolerance and pecification limits,

Unit-IV 12 Hours

Control Charts for variables (Mean, Range, charts) and attribute (p, np and C) Charts for fixed sample size only.

Unit-V 12 Hours

Index numbers: Definition and meaning of Index Numbers. problems involved in the construction of index numbers , Simple and Weighted Index Numbers-Laspeyre's Paasche's and Fisher's indices. Cost of living index numbers.

Reference Books:

1. Statistical methods-S.P.Gupta
2 Fundamentals of statistics-Goon Gupta and Das Gupta Vol I and Vol II
3. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.
4. Applied Statistics-V.K.Kapoor & S.C.Gupta
5. Applied Statistics-Parimal Mukhopadhyay.

PRACTICALS:

1. Birth rates
2. Death rates
3. Trend-Straight line
4. Seasonal indices-Simple Average
5. X, R charts
6. Attribute control chart p chart
7. Attribute control chart np chart

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Computer Applications (Cluster-1, Paper-2) Paper -VII

Unit-I: 12 Hr

Introduction to Operating system: Structure of an Operating system The purpose of Operating systems –Features of an Operating systems-

Types of an Operating Systems –Proving a User interface-Running Programs-managing Hardware-Enhancing an OS utility software.

Unit-II: 12 Hr

MS Word: Starting word, Creating new documents when Word is running, Standard tool bar,Formating tool bar, File menu, Edit and manipulating text, Page setup, tab keys ,undo and redo commands, bullets and numbered list, Exiting word, Inserting page breaks. Inserting headers and footers, Inserting page numbers.

Unit-III: 12 Hr

Tables: creating a simple table using table button, creating a table using table menu, entering and editing text in a table, adding rows, changing row heights, deleting rows, inserting columns, deleting columns, Graphics in MS Word-Adding a clipart, Editing a graphic,Autoshapes.Template.Mail merge. Macro-recording a macro, running a macro.

Unit-IV: 12 Hr

MS EXCEL: Save and print workbooks.,Enter and edit data. Modify a worksheet and workbook. Work with cell references. Learn to use functions and formulas. Create and edit charts and graphics.Filter and sort table data and charts. Import and export data. Excel Basics Work with Cells and Worksheets Calculate Your Data Format your Workbook Add Charts and Graphics Collaborate with Others Analyze your Data Work

Unit-V: 12 Hr

MS POWER POINT: Basics, Creating presentations-auto content wizard, design template. Working with menus-file menu, edit menu, view menu, insert menu, format menu, tools menu, slide show menu, windows, help. Tool bars-standard tool bar, Formatting tool bar, draw tool bar, Slide control tool bar, Picture tool bar. Opening a presentation, Insert a new slide, selecting slides-single, multiple, deleting a slide. Cut, Copy, Paste slides, saving a presentation, closing a presentation, slide numbering, printing presentation. Applying a design to presentation, Slide transition.

Prescribed Books:

1. Working in Microsoft Office by Ron Mansfield, Tata McGraw Hill.
2. Advanced Microsoft office 2000 by Meredith Flynn & Nita rutkosky, BPB publications.
3. Fundamentals of computers by V.Rajaraman,PHI
4. Computer System Architecture by M.Morris Mano
5. Operating System by Dhumdhere

PRACTICALS:

1. Design a visiting card for a managing director of a company as per the following specification. Size of the visiting card should be 31/2 “X2”
2. Name of the company with a big font using word art. Phone number, Fax number and Email address with appropriate left and right margins and page number in the footer and name on top right side.
3. Prepare a resume of an MCA graduate with proper headings, appropriate left and right margins and page number in the footer and name on top right side.
4. Create an interview call letter as the main document and create 10 records for 10 persons. Use mail merge to create letters for 6 selected persons among the 10.
5. Write a macro to format a document as below.
   i) Line spacing is two
   ii) Paragraph indent of 0.10
   iii) Justification formatting style.
   iv) Arial font of 10 point size.
6. Filter and sort table data and charts.
7. Work with Cells and Worksheets Calculation
8. Make a Presentation of a slide for a given DATA
9. Make a Power Point presentation about our college with statistical DATA

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Official Statistics and Design of Experiments (Cluster-2, Paper-1) Paper -VII

Unit-I: 12 Hours

Official Statistics: National income, methods to estimate national income, problems involved in estimating national income, agricultural statistics.

Unit-II 12 Hours

Area, yield of statistics, Functions and organization of CSO, NSSO

Unit-III 12 Hours

Analysis of variance: Meaning, definition, assumptions, one way and two way classifications.

Unit-IV 12 Hours

Principles of design of experiments: Principles of experiment, Completely Randomized design, Randomized block design and Latin square design.

Unit-V 12 Hours

Missing plot techniques: RBD, LSD, Concepts of Factorial experiments 22 , 23

Text Books:

1. Fundamentals of Statistics: Goon Gupta, Das Gupta
2. Applied Statistics-Parimal Mukhopadhyaya

Reference Books

1. Design of Experiments by Gupta Kapoor:
2. Applied Statistics-V.K.Kapoor & S.C.Gupta
3. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.

PRACTICALS:

1. ANOVA-equal one way classifications
2. ANOVA-unequal one way classifications
3. ANOVA-Two way classifications
4. CRD
5. RBD
6. LSD

Proposed Syllabus - Basic Applied Statistics (for Non-Mathematics Students)

Semester-VI

Mortality and Actuarial Statistics (Cluster-2, Paper-2) Paper -VII

Unit-I: 12 Hours

Rates and Ratio's in Mortality- Exposed to Risk Aggregate Rates- Life Year and other rate Intervals

Unit-II 12 Hours

Select Rates – Multiple Decrement Tables – Its role in Actuarial Statistics

Unit-III 12 Hours

Principles and Purposes of Graduation – The Graphic Method - Graduation by reference to a Standard table.

Unit-IV 12 Hours

Compression of Rates of Selection – Social and Economic factors in Mortality – Population Structures and Projections – Age Sex Pyramid

Unit-V 12 Hours

U.K. Assured lives and Annuitants Mortality.- The English life Tables – Individual Policy Sickness Experience – Indian Assured Lives Mortality.

Recommended Books:

1. Benjamin, B and Pollard: Analysis of Mortality and other Actuarial Sciences Published by Heinemann10,11,12,15,19.
2. Special Note: Exposed to Risk using the Direct and Census methods including mortablity rates by age and Multiple Decrements.
3. Special Note: Population Structures and Projections -1990 Edition
4. English Life Tables No. 14-1980/82 HMSC: Chapters 1,

RENEWABLE ENERGY

COURSE STRUCTURE UNDER CBCS PATTERN

New Subject: RENEWABLE ENERGY SOURCES
(MATHEMATICS, PHYSICS & RENEWABLE ENERGY SOURCES)
UNDER CBCS PATTERN

SEMESTER	PAPER	SUBJECT	HRS.	CREDITS	IA	ES	TOTAL
FIRST YEAR							
SEMESTER I	I	BASICS OF FLUID MECHANICS	4	3	25	75	100
		PRACTICAL I	2	2	NIL	50	50
SEMESTER II	II	THERMODYNAMICS AND HEAT TRANSFER	4	3	25	75	100
		PRACTICAL II	2	2	NIL	50	50
SECOND YEAR							
SEMESTER III	III	ELECTRONICS AND INSTRUMENTATION	4	3	25	75	100
		PRACTICAL III	2	2	NIL	50	50
SEMESTER IV	IV	RENEWABLE ENERGY	4	3	25	75	100
		PRACTICAL IV	2	2	NIL	50	50
THIRD YEAR							
SEMESTER V	V	BIO ENEGY CONVERSION	4	3	25	75	100
		PRACTICAL V	2	2	NIL	50	50
	VI	OCEAN ENERGY AND THRMOELECTRIC POWER	4	3	25	75	100
		PROJECT/INTERNSHIP	2	2	NIL	50	50
SEMESTER VI	ELECTIVE VII A	ENERGY STORAGE DEVICES	4	3	75	25	100
		PROJECT/INTERNSHIP	2	2	NIL	50	50
	CLUSTER VIII A I,II,III	SOLAR THERMAL ENERGY CONVERSION	4	3	25	75	100
		SOLAR PHOTOVOLTAIC CONVERSION	4	3	25	75	100
		WIND ENERGY CONVERTION	4	3	25	75	100
		PROJECT/INTERNSHIP	2	2	NIL	50	50

NOTE: Problems should be solved at the end of every chapter of all Units.

1. Each theory paper is of 100 marks and practical paper is also of 50 marks.
   Each theory paper is 75 marks University Exam (external) + 25 marks mid Semester Exam (internal). Each practical paper is 50 marks external
2. The teaching work load per week for semesters I to VI is 4 hours per paper for theory And 2 hours for all laboratory (practical) work.
3. The duration of the examination for each theory paper is 3.00 hrs.
4. The duration of each practical examination is 3 hrs with 50 marks, which are to be distributed as30 marks for experiment

   10 marks for viva
   10 marks for record

Practicals	50 marks
Formula & Explanation	6
Tabular form +graph +circuit diagram	6
Observations	12
Calculation, graph, precautions & Result	6
Viva-Voce	10
Record	10

Model question Paper for all theory papers

Time : 3 hrs Max marks : 75

Section-A (Essay type)
Answer ALL questions with internal choice from all units Marks : 10x5 = 50
(Two questions are to be set from each unit with either or type)

Section-B (Short answer type)
Answer any FIVE out of 8 questions from all units (I to V) Marks: 5x5 = 25
At least one question should be set from each unit.

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
FIRST SEMESTER
PAPER 1 BASICS OF ENERGY AND FLUID MECHANICS

No. of Hours per week: 04 Total Lectures: 60

UNIT-I (12 hrs)

1. Translatory Motion: Newton's laws of motion - Applications of Newton's laws of motion - Principle of Conservation of Linear Momentum - Frictional force.
2. WORK, POWER AND ENERGY: Work done by a constant force - Work done by a variable force - Kinetic Energy - Work - Energy Theorem - Significance of work-energy theorem - Power - Conservative forces -Potential energy - One dimensional conservative systems - Non-conservative forces - Conservation of energy

UNIT-II (12 hrs)
3. Rotational Dynamics and Energy due to Rotation: Rotational Dynamics- Torque acting on a particle - Angular momentum of a Particle - System of particles -kinetic energy of rotation and rotational inertia - Rigid body - Moment of inertia of a rigid body- Parallel axis theorem and perpendicular axis theorem - Angular momentum of a Rigid body - Equation of motion for rotation of a rigid body -gyroscopic motion - Kinetic energy of rotation of a rigid body - comparison of translational motion of a rigid body along a straight line with rotational motion about a fixed axis

UNIT-III (14 hrs)
4. Viscosity: Viscosity of a fluid - Coefficient of viscosity - stream line turbulent flow - Reynold's number - Poiseulle's equation for the flow of liquid through a tube - Volume of the liquid flowing out - Stoke's law and terminal velocity - Experimental determination of coefficient of viscosity by i) capillary flow method ii) falling sphere method and iii)comparison of viscosities - Ostwarld viscometer method - Meyer relation for flow of a gas through a capillary tube.

UNIT-IV (12 hrs)
5. Surface Tension: Molecular forces - Surface tension - Surface energy - Angle of contact - pressure difference across a liquid surface - excess pressure inside a liquid drop - Shape of liquid surface in a capillary tube - rise of liquids in capillary tube - determination of surface tension by capillary rise method- Effect of temperature on surface tension - Examples of surface tension and capillarity.

UNIT-V (12 hrs)
6. Fluid Dynamics: Fluids - Pressure and density - The variation of pressure in a fluid at rest - Pascal's principle - Archimedes' principle - Measurement of pressure, General concepts of fluid flow - stream lines - The equation of continuity - Bernoulli's equation - Applications of Bernoulli's equation and equation of continuity - dynamic lift - Torricelli's theorem - conservation of Momentum in fluid mechanics - Fields of flow

Reference

1. Physics - Part I David Halliday and Robert Resnick Wiley Eastern Edition
2. Physics - Marcelo Alonso and Edward J Finn - Addison Wesley Longman (AWL)
3. Unified Physics, Vol. I by S.L. Gupta and Sanjeev Gupta, 1997 Jaiprakashnath and Co., Meerut
4. Engineering Physics by R.K Gaur and S L Gupta Fifth Edition 1997 Dhanpat Rai and sons, Delhi

Practical: 2 hrs/Week

Any six experiments out of the following
1. Bifilar Suspension - Determination of Moment of Inertia
2. Fly Wheel - Determination of Moment of Inertia
3. Determination of Surface Tension of a Liquid - Capillary tube method
4. Determination of viscosity of a Liquid - Searle's method
5. Determination of Viscosity of a Liquid - Poiseulle's method
6. Determination of viscosity of liquid - Ostwald Viscometer
7. Determination of Surface tension - Stalagnometer method/Drop number method
8. Vibration of Springs - Determination of Force Constant of a Spring and verification of laws of combination of springs (Series and parallel)
9. Torsion Pendulum - Determination of rigidity modulus of the material of a given wire

LEARNING OUTCOMES; Working knowledge of the subject.
Suggested student activities:
Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
SECOND SEMESRER
PAPER II: THERMODYNAMICS AND HEAT TRANSFER

No. of Hours per week: 04 Total Lectures: 60

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UNIT I (10Hrs)
1. Thermodynamics I: Zeroth law of thermodynamics - Measurement of temperature - Ideal gas - Electrical resistance thermometer - Thermocouple - Work Transfer - Indicator diagram - specific heat and latent heat - Adiabatic and isothermal processes - Work done by an ideal gas in adiabatic and isothermal expansion - Internal energy - First law of thermodynamics - Energy a property of system -Different forms of stored energy - Specific heat at constant volume - enthalpy- Specific heat at constant pressure - energy of isolated system.

UNIT II (14Hrs)
2. Thermodynamics II: Qualitative difference between heat and work - cyclic heat engine - Energy reservoirs - Carnot engine and its efficiency - Second law of thermodynamics - Carnot theorem - Thermodynamic Scale of temperature - Entropy - Changes in entropy - entropy and disorder - Maxwell's thermodynamic equations - T-dS equations - Difference and ratio of specific heats - Clausius - Clapeyron equation - Joule Kelvin effect - Conditions of equilibrium of a heterogeneous system - Gibbs phase rule - types of equilibrium - local equilibrium conditions - conditions of stability

UNIT III (12Hrs)
3. Gaseous State: Avogadro's law - Boyle's law and Clarles' law - Equation of State of a gas - Ideal gas - Kinetic theroy of gases -Equations of State - Virial expansions - Law of corresponding states- Properties of mixtures of gases - Dalton's law of partial pressures- Internal energy, enthalpy and specific heats of gas mixtures - Entropy of gas mixtures - Gibbs function of a mixture of Inert ideal gases.

UNIT IV(12Hrs)
4. Heat Transfer: Conduction Heat Transfer, Various modes of Heat Transfer – Mechanisms of Different Modes of Heat Transfer Fourier's Law of Heat Conduction, Conductivity - Electrical Analogy, Concept of Thermal Resistance – Introduction to Newton's Law of Cooling – Unidirectional Heat Conduction , Heat Conduction with R Convective Environment
Convection –Basic Concepts: Convective Heat Transfer Coefficients, Boundary Layer Concept, Types of Convection, Forced Convection-Laminar and Turbulent Flow, Combined Laminar and Turbulent –Nusselt Theory – Film Wise and Drop Wise Condensation.

UNIT – V(12Hrs)
5. Radiation Heat Transfer: Basic Concepts, Laws of Radiation-Stefan Boltzmann Law, Kirchoff Law – Black Body Radiation Heat Exchanger & Insulation, Classification of Heat Exchangers – Overall Heat Transfer Coefficient – Fouling Factor –Design & Selection of Heat Exchanger-

Practical Application of Heat Exchanger- Purpose of Insulation – Classification of Insulation- Types of Insulation Material –Economic Thickness of Insulation

TEXTBOOKS:
1. Engineering Thermodynamics/ PK Nag/TMH, III Edition
2. Fundamentals of Thermodynamics – Sonntag, Borgnakke and vanwylen/ John Wiley & sons (ASIA) Pvt.Ltd.

REFERENCES:
1.EngineeringThermodynamics–Jones& Dugan
2.Thermodynamics–AnEngineeringApproach–YunusCengel&Boles/TMH
3.Thermodynamics–J.P.Holman/ Mc Graw Hill
4.AnintroductiontoThermodynamics/ YVCRao/ NewAge
Formoredetails, visitHttp://www.jntu.ac.in/

HEAT AND MASS TRANSFER REFERENCES:
1. Sachdeva RC,"Fundamentals of Engineering Heat and Mass Transfer" New Age International,1995
2. YadavR"HeatandMassTransfer"Central PublishingHouse,1995.
3. HeatTransfer, S.P.Sukhatme.
4. HeatTransfer,P.K.Nag,Tata McGrawHill2002Publications.
5. Heat Transfer,RCSachdeva.
6. Thermal Insulation and Refractories-PCRA.
7. Insulation and Refractories-British Energy Efficiency Office.

Practicals 2Hrs/Week
1. Specific Heat of solids - Method of mixtures
2. Coefficient of conductivity of a bad conductor - Lee's method
3. Verification of Boyle's law
4. Resistance thermometer
5. Thermocouple thermometer
6. Newton's law of cooling
7. Determination of Stefan's constant
8. Efficiency of a kettle

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
THIRD SEMESTER
PAPER III. ELECTRONICS AND INSTRUMENTATION

No. of Hours per week: 04 Total Lectures: 60

UNIT – I(10Hrs)

1. Basic Electronic Components: Definitions of resistance, capacitance and inductance-Equations defining resistance, capacitance and inductance – Concept of reactance and impedance

2. Network Theorems: Kirchhoff's laws (revision) – Voltage and current divider circuit-Thevenin's theorem - Norton's theorem - Maximum Power Transfer Theorem

UNIT – II(12Hrs)

3. Semiconductor Devices: Conductors , insulators and semiconductors - extrinsic and intrinsic semiconductors - p- type and n-type semiconductors - pn junction diode - zener diode - tunnel diode –bipolar junction transistor, types, symbols and basic action -Configurations (Common Base, Common Emitter & Common Collector) – Definition of alpha, beta and their relations. - Input, output and transfer characteristics of CE and CB configurations.-Biasing methods.

UNIT – III (14Hrs)

4. Operational Amplifiers and Oscillators: Operational amplifier: IC 741- Block diagram, Characteristics: ideal and practical – Concept of virtual ground - Inverting and non-inverting operational amplifiers with concept of gain –Barkhausein criteria for an oscillator – Phase shift oscillator and Wien bridge oscillator (Derivation for frequency and feed back factor for both oscillators expected).

UNIT –IV(12Hrs)

5. Rectifiers and power supplies: Half wave, Full wave and Bridge rectifier, ripple factor, capacitor filter- Difference between regulated and unregulated power supply- Definition of Line and Load regulation – Series and Shunt regulators – Block diagram and circuit of regulated power supply using discrete components, Simple current limiting circuit.

UNIT V (12Hrs)

6. Digital Electronics: Number systems: Binary, Binary coded decimal (BCD), Octal, Hexadecimal - Addition and subtraction of binary numbers and binary fractions using one's and two's complement. – Basic logic gates: OR, AND, NOT, Derived gates: NOR, NAND, EXOR, EXNOR with symbols and truth tables – Boolean Algebra, Boolean Equations – De Morgan's theorems and its verification - Half and Full Adders –RS Flip-flop, J-K flip flop, ripple counter ring counter and decade counter -D/A and A/D conversion Problems

Reference Books

1. ElectronicsPrinciples,Malvino,7thEditionTaTaMc-GrawHills.
2. Principles of Electronics,V.K.Mehta,S.Chand PublicationNewDelhi.
3. OpAmp and Linearintegrated circuits,Ramakant Gaikwad, PrenticeHallofIndiaPub.
4. Integrated Circuts,Botkar, Khanna Publications,NewDelhi
5. Digital Principles and Applications, Malvino and Leech Tata McGraw Hills

Practicals 2Hrs/Week

1. Verification of Kirchoff's laws
2. Verification of network theorems
3. Junction diode characteristics
4. RC - Phase shift oscillator
5. Verification of truth tables of logic gates
6. De Morgan's theorems
7. Half adder and Full adder

B.Sc. RENEWABLE ENERGY -SYLLABUS

(UNDER CBCS PATTERN)

FOURTH SEMESTER

PAPER IV RENEWABLE ENERGY

No. of Hours per week: 04 Total Lectures: 60

UNIT-I (12 hrs)

1. Introduction to Energy: Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin and time scale of fossil fuels, Conventional energy sources, Role of energy in economic development and social transformation.

2. Global Energy Scenario: Energy consumption in various sectors, projected energy consumption for the next century, exponential increase in energy consumption, energy resources, coal, oil, natural gas, nuclear and hydroelectric power, impact of exponential rise in energy usage on global economy.

UNIT-II (12 hrs)

3. Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, energy consumption pattern and its variation as a function of time, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources.

4. Environmental Effects : Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming, biological damage due to environmental degradation. Effect of pollution due to thermal power station, nuclear power generation, hydroelectric power stations on ecology and environment.

UNIT-III (10 hrs)

5. Solar energy: Solar energy, Spectral distribution of radiation, Flat plate collector, solar water heating system, Applications, Solar cooker; Solar cell principle, Applications of solar PV systems.

6. Wind Energy: Introduction, Principle of wind energy conversion, Advantages and disadvantages of wind mills, Applications of wind energy.

UNIT-IV (12 hrs)

9. Geothermal energy: Introduction – Estimates of Geothermal Power – Nature of geothermal fields – Geothermal resources – Hydrothermal (convective) Resources Geo pressured resources – Hot dry rock resources of petro-thermal systems – Magma resources-Interconnection of geothermal fossil systems – Advantages and disadvantages of geothermal energy over other energy forms

UNIT – V (14 hrs)

7. Ocean Energy: Introduction, Principle of ocean thermal energy conversion (OTEC), Tidal power generation, Tidal energy technologies, Energy from waves, Wave energy conversion, Wave energy technologies, advantages and disadvantages.

8. Bio-Energy

Energy from biomass – Sources of biomass – Different species – Conversion of biomass into fuels – Energy through fermentation – Pyrolysis, gasification and combustion Biogas plants – Properties and characteristics of biogas.

References:

1. Solar Energy Principles, Thermal Collection &Storage, S.P.Sukhatme: Tata McGraw Hill Pub., New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, New Delhi.
3. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004,
4. The Generation of electricity by wind, E.W. Golding.
7. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.
8. Fundamentals of Renewable Energy Resources by G.N.Tiwari, M.K.Ghosal, Narosa Pub., 2007.

Practical: Renewable Energy
2hrs/Week
Minimum of 6 experiments to be done and recorded
1. Preparation of copper oxide selective surface by chemical conversion method.
2. Performance testing of solar cooker.
3. Determination of solar constant using pyroheliometer.
4. Measurement of I-V characteristics of solar cell.
5. Study the effect of input light intensity on the performance of solar cell.
6. Study the characteristics of wind.
7. Solar mapping
Topics in italics are suggested by representatives of industry
LEARNING OUTCOMES; Working knowledge of the subject

B.Sc. RENEWABLE ENERGY -SYLLABUS

(UNDER CBCS PATTERN)

FIFTH SEMESTER

PAPER V. BIOENERGY CONVERSION

No. of Hours per week: 04 Total Lectures: 60

UNIT - I (12 hrs)

1. Basics in Biomass Study: Biomass-types and its advantages and drawbacks – Indian scenario – Characteristics –Conversion Mechanisms – Fuel Assessment Studies, Selection of site for biogas plant.

UNIT – II (12 hrs)

2. Biomethanation: Microbial systems, Phases in Biogas Production – Parameters Affecting Gas Production-Biogas Plants: Types, Design, Constructional Details and Comparison – Factors affecting the design.

UNIT – III (12 hrs)

3. Methods for Maintaining Biogas Production: Insulating the Gas Plant – Composting – Hot Water circulation – Use of Chemicals –Solar energy systems, problems related to biogas plants

UNIT- IV (12 hrs)

4. Commissioning and Management of Bio Gas Plant: Commissioning and Management of Biogas plant, Community Plant-Biogas Appliances –Effect of Biogas on Engine Performance - Socio-Economic Aspects of Biogas – Cost –Benefit Analysis of Biogas Plant

UNIT – V (12 hrs)

5. Biofuel: Ethanol and Methanol production from Cellulose and wood – Biomass – Biodiesel Production from Non-Edible Oil Seeds

Students are advised to visit and submit a detailed on the following

1. Production of bio gas with microbial system
2. Production of Bio diesel

Text Books

1.DavidBoyles,BioEnergyTechnologyThermodynamicsandcosts,Ellis Hoknood,Chichester,1984.
2.Non-ConventionalEnergySources,G.D.Rai,KhannaPublications.
3.Non-Conventional Energy Resources, B.H. Khan, Tata Mc Graw Hill Publications.

References

1. Khandelwal, K.C., Mahdi, S.S., Biogas Technology – A Practical Handbook, Tata Mc Graw – Hill,1986.
2. R. C. Maheswari, Bio Energy for Rural Energization, Concepts Publication,1997.

3. Tom, B. Reed, Biomass Gasification– Principles and Technology, Noyce Data Corporation, 1981

The following Scheme may be followed instead of practicals for paper 6/7/8

Comprehensive Viva : 1 credit
Seminar : 1 credit
OR
Project : 2 credits
OR
Internship : 2 credits

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
FIFTH SEMESTER
PAPER VI. OCEAN ENERGY AND THRMOELECTRIC POWER
No. of Hours per week: 04 Total Lectures:60

UNIT-I (12Hrs)
Small Hydropower Systems: Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection; Speed and voltage regulation; Investment issues load management and tariff collection; potential of small hydro power in India. Wind and hydro based stand-alone hybrid power systems.

UNIT-II (12Hrs)
Ocean Thermal Energy Conversion: Introduction, Working principle, Resource and site requirements, Location of OTEC system, Electricity generation methods from OTEC, open cycle and closed cycle OTEC systems, Advantages and disadvantages, Applications of OTEC,

UNIT-III (12 Hrs)
Tidal Energy - Introduction, Origin and nature of tidal energy, Basic principle of tidal power generation, Components of tidal power plants, Tidal energy technology, Tidal range power, Basic modes of operation of tidal systems. Advantages and limitations

UNIT-IV (12 Hrs)
Wave Energy – Introduction, Basics of wave motion, Power in waves, Wave energy conversion devices, Advantages and disadvantages, Applications of wave energy, Prospects of wave energy in India.

UNIT – IV (12hrs)
Thermoelectric power : Basic principles of thermoelectric power generation – Thermoelectric power generator – performance analysis of thermo electric power generator – thermoelectric materials – selection of materials, Thermionic generation- Thermionic work function – Basic thermionic generator –analysis of thermionic generator

REFERENCEBOOKS:
1. Non-ConventionalEnergySources.G.D.Ray,KhannaPublications.
2. Non-Conventional EnergyResources, B. H. Khan, TheMcGraw Hill Publication
3. Khan, B.H., “Non-Conventional Energy Resources”, TMH, 2nd Edition, New Delhi, 2009.
4. Tiwari, G.N., and Ghosal, M.K, Renewable Energy Resources – Basic Principles and applications, Narosa Publishing House,2007.

Practical: Wind, Hydro and Ocean Energies: 2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Estimation of wind speed using anemometer.

2. Determination of characteristics of a wind generator
3. Study the effect of number and size of blades of a wind turbine on electric power output.
4. Performance evaluation of vertical and horizontal axes wind turbine rotors.
5. Study the effect of density of water on the output power of hydroelectric generator.
6. Study the effect of wave amplitude and frequency on the wave energy generated.

LEARNING OUTCOMES; Working knowledge of the subject

Students are advised to visit and submit a detailed report on

1. Hydrogen storage unit
2. Thermal power stations.

Project : 2 credits
OR
Internship : 2 credits

B.Sc. RENEWABLE ENERGY -SYLLABUS

(UNDER CBCS PATTERN)

SIXTH SEMESTER

Paper VII: Energy Storage Devices

No. of Hours per week: 04 Total Lectures: 60

UNIT-I (12 hr)

1. Energy Storage: Need of energy storage; Different modes of energy storage, Flywheel storage, Electrical and magnetic energy storage: Capacitors, electromagnets; Chemical Energy storage: Thermo-chemical, photo-chemical, bio-chemical, electro-chemical, fossil fuels and synthetic fuels. Hydrogen for energy storage.

UNIT-II (12 hrs)

2. Electrochemical Energy Storage Systems: Batteries: Primary, Secondary, Lithium, Solid-state and molten solvent batteries; Lead acid batteries; Nickel Cadmium Batteries; Advanced Batteries. Role of carbon nano-tubes in electrodes.

UNIT-III (12 hrs)

3. Magnetic and Electric Energy Storage Systems: Superconducting Magnet Energy Storage(SMES) systems; Capacitor and battery: Comparison and application; Super capacitor: Electrochemical Double Layer Capacitor(EDLC), principle of working, structure, performance and application.

UNIT-IV (12 hrs)

4. Fuel Cell: Fuel cell definition, difference between batteries and fuel cells, fuel cell components, principle and working of fuel cell, performance characteristics, efficiency, fuel cell stack, fuel cell power plant: fuel processor, fuel cell power section, power conditioner, Advantages and disadvantages.

UNIT-V (12 hrs)

5. Types of Fuel Cells: Alkaline fuel cell, polymer electrolyte fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell; solid oxide fuel cell, proton exchange membrane fuel cell, problems with fuel cells, applications of fuel cells.

REFERENCE BOOKS

1. J. Jensen and B. Squrensen, Fundamentals of Energy Storage, John Wiley, NY, 1984.
2. M. Barak, Electrochemical Power Sources: Primary and Secondary Batteries by, P. Peregrinus,IEE,1980.
3. P.D.Dunn, Renewable Energies, Peter Peregrinus Ltd, London, 1986.
4. B.Viswanathan and M. A. Scibioh, Fuel Cells-Principles and Applications, University Press, 2006.
5. Hart, A.B and G.J.Womack, Fuel Cells: Theory and Application, Prentice Hall, NewYork, 1989.
6. Hydrogen and Fuel Cells: A comprehensive guide, Rebecca Busby, Pennwell corporation (2005)

7. Hydrogen and Fuel Cells: Emerging Technologies and Applications, B.Sorensen, Academic Press (2012).

Practical: Energy Storage Devices: 2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Study of charge and discharge characteristics of storage battery.
2. Study of charging and discharging behavior of a capacitor.
3. Determination of efficiency of DC-AC inverter and DC-DC converters
4. Study of charging characteristics of a Ni-Cd battery using solar photovoltaic panel.
5. Performance estimation of a fuel cell.
6. Study of effect of temperature on the performance of fuel cell

LEARNING OUTCOMES; Working knowledge of the subject

B.Sc. RENEWABLE ENERGY -SYLLABUS

(UNDER CBCS PATTERN)

SIXTH SEMESTER

PAPER VIII- I. SOLAR THERMAL CONVERSION

No. of Hours per week: 04 Total Lectures: 60

UNIT-I (12 hrs)

1. Basics of Solar Radiation: Structure of Sun, Spectral distribution of extra terrestrial radiation, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement – Thermoelectric pyranometer and pyrheliometer.

UNIT-II (12 Hrs)

2. Radiative Properties and Characteristics of Materials: Reflection, absorption and transmission of solar radiation through single and multi covers; Kirchoff's law – Relation between absorptance, emittance and reflectance; Selective Surfaces - preparation and characterization, Types and applications; Anti-reflective coating.

UNIT-III (12 hrs)

3. Flat Plate Collectors (FPC) : Description of flat plate collector, Liquid heating type FPC, Energy balance equation, Efficiency, Temperature distribution in FPC, Definitions of fin efficiency and collector efficiency, Evacuated tubular collectors.

UNIT-IV (12 Hrs)

4. Concentrating Collectors: Classification, design and performance parameters; Definitions of aperture, rim-angle, concentration ratio and acceptance angle; Tracking systems; Parabolic trough concentrators; Concentrators with point focus.

UNIT-V (12 Hrs)

Solar hot water system (SHWS), Types of SHWS, Standard method of testing the efficiency of SHWS; Passive space heating and cooling concepts, Solar desalinator and drier, Solar thermal power generation.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modeling and applications, G.N. Tiwari, Narosa Pub., 2005.
3. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.

Minimum of 6 experiments to be done and recorded

1. Measurement of direct solar radiation using pyrheliometer.
2. Measurement of global and diffuse solar radiation using pyranometer.
3. Measurement of emissivity, reflectivity and transitivity.
4. Measurement of efficiency of solar flat plate collector.
5. Performance testing of solar air dryer unit.
6. Performance testing of solar cooker unit

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
SIXTH SEMESTER
PAPER VIII- 2. SOLAR PHOTOVOLTAIC CONVERSION

No. of Hours per week: 04 Total Lectures:60

Unit-I (12 hrs)
1. Fundamentals on Junctions: p-n junction, Type of junctions, homo, hetero and schottky junctions, depletion layer, junction in equilibrium, application of bias, energy band diagram, abrupt and graded junctions, electric field and potential distribution at the interface, calculation of built-in voltage, Expression depletion layer capacitance.

UNIT-II (12 Hrs)
2. Solar cell: Photovoltaic Effect, Equivalent circuit of solar cell, homojunction, hetero-junction solar cells, advantages and drawbacks, choice of materials, Solar cell output parameters, Fill factor, conversion efficiency, Series and shunt resistances and its effect on cell efficiency; Variation of efficiency with energy band gap and temperature, effect of input intensity on the cell parameters

UNIT-III (12 Hrs)
3. Crystalline silicon solar cell: Production of single crystal Silicon: Czokralski (CZ) and Float Zone (FZ) methods, advantages and drawbacks, Silicon wafer fabrication, Wafer to cell formation, Contacts – Ohmic and blocking contacts, current-voltage characteristics, Factors limiting the efficiency.

UNIT-IV (12 Hrs)
4. Thin film solar cells: Thin Films, Advantages and draw backs, Preparation of thin films – Chemical bath deposition, Thermal evaporation, sputtering, close spaced sublimation, advantages and drawbacks of each technique, Substrate and superstrate configuration, CdTe/CdS solar cell structure and cell formation, Multi-junction solar cell;

UNIT-V (12 hrs)
5. Solar PV systems: Solar cell module assembly – Steps involved in the fabrication of solar module, Module performance, I-V characteristics, Modules in series and parallel, Module protection – use of Bypass and Blocking diodes, Solar PV system and its components, PV array, inverter, battery and load.
.

Reference Books:

1.Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
2. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

Practical: Solar Thermal and Photovoltaic Aspects 2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Effect of tilt angle on the efficiency of solar photovoltaic panel.
2. Study on solar photovoltaic panel in series combination.
3 Study on solar photovoltaic panel in parallel combination.
4. Performance of solar module under various conditions (dusting)

LEARNING OUTCOMES; Working knowledge of the subject

B.Sc. RENEWABLE ENERGY -SYLLABUS
(UNDER CBCS PATTERN)
SIXTH SEMESTER
PAPER VIII A-3. WIND ENERGY

UNIT-I (12 Hrs)
1. Introduction: Nature of the wind, Power of the Wind, Forces of the Blades, Wind generation, meteorology of wind, world distribution of wind, wind speed variation with height, wind speed statistics, Wind energy conversion principles; General introduction;

UNIT-II (12 Hrs)
2. Wind Measurements: Eolian features, biological indicators, rotational anemometers, other anemometers, wind measurements with balloons.

UNIT-III (12 Hrs)
3. Wind Energy Conversion System: Types and classification of WECS; Power, torque and speed characteristics, Aerodynamic design principles; Aerodynamic theories; Axial momentum, blade element and combine theory; Rotor characteristics; Maximum power coefficient; Prandlt's tip loss correction.

4.UNIT-IV (12 Hrs)
Design of Wind Turbine: Wind turbine design considerations; Horizontal axis machines, vertical axis machines, Advantages and drawbacks, Methodology; Theoretical simulation of wind turbine characteristics; Test methods.

UNIT-V 12 (Hrs)
5. Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Standalone, grid connected and hybrid applications of wind energy conversion systems, Economics of wind energy utilization; Wind energy in India; Environmental Impacts of Wind farms.

Reference Books:
1. Dan Charis, Mick Sagrillo, LanWoofenden, "Power from the Wind", New Society Pub., 2009.
2. Erich Hau, "Wind Turbines-Fundaments, Technologies, Applications, Economics", 2ndEdition, Springer Verlag, BerlinHeidelberg, NY, 2006.
3. Joshue Earnest, Tore Wizelius, Wind Power and Project Developmen", PHI Pub., 2011.
4. T. Burton, D. Sharpe, N. Jenkins, E. Bossanyi, Wind Energy Handbook, John Wiley Pub., 2001.
5. Paul Gipe, "Wind Energy Basics", Chelsea Green Publications, 1999.
6. Khan, B.H., "Non-Conventional Energy Resources", TMH, 2nd Edition, New Delhi, 2009.
7. Tiwari, G.N., and Ghosal, M.K, Renewable Energy Resources – Basic Principles and applications, Narosa Publishing House,2007.
8. G.D.Rai, Non-conventional Energy Sources, Khanna Publishers, New Delhi (2008)

Practical: Wind EnergiesConversion - 2hrs/Week

Minimum of 6 experiments to be done and recorded
1. Estimation of wind speed using anemometer.
2. Determination of characteristics of a wind generator
3. Study the effect of number and size of blades of a wind turbine on electric power output.
4. Performance evaluation of vertical and horizontal axes wind turbine rotors.

LEARNING OUTCOMES; Working knowledge of the subject

DATA SCIENCE

Semester	Part	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Maths for Data Science	4	3	25	75	100
		Tutorial	2	2	0	50	50
SEMESTER II	II	Introduction to Data Science With R	4	3	25	75	100
		R Lab	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Data Mining and Data Analysis	4	3	25	75	100
		Data Mining and Data Analysis using 'R'Lab	2	2	0	50	50
SEMESTER IV	IV	Multivariate Technique for Data Analysis	4	3	25	75	100
		Multivariate Technique for Data Analysis Using 'R' Lab	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	Big Data Technology	3	3	25	75	100
		Big Data Technology through Hadoop Lab -I	2	2	0	50	50
	VI	Big Data Acquisition	3	3	25	75	100
		Big Data Technology through Hadoop Lab - II	2	2	0	50	50
SEMESTER VI	**VII (A/B)**	**Elective-I**	3	3	25	75	100
		A. Java Programming for Data Analytics					
		B .Python Programming for Data Analytics					
		Lab for Elective –I	2	2	0	50	50
	VIII ClusterA-1,2,3 Or Cluster B-1,2,3	**Elective-II(cluster A)**					
		1. Spark Programming +. Spark Programming Lab	3	3	25	75	100
		2.Marketing Analytics + Mongo DB Lab					
		3.Social Network Analytics + Social Network Analytics through 'R' Lab					
		Lab	2	2	20	30	50
		Elective-II(cluster B)					
		1.Data & Information Security + Information Security through Python Lab	3	3	25	75	100
		2. Spark Programming + Spark Programming Lab					
		3.Big Data Security + Mango DB Lab					
		Lab & Project	2	2	20	30	50

I YEAR I SEMESTER

MATHS FOR DATA SCIENCE

Objective

The course is a brief overview of the basic tools from Linear Algebra and Multivariable Calculus that will be needed in subsequent course of the program.

Outcome

By completing the course the students will have been reminded of the basic tools of Linear Algebra and Multivariable Calculus needed in subsequent courses in the program notably:

- Fundamental properties of matrices, their norms, and their applications.
- Differentiating/Integrating multiple variable functions and the role of the gradient and the hessian matrix.
- Basic properties of optimization problems involving matrices and functions of multiple variables.

Unit-I

Matrices and Basic Operations, Special structures Matrices and Basic Operations, Interpretation of matrices as linear mappings and some examples.

Square Matrices, Determinants Properties of determinants, singular and non-singular matrices, examples, finding an inverse matrix.

Unit-II

Eigen values and Eigenvectors Characteristic Polynomial, Definition of Left/Right Eigen values and Eigenvectors, Caley – Hamilton theorem, singular value Decomposition, Interpretation of Eigen values/vectors.

Unit-III

Linear Systems Definition, applications, solving linear systems, linear inequalities, linear programming.

Unit-IV

Real-valued functions of two or more variables. Definition, examples, simple demos, applications.

Unit-V

Analysis elements Distance, Limits, Continuity, Differentiability, the gradient and the Gaussian.

Optimization problems Simple examples, motivation, the role of the Hessian maxima and minima and related extreme conditions.

Integration Double integrals, Fubini's theorem, properties, applications.

References

1. Gilbert Strang, *Linear Algebra and its Applications*. Thomson /Brooks Cole (Available in a Greek Translation).
2. Thomas M. Apostol, Calculus, Wiley, 2nd Edition, 1991 ISBN 960-07-0067-2.
3. Michael Spivak. *Calculus,* publish or Perish, 2008, ISBN 978-0914098911.
4. Ross L. Finney, Maurice D.Weir . and Frank R. Giordano. Thomas's Calculus, Pearson 12th Edition 2009.
5. David C. Lay, Linear Algebra and Its Applications, 4th Editoin.
6. Yourself saad, Iterative Methods for spare Linear Systems.

Student Activity:

1. Find the Eigenvectors of A = { 1 1 1 1,2 3 4 5,3 4 5 6}
2. Find orthogonal S =Spam{(1 1 1 1),(1 4 4 0),(-1 4 4 0),(-4 2 2 0)}

I YEAR I SEMESTER

MATHS FOR DATA SCIENCE

Tutorial

1. Study various applications of Matrices.
2. Study different polynomial functions and their uses.
3. Take one real world example and apply the Linear System solution.
4. Study some real valued functions and its applications.
5. Study and solve one optimization problem.

I YEAR II SEMESTER

INTRODUCTION TO DATA SCIENCE WITH R

Objective

Data Science is a fast-growing interdisciplinary field, focusing on the analysis of data to extract knowledge and insight. This course will introduce students to the collection. Preparation, analysis, modelling and visualization of data, covering both conceptual and practical issues. Examples and case studies from diverse fields will be presented, and hands-on use of statistical and data manipulation software will be included.

Outcomes

i. Recognize the various discipline that contribute to a successful data science effort.
ii. Understand the processes of data science identifying the problem to be solved, data collection, preparation, modelling, evaluation and visualization.
iii. Be aware of the challenges that arise in data sciences.
iv. Develop an appreciation of the many techniques for data modelling and mining.
v. Be cognizant of ethical issues in many data science tasks.
vi. Be comfortable using commercial and open source tools such as the R language and its associated libraries for data analytics and visualization.

Unit-I

Introduction to the field of data science, different types of data(Data Base data, data Warehouse data, Transaction Data, Stock Exchange Data, Time Series and Bio logical data) ; data collection.

Unit-II

Experimental design; data attributes; data cleaning; data characterization and analysis.

Unit-III

Data modelling and mining techniques; model evaluation; visualization; application of data science introducing to R – R Data structures – Help functions in R

Unit-IV

Vectors-Scalars-Declarations- recycling-Common Vector operations – Using all and any Vectrorized operations-NA and NULL values – Filtering – Vectorized if- then else-Vector Equality – Vector Element names.

Creating matrices –Matrix operations-Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns.

Unit-V

Vector /Matrix Distinction –Avoiding Dimension Reduction –Higher Dimensional arrays – lists-Creating lists – General list operations – Accessing list components and values – applying

functions to lists –recursive lists. Creating Data Frames – Matrix –like operations in frames – Merging Data Frames – Applying function to Data frames.

References

1.Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
2.Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
3.Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
4.W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
5.Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
6.Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
7.Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

Student Activity

Databases need to undergo pre-processing to be useful for data mining. Dirty data can cause confusion for the data mining procedure, resulting in unreliable output. Data cleaning includes smoothing noisy data, filling in missing values, identifying and removing outliers, and resolving inconsistencies.

I YEAR II SEMESTER
R LAB

1) Installing R and R studio
2) Basic operations in r
3) Getting data into R, Basic data manipulation
4) Basic plotting
5) Loops and functions

II YEAR III SEMESTER
DATA MINING AND DATA ANALYSIS

Objective

- To learn data analysis techniques.
- To understand Data mining techniques and algorithms.
- Comprehend the data mining environments and application.

Outcome

Students who complete this course will be able to

- Compare various conceptions of data mining as evidenced in both research and application.
- Characterize the various kinds of patterns that can be discovered by association rule mining.
- Evaluate mathematical methods underlying the effective application of data mining.

Unit-I

Data mining-KDD versus data mining, Stages of the Data Mining Process-Task primitives., Data Mining Techniques – Data mining knowledge representation.

Unit-II

Data mining query languages- Integration of Data Mining System with a Data Warehouse-Issues, Data pre-processing – Data Cleaning.

Data transformation – Feature selection – Dimensionality reduction – Discretization and generating concept hierarchies – Mining frequent patterns association – correlation.

Unit-III

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

Model Over fitting: Due to presence of noise, due to lack of representation samples, evaluating the performance of classifier: holdout method, random sub sampling, cross-validation, bootstrap

Unit-IV

Bayesian Classification – Rule Based Classification – Classification by back propagation – Support Vector Machines –Associative Classification – Lazy Learners – Other Classification Methods-

Unit-V

Clustering techniques – Partitioning methods-k-means-Hierarchical Methods – Distance based agglomerative and divisible clustering – Density – Based Methods – Expectation maximization –

Grid Based Methods – Model – Based Clustering – Methods – Constraint – Based Cluster Analysis – Outlier Analysis.

References

1. Adelchi Azzalini, Bruno Scapa, "Data Analysis and Data mining" , 2nd Ediiton, Oxford Univeristy Press Inc., 2012.
2. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", 3rd Edition, Morgan Kaufmann Publishers, 2011.
3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", 10th Edition, TataMc Graw Hill Edition , 2007.
4. G.K. Gupta, "Introduction to Data Mining with Case Studies", 1st Edition, Easter Economy Edition, PHI, 2006.

Student Activity

Case Study I: Analysis and Forecasting of House Price Indices

Case Study II: Customer Response Prediction and Profit Optimization

II YEAR III SEMESTER
DATA MINIG AND DATA ANALYSIS LAB

Objectives

- To Analyze the data using statistical methods
- To understand and demonstrate data mining

List of Experiments

1. Data Analysis – Getting to know the Data (Using ORANGE WEKA)
    - Parametric – Means . T-Test, Correlation
    - Prediction for numerical outcomes – Linear regression
    - Correlation analysis
    - Preparing data for analysis
        - Pre-Processing techniques

2. Data Mining (Using ORANGE WEKA or any source data mining tool)
    - Implement clustering algorithm
    - Implement classification using
        - Decision tree
        - Back Propagation
    - Visualization methods

Outcome

- Use Statistical techniques to carry out the analysis of data
- Gain hands-on skills and experience on data mining tools.

II YEAR IV SEMESTER
MULTIVARIATE TECHNIQUE FOR DATA ANALYSIS

Objective

The Objective of this course is to introduce the students into the field of Multivariate Techniques for analyzing large volumes of data and to take decisions based on inference drawn.

Outcomes

- Data characteristics and form of Distribution of the Data Structures.
- Understanding the usage of multivariate techniques for the problem under the consideration.
- For drawing valid inferences and to plan for future investigation.

Unit-I : Introduction to Multivariate Analysis

Meaning of Multivariate Analysis, Measurements Scales – Metric measurement scales and Non-Metric measurement scales, classification of multivariate techniques (Dependence Techniques and Inter-dependence Techniques), Applications of Multivariate Techniques in different disciplines.

Unit-II : Factor Analysis

Factor Analysis: Meaning, objectives and Assumptions, Designing a factor analysis, Deriving factors and assessing overall factors, Interpreting the factors and validation of factor analysis.

Unit-III: Cluster Analysis

Cluster Analysis: Objectives and Assumptions, Research design in cluster analysis, Deriving clusters and assessing overall fit (Hierarchical Methods, Non Hierarchical Methods and Combinations), Interpretation of clusters and validation of profiling of the clusters.

Unit-IV: Discriminate Analysis

Discriminate Analysis – Concept, objective and applications, Procedure for conducting discriminate analysis, Stepwise discriminate analysis and Mahalanobis procedure. Logit model.

Unit-V: Linear Programming

Linear Programming problem – Formulation, graphical method, simplex method. Integer Programming. Transportation and Assignment problem.

References

1. Joseph F Hair, William C Black etal, "Multivariate Data Analysis", Pearson Education, 7th edition, 2013.
2. T.W Anderson, " An introduction to Multivariate Statistical Analysis, 3rd Edition", Wiley 2003.
3. William r Dillon, John Wiley & Sons, "Multivariate Analysis Methods and Applications", Wiley, 1984.
4. Naresh K Malhotra, Satyabhusan Dash, "Marketing Research Anapplied Orientation", Pearson, 2011.
5. Hamdy A Taha, "Operations Research", Pearson, 2012.
6. S R Yaday, A K Malik, "Operations Research", Oxford, 2014.

II YEAR IV SEMESTER

MULTIVARIATE TECHNIQUE FOR DATA ANALYSIS Using 'R' LAB

1. Navigating the basic operating environment of 'R'
2. Importing network data.
3. Creating and manipulating network objects.
4. Plotting Network Graphs.
5. Network Descriptive Statistics.
6. Hypothesis Testing.

III YEAR V SEMESTER

BIG DATA TECHNOLOGY

Objective

This course provides practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including map Reduce and Hadoop and its ecosystem.

Outcome

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

Unit-I

Introduction –distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications.

Unit-II

Big Data – Apache Hadoop & Hadoop Ecosystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map reduce- Data Serialization.

Unit-III

Introduction –distributed file system-algorithms using map reduce, Matrix – Vector Multiplication by Map Reduce – Hadoop – Understanding the Map Reduce architecture – Writing Hadoop Map Reduce Programs – Loading data into HDFS – Executing the MAP phase – Shuffling and sorting – Reducing phase execution.

Unit-IV

Hadoop Architecture, Hadoop Storage : HDFS, Common Hadoop Shell Commands, Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers –Cluster Setup – SSH & Hadoop Configuration –HDFS Administering – Monitoring & Maintenance.

Unit-V

Hadoop ecosystem components – Schedulers- Fair and Capacity, Hadoop 2.0 New Features – NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

References

1. Boris lublinsky, Kevin t. Smith Alexey Yakubovich, “Professional Hadoop Solutions”. Wiley, ISBN : 9788126551071, 2015.
2. Chris Eaton, Dirk Deroos et al., “Understanding Big Data”, McGraw Hill , 201.

3. Tom White, “HADOOP” : The definitive Guide”, O Reilly 2012.

Student Activity:

Case Study I: Centers for Medicare & Medicaid Services: The Integrity of Healthcare Data and Secure Payment Processing.

Case Study II: Hadoop and the Data Warehouse: Competitive or Complementary

III YEAR V SEMESTER

BIG DATA TECHNOLOGY Through Hadoop LAB -I

1. Implement the following Data Structures in Java
   a) Linked Lists
   b) Stacks
   c) Queues
   d) Set
   e) Map

2.
   (i) Perform setting up and Installing Hadoop in its three operating modes:
   Standalone
   Pseudo distributed
   Fully distributed
   (ii) Use web based tools to monitor your Hadoop setup.

3. Implement the following file management tasks in Hadoop:
   Adding files and directories
   Retrieving files
   Deleting files

III YEAR V SEMESTER

BIG DATA ACQUISITION

Objective

- To Understand the complexity and volume of Big Data and their challenges
- To analyse the various methods of data collection.
- To comprehend the necessity for pre-processing Big Data and their issues

Outcome

- Identify the various sources of Big Data
- Design new algorithms for collecting Big Data from various sources
- Design algorithms for pre-processing Big Data other than the traditional approaches
- Design methodologies to extract data from structured and un-structured data for analytics

Unit- I

INTRODUCTION TO BIG DATA ACQUISITION: Big data framework – fundamental concepts of Big Data Management and analytics – Current challenges and trends in Big Data Acquisition.

Unit-II

DATA COLLECTION AND TRANSMISSION: Bid data collection – Strategies – Types of Data Sources – Structured Vs Unstructured data – ELT vs ETL – storage infrastructure requirements – Collection methods – Log files – sensors – Methods for acquiring network data (Libcap-based and zero-copy packet capture technology) – Specialized network monitoring softwares (Wireshark, Smartsniff and Winnetcap) – Mobile equipments – Transmission methods – Issues.

Unit- III

DATA PRE-PROCESSING: Data pre-processing overview-Sampling- Missing Values – Outlier Detection and Treatment – Standardizing Data – Categorization – Weights of Evidence Coding – Variable Selection and Segmentation

Unit-IV

DATA ANALYTICS : Predictive Analytics (Regression, Decision Tree, Neural Networks) – Descriptive Analytics (Association Rules, Sequence Rules), Survival Analysis (Survival Analysis Measurements, Kaplan Meir Analysis, Parametric Survival Analysis) – Social Network Analytics (Social Network Learning – Relational Neighbour Classification).

Unit-V

BIG DATA PRIVACY AND APPLICATIONS: Data Masking – Privately identified Information (PII) – Privacy preservation in Big Data – Popular Big Data Techniques and tools –

Map Reduce paradigm and the Hadoop system – Applications – Social Media Analytics – Recommender Systems – Fraud Detection.

References

1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications', John Wiley & Sons, 2014.
2. Min Chen. Shiwen Mao, Yin Zhang. Victor CM Leung, Big Data: Related Technologies, Challenges and Future Prospects, Springer, 2014.
3. Michael Minelli, Michele Chambers Ambiga Dhiraj, "Big Data, Big Analytics : Emerging Business Intelligence and Analytic Trends", John Wiley & Sons, 2013.
4. Raj. Pethuru " Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

Student Activity:

Case study I: "BankAmeriDeals" provides cash-back offers to credit and debit-card customers based upon analyses of their prior purchases.

Case Study II: ***GOOGLE:*** Working with the U.S. Centers for Disease Control, tracks when users are inputting search terms related to flu topics, to help predict which regions may experience outbreaks.

III YEAR V SEMESTER

BIG DATA TECHNOLOGY Through Hadoop LAB –II

1. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm

2. Write a Map Reduce program that mines weather data.
   Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

3. Implement Matrix Multiplication program with Hadoop Map Reduce.

4. Install and Run Pig then write Latin scripts to sort, group, join, project, and filter your data.

5. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

II YEAR VI SEMESTER

Elective-I(A)

JAVA PROGRAMMING FOR DATA ANALYTICS

Objective

The rate in which data is exponentially growing has led to the evolvement of many technologies to better utilize this data for timely and accurate decision making. Such data with huge variety. Volume and velocity is coined as big data. The big data platform such as Hadoop is programmed in Java. This course aims at discussing the technical concepts which are the basic building blocks for most of the big data platforms.

Outcome

1. Understanding basic network and distributed programming.
2. Constructing a real world application with data storage and retrieval
3. Leveraging the benefits of reusable components
4. Analyzing basic file modes and operations
5. Applying Map Reduce paradigm to solve problems

Unit-I

NETWORK PROGRAMMING & DISTRIBUTED OBJECTS: Connecting to a Server – Implementing Servers and Clients – Advanced Socket Programming – Intel Address – URL Connections – RMI Programming.

Unit-II

CONNECTING TO DATABASE: The design of JDBC – Basic Concepts – Executing Queries – Prepared Statements – Result Sets – Metadata – Transactions.

Unit-III

JAVABEANS: The bean – Writing Process – Using Beans to Build Application – Bean Property Types- Property Editors – Customizers.

Unit-IV

STREAMS AND FILES: Streams – Text Input and Output – Reading and Writing Binary Data – Zip Archives – Object Streams and Serialization – Memory Mapped Files.

Unit-V

PROGRAMMING MAP REDUCE: Map Reduce program in Java – Map Reduce API – Programming Examples – Combiner Functions- Distributed Map Reduce Job.

References

1. White. "Hadoop: The Definitive Guide". Third Edition – 2012 – O'Reilly – ISBN: 9789350237564.
2. Cay S.Horstmann. Gary Cornell. "Core Java™ 2: Volume II-Advanced Features". Prentice Hall. 9th edition. ISBN: 978-0137081608.
3. Jean Dollimore. Tim Kindberg. George Coulouris. "Distributed Systems Concepts and Design". 4th Edition. Jun 2005. Hardback. 944 pages. ISBN: 9780321263544.
4. Y. Daniel Liang. Introduction to Java Programming. Tenth Edition. Pearson, 2015.

Student Activity:

Case Study I: Create a school Data Base.
Case Study II: How to install a JAVABEANS
Case Study III: Analyze life-threatening risks

II YEAR VI SEMESTER
Elective-I(A) Lab

JAVA PROGRAMMING FOR DATA ANALYTICS Lab

1. Write a Java Mapper program for Word Count.
2. Write a Java reducer program for Word Count.
3. Implement Java program for
   Word Count: given a collection of text documents, find the number of occurrences of each word in the collection.
4. Wirte a Java Mapper program for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.
5. Implement Java program reducer for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.
6. Write a Java program for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.

III YEAR VI SEMESTER

Elective-I(B)
PYTHON PROGRAMMING FOR DATA ANALYTICS

Objective

Data. Which is available in abundance and in accessible forms, if analysed in an efficient manner unfolds many patterns and promising solutions. Data has to be pre-processed, converted to required format and fed to appropriately chosen algorithm to yield better results. This course aims at applying such techniques to raw data. Using Python, to arrive at meaningful result.

Outcome

1. Understanding the basic concepts of Python
2. Preparing and pre-processing data
3. Understanding the data aggregation and grouping concepts
4. Leveraging web scraping
5. Visualizing the results of analytics effectively

Unit-I

PYTHON CONCEPTS, DATA STRUCTURES CLASSES: Interpreter – Program Execution – Statements- Expressions – Flow Controls – Functions – Numeric Types – Sequences – Strings, Tuples, Lists and – Class Definition – Constructors – Inheritance – Overloading – Text & Binary Files – Reading and Writing.

Unit-II

DATA WRANGLING: Combining and Merging Data Sets – Reshaping and Pivoting – Data Transformation – String Manipulation, Regular Expressions.

Unit-III

DATA AGGREGATION, GROUP OPERATIONS , TIMESERIES : GroupBy Mechanics – Data Aggregation – GroupWise Operations and Transformations – Pivot Tables and Cross Tabulations - Date and Time Date Type tools – Time Series Basics – Data Ranges , Frequencies and Shifting.

Unit-IV

WEB SCRAPING: Data Acquisition by Scraping Web applications – Submitting a form – Fetching Web pages – Downloading Web pages through form submissions – CSS Selectors.

Unit-V

VISUALIZAITON IN PYTHON: Matplotlib package – Plotting Graphs – Controlling Graph – Adding Text – More Graph Types – Getting and Setting values – Patches.

References

1. Mark Lutz. "Programming Python". O'Reilly Media, 4th edition, 2010.
2. Mark Lutz. "Learning Python". O'Reilly Media, 5th edition, 2013
3. Tim Hall and J-P Stacey. "Python 3 for Absolute Beginners". Apress. 1st edition, 2009
4. Magnus Lie Hetland. "Beginning Python: From Novice to Progessional". Aprèss. Second Edition, 2005.
5. Shai Vaingast. "Beginning Python Visualizing Crafting Visual Transformation Scripts". Aprèss. 2nd edition. 2014.
6. Wes Mc Kinney, "Python for Data Analysis". O'Reilly Media, 2012.
7. White. "Hadoop: The Definitive Guide". Third Edition – O'Reilly, 2012.
8. Brandon Rhodes and John Goerzen. "Foundations of Python Network Programming: The Comprehensive Guide to Building Network Application with Python". Apress, Second Edition, 2010

III YEAR VI SEMESTER

Elective-I(B)

PYTHON PROGRAMMING FOR DATA ANALYTICS Lab

1. Write a Python Mapper program for Word Count.
2. Write a Python reducer program for Word Count.
3. Implement Python program for
   Word Count: given a collection of text documents, find the number of occurrences of each word in the collection.
4. Write a Python Mapper program for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.
5. Implement Python program reducer for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.
6. Write a Java program for
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year.

III YEAR VI SEMESTER

Elective –II (Cluster A)

1.SPARK PROGRAMMING

Objective

1. Student can understand the depth of fundamental concepts, design principles, and system architectures of Apache Spark.
2. Students can understand and learn processing and analysing big data sets.

Outcome

- Learn to use the Apache Spark framework for the purpose of Such Big Data Management and analysis..
- Focus on Fundamental Concepts.
- Focus on Architecture and, interfaces and various components.

Unit-I

Introduction to big data, properties of data different processing frame works. Introduction to Hadoop and Spark.

Unit-II

Programming with Scale, data types, conditional and control statements, functional & non functional programming.

Unit-III

Introduction to Spark, RPD supporting operators. Architecture of Spark, Working with data sets.

Unit-IV

Spark Libraries, Creating machine learning and predictive models using MLib.

Unit-V

Processing Streaming data and graph structured data using spark streaming and Graph.

REFERENCES

1. **Learning Spark: Lightning-Fast Big Data Analysis by** Holden Karau, Andy Konwinski, Patrick Wendell, O'Reilly Publishers

2. **Advanced Analytics with Spark: Patterns for Learning from Data at Scale** By Sandy Ryza, Uri Laserson, Sean Owen, Josh Wills
3. **Spark in Action by** Petar Zecevic, Marko Bonaci Manning Publications Company, 2016

III YEAR VI SEMESTER

Elective –II (Cluster A)

1.SPARK PROGRAMMING LAB
(Using either Python, Scala (or) Java)

1.
   (a) Scala Installation in Windows platform
   (b) Write a program to implement Arithematic operators.
   (c) Write a profram to find biggest of two numbers

2. Write a program to implement
   Word Count: given a collection of text documents, find the number of occurrences of each word in the collection.
3. Write a program to implement
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year

4. Write a program to implement Pie estimation

III YEAR VI SEMESTER
Elective –II (Cluster A)

2.MARKETING ANALYTICS

Objective

The objective of this course is to provide through knowledge required to address fundamental marketing decision problems. It will also train to view marketing process and relationships systematically and analytically. The techniques discussed in this course are useful in market segmentation, targeting, and mapping market structure and product design.

Outcome

1. Learn how to tap a simple and cost-effective tool. Microsoft Excel, to solve specific business problems using powerful analytic techniques.
2. Helps to forecast sales and improve response rates for marketing campaigns.
3. Explore how to optimize price points for produces and service, optimize store layouts, and improve online advertising.

Unit-I

MARKETING DATA SUMMARIZATION : Slicing and Dicing Marketing Data with Pivot Tables – Using Excel Charts to Summarize Marketing Data- Using Excel Functions to Summarize Marketing Data.

Unit-II

FORECASTING TECHNIQUES: Simple Linear Regression and Correlation – Using Multiple Regression to Forecast Sales- Forecasting in the Presence of special Events- Modelling Trend and Seasonality- Ratio to Moving Average Forecasting Method – Winter's Method – Using Neural Networks to Forecast Sales.

Unit-III

CUSTOMER NEEDS : Conjoint Analysis - Logistic Regression – Discrete Choice Analysis – Customer Value- Introduction to Customer Value , Benefits.

Unit-IV

MARKET SEGEMENTATION : Cluster Analysis – User Based Collaborative Filtering – Collaborative Filtering – Using Classification Trees for Segmentation.

Unit-V

RETAILING AND MARKET RESERCH TOOLS: Retailing – Introduction to retailing, Market Basket Analysis and Lift – Marketing Research Tools – Principal Components Analysis.

References

1. Wayne.L.Winston, " Marketing Analysis: Data driven Techniques with MS-Excel", Wiley, 1st ed. 2014.
2. Stephan Sorger. "Marketing Analytics: Strategic models and Metrics ", Create Space Independent Publishing Platform 1st ed., 2013.

Student Activity:

Case Study I: How one company's thought leader ship content in driving new business exposure?

Case Study II: How IBM offset the impact of a down economy on event attendance.

III YEAR VI SEMESTER

Elective –II (Cluster A)
2.Mongo DB Lab

1. Learn the basics of Mongo DB.
2. Installation steps for Mongo DB.
3. Use the following commands
   (a) DATABASE_NAME.
   (b) Drop Database( )
   (c) create Collection
   (d) insert( )
   (e) drop( )
   (f) find( )
4. Differentiate between SQL and Mongo DB.
5. Write a program to update a collection in Mongo DB
6. Write a program to remove specific document from Mongo DB.
7. Write a program to implement aggregate function in Mongo DB
8. Apply the Map reduce operation to find total salary of each department assuming employee collection is already exists.

III YEAR VI SEMESTER

Elective –II (Cluster A)

3. SOCIAL NETWORK ANALYTICS

Objective

This course will be used for social network analysts, both its theory and computational tools, to make sense of the social and information networks that have been fuelled and rendered accessible by the internet.

Outcome

1. Analyze the structure and evolution of networks.
2. Able to knowledge from disciplines as diverse as sociology, mathematics, computer science.
3. Understand the Online interactive demonstrations and hands-on analysis of real-world data sets.

Unit-I

INTRODUCTION : Overview; Social network data-Formal methods – Paths and Connectivity – Graphs to represent social relations – Working with network data – Network Datasets – Strong and Weak ties – Closure, Structural Holes, and Social Capital.

Unit-II

SOCIAL INFLUENCE: Homophile; Mechanisms Underlying Homophile, Selection and Social Influence. Affiliation, Tracking Link Formation in Online Data, Spatial Model of Segregation – Positive and Negative Relationship – Structural Balance – Applications of Structural Balance. Weaker Form of Structural Balance.

Unit-III

INFORMATION NETWORKS AND THE WORLD WIDE WEB : The structure of the Web- World Wide Web – Information Networks, Hypertext and Associative Memory – Web as a Directed Graph. Bow-Tie Structure of the Web-Link Analysis and Web Search – Searching the web; Ranking Link Analysis using Hubs and Authorities – Page Link Analysis in Modern Web Search, Applications, Special Analysis Random Walks and Web Search.

Unit-IV

SOCIAL NETWORK MINING: Clustering of Social Network graphs; Betweens, Girvan Newman algorithm – Discovery of Communities – Cliques and Bipartite graph- Graph partitioning methods – Matrices-Eigen values – simrank..

Unit-V

NETWORK DYNAMICS: Cascading Behaviour in Networks: Diffusion in Networks, Modelling Diffusion- Cascades and Cluster, Thresholds, Extensions of the Basic Cascade Model – Six Degrees of Separation – Structure and Randomness, Decentralized Search – Empirical Analysis and Generalized Models – Analysis of Decentralized Search.

References

1. Easley and Kleinberg, "Networks, Crowds, and Markets: Reasoning about a highly connected World", Cambridge Univ. Press. 2010..
2. Robert A. Hamneman and Mark Riddle. " Introduction to social network methods", University of California, 2005.
3. Jure Leskovec. Stanford Univ. Anand Rajaraman, Milliway Labs, Jeffery D. Ullman "Mining of massive Datasets", Cambridge University Press. 2 edition , 2014.
4. Wasseman, S. & Faust, K. "Social Network Analysis:, Methods and Applications", Cambridge University Press., 1st edition, 1994.
5. Borgatti, S.P. Everest, M.G. & Johnson, J.C., " Analyzing Social networks", SAGE Publications Ltd., 1 edition, 2013.
6. John Scott, , Social Network Analysis: A Handbook " – SAGE Publications Ltd., 2nd edition, 2000.

Student Activity:

Case Study I: How Twitter Will Work.
Case Study II: Write a report on some of social networks in our day to day life

III YEAR VI SEMESTER

Elective –II (Cluster 1)

3.SOCIAL NETWORK ANALYTICS through 'R' Lab

1. Navigating the basic operating environment of 'R'
2. Importing network data.
3. Creating and manipulating network objects.
4. Plotting Network Graphs.
5. Network Descriptive Statistics.
6. Hypothesis Testing.

III YEAR VI SEMESTER

Elective –II (Cluster B)

1.DATA & INFORMATION SECURITY

Unit -I

Overview of Security: Protection versus security; aspects of security – data integrity, data availability, privacy; security problems, user authentication, Orange Book.

Unit -II

Security Threats: Program threats, worms, viruses, Trojan horse, trap door, stack and buffer overflow; system threats- intrudes; communication threats- tapping and piracy.

Unit -III

Cryptography: Substitution, transposition ciphers, symmetric-key algorithms – Data Encryption Standard, advanced encryption standards, public key encryption – RSA; Diffie- Hellman key exchange, ECC cryptography, Message Authentication – MAC, has functions.

Unit -IV

Digital Signatures: Symmetric key signatures, public key signatures, message digests, public key infrastructures.

Unit -V

Security Mechanism: Intrusion detection, auditing and logging, tripwire, system –call monitoring.

References

1. W. Stallings, Cryptography and Network Security Principles and Practices (4th ed.,), Prentice – Hall of India, 2006.
2. C. Pfleeger and SL Pfleeger, Security in Computing (3rd ed.,), Prentice- Hall of India, 2007.
3. D. Gollamann, Computer Security, John Wiley and Sons, Ny, 2002.
4. J. Piwprzyk, T. Hardjono and J. Seberry, Fundamentals of Computer Security, Springer-Verlag Berling, 2003.
5. J.M. Kizza, Computer Netwrok Security, Springer, 2007
6. M. Merkow and J. Breithaupt, Information Security: Principles and Practices, Pearson Education, 2006.

Student Activity

Case Study I: Transform Data from one format to another format using Cryptography.
Case Study II: How mails are hacked.

III YEAR VI SEMESTER

Elective –II (Cluster B)

1.DATA & INFORMATION SECURITY Through Python Lab

1. Implement Ceiser Cipher encryption in Python.
2. Implement Ceiser Cipher decryption in Python.
3. Implement Transposition technique encryption in Python.
4. Implement Substitution cipher encryption in Python.
5. Implement Substitution cipher decryption in Python.
6. Implement One time Pad cipher in Python.
7. Implement DES encryption in Python.
8. Implement RSA Public Key encryption in Python.

III YEAR VI SEMESTER

Elective –II (Cluster B)

2.SPARK PROGRAMMING

Objective

1. Student can understand the depth of fundamental concepts, design principles, and system architectures of Apache Spark.
2. Students can understand and learn processing and analysing big data sets.

Outcome

- Learn to use the Apache Spark framework for the purpose of Such Big Data Management and analysis..
- Focus on Fundamental Concepts.
- Focus on Architecture and, interfaces and various components.

Unit-I

Introduction to big data, properties of data different processing frame works. Introduction to Hadoop and Spark.

Unit-II

Programming with Scale, data types, conditional and control statements, functional & non functional programming.

Unit-III

Introduction to Spark, RPD supporting operators. Architecture of Spark, Working with data sets.

Unit-IV

Spark Libraries, Creating machine learning and predictive models using MLib.

Unit-V

Processing Streaming data and graph structured data using spark streaming and Graph.

REFERENCES

1. **Learning Spark: Lightning-Fast Big Data Analysis by** Holden Karau, Andy Konwinski, Patrick Wendell, O'Reilly Publishers
2. **Advanced Analytics with Spark: Patterns for Learning from Data at Scale** By Sandy Ryza, Uri Laserson, Sean Owen, Josh Wills
3. **Spark in Action by** Petar Zecevic, Marko Bonaci Manning Publications Company, 2016

III YEAR VI SEMESTER
Elective –II (Cluster B)

2.SPARK PROGRAMMING LAB
(Using either Python, Scala (or) Java)

1.
   (a) Scala Installation in Windows platform
   (b) Write a program to implement Arithmetic operators.
   (c) Write a program to find biggest of two numbers

2. Write a program to implement
   Word Count: given a collection of text documents, find the number of occurrences of each word in the collection.
3. Write a program to implement
   Max Temp: given a file containing temperature measurements, find the maximum temperature recording per year

4. Write a program to implement Pie estimation

III YEAR VI SEMESTER

Elective –II (Cluster B)

3.BIG DATA SECURITY

Objective

With the data generated from electronic devices growing exponentially, the need to analysed data on a large scale is important. Such data are of many types like financial, personal etc. Big data environment also created significant security challenges. When trying to make quick decisions. Data breach poses many complications. This course aims at introducing concepts related to big data security.

Outcome

1. Understanding significance of privacy, ethics in big data environment.
2. Analyzing the steps to secure big data.
3. Analyzing data security and event logging.

Unit-I

BIG DATA PRIVACY, ETHICS AND SECURITY: Privacy- Re identification of Anonymous people – Why Big Data Privacy is self regulating? – Ethics – Ownership – Ethical Guidelines - Big Data Security – Organizational Security.

Unit-II

SECUTIY, COMPLIANCE, AUDITING, AND PROTECTION: Steps to secure big data – Classifying Data – Protecting – Big Data Compliance – Intellectual Configuration..

Unit-III

HADOOP SECURITY DESIGN: Kerberos – Default Hadoop Model Without security-Hadoop Kerberos Security Implementation & Configuration.

Unit-IV

HADOOP ECOSYSTEM SECURITY: Configuring Kerberos for Hadoop ecosystem components – Pig. Hive. Oozie, Flume, HBase, Scoop.

Unit-V

HADOOP ECOSYSTEM SECURITY: Integrating Hadoop with Enterprise Security Systems- Securing Sensitive Data in Hadoop – SIEM System – Setting up audit logging in hadoop cluster.

References

1. Mark Van Rijmenam, “Think Bigger: Developing a successful Big Data Strategy for your Business”, Amazon, 1 edition , 2014.

2. Frank Ohihorst John Wiley & Sons, " Big Data Analytics: Turning Big Data into Big Money", John Wiley & Sons 2013.
3. Sherif Sakr, " Large Scale and Big Data: Processing and Management", CRC Press. 2014.
4. Sudeesh Narayanan, "Securing Hadoop", Pacjt Publishing – 2013.
5. Ben Spivey, Joe Echeverria. "Hadoop Security Protecting Your Big Data Problem", O'Reilly Media , 2015.
6. Top Tips for Securing Big Data Environments : e-book

III YEAR VI SEMESTER

Elective –II (Cluster B)

3.Mongo DB Lab

1. Learn the basics of Mongo DB.
2. Installation steps for Mongo DB.
3. Use the following commands
   (g) DATABASE_NAME.
   (h) Drop Database( )
   (i) create Collection
   (j) insert( )
   (k) drop( )
   (l) find( )
4. Differentiate between SQL and Mongo DB.
5. Write a program to update a collection in Mongo DB
6. Write a program to remove specific document from Mongo DB.
7. Write a program to implement aggregate function in Mongo DB
8. Apply the Map reduce operation to find total salary of each department assuming employee collection is already exists.

PROJECT & VIVA-VOCE

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

MULTIMEDIA

MULTIMEDIA
COURSE STRUCTURE

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Graphic designing	4	3	25	75	100
		Graphic designing lab	2	2	0	50	50
SEMESTER II	II	Web designing basics	4	3	25	75	100
		Web designing Lab	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	2D Animation	4	3	25	75	100
		Captivate and premiere lab	2	2	0	50	50
SEMESTER IV	IV	Introduction to 3D Animation.	4	3	25	75	100
		Maya lab –I	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	E – learning technologies	3	3	25	75	100
		Java script and Captivate lab.	2	2	0	50	50
	VI	Advanced 3D Animation	3	3	25	75	100
		Maya lab –II	2	2	0	50	50
SEMESTER VI	VII (A/B)	**Elective-I** A. Gamification in B. e-learning	3	3	25	75	100
		C. Facial and blend modes. Lab for Elective -1	2	2	0	50	50
	VIII Cluster - A-1,2 Or Cluster – B – 1,2	**Elective-II(cluster A)**					
		1. LMS technologies. 2. App development. 3. PHP/MY SQL.	3	3	25	75	100
		Project Work	2	2	20	30	50
		Elective-II (cluster B)					
		1. Maya live integration 2. Visual effects. 3. Character animation.	3	3	25	75	100
		Project Work	2	2	20	30	50

I Year Semester-I Paper-I

GRAPHIC DESIGNING

Objectives:

1. To provide knowledge and skills in creating any design.
2. To provide technical skills in implementing the design like photo editing skills, typography skills, etc.
3. To improve the skills in creating documents - both hard copies and online, typography skills, building logos, print layout design and printing technologies.

UNIT – I

Introduction to Graphic Design: Introduction to Multimedia , key elements of multimedia, applications of multimedia, hardware and software requirements of multimedia, introduction to Graphic Design, what is Raster Graphic & Vector Graphic, Uses & Difference between Raster Graphic & Vector Graphic, Media and Types of Media, difference between multimedia and Graphic Designing, Colour formats, Types of Colour Formats for various types of media. Basic Colours & Colour Theory.

UNIT – II

Photoshop: Getting started with Photoshop, page layout and back ground, Photoshop program window-title bar, menu bar, options bar, image window, image title bar, Status bar, ruler, palettes, tool box, screen modes, saving files, reverting files, closing files.

Working with images - image size and resolution, image editing, color modes & adjustments, back grounds.

UNIT – III

Making selections –lasso tools, sections tools, polygon lasso tool, magnetic lasso tool, magic hand tool, grow and similar commands, moving a portion of image, editing selections, filling a selection, transforming selection, painting, drawing and retouching tools.

Layers and Filters : layers, type tool, converting layers, image masking, filters – the filter menu, artistic filter, blur filter, brush store filters, distort filters, noise filters, pixelate filter, lighting effects, difference clouds, sharpen filters, printing.

Web based photoshop: Web template designing, buttons, tittles, back grounds, etc.

UNIT – IV

Illustrator : Understanding the GUI of the Illustrator - Understanding Tool Box – Using menus -Drawing Basic Shapes - Drawing with Pencil Tool - Drawing with Pen Tool - Using Brushes - Creating Compound Paths - Working with Color and Strokes - Editing Objects - Layers &

Groups- Transparency & Graphic Styles - Transforming & Moving Objects - Basic Text - Blending Shapes& Colors.

UNIT – V

In Design: Introduction to Adobe In Design, Creating and Viewing Documents, Understanding Workspace, working with Type, formatting bar, Working with shapes, Working with Colors, Points and Paths, Working with drawing tool bar, Managing and Transforming Objects, Character and Paragraph Formatting, Using Styles, Tables Long and Interactive Documents, Working with effects, Working with menus Packaging and Printing.

Reference Books:

1. Multimedia Basics, Volume 1 by Andreas Holzinger, Firewall Media.
2. Fundamentals of Multimedia, Ze-Nian Li, Mark S. Drew, Pearson Prentice Hall.
3. Software Essentials for Graphic Designers: Photoshop, Illustrator, InDesign by Mark Gatter; Laurence King Publishing.
4. Adobe Photoshop Class Room in a Book by Adobe Creative Team.
5. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color.
6. Adobe Photoshop by Andrew Faulkner; Peachpit Press.
7. Adobe InDesign CS6 Classroom in a Book by Sandee Adobe Creative Team.
8. The InDesign Effects Book by Ted LoCascio; John Wiley & Sons.

Student Activity:

1. Create a broacher for your department seminar.
2. Create a poster for your college technical bouquet inserting your college logo.

GRAPHIC DESIGNING LAB

I. DRAWING CONCEPTS

STILL LIFE DRAWING

1. Composition
2. Sketching
3. Texture, material
4. Light, shadow and highlights
5. Drawing pencils
6. Color pencils
7. Glasses, books, vases, flowers, plants, and rocks.

NATURE STUDY

1. Sketching
2. Shading
3. Draw the shape of natural objects like trees, flowers.
4. Composition and perspective
5. Outdoor study, nature study, architectural study
6. Working with pencil, water color, charcoal, oil pastels and acrylic paints.

MEMORY DRAWING

1. Drawing and composition.
2. Drawing from imagination
3. Illustration based on imaginary concepts
4. Experimenting with dot, lines, shapes, forms, contour, texture, size perspective
5. Working with pencil, water color, charcoal, oil pastels and Acrylic paints

PHOTOSHOP:

Commercial Work: Photo base multi color visiting card – Multi color wedding cards – Paper adds (Photo base) Pomp lets (Photo base) Broachers (Photo base) – Advertisement designing – Pomp lets (Photo base) – Broachers (Photo base).

Digital Work: Pass port designing , Maxi Modeling , Digital Modeling - Black and White Photo Color conversation , Marriage album designing.

Flex Modeling: Front light board designing , Back light board designing.

Illustrator: Cartoon drawing-logo creation – 3D objects creation – move title creation – brush effects based title-filter effects backgrounds.

In Design: Creating A Multiple Page Document – Paper add designing – Creating A Book Layout – multicolor color photo and text base advertisement – Broacher designing – multicolor pomp let creation – Creating A PDF Presentation.

I Year Semester-II Paper-II

WEB DESIGNING BASICS

Objectives:

1. To provide knowledge on web services, client side and server side and to focus on the development of web-based information systems and web services.
2. To provide skills to design interactive and dynamic web sites.

UNIT – I

HTML: Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML responsive.

UNIT – II

HTML forms: HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug ins, you tube.

HTML API'S : Geo location, Drag/drop, local storage, HTML SSE.

UNIT – III

CSS: CSS home, introduction, syntax, colours, back ground, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters, CSS responsive.

UNIT – IV

Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

UNIT – V

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css .

Reference Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Paul S.Wang Sanda S. Katila, An Introduction to Web Design Plus Programming, Thomson(2007).
3. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.

4. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
5. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.
6. Word press for Beginners, Dr.Andy Williams.
7. Professional word press , Brad Williams, David damstra, Hanstern.

Student Activity:

1. Create a web site for your college.
2. Create a web page about seasons and link the corresponding pages to the home page.

WEB DESIGNING LAB

HTML and CSS:

1. Create a menu form using html.
2 Style the menu buttons using css.
3. Create an HTML document with the following formatting options:

I . Bold
II. Italics
III. Underline
IV. Headings (Using H1 to H6 heading styles)
V. Font (Type, Size and Color)
VI. Background (Colored background/Image in background)
VII. Paragraph
VIII. Line Break
IX. Horizontal Rule
X. Pre tag

4, Create an HTML document which consists of:

I. Ordered List
II. Unordered List
III. Nested List
IV. Image

5. Create a Table with four rows and five columns. Place an image in one column.

6 Create a form using HTML which has the following types of controls:

I. Text Box
II. Option/radio buttons
III. Check boxes
IV. Reset and Submit buttons

Wordpress:

7. Installation and configuration of word press.
8. Create a site and add a theme to it.
9. Create a child theme
10. Create five pages on demonetization and link them to the home page. .
11. Create a simple post with featured image.
12. Add an external video link with size 640 X 360.
13. Create a user and assign a role to him.
14. Create a login page to word press using custom links
15. Create a website for your college.

II Year Semester-III Paper-III

2D ANIMATION

Objectives:

1. To provide knowledge and technical skills in two dimensional animation tools.
2. To acquaint with simple audio and video editing technologies.

UNIT – I

Introduction to Animation: Animation - origin and growth, basic principles of animation, meaning, definition and types of Animation, how to create animation, role of computers in animation, Story Board creation, how to measure animation Speed, what is frame to frame animation, what is motion, animation with effects, difference between web animation, TV advertisements and system presentation.

UNIT – II

Captivate : Creating a new Captivate project, Recording Your Screen in Captivate, Creating a simulation, Adding text, audio , video, shapes, and animations, Inserting interactive elements such as buttons and rollovers.

UNIT – III

Creating timeline animations, Applying effects, Creating a drag-and-drop interaction, Adding closed captions for narration, Enabling accessibility, Creating responsive projects, Publishing a Captivate project.

UNIT – IV

Camera Techniques: Introduction to Digital Video Cinematography , Compositions Lenses and Cameras Types of lenses, Types of Cameras, Basics of Film Camera Difference between Film Camera and Digital Camera, working with camera.

UNIT – V

Adobe premiere, Working with sound: Navigate Premiere Pro, Setting up a project and a sequence, Importing and organizing media, Marking and selecting the best takes from clips, Performing insert, overwrite, and replace edits, Trimming, splitting, moving, and deleting clips, Audio editing and mixing, Recording voice-overs, Applying transitions, effects, and filters, Changing clip speed, Color correction, Creating titles, Multicam editing techniques, Exporting your final project.

Reference Books:

1. Animation: The Mechanics of Motion, Volume 1by Chris Webster; Taylor & Francis.
2. The complete animation course: the principles, practice and techniques of successful animation by Chris Patmore; Barron's educational Series, Inc., 2003

3. Adobe Captivate 8 (E-Learning Uncovered) Paperback – Import, 11 Jun 2014, by Diane Elkins .
4. Adobe premiere Pro Class room in a book, Maxim Jago.

Student Activity:

1. Create a 2D animation story and add sound to it.
2. Create a remix of a movie song by editing the existing video as per the song.

2D ANIMATION LAB

CAPTIVATE :

1. Captivate installation.
2. Create a new project.
3. Choose a theme for a project.
4. Add text captions and buttons.
5. Adding text effects.
6. Create buttons with roll over image.
7. Create one multiple choice question with three image buttons.
8. Create a time line animation.
9. Inserting an image in a master slide along with audio.
10. Record a captivate screen and output in MP4.
11. Create a drag and drop interaction. For example dropping two apples in a basket.
12. Apply accessibility settings for all the slides.
13. Create one responsive project.
14. Publish your project in either HTML or SWF format.

Adobe premiere, Working with sound, Camera Techniques

1. Working with camera
2. Video NTSE to PALL conversation
3. Script writing
4. Voice Dubbing
5. Video Shooting
6. Advertisement creation
7. short film making

II Year Semester-IV Paper-IV

INTRODUCTION TO 3D ANIMATION

Objectives:

1. To provide knowledge in using specialized software to produce three dimensional images which in sequence create the illusion of movement.
2. To acquaint students with skills to produce animation for film, television & video especially in the areas of modeling and texturing.

UNIT – I

Animation Industry: Animation company setup – 2D & 3D Animation – world's famous animation companies – Animation Company work flow - CG Production workflow – Basic Film concepts.

UNIT – II

Maya Interface: Introduction to MAYA - The Maya interface – software and hardware - Tool bar – Menubar- layers, Shortcut Keys, Knowing the Primitive objects in Maya, Understanding About ViewPorts, Channel Box, Hot Box, Channel Attributes, Outline Editor.

UNIT – III

Modelling: Introduction to modeling – Understanding polygons - Primitive objects - NURBS and polygon modeling – Tools used for modeling - Organic and Industrial designs – Editing Nurbs & Polygons, Learning Menus in Surfaces and Polygons Tabs, Shortcut.

UNIT – IV

Texturing: Introduction to Materials: – Understanding the Materials & Behavior of material,Understanding UV Texture Editor, Applying Single Color to object, Hyper shade – Understanding different types of Maps – Understanding UV mapping - UV manipulation - editing texture inPhotoshop – UV snap shot - Applying materials and textures to models and props – Shortcuts.

UNIT – V

Rigging: Knowing Deformers and there functionality (Lattice, Cluster, Wire, Jiggle… & Non Linear Deformers), Knowing Constraints (Point, Orient, Scale, Parent, Pole Vector, Aim…),Introduction to Joints – Understanding difference between Local Axis and World Axis for Joints.

Reference Books:

1. Digital Character Animation 2 and 3, George Maestri.
2. Mastering Maya, John Kundert-Gibbs.

Student Activity:

1. Create a model of a basket ball court.
2. Create any old Indian temple/church and apply textures and ligthing.
3. Create a fully furnished living room.

MAYA LAB - I (Modeling & Texturing)

Modeling

Maya toolbar, 3-D workspace, Primitive objects (cubes, cylinders, spheres, planes, and tours)

Modeling with NURBS

Creating NURBS curves , Understanding CV Curve & EP Curve, NURBS basics (control vertices, curves (Isoparms), Hulls & Patches), Tools to Edit Curve, Creating Surfaces with Curves, Knowing Options Revolve, Loft, Extude, Biral (Biral 1, Biral 2, Biral3).

Editing NURBS Surfaces using Edit Nurbs Menu.

1. Trimming
2. Attach & Detach Surfaces.
3. Booleans
4. Insert Isoparms
5. Stitching
6. The Sculpt Geometry Tool

Modeling with NURBS Surfaces.

1. Objects Modeling with Loft, Revolve, Extrude & Brail.
2. Creating Bottles, Lids, bulbs, fans, pots, glass, etc.,

Modeling with polygons

1. Polygon Basics, about polygons, Create and reshape polygons, Knowing, Mesh Menu.
2. Edit Polygons Menu.

3. Combining, separating, and splitting, Booleans, Create Polygon, insert Edge Loop, Make Hole, Fill Hole, Extrude, Bridge, Slide edge Tool, Sculpt Geometry Tool etc,.
4. Reflections, rotations, and scaling (using animation software tools)
5. Splitting polygons
6. Modeling Props & sets & Small Vehicle, Objects.

Texturing:

Surfacing: Enhancing Form through Texture

1. Use the UV Texture Editor to visualize how the UV texture coordinates from a three-dimensional model relate to an assigned two-dimensional texture map.
2. V mapping & UV manipulation.
3. Hyper shade & Hyper shade Operations to apply wood, rock, ice, and more.
4. Applying texture to Basic Primitives.
5. Materials and Textures.
6. Unwrapped and stitched together in Photoshop.
7. Unwrapping & Texturing Ball (Tennis Ball, Foot ball, Volley Ball, Cricket Ball).
8. Editing texture in Photoshop and Unwrapping & Texturing Sets, Props.

III Year Semester-V Paper-V

E-LEARNING TECHNOLOGIES

Objectives:

1. To explore basic knowledge in e-learning technologies.
2. To write simple programs in Jawa script.
3. To learn to develop e-learning projects using java script and advanced Captivate.

UNIT – I

E – learning tools and technologies: E-learning technologies – Virtual class rooms, online courses, online discussion forums, chat rooms, video based learning, instructor led learning , online evaluation, LMS technologies, CMS technologies, different types of file and image formats, types of learning – traditional learning, blended learning, Flipped class rooms. E-learning tools – hardware tools – smart boards, LCD projectors, kindles/e-readers, stylus pads, light pens, computers, etc. Software tools – power point, Flash, Captivate, Moodle, etc.

Unit – II

Java script: Understanding the structure of JavaScript code, statements, Comments, variables, operators, assignments, data types, functions, events, objects, strings, numbers, dates, arrays, conditions, loops, type conversions and debugging.

Unit – III

Sending messages to the console, Working with different variable types and objects, Creating and changing DOM objects, Event handling, Working with timers, Debugging JavaScript, building smarter forms.

Unit – IV

Advanced Captivate : Table of contents, customizing player themes and borders, working with slides, Adding custom states to objects, Creating and using variables – system generated and user generated , Creating standard, conditional, and shared actions.

Unit – V

Working with question slides, Working with Captivate widgets like puzzle, memory game, etc., Using built-in states for interactive objects, Adding assessments, Adding knowledge check questions, Randomizing quiz questions, Enabling LMS reporting.

Reference Books:

1. Adobe Captivate 8 (E-Learning Uncovered) Paperback – Import, 11 Jun 2014, by Diane Elkins .
2. Java script the definitive guide, David Flanagan.

Student Activity:

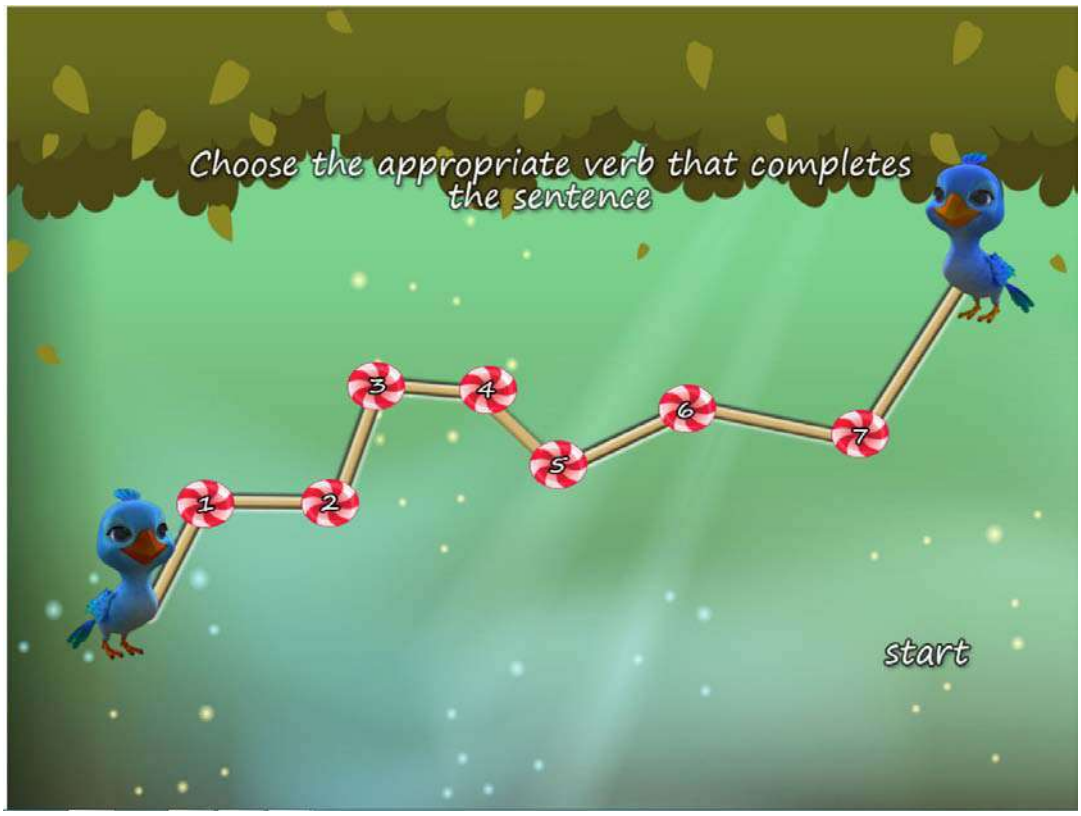
1. Create a flower blooming animation.
2. Create an e-content for any one lesson inserting necessary multimedia.

JAVA SCRIPT AND CAPTIVATE LAB

Captivate :

1. Create a simple quiz.
2. Randomization of questions in the quiz.
3. Enable the LMS with the following settings [set standard to: Scorm:1.2, status: incomplete to pass/fail, data report:points].
4. Create the following e-learning project-

    a. Here birds needs to meet his friend- on answering each question the birds moves..



click each candy for one question to appear.

5 Create a simple project. Take an image of a car and design four buttons. Each button should represent a colour and when you click that button, colour of car should change to the button colour. Hint : Multistate object.

6 Make a game with widgets.

7 Create a quiz using a widget (multi millionaire).

8 Import an audio into your project and control your audio with buttons (play and pause.

9 Create a quiz using match the following question.

III Year - Semester-V - Paper-VI

ADVANCED 3D ANIMATION

Objectives:

1. To explore knowledge on 3D character modeling and animation.
2. To provide technical skills in creating 3D animations concentrating on rigging and animations utilizing the previous skills on modeling and texturing.

UNIT – I

Animation: Animation in MAYA - Principles of animation (squash and stretch, timing)... Doing Object animation & Understanding the Behavior of Shapes of Objects, Making play blasts- Working with Animation Curves - Graph Editor – time line- Shortcuts, Camera Animation, Setting Resolution Gates.

UNIT – II

Facial Animation: Introduction to Facial animation – Using blend shapes for facial animation and expressions, using the trax editor, understanding human expressions and emotions, working on dialogue and lip-sync, understanding expressions chart. -

UNIT – III

Lighting: Understanding Color Theory, Introduction to lighting – importance of lighting for animation - Basic Lighting Concepts – types of lights – Change the color of the light – light attributes – rendering – Shortcuts -

UNIT – IV

Rendering: Introduction to rendering, Knowing Renderers – software Rendering, Hardware Rendering, Vector Rendering, Mental Ray Rendering, Selecting a Render Type, Interactive Photorealistic Rendering (IPR), Batch Rendering, Working with the Options in Render setting.

UNIT – V

Dynamics: Introduction to Particles, Crating Emitter, Knowing Different types of Particle,particle object, knowing about Hardware rendering Particles & Software Rendering Particles,Goals, Particle collisions, Emit from Object, Goals, Understanding the Physics of Dynamics,Knowing Fields, Understanding Dynamics Constrains, Knowing Soft Body and Rigged Bodies,Emitting From Object, Understanding Fields, Setting Particle Life Span, Setting Color forParticles, Understanding Basic Particle Attributes.

Reference Books:

1. Maya fundamentals by Garry Lewis & Jim Lammers.

Student Activity:

1. **Create a logo animation for a TV channel.**
2. **Create a animation of volcano.**

MAYA LAB –II (Animation and Rigging)

1. Understanding 12 Principles of Animation
2. Understanding Maya Key frames & Frame Rates. Pendulum Animation
3. Knowing the Importance of Spacing and timing.
4. Understanding Graph Editor & Tangents in Graph.
5. Understanding what is Rigging. Knowing Set Driven Keys.-
6. Types of Rigging.Knowing Non Linear Deformers. Knowing Constraints.
7. Bouncing Ball Animation How Giving Weight to the Object.
8. Editing & Controlling the Graph for Animation. Knowing Animate Menu.
9. Difference between Normal Parent & Parent Constraint.
10. Know the Importance of Group. Creating Controller's for the object.
11. Adding Attributes for the Controller.
12. Doing Box Walk. Doing Exercises on Spacing and Timing.
13. Follow Through Animation.

14. Knowing Joints. Understand Local & World Orientation's. Knowing IK RP & SC Solver. KnowingIK Spine Solver.-
15. Anticipation Actions for Objects. Follow Through and Over Lapping Action Animation. Setting aStaging through Camera. Doing Motion Path Animation.
16. Knowing Resolution Gate.
17. Doing IK FK Rig For Hand & Leg. Knowing the Skeleton Menu. Knowing how to Bind Mesh to
18. Joints. Understanding Skinning. Box Walk with Character Walk Cycle. Antic Action with Character.

    Doing Rig for Props using Constraints. Doing Follow through Animation with Character.

III B.Sc Semester-VI Paper-VII.A

GAMIFICATION IN E-LEARNING.

Objectives:

1. To provide knowledge and skills in developing games using 2D softwares.
2. To demonstrate how to involve gaming in e-learning industry.

UNIT – I

Advanced java script : Working with CSS, HTML5, and JavaScript , Using regular expressions, Creating forms with JavaScript, including shopping carts, Using JavaScript to track dates and time, Creating to maps with the Google Maps API.

UNIT – II

Gamification using Captivate: Edit object styles, Adding and editing images, characters, and other assets, Adding external animations ,Creating and saving custom effects, text management – text to speech, closed captions, slide notes, Using VTML tags

UNIT – III

Working with PowerPoint presentations – importing and exporting, Object level audio management- adding and editing audio to buttons, text captions, slides e.tc

UNIT – IV

Adding an element of chance with a random number generator, Using random question slides, Tracking activity and score with advanced actions

UNIT – V

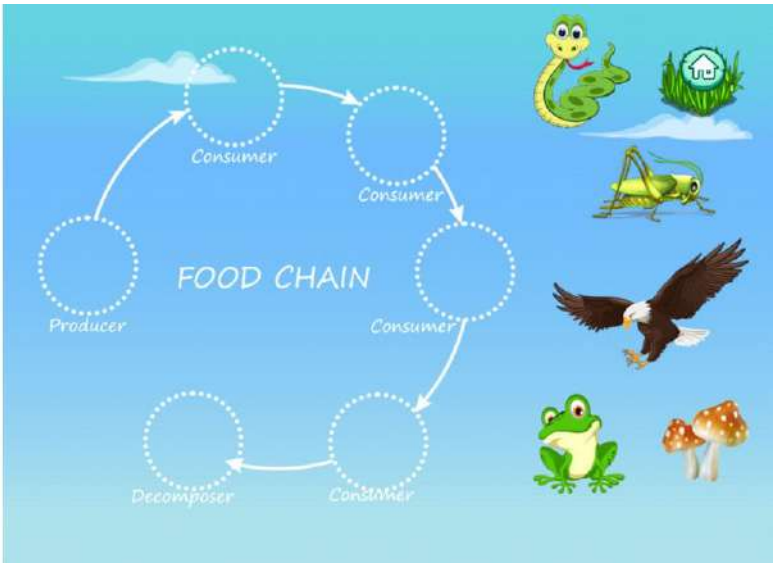
Using JavaScript and Captivate together- Creating timed activities, creating alert box, Working with publishing settings.

Reference Books:

1. How gamification reshapes learning, a free ebook.
2. E-learning 101 concepts, trends, applications, a free ebook.
3. Adobe Captivate 8 (E-Learning Uncovered) Paperback – Import, 11 Jun 2014, by Diane Elkins .
4. Java script the definitive guide, David Flanagan.

GAMIFICATION IN E-LEARNING LAB

1. Create a Timer using java script in Captivate.
2. Create a quiz. Correct answer should be initimated with tick mark image and wrong answer with cross mark image.
3. Audio should be attached to the above project.
4. Import a video. Attach closed captions for that video.
5. Import a power point presentation into Captivate. Add Next button for every slide.
6. Generate a certificate for your performance in the quiz. (using widget).
7. Create the following project
8. Create the drag and drop interaction of food chain . Drag each animal into the order

a. 

FACIAL ANIMATION AND BLEND SHAPES

Objectives:

1. **Getting knowledge on facial animation and facial expressions.**
2. **Getting animal and any object expressions**

UNIT – I

INTRODUCTION: Introduction to Facial Animation–Recalling principals of Animation – software and hardware –Character rig analogy – application domain - Shortcut Keys, - Facial rigging process – Morphology –Behaviors – Facial rigging for key frame animation.

UNIT – II

FACIAL RIGGING: Hierarchies, Transformations, Scale and Pose. - Naming Conventions - Facial Rigging for Key Frame Animation: Techniques - Facial Rig Mechanics – Facial Rig Controls - Facial Rigging for Key Frame Animation.

General Anatomy - Eyebrows - Eyelids - Eyeballs and Pupils - Nose - Ears - Cheeks - Jaw - Lips - Tongue.

UNIT – III

FACIAL ANIMATION: Facial Animation Control–Goals and Objectives - Methodology – Studying the Anatomy of the Human Head and Face - Development of an Expression Taxonomy - Development of a Polygon Model Mesh - Collection of Reference Data - Superposition of Overlapping Blend shapes - Demonstration of the Developed Model With Several Facial Animations.

UNIT – IV

ACTIONS: Implemented Muscle Actions – Inner Brow Raiser (both sides) - Outer Brow Raiser (both sides) – Brow Lowerer (both sides) – Eyes Closed (both sides) – Nose Winkler – Upper Lip Raiser (both sides) - Lip Corner Puller (both sides) - Lip Stretcher (both sides) - Lip Corner Depressor (both sides) - Chin Raiser - Lip Tightener - Lip Puckerer.

UNIT – V

LIP SYNC: Introduction to lip sync - The Lip Sync Process - Determine the Speech Pattern - Analyze the Audible Dialog to Determine Phonemes - Use Timing Table to Set Frames - Getting the Finished Animation - Phoneme Dropping Guidelines - Synchronization Time and Artistic Freedom - Creating Data Structures - Collecting Information – Discussion – Conclusion.

Reference:

1. Digital Character Animation 2 and 3 Author: (George Maestri)
2. The Animator's Survival Kit (Author: Richard Williams)

Student Activity:

1. **Create a face modeling and animation with expression of happiness.**

FACIAL ANIMATION LAB

1. 12 Principles of Animation
2. Understanding Maya Key frames & Frame Rates
3. Knowing the Importance of Spacing and timing.
4. Understanding Graph Editor & Tangents in Graph.
5. Understanding what is Rigging. Knowing Set Driven Keys.
6. Types of Rigging. Knowing Non Linear Deformers. Knowing Constraints.
7. Creating blend shapes for facial animation
8. Editing & Controlling the Graph for Animation. Knowing Animate Menu.
9. Difference between Normal Parent & Parent Constraint.- **3Hours**
10. Know the Importance of Group. Creating Controller's for the object.
11. Adding Attributes for the Controller.
12. Doing Exercises on Spacing and Timing.
13. Follow Through Animation.
14. Knowing Joints. Understand Local & World Orientation's. Knowing IK RP & SC Solver. Knowing Spine Solver.
15. Anticipation Actions for face expressions. Follow Through and Over Lapping Setting a Staging through Camera.
16. Working on ovals
17. Working on mouth shapes and lip-sync

III B.Sc Semester-VI Cluster A1

LMS TECHNOLOGIES

Objectives:

1. To introduce learning management systems.
2. To acquaint with open source LMS Moodle.
3. To give knowledge in creating an online course.

UNIT – I

Introduction to LMS Technologies: What is LMS, why to use LMS, exploring different LMS platforms – Moodle, Blackboard, Canvas, Edmodo, etc. Choosing an LMS – Standard features of LMS, understanding learning needs, choosing course layout, content writing.

UNIT-2

Getting started with Moodle : Introduction to Moodle platform, features of Moodle, installing Moodle cloud, creating a sample website for launching Moodle course, navigating a Moodle course, customizing your profile., using the calendar and managing events.

UNIT- III

Designing a course in Moodle: The LMS and your syllabus , designing course layout, Start with a blank course template, adding sections to the course, adjust course settings, uploading course materials, enrolling students, exploring the student view, giving instructions to students, creating users, assigning roles.

UNIT- IV

Course activities: Setting up assignments, Quizzes, question bank, creating online discussion forums, choice, survey and feed back. Grading assignments, evaluating course, tracking course completion, backing up and restoring courses.

UNIT-V

Managing your course : Setting preferences for working with themes, customizing theme settings, installing themes, creating custom theme CSS rules, customizing theme layouts.

On line resources available:

1. https://moodlecloud.com
2. www.lynda.com

Student activity:

Create your own online course on any subject of your interest. Include quiz, survey, forum, grading and themes.

III B.Sc Semester-VI Cluster A2

APP DEVELOPMENT

Objectives

1. To understand the services provided by and the design of an operating system.
2. To demonstrate their understanding of the fundamentals of Android operating systems
3. To demonstrate their skills of using Android software development tools
4. To demonstrate their ability to develop software with reasonable complexity on mobile Platform.
5. To demonstrate their ability to deploy software to mobile devices
6. To demonstrate their ability to debug programs running on mobile devices

UNIT I

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

UNIT II

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications,

UNIT III

Tools :Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes.

UNIT IV

Android User Interface: Measurements – Device and pixel density independent measuring units, Layouts –Linear, Relative, Grid and Table Layouts , form widgets, User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes.

Event Handling: Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components; Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities, connecting with the database.

UNIT V

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a numberor to send SMS

Reference Books:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
3. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013.
4. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

Student activity:

1. Develop a small mobile app for your college.

Mobile App Development Lab

1. write a simple Android Application which will print "Hello World!"
2. Develop an application that uses GUI components, Font and Colors.
3. Develop an application that uses Layout Managers and event listeners.
4. Develop a native calculator application.
5. Write an application that draws basic graphical primitives on the screen.
6. Implement an application that implements Multi threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that creates alarm clock

III Year Semester-VI Cluster A3

PHP/MYSQL

Objectives:

1. To introduce back end softwares for web designing using PHP and My SQL.
2. To demonstrate the programming language PHP.
3. To learn how to retrieve and manipulate data from one or more tables using My SQL.

UNIT – I

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants.

Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output.

Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

Unit-2:

Working with Arrays: What are Arrays?, Creating Arrays, Some Array-Related Functions.

Working with Objects: Creating Objects, Object Instance

Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

Unit-3

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads**.**

Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

Unit-4

Working with Files and Directories: Including Files with inclue(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

Unit-5

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data

Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

Reference Books:

1. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).
2. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).

PHP/MYSQL LAB

MySQL

Cycle -1

An Enterprise wishes to maintain the details about his suppliers and other corresponding details. For that he uses the following details.

Suppliers (sid: Integer, sname: string, address: string)

Parts (pid: Integer, pname: string, color: string)

Catalog (sid: integer, pid: integer, cost: real)

The catalog relation lists the prices charged for parts by suppliers.

Write the following queries in SQL:

1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part.
3. Find the snames of supplier who supply every red part.
4. Find the pnames of parts supplied by London Supplier abd by no one else.
5. Find the sid's of suppliers who charge more for some part than the average cost of that part.
6. For each part, find the sname of the supplier who charges the most for that part.
7. Find the sid's of suppliers who supply only red parts.
8. Find the sid's of suppliers who supply a red and a green part.
9. Find the sid's of suppliers who supply a red or green part.
10. Find the total amount has to pay for that suppler by part located from London.

Cycle – 2

An organisation wishes to maintain the status about the working hours made by his employees. For that he uses the following tables.

Emp (eid: integer, ename: string, age: integer, salary: real)

Works (eid: integer, did: integer, pct_time: integer)

Dept (did: integer, budget: real, managerid: integer)

An employee can work in more than one department; the pct_time field of the works relation shows the percentage of time that a given employee works in a given department.

Resolve the following queries.

1. Print the names and ages of each employee who works in both Hardware and Software departments.
2. For each department with more than 20 full time equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did's together with the number of employees that work in that department.
3. Print the name of each employee whose salary exceeds the budget of all of the departments that he or she work in.
4. Find the managerid's of managers who manage only departments with budgets greater than 1,000,000.
5. Find the enames of managers who manage the departments with largest budget.
6. If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerid's of managers who control more than 5,000,000.
7. Find the managerid's of managers who control the highest amount.
8. Find the average manager salary.

PHP Lab Cycle

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display the today's date.
3. Write a PHP Program to read the employee details.
4. Write a PHP Program to display the

5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Write a PHP Application to perform demonstrate the college website.
8. Write a PHP application to add new Rows in a Table.
9. Write a PHP application to modify the Rows in a Table.
10. Write a PHP application to delete the Rows from a Table.
11. Write a PHP application to fetch the Rows in a Table.
12. Develop an PHP application to make following Operations
    i. Registration of Users.
    ii. Insert the details of the Users.
    iii. Modify the Details.
    iv. Transaction Maintenance.
        a) No of times Logged in
        b) Time Spent on each login.
        c) Restrict the user for three trials only.
        d) Delete the user if he spent more than 100 Hrs of transaction.

III Year Semester-VI Cluster B1

MATCH MOVIE AND MAYA LIVE INTEGRATION

Objectives:

1. To provide technical knowledge on mixing 2D and 3D cameras.
2. To integrate physical camera inti 3D camera.

UNIT – I

INTRODUCTION: Introduction to Autodesk Match mover–Interface and tools – Interaction with live cameras using in production - working on 3D camera and 2D camera–understanding camera formats – Knowing 3D camera and live camera – familiarizing in camera animation.

UNIT – II

2D AND 3D: Understanding visual effects pipe line - Understand the basic principles of match moving - matching the perspective in a 3D animation program - integrating 2D and 3D - Understand the core principles of photogrammetry - key concepts and procedures involved with 2D tracking - identify and correct problems with 2D tracking.

UNIT – III

CAMERAS: camera calibration - underlying mechanisms involved with calibration – Solve Cameras – working on 2D tracking - understand what a “good” calibration looks like and how to achieve it in a match moving program - Understand the core concepts of camera calibration – Understand the concepts and procedures used in automatic tracking - Working on automatic tracking.

UNIT – IV

TRACKING: working on cameras and lenses – film gate sizes and lens distortion – basic process of integrating the solution from a match moving program into a 3D scene - adjust the coordinate system - perform final checks of the match move - strategies for delivering scenes to downstream artists - how to fit a match moved camera to a 3D environment - how to adjust a coordinate system in a 3D animation program.

UNIT – V

STEREO AND TRACKING: using tracking markers - highly recommend to work on green screen - Understand the various aspects of a match mover's job- Matchamation blends techniques from animation and rotoscoping - Demonstrate the techniques that make matchamation - Apply the techniques in this chapter to difficulties encountered in match moving- object tracking and geometry trackingdifference between object tracking and geometry tracking - Demonstrate alternate ways of using match move data - how stereo footage is match moved - Understand how

3D movies are filmed and viewed - Understand the basic concepts of stereography – Understand how stereo footage is match moved.

Reference:

1. The Animator's Survival Kit (Author: Richard Williams)

2. Composite a 3D object into video footage with Boujou, Maya and After Effects by Alan monroig.

Student Activity:

1. Create a small character and integrate with an existing video.

MATCH MOVIE AND MAYA LIVE INTEGRATION – LAB

1. Moving from 3D to 2D and back again.
2. Evaluating the Footage, Defining the Camera.
3. Adding Rough Geometry and Refining the Camera.
4. Evaluating and Adjusting the Camera, Calibration, The Optics of Photography.
5. Exploring the Anatomy of a 2D Track, Making Every Track Count.
6. Anatomy of a 2D Track, Track Stationary Objects, Track "True" 3D Positions.
7. Handling Plate Issues, Motion Blur, Occlusion, Optimizing the Plate for 2D Tracking.
8. "Good" Calibration, Calibrating Your Cameras.
9. Evaluating the 3D Nulls, 3D Space.
10. Dolly/Crane/Moving Camera, Pan/Tilt Shots, Slight Dollies/Translation. Shaky Footage/Handheld Footage, working on Coordinate System- Implementing the Automatic Tracking Process.
11. Lenses, Film Back and Focal Length, CMOS, CCD, and Rolling Shutter- Performing the First Tests, Altering the Coordinate System,
12. Tracking Markers for a Green Screen or Blue Screen, Blending Cameras in Maya.

III Year Semester-VI Cluster B2

VISUAL EFFECTS

Objectives:

1. To equip students with skills related to composting and roto scopy.
2. Wire removal and blue & green screen mat methodologies are to be shared.

UNIT – I

USER INTERFACE: Work Space Importing, Compositions, Views and Previews Layers and Properties &Animation Colors, Masks, Transparency and Keying Text, Drawing and Painting Motion Tracking, Effects and Animation Presets, Rendering and Exporting

UNIT – II

MOTION GRAPHICS: Image Based Motion Graphics, Video Based Motion Graphics .

UNIT – III

EFFECTS & TITLE EFFECTS: 3d Channel, Audio, Blur and Sharpen, Color Correction, Distort, Expression Control, Generator, Keying, Matte, Noise and Grain, Paint, Perspective, Noise and Grain, Paint, Perspective.

UNIT – IV

COLOR CORRECTION & KEYING: Auto Colors, Auto Contrast, Auto Levels, CC Color Offset, CC Toner Channel Mixer, Color Balance, Color Link, Colorama, Curves, Equalizers, Exposures, Levels, Levels (Individual Controls), Photo Filters, Shadows / Highlights, Tint, Tritone, CC Simple Wire Removal, Color Difference Key, Color Key, Color Range, Difference Matte, Extract, Inner /Outer Key, Key Light , Linear Color key, Luma Key, Spill Suppresser.

UNIT – V

MATCH MOVER: Motion tracking Overview, Motion Tracking Workflow and Controls, Tracking, Rot scoping, Wire Removal, Motion Tracking Options and Properties, Using Garbage Matte Clearing Unwanted Data, 3rd Party Plug-in

Recommended books:

1. Creating Motion Graphics with After Effects, Chris and Trish Meyer.
2. Creative after Effects 7, Angie Taylor.

Student Activity:

1. **Create Roto animation.**
2. **Create special effects for a small video.**

VISUAL EFFECTS LAB

1. Compositing A over B and a bit more
2. Plug – ins and animation presets
3. Render queue
4. Timing key frames and the graph editor
5. Accurate motion blur and professionalize short cuts
6. Timing and Retiming
7. Combine Layers Transparency and Variable mask feather
8. Working with multiple comps and projects
9. Color correction and image optimization
10. Gamma and contrast, Color and intensity
11. Compositors match colors
12. Color keying Green screen, blur screen and very rarely red screen- Paint and coloring, 3D camera tracker creating expressions
13. Multiple 3D Compositing
14. Sky replacement working on particles

III Year Semester-VI Cluster B3

CHARACTER ANIMATION

CLOUD COMPUTING

Cloud Computing under CBCS with effect from Academic Year 2017-2018

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Basics of Cloud Computing (Google, Amazon, IBM, Red hat, Microsoft, Sales force)	4	3	25	75	100
		Cloud Computing Lab	2	2	0	50	50
SEMESTER II	II	Cloud Computing Services	4	3	25	75	100
		HTML / CSS and Java Script Lab	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Application development on Cloud Computing	4	3	25	75	100
		Cloud based Application Development Lab	2	2	0	50	50
SEMESTER IV	IV	APEX & Visual force Programming	4	3	25	75	100
		APEX and Visual force Lab	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	Advanced JavaScript	3	3	25	75	100
		JQuery, JSON Lab	2	2	0	50	50
	VI	Business Intelligence	3	3	25	75	100
		Business Intelligence Lab	2	2	0	50	50
SEMESTER VI	VII (A/B)	**Elective-I**					
		A. Sales force in marketing & sales + Sales force Marketing Lab	3	3	25	75	100
		B. customer services through Sales force + Cloud Service Lab	2	2	0	50	50
		Lab for Elective -1					
	VIII Cluster - A-1,2 Or Cluster – B – 1,2	**Elective-II(cluster A)**					
		Sales force Integration	3	3	25	75	100
		1. SOAP INTEGRATION + SOAP Lab					
		2. REST INTEGRATION + REST APEX Lab					
		3. SALESFORCE STREAMING APIs + Visual Force Streaming Lab					
		Project Work	2	2	20	30	50
		Elective-II (cluster B)					
		Sales force Lightning					
		1. Sales force Lightning (Client Controller) + Lab	3	3	25	75	100
		2. Salesforce Lightning (Server Controller) + Lab					
		3. Traditional Lightning + Lab					
		Project Work	2	2	20	30	50

I YEAR I SEMESTER

Basics of Cloud Computing

Objective

The student will be knowing Cloud Computing basics and its services which include SaaS, PaaS, and IaaS. It also deals with different types of cloud such as Google, Amazom, IBM, Redhat, Microsoft and Salesforce.com

Outcome: The student will be able to know how the Cloud Computing is changing software industry with different services and cost saving.

UNIT-I

Computer Networks, basics of networking, Architectures of networking, topologies, types of Networks ,LAN,WAN,MAN, Network Components, Protocols, Communication aspects, basics of internet.

UNIT-II

Client-Server Computing, Cluster Computing, Grid Basics, Distributed Computing. Introduction to Cloud Computing, Introduction to Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS).

UNIT- III

Understanding Google Cloud, Google Apps, Google Compute Engine (GCE) ,Google App Engine. Amazon Services, Amazon Web Services, Amazon EC2. IBM Cloud Computing with its PaaS, IBM as Saas and IBM as IaaS.

UNIT-IV

Red hat Cloud Computing with its PaaS. Microsoft Azure Cloud Computing Service- Windows azure platform Services, Windows Azure storage, Windows Azure fabrics.

UNIT-V

Salesforce Cloud Computing Services Pass, SaaS and IaaS.Heroku and Force.com as PaaS.

References

1. Cloud Computing – An Introduction by SubuSangameswar
2. Mastering Cloud Computing Paperback by Buyya (Author), Vecchiola (Author), Selvi (Author)
3. Cloud Computing for Complete Beginners: Building and Scaling High-Performance Web Servers on the Amazon Cloud **by Ikram Fatah**

I YEAR I SEMESTER

Cloud Computing Lab

1) Creating Amazon Account to store images.
2) Creating Google Account to store files and programs.
3) Creating IBM cloud account and access storage space.
4) Creating Microsoft Azure Account and working on Azure Cloud
5) Creating salesforce.com Account and working on Trailhead.com

I YEAR II SEMESTER

Cloud Computing Services

Objective

This subject would be exploring SaaS, PaaS, and IaaS in Cloud Computing and different types of clouds such as Sales Cloud, Service Cloud, Marketing Cloud, Analytics Cloud, etc.

Outcome

After completing this subject the student would be having knowledge on benefits of being part of a community dedicated to success, know where to get started, connect with others, get help, share ideas, and collaborate.

UNIT-I

Eco System of Salesforce.com, Leveraging our community resources and events, Stopping, Collaborating and listening, Industries and Clients.

UNIT-II

Various Clouds in Salesforce.com, Functionality, Advantages, Uses, Define Sales cloud, Service cloud, Marketing cloud, Analytics cloud, Platform and Apps, IOT and Commerce.

Unit –III

Brief overview on Marketing Cloud, Sales Cloud & Service Cloud in Salesforce.com

Unit –IV

Heroku and Force.com Clouds of Salesforce.com, Functional uses, Advantages, Examples

Unit-V

Brief overview on Wave Cloud, Thunder for IoT and Collaboration Cloud in Salesforce.com

References

1. Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS) (Wiley CIO) by Michael J. Kavis (Author)
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More by Kris Jamsa (Author)

I YEAR II SEMESTER

HTML, CSS and Java Script Lab

1. How to create an HTML page?
2. How to create, Body, Header?
3. What is the Simplest HTML Page?
4. How can i add Comment in HTML?
5. What is HyperText Link?
6. Can I nest tables with in Tables?
7. How to create CSS ?
8. What are Pseudo classes and what they are used for?
9. What are the three main ways to apply CSS to a web Page?
10. What is grouping and why it is used for?
11. What is an ID Selector and how it is used?
12. What is class selector how it is differ from ID selector?
13. How to create Java script pages?

II YEAR III SEMESTER

Application Development on Cloud Computing

Objective
This subject will be exploring data structure with objects, fields, object relationships, security management, and communication templates.

Outcome
After completing this subject the student would be having knowledge on developing an application through GUI.

UNIT-I
Creating Apps, Tabs, S Objects, Fields, Records, Data. Working on Salesforce.com Classic Interface.

UNIT-II
Working on Various Relationships – Self Relationship, Lookup Relationship, Master detail Relationship, Many to many Relationship, Rollup Summery Relationship, Hierarchical Relationship

UNIT –III
Working with Custom components, Principles of designing Salesforce.com Projects. Filtering Data through Validations of Master Data, Designing page layouts, Designing Search layouts, and Record Types.

UNIT –IV
Security Management – Data Security, Data Migration- Import Wizard/ Data Loader. Schema Security/User Security, Organisation Security, Profiles, Roles, Queues, Public Groups, OWD Sharing Rules and Permission Sets.

UNIT-V
Communication Templates, Domain management, Working with Workflows & Approvals Process, Working with Process builder.

References :

Practical Salesforce.com Development Without Code by **Philip Weinmeister.**
Teach Yourself VISUALLY Salesforce.com by Justin Davis and Kristine Curington

II YEAR III SEMESTER

Cloud based Application Development Lab

1. How to Create Model?
2. How to Create Apps?
3. How to create Tabs?
4. How to create S objects?
5. How to create Field?
6. How to create Records?
7. How to create Validation rules?
8. How to create page layouts?
9. How to create Record Types?
10. How to create Users?
11. How to create Roles?
12. How to create Public Groups?
13. How to create Queues?
14. How to create Sharing Rules?
15. How to create Workflows?
16. How to create Process Builder Automations?
17. How to use Approval Process?

II YEAR IV SEMESTER

APEX & Visual force Programming

Purpose

This subject will be exploring basics of programming through Salesforce.com with apex and visual force, which are programming language and framework respectively.

Objective

After completing this subject the student would be having knowledge on data types and operators, understanding core concepts of apex and visual force, which includes collections and interfaces.

UNIT-I

Data Types and Operators- Primitive, Complex, Expressions and operators, Defining Functions, Oops Concept- Abstraction, Encapsulation, Inheritance and Polymorphism

UNIT-II

Understanding Apex core concepts, Developing code in the cloud Apex Development process: Learning Apex, App Quick Start, Writing Apex class, Creating a custom object, Adding the Test class,

UNIT –III

Collections- List, Set, Map Working with DML Operations- Insert, Update, Upsert, Delete, Undelete and Merge, Execution flow in Apex- Exception Handling, Assertions and Annotations**.**

UNIT –IV

Interface in Apex- Batch Apex, Schedule Apex. Working with Triggers- Trigger Syntax, Trigger Context variables, Validations and Automations

UNIT-V

Introduction to Visual Force, Working on Visual Force components- Format Tags, Input Tags, Action Tags, Output Tags and Miscellaneous Tags. Working on Various Controllers-Custom controllers, Standard controllers, Extensions.

References

1. Apex Complete Developer Guide by Salesforce.com
2. Visual Force Developer guide by Salseforce.com

II YEAR IV SEMESTER

APEX and Visual Force Lab

1. How to write a Business class and Test class and how to create an Object?
2. Create a Rectangle class Apex class?
3. Create a Point class Apex class?
4. Create a Bank Account class?
5. How to write Collection class?
6. How to write DML statements like insert, Update, delete, Undelete, merge and Upsert?
7. How to implement Exception Handling?
8. How to write Assertion and Annotations?
9. How to write Trigger Class
10. How to write Batch Apex class?
11. How to write Schedule Apex class?
12. How to create Visual force page?
13. How to work on Standard Controllers and Custom Controllers
14. How to work on Standard list controllers?

III YEAR V SEMESTER

Advanced JavaScript

Objective:
This subject will be exploring concepts on advanced JavaScript, JQuery, and JSON
Outcome:
After completing this subject the student would be having knowledge on JQuery Selectors, JQuery UI Widgets, JQuery AJAX, and Operations from Angular JS.

UNIT 1

JQuery Selectors- All Selector, : animated selector, Attribute contain prefix selector, Attribute contain selector, Attribute contain word selector, Attribute not equal selector, Attribute equal selector, Button selector, Check selector, Checked selector, Child Selector, Using JQuery for Validating Forms- Client side Validations. Server side Validations.

UNIT 2

JQuery UI Widgets-Accordion widget, Auto complete widget, Button widget, Button widget, Checkbox radio widget, Control group widget, Date picket widget, Dialogue widget, Form reset Mixin, Widget Factory, Widget Plugin bridge, Menu widget, progress bar widget, Select menu widget, Slider widget.

UNIT 3

JQuery AJAX-Introduction to JQuery AJAX, DifferentJQuery Methods, Implementations , Example

UNIT 4

Structure of JSON- Data Structure supported by JSON,Data types in JSON, Object, Storing JSON data, Storing JSON data in Array, Nesting JSON Data, Usages of JSON-

UNIT- 5

Operations from Angular JS- Create, Read Update and Delete, Connecting to database.

References

- JavaScript: The Complete Reference by Thomas Powell (Author), Fritz Schneider (Author)
- JSON: Learn JSON In A DAY! - The Ultimate Crash Course to Learning the Basics of JSON In No Time (JSON, JSON Course, JSON Development, JSON Books)
- AngularJS: Up and Running by Na (Author)
- Visualforce Development Cookbook

III YEAR V SEMESTER

JQuery, JSON Lab

1. How to accept inputs through JavaScript?
2. How to display output through javaScript?
3. Calculate Even and Odd numbers through JavaScript?
4. How to display Capital Letters through JavaScript?
5. How to work with Arrays?
6. How to work on Keyboard Events and Mouse Events?
7. How to work on Keypress event?
8. How to work on Keyrelease event?
9. How to work on Keydown event?
10. How to work on Mouse Click event?
11. How to work on Mouse Over?
12. How to work on Mouse Drag?
13. How to work on Mouse Double Click?
14. How to work on button Click?
15. How to create mobile Layout using JQuery?

III YEAR V SEMESTER

Business Intelligence

Purpose

This subject will be exploring concepts on Wave Analytic basics, Wave Desktop Exploration, Wave App Basics, Sales Wave App, and Service Wave App.

Objective

After completing this subject the student will gain the knowledge of Business Intelligence using which they can convert raw data into pictorial format and analyse it to predict the future business.

Unit-I

Wave Analytic basics – Exploring Wave Analytics, Setup Wave analytics, Creating wave analytic App

Unit-II

Wave Desktop Exploration- Data Explorer, Analyse Data Explorer, Compare Table. Wave Mobile Exploration: Mobile Data Explorer, Mobile Exploration interface.

Unit- III

Wave App Basics: Creating Wave App basics, setting up Wave app Licenses and permissions

Unit- IV

Sales Wave app – Creating and Analysing Sales wave using Wizard, Sales wave on Mobiles

Unit-V

Service Wave App – Creating Service Wave using wizard, Service wave to Manage Service Load, Basic Wave Dashboard Customization.

References

Introduction to Salesforce Analytics - Building Reports and Dashboards: Class Slides & Workbook for Sprd-101 by Steve Wasula (Author)

III YEAR V SEMESTER

Business Intelligence Lab

1. How to create Report?
2. How to create Dashboards?
3. How to create Tabular reports
4. How to create Matrix reports?
5. How to create Joined reports?
6. How to create Summary reports?
7. How to add custom field formulas?
8. How to create immediate reports and Scheduled reports?
9. Creating Vertical Bars, Horizontal and Pie charts.
10. Adding Reports to Dashboards.
11. How to add Tabular Report to Dashboard?
12. Adding Filters to Reports.

III YEAR VI SEMESTER (ELECTIVE 1)

A. Salesforce Marketing & Sales

Objective
The student will be exploring on Standard Components of Salesforce.com, CRM Architecture, CRM as SaaS, and Campaign members.

Outcome
After completing this subject the student would understand the CRM functionality in Salesforce.com with different domains and its landscape.

UNIT-I
Working with Standard Components of Salesforce.com, Domains, Client Communication with different Industries, Landscape of Applications.

Unit-II
CRM Architecture on SFDC – Marketing Cloud, Sales Cloud and Sites Apps.

Unit- III
Working with SFDC CRM Objects: Campaigns, Leads, Accounts, Contacts, Opportunities, Products, Price Books, Quotes, Orders, and Assets.

UNIT- IV
PaaS components for CRM, Web to Lead Conversion, Auto response, Assignment rules, Mail to Case, Escalation rules.

UNIT-V
Campaign members, CRM Functional Domain, App Exchange.com.

References

The CRM Handbook: A Business Guide to Customer Relationship Management by Jill Dyché

Salesforce.com CRM by Salesforce.com publication.

III YEAR VI SEMESTER (ELECTIVE 1)

A. Sales Force Marketing Lab

1. How to create Campaign?
2. How to create Lead?
3. How to convert Lead?
4. How to create Account?
5. How to create Contact?
6. How to create Opportunity?
7. How to create Product?
8. How to create Price book?
9. How to create Quote?
10. How to create forecast?
11. How to create Order?
12. How to create Asset?
13. How to work with Campaign Management?

III YEAR VI SEMESTER (ELECTIVE-2)

B. Customer Services through Sales force

Purpose

The student will be exploring on Service Cloud, Call Centre, Chatter, VOC, CSR, and Live Agents

Objective

After completing this subject the student would understand different standard SObjects, converting the leads, tracking and managing customer purchase, creating online communities.

UNIT-I

Introduction to Service Cloud, Call Centre, Chatter, Gathering Voice of the Customer (VOC) information, Quantify the revenue cost of inaction, Inputting the VOC into other departments.

UNIT-II

Introduction to Standard S objects, Creating Account, Contacts Cases and Solutions, Converting Lead.

Unit-III

Creating customer engagement- Identifying CEC Strategy, Defining the ideal customer experience, Tracking and managing customer purchases.

UNIT-IV

Customer history and segmentation information, Customer Service Representative (CSR), surveying customers, Identify opportunities, Create online communities

UNIT-V

Live Agents-Log deployment activity with the deployment API's, Customize your chat window with the deployment API's, Customize chat buttons with the Deployment API's, Find and create records automatically with the deployment API's, Customize automated chat invitations with the deployment API's.

References

Salesforce.com For Dummies by Liz Kao and Jon Paz
Salesforce Service Cloud For Dummies by Jon Paz and T. J. Kelley

III YEAR VI SEMESTER (ELECTIVE-2)

B. Cloud Services Lab

1. How to work Cases**?**
2. How to create Solutions?
3. How to work on Console App?
4. How to convert Web to Case?
5. How to work on Escalation rules?
6. How to work on assignment rule?
7. How to work on Live agent?
8. How to create Online communities?
9. How to work on Mail to Case?
10. How to create Auto response?

SEMESTER – VI ELECTIVE – II CLUSTER-A

SALESFORCE INTEGRATION

1. SOAP Integration

Purpose

The student will be exploring on SOAP APIs, Primitive data types, custom objects and external objects, error handling, different types of WSDL.

Objective

After completing this subject the student would understand how to integrate using SOAP APIs.

UNIT-I

Introduction to SOAP API's, When to Use the SOAP API, Customize, Integrate, and Extend Your Salesforce Solutions, Supported Salesforce Editions, Standards Compliance, Development Platforms, SOAP API Support Policy, Choosing a WSDL, Related Resources, Obtain a Salesforce Developer Edition Organization, Generate or Obtain the Web Service WSDL, Import the WSDL File Into Your Development Platform , Walk Through the Sample Code.

UNIT-II

Primitive data types, Field Types, Compound fields, API data types and Salesforce field types, Core data types used in API calls, System fields, Required fields, Frequently occurring fields, API field properties, Relationship among objects, relabeling fields and tabs and API's, Tooling API in the Enterprise WSDL, Force.com App Exchange object prefix and the API's, Custom object and External objects.

UNIT- III

Custom object and External objects. Tooling API in the Enterprise WSDL, Force.com App Exchange object prefix and the API's, Custom object and External objects. Characteristics of API calls, Factors that affect data access, Package and version settings

UNIT-IV

Error handling for session expiration, Security: User Authentication, User profile and Permission set configuration, Security token, Sharing, Implicit restrictions for objects and fields, API access in Force.com App Exchange Packages, Outbound post restrictions.

UNIT-V

Obtaining the Partner WSDL file, Calls and the Partner WSDL, Object, fields and field data and the partner WSDL, Queries and the partner WSDL, Namespaces in the Partner WSDL, Packages

versions and the Partner WSDL, User Interface themes, Examples using the Partner WSDL. Data models and Standard objects

References

Programming Web Services with SOAP by Doug Tidwell and James Snell
SAlesforce.com integration Patterns by Salesforce.com

SEMESTER – VI ELECTIVE – II (CLUSTER-A)

SALESFORCE INTEGRATION

1. SOAP Lab

1. How to Create SOAP Integration class?
2. How to convert Apex code to WSDL?
3. How to convert WSDL to Apex?
4. How to perform Read operation on SOAP in one organisation?
5. How to perform Update operation on SOAP in one organisation?
6. How to perform delete operation on SOAP in one organisation?
7. How to perform Create operation on SOAP in between two organisations?
8. How to perform Read operation on SOAP in between two organisations?
9. How to perform Update operation on SOAP in between two organisations?
10. How to perform Delete operation on SOAP in between two organisations?
11. How to perform Authentication in SOAP Integration?

SEMESTER – VI ELECTIVE – II CLUSTER-A

SALESFORCE INTEGRATION

2. REST Integration

Purpose

The student will be exploring on Force.com REST API, HTTP Requests, Object Metadata, and Approval Process.

Objective

After completing this subject the student would understand on how to integrate other applications like SAP, IBM, Javausing REST API.

UNIT- I

Introducing Force.com REST API, Force.com REST Resources, Using Compression, Using Conditional Requests.

UNIT-II

Using cURL in the REST Examples, Understanding Authentication. Use CORS to Access Supported Salesforce APIs, Apex REST, and Lightning Out.

UNIT- III

Obtain a Salesforce Developer Edition Organization, Set Up Authorization, Send HTTP Requests with cURL, Walk Through the Sample Code, Using Workbench. Getting Information About My Organization.

UNIT-IV

Working with Object Metadata, Working with Records, Working with Searches and Queries, Working with Recently Viewed Information, Managing User Passwords.

UNIT-V

Working with Approval Processes and Process Rules, Using Event Monitoring, Using Composite Resources.

References

1.REST API In A Nutshell by Van Nguyen

2. RESTFUL Web APIs: Services for a Changing World by Leonard Richardson and Mike Amundsen

3.Salesforce.com Integration patterns by Salesforce.om

SEMESTER – VI ELECTIVE – II CLUSTER-A

SALESFORCE INTEGRATION

2.REST APEX Lab

1. How to Create REST Integration class?
2. How to create a REST resource?
3. Creating REST HTTP Methods .
4. Creating JSON data for REST Integration?
5. Integrating from Workbench.
6. How to perform Read operation on REST in one organisation?
7. How to perform Update operation on REST in one organisation?
8. How to perform delete operation on REST in one organisation?
9. How to perform Create operation on REST in between two organisations?
10. How to perform Read operation on REST in between two organisations?
11. How to perform Update operation on REST in between two organisations?
12. How to perform Delete operation on REST in between two organisations?
13. How to perform Authentication on REST Integration?

SEMESTER – VI ELECTIVE – II (CLUSTER-A)

SALESFORCE INTEGRATION

3. Sales force Streaming API's

Purpose

The student will be exploring on Streaming API, Set Up Authentication for Developer Testing, Examples of Interactive Visual force Page, and Generic Streaming.

Objective

After completing this subject the student would understand the concept the Streaming API, describe the primary benefit that push technology offers over pull technology and broadcast a message with generic streaming.

UNIT-I

Introducing Streaming API, Push Technology , Bayeux Protocol, CometD, and Long Polling, Streaming API Terms, How the Client Connects , Message Reliability, Message Durability, Quick Start Using Workbench, Create an Object , Create a PushTopic , Subscribe to the PushTopic Channel , Test the PushTopic Channel

UNIT-II

Examples of InteractiveVisualforce Page, Create an Object, Create a PushTopic , Create the Static Resources, Create a Visualforce Page, Test the PushTopic Channel

Examples of Visualforce Page- Create an Object, Create a PushTopic , Create the Static Resources, Create a Visualforce Page, Test the PushTopic Channel .

UNIT-III

Example: Java Client- Create an Object , Create a PushTopics, Download the JAR Filles, Add the Source Code. Example: Replay PushTopic and Generic Streaming Events Using a Visualforce Page- Deploy a Sample Project to Your Org, Durable PushTopic Streaming Sample, Durable Generic Streaming Sample, Replay Events Sample: Code Walkthrough.

UNIT-IV

Set Up Authentication for Developer Testing ,Set Up Authentication with OAuth 2.0, USING STREAMING API- Working with PushTopics, Streaming API Considerations

UNIT-V

GENERIC STREAMING- Introducing Generic Streaming, Replay Generic Streaming Events with Durable Generic Streaming, Create a Streaming Channel , Create a Java Client, Generate Events Using REST.

References

Integration Patterns through Salesfor.com by Salesfor.com

SEMESTER – VI ELECTIVE – II CLUSTER-A

SALESFORCE INTEGRATION

3.Visual Force Streaming Lab

1. How to work on Streaming API with Visualforce Pages?
2. How to create Visual force pages ?
3. How to add data to Visual force Page?
4. How to Activate Streaming API for Push Notification?
5. How to integrate through Push API's?
6. How to Create Data through Streaming API's?
7. How to perform Delete Data through Streaming API?
8. How to perform Un Delete Data through Streaming API?
9. How to perform Update Data through Streaming API?

III YEAR VI SEMESTER (CLUSTER- B)

Salesforce Lightning

1.Sales force Lightning (Client Controller)

Purpose

The student will be exploring on Component Event Propagation, Fire component Events, and Handling Component event.

Objective

After completing this subject the student would understand the concepts of handling events with client-side controllers consisting of JavaScript.

UNIT-I

Introduction to Lightning, Creating free life time account for lightning, Setup a custom domain in lightning. Creating lightning applications.

UNIT-II

Working on how to Test the custom domain, deploy the domain, Creating app, Lightning App Builder and customizing.

UNIT-III

Performing Styling Components by using Lightning , Using Style Sheet, Define and create Attributes in Lighting.

UNIT-IV

Define Functions, Define Attributes in Applications and uses and functionality in Lightning,

UNIT-V

Creating Wrapper Components in applications, Working on Conditional statements, Working on Value providers,

References

Lightning Components Developer Guide by Salesforce.com

III YEAR VI SEMESTER (CLUSTER- B)
Salesforce Lightning

1.Lightning Lab

1. Create an account for Lightning or enable lighting through Salesforce Classic?
2. How to register a domain?
3. How to create an App in Lightning?
4. Working on Custom domain in lightning?
5. How to deploy domain in Lightning?
6. How to create Components in lightning?
7. How to styling to the components?
8. How to work on attributes in lightning?
9. Define functions in Controller (Client Controller)?
10. How to call Controller functions in component?'
11. Working on Conditional Statements through Lightning?

III YEAR VI SEMESTER (CLUSTER- B)

Salesforce Lightning

2.Salesforce Lightning (Server Controller)

Purpose

The student will be exploring on creating server side controllers, calling a server-side controller action, returning error.

Objective

After completing this subject the student would understand how to create Apex methods that can be called remotely from Lightning Components code, Make calls from Lightning Components to remote methods, and handle server responses asynchronously using callback functions.

UNIT-I

Introduction to server side Controllers, Identifying Event source, Server side controllers, Calling Controller methods, Building an Lightning App,

UNIT-II

Define Standard reusable components, usage and their functioning in Lightning, Working on UI Component

UNIT- III

Define UI component Dynamic Update, Usage of UI Component dynamics Update, Working on Handling Events.

UNIT-IV

Introduction to Calling a server side action-response.getReturnValue(), $A.enqueueAction, Action States- New, Running, Success, Error, Incomplete, Aborted.

UNIT-V

Introduction to Queuing Abortable actions, Storable actions, Implementations and Usage.

References

Lightning Components Developer Guide by Salesforce.com

III YEAR VI SEMESTER (CLUSTER- B)

2. Sales force Lightning (Server Controller) **Lab**

1. How to use event sourcing in lightning experience?
2. How to call controller methods in Lightning?
3. How to build lightning app in Lightning and how to do Customizing?
4. How to implement Standard reusable components?
5. Defining the working of UI components in Lightning?
6. How to work response. getreturnvalue() in lightning?
7. How to deal with server responses, various response codes?
8. Implement all lightning components in Lightning app builder

III YEAR VI SEMISTER (CLUSTER- B)

Salesforce Lightning

3. Traditional Lightning

Purpose

The student will be exploring on Visual force in Lightning Experience, Managing Navigation, and Introduction to Design Considerations.

Objective

After completing this subject the student would understand Complete the setup of your Lightning Experience development environment. Describe two different ways to view a Visual force page in Lightning Experience during development.

UNIT-I

Application Events, Create custom application events, Fire application events, Handling Application events

UNIT-II

Advanced event applications, Firing lightning event from Non lightning code, Events best practices, Event fired during rendering lifecycle,

UNIT-III

System events, debugging, Creating app templates, Using Java Script,

UNIT-IV

Using Apex, using object oriented development, Distributing components and applications.

UNIT-V

Enable debug mode for lightning component, Salesforce lightning Inspector chrome extensions, Log messages, Fixing performance warning

References

Lightning Components Developer Guide by Salesforce.com

III YEAR VI SEMISTER (CLUSTER- B)

4. Traditional Lightning Lab

1. How to Handle an application event in lightning?
2. How to handle custom application events through lightning
3. How to implement firing lightning event from non-lightning code?
4. How to use System events in Sales force?
5. How to connect Apex in lightning?
6. How to connect Java Script in Lightning?
7. How to enable debugging mode in Lightning experience?
8. How to display log messages in Sales force lightning?
9. How to fix performance warning through lightning?

PROJECT & VIVA-VOCE

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

INTERNET OF THINGS

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Computer Fundamentals and Programming in 'C'	4	3	25	75	100
		Hardware and C Programming Lab	2	2	0	50	50
SEMESTER II	II	Fundamentals of IoT and Applications	4	3	25	75	100
		Arduino Basics Lab and Tutorial	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Computer Networks (wired and wireless)	4	3	25	75	100
		Wireless Technology Lab	2	2	0	50	50
SEMESTER IV	IV	RFID and Sensor Networks	4	3	25	75	100
		Network Simulator –3 Lab	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	Embedded Systems	3	3	25	75	100
		Embedded Systems Lab	2	2	0	50	50
	VI	Machine-Machine Technologies, Applications &Markets	3	3	25	75	100
		Machine-Machine Lab	2	2	0	50	50
SEMESTER VI	**VII (A/B)**	**Elective-I**	3	3	25	75	100
		A. Service Oriented Architecture + SOA Lab					
		B . Big Data Technology+ Big Data Technology through Hadoop lab					
		Lab for Elective -I	2	2	0	50	50
	VIII ClusterA-	Elective-II(cluster A)					
		1. Security and Privacy in IoT +	3	3	25	75	100

	1,2,3 Or Cluster B- 1,2,3	Security and Privacy in IoT Lab 2. IoT in the Cloud + IoT in the Cloud Lab 3. Mobile Internet: Enabling Technologies and Services + Mobile Internet: Enabling Technologies and Services LAB					
		Lab+Project	2	2	20	30	50
		Elective-II(cluster B)					
		1. Data Mining and Data Analysis + Data Mining and Data Analysis Lab 2 Big Data and IoT/ Big Data and IoT Lab 3. Security and Privacy in IoT + Security and Privacy in IoT Lab	3	3	25	75	100
		Lab+ Project	2	2	20	30	50

SEMESTER-I

Computer Fundamentals and Programming in 'C'

Objectives

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn data types and control structures of C
4. Learn to map problems to programming features of C.
5. Learn to write good portable C programs.

Outcomes

1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

UNIT-I

Introduction to computers, characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations. Number systems: binary, hexa and octal numbering system Input and output devices: Keyboard and mouse, inputting data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory.

UNIT-II

Introduction to C: Introduction, structure of c program, writing the first c program, file used in c program, compiling and executing c programs, using comments, keywords, identifiers, basic data types in c, variables, constants, I/O statements in c, operators in c, programming examples, type conversion and type casting.

UNIT-III

Decision control and looping statements: Introduction to decision control statements, conditional branching statements, iterative statements, nested loops, break and continue statement, go to statement.

Functions: Introduction, using functions, function declaration/prototype, function definition, function call, return statement, passing parameters, scope of variables, storage classes, recursive functions, type of recursion, towers of Hanoi, recursion vs iteration. Function Calling

UNIT-IV

Arrays: Introduction, declaration of arrays, Accessing elements of the array, storing values in array, calculating the length of the array, one dimensional array for inter function communication, two dimensional arrays for inter function communication.

Strings: Introduction, suppressive input, string taxonomy, string operations, miscellaneous string and character functions.

UNIT-V

Pointers: Understanding computer memory, introduction to pointers, declaring pointer variables, pointer expressions and pointer arithmetic, null pointers, generic pointers, passing arguments to functions using pointer, pointer and array, passing array to function, difference between array name and pointer, pointers and strings, array of pointers.

Structures, union and enumerated data types: Introduction, nested structures, array of structures, structures and functions, self referential structures, union, array of unions, variables, unions inside structures, enumerated data types.

References

1. Computer fundamentals and c programming in c by Reema thareja, oxford university press
2. E Balaguruswamy, programming in c ANSI C, McGraw Hill, six Ed 2012, ISBN 978-1259004612, 572 pages.
3. Y kanithkar, let us c BPB, 13th edition-2013, ISBN:978-8183331630,656 pages.
4. Dennis M. Ritchie and Brain W. Kernighan, "the c programming language PHI:2 edition, 1990 ISBN:978-8120305960" 284 pages.
5. Ashok N kamthane : programming with ANSI and Turbo c, pearion edition publ, 2002.

SEMESTER-I

Hardware and C Programming Lab

Hardware Lab:

1. Identify various Memory components of the Computer.
2. Identify Various Cables and their uses
3. Identify various Network Devices.
4. Assembling and Disassembling of Computers.

C Programming Lab:

1. Find the biggest of three numbers using c.
2. Write a c program to find the sum of individual digits of a positive integer.
3. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
4. Write a c program to check whether a number is Armstrong or not.
5. Write a program to perform various string operations.
6. Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a c program that uses functions to perform the following:
   a. Addition of two matrices.
   b. Multiplication of two matrices.
8. Write a c program that implements searching of given item in given list.
9. Write a c program to sort a given list of integers in ascending order.
10. Write a c program to perform various operations using pointers.
11. Write a c program to read data of 10 employees with a structure of 1.employee id 2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
12. Write a program for concatenation of two strings.
13. Write a program for length of a string.

SEMESTER-II

FUNDAMENTALS OF IoT AND APPLICATIONS

Objective

The Objective of this course is to understand where the IoT concept fits within the broader ICT industry and possible future trends. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.

Outcome

Students can understand how to design a simple IoT system comprising sensors, edge devices, wireless network connections and data analytics capabilities.

UNIT-I

Introduction to the Internet of Things, Importance of IoT, Elements of an IoT ecosystem, Technology drivers, Business drivers, Typical IoT applications, IoT Trends and implications.

UNIT-II

Sensors and sensor nodes, Sensing devices, Sensor modules, nodes and systems.

UNIT-III

Connectivity and networks, Wireless technologies for the IoT, Edge connectivity and protocols, Wireless sensor networks.

UNIT-IV

Analytics and applications, Signal processing, real-time and local analytics, Databases, cloud analytics and applications.

UNIT-V

Industry perspective, Business considerations, Legal challenges

References

1. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
2. Keysight Technologies, “The Internet of Things: Enabling Technologies and Solutions for Design and Test”, Application Note, 2016.

3. Charles Bell, “Beginning Sensor Networks with Arduino and Raspberry Pi”, Apress, 2013.
4. D. Evans, "The Internet of Things: How the Next Evolution of the Internet Is Changing Everything", Cisco Internet Business Solutions Group, 2011
5. McKinsey & Company, "The Internet of Things: Mapping the value beyond the hype", McKinsey Global Institute, 2015.
6. European Alliance for Innovation (EAI), "Internet of Things: Exploring the potential", Innovation Academy Magazine, Issue No. 03, 2015.
7. Digital Greenwich, “Greenwich Smart City Strategy”, 2015.
8. ITU and Cisco, "Harnessing the Internet of Things for Global Development", A contribution to the UN broadband commission for sustainable development.

SEMESTER-II

Arduino Lab and Tutorial

1) Gather Different Sensors.
2) Study about Different Networks Examples.
3) Arduino Board Basics.
4) Architecture
5) Protocols.

SEMESTER III

COMPUTER NETWORKS (WIRED AND WIRELESS)

Objective

Emphasize the wired & wireless computer networks as a hybrid system to reflect the current trends of modern communications network architectures and techniques, instead of treating the wired networks and wireless networks separately, focus on both network architecture design and rigorous mathematical modelling techniques for performance analyses, rather than mainly on the network protocols specifications, integrate results of instructor's research and emerging techniques into the course topics to motivate students' research interests, not confined to traditional techniques.

Outcome

Students get familiar with various Network Reference Models, Protocols and issues involved in wired and wireless networks.

UNIT-I

Network architecture, layered protocols, Internet TCP/IP, hybrid wired & wireless networks, Digital data transmission over wired/wireless links & wireless communications channel, Network models.

UNIT-II

Reliable communication techniques & channel coding over wired & wireless links, Multiple access control over wired/wireless networks, IEEE 802 spectrum & MAC protocols.

UNIT-III

Network topology, packet switching architectures, packet routing algorithms, fair queuing, Internet protocol stack, wire line TCP/UDP/IP, wireless TCP, window-based vs. rate-based.

UNIT-IV

Network queuing-delay/loss modelling for performance analyses in quality of service (QoS), IEEE 802.11 protocol spectrum, MAC and DCF/PCF, and interconnections with Internet:

UNIT-V

Next generation wired and wireless networks – QoS provisions for multimedia streaming:

References

1. Data Communications and Computer Networks By Prakash C. Gupta, PHI Publishers.
2. Computer Networks By Andrew S.Tanenbaum, Pearson Education.
3. Wireless Technologies Circuits, Systems and Devices by Krzysztof Iniewski CRC Press.
4. Wireless Networking Technology: From Principles to Successful Implementation by Stephen A. Rackley.

SEMESTER III

Wireless Technology LAB

Objectives

- To understand the functioning of various protocols in Wired and Wireless Environment.
- To perform real time experimentation using the existing infrastructure.
- To impart programming to construct LAN, WLAN , and VLAN in a real- time environment.

Outcome

- Ability to design MAC and routing protocols in Wired and Wireless Environment using NS2/QUALNET/BWSim. Matlab.
- To acquire the technical competence to meet out the industry expectation on the state-of the art wired / wireless technologies.
- To acquire the ability to design WLAN / LAN systems meeting out real time requirements.

List of Experiments (NS2/QUALNET/BWSIM/MATLAB)

1. Wired and Wireless network scenario creation.
2. Study of Routing Protocols.
3. Analysis of Network Security Algorithms.
4. Study of Zig Bee Energy Model and MAC Protocols.
5. Queuing Mechanism
6. QoS Analysis of Multimedia traffic.
7. Call establishment in cellular network.
8. Handover in cellular network.
9. Throughout performance for various terrain models transmission modes, loading conditions, traffic profiles in L TE network.

SEMESTER IV

RFID and Sensor Networks

Objective

Introducing RFID and related Architectures and to discuss the uses of RFID Principles, RFID Components and security issues. Introducing Wireless Sensor Networks, Various Small Components, embedded systems, introducing various technologies.

Outcome

1) Students will be familiar with RFID technology, various components involved.
2) Getting familiar with various RFID standards.
3) Students learn various Security issues involved in RFID.
4) Students learn about Wireless Sensor Networks, protocols routing algorithms.
5) Various Security issues involved in Wireless Sensor Networks.

Unit-I

Introduction of RFID, Medium access control in RFID Anti collision Algorithms in RFID.

Unit-II

Low power Transponders for RFID, EDC – Gen-2 Standard for RFID.

Unit-III

RFID Authentication, Privacy, Security. Basics of Wireless Sensor Networks, Geographic Routing in Wireless Sensor Networks.

Unit-IV

Medium access control, localization, Data Aggregation in Wireless Sensor Networks.

Unit-V

Energy Efficient Sensing, Mobility, Security Network Management the Wireless Sensor Networks.

References

1) RFID and Sensor Networks Architecture, Protocols, Security and integration by Yan Zhang, Laurence T. Yang, Jining.

2) Wireless Sensor Networks Technology, protocols and applications by KAZEM SOHRABY, DANIEL MINOLI TAIEB ZNATI, JOHN WILEY & SONS, INC Publication.
3) REILLY, RFID Essentials By Bill Glover, Himanshu Bhatt.

SEMESTER IV

Network Simulator –3 Lab

1. Introduction to network simulators used for wireless Ad Hoc and Sensor Networks.
2. Introduction to TCL scripting: demonstration of one small network simulation script.
3. To study various trace file formats of network simulators.
4. To implement and compare various MAC layer protocols.
5. To implement and compare AODV and DSR routing algorithms in MANET.
6. To implement DSDV routing algorithms in MANET.
7. To implement signal strength based link management routing protocols.
8. To calculate and compare average throughput for various TCP variants.
9. To implement and compare various routing protocols for wireless sensor networks.

SEMESTER V

EMBEDDED SYSTEMS

Objectives

- To study the overview of Embedded System Architecture
- To focus on distributed Embedded Architecture and its accessing protocols
- To understand about the design methodologies in hardware and software design

Outcomes

- Explain various embedded system applications and design requirements
- Construct embedded system hardware
- Develop software programs to control embedded system
- Generate product specification for embedded system
- Outline validation and testing methodologies for embedded system

Unit I

Introduction: Embedded systems overview-design challenge-optimizing metrics-processor Technology-IC technology-design technology-automation-synthesis-verification: hardware/software co-simulation-trade-offs.

Unit II

Processing Elements: Custom single purpose processor design-RT level custom single purpose processor design-optimizing custom single purpose processors-General purpose processor's software: architecture, operation, programmer's view and development Environment –ASIPs -selecting a microprocessor -general purpose processor design.

Unit III

Memory: Introduction-memory write ability and storage Permanence-common memory types -composing memory-memory hierarchy and caches-advanced RAM.

Unit IV

Interfacing: Introduction-communication basics-microprocessor interfacing: I/O addressing, interrupts, DMA-Arbitration-multilevel bus architectures-advanced communication principles -serial protocols-parallel protocols-wireless protocols-Standard single purpose processor's peripherals: timers, counters, watchdog timers, UART, PWM, LCD controllers, keypad controllers, stepper motor controllers, ADC and RTC.

Unit V

Applications: Digital camera-washing machine-cell phones-home security systems-finger print identifiers-cruise control-printers-Automated teller machine.

References

1.Frank Vahid and Tony Givargis, Embedded system design: A unified hardware/Software introduction, Third edition, John Wiley & sons, 2010

2.Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design , Morgan Kaufman Publishers, 2008.

3.Jonathan.W.Valvano, Embedded Microcomputer systems: Real Time Interfacing, Third edition, cengage learning,2012

4.Santanuchattopadhyay, Embedded system Design, PHI Learning Pvt. Ltd., 2010

5.Steave Heath, Embedded system Design, Second edition, 2003

6.Daniel D. Gajski, Samar. Abdi, Andreas. GerstlauerEmbedded system design: Modeling, synthesis and verification", Springer, 2009

SEMESTER V

EMBEDDED SYSTEMS LAB

List of Experiments (PIC/ARM/Cold Fire)

1.Study of Trainer kit and IDE

2.Interface switches and LEDs

3.Interface LCD and display "Hello World"

4.Interface 4*4 matrix keyboard

5.Interface stepper motor

6.Implementation of Interrupt Handling Techniques.

7.Interface 7 Segment Display using I2C

8.Serial communication using UART to display "Hello World" in PC

9.Interface LM35 temperature sensor using ADC

10.Generation of RAMP wave using on-chip DAC

SEMESTER V

MACHINE-MACHINE TECHNOLOGIES, APPLICATIONS & MARKETS

Objectives:

1. The objective of this course is to discuss the cradle of M2M systems and the reasoning of their emergence, the peculiarities of these systems with emphasis on the very differing rate, delay and energy requirements..
2. We will deal with embedded short-range systems which generally deliver M2M traffic via multiple hops towards a gateway which in turn is connected to the back-end server network or has cellular connectivity (so-called M2M Gateways).
3. We will also draw a comprehensive comparison between these canonical architectures. We will discuss in great details the tradeoffs between node performance (throughput, delay, energy efficiency), network performance (outage, lifetime) and cost (CAPEX, OPEX). Finally, we will summarize and highlight a large set of open problems which are likely to occupy the community for years to come.
4. We can know the Big Data, market and business cases for M2M. Finally, we will dwell on open challenges and outline some of our M2M predictions. We will also leave space for discussions and Q&A.

Outcome

Students will learn a detailed industrial, technical and market insight into latest key aspects of wireless M2M networks, with particular application to smart cities and smart grids. They also learn different protocols and their working, also business issues.

Unit-I

Overview of M2M: Quick Introduction, M2M Return-of-Investment (ROI), M2M in Smart Cities, M2M in Smart Grids

Unit-II

Capillary M2M: Quick Intro to Short-Range Networks, IEEE-Pertinent M2M Standards, IETF-Pertinent M2M Standards, Low-Power Wifi for M2M

Unit-III

Cellular M2M: Introduction to Cellular Communications, M2M in Current Cellular Networks, M2M Cellular Standardization Activities and Alliances, Specific M2M Architectures, Platforms, and Performance

Unit-IV

Market and Business for M2M: Current M2M Market and Outlook, Opportunities and Business Models, The M2M Value Chain, The Role of Mobile Operators, Big Data in M2M

Unit- V

Conclusions: Challenges for the Future, Some Predictions for M2M

Reference books

1. Machine-to-Machine Communications: Architectures, Technology, Standards, and applications by Vojislav B. Misic, Jelena Misic ,CRC PUBLICATIONS
2. M2M Communications: A Systems Approach BY David Boswarthick , WILEY
3. Machine-to-machine (M2M) Communications: Architecture, Performance and PERFORMANCE BY Carles Anton-Haro, Mischa Dohler, WOODHEADPUBLISHING

SEMESTER V

MACHINE-MACHINE LAB

1. **Bluetooth Robot:**

   Control a small rover from your Android phone using Bluetooth and an Arduino and motor shield.

2. **Android Geiger Counter:**

   An Android Open Accessory project using a USB host shield and Arduino Uno

3. **Android Light Show:**

   A powered Open Accessory dock for your Android phone that drives three LED panels to make a sound-sensitive light show.

4. **Android TV Remote:**

   Programmable infrared remote control accessory for your Android phone

SEMESTER VI

Elective-I (A)

SERVICE ORIENTED ARCHITECTURE

Objectives

Learn XML fundamentals.
Be exposed to build applications based on XML.
Understand the key principles behind SOA.
Be familiar with the web Services technology elements for realizing SOA.
Learn the various web Service standards.

Outcome

Build applications based on XML. Develop web services using technology elements. Build SOA-based applications for intra-enterprise and inter-enterprise applications.

UNIT-I

INTRODUCTION TO XML: XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files.

UNIT-II

BUILDING XML- BASED APPLICATIONS: Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modelling Databases in XML.

UNIT-III

SERVICE ORIENTED ARCHITECTURE: Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA — Principles of Service orientation – Service layers.

UNIT-IV

WEB SERVICES : Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions.

UNIT-V

BUILDING SOA-BASED APPLICATIONS: Service Oriented Analysis and Design – Service Modelling – Design standards and guidelines — Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE

References

1. Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2002.
2. Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

3. Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education, 2002
4. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2005
5. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2004.
6. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, "Java Web Services Architecture", Morgan Kaufmann Publishers, 2003.

SEMESTER VI

Elective-I (A)

SERVICE ORIENTED ARCHITECTURE LAB

Design based Problems (DP)/Open Ended Problem

1. Think, analyze and implement SOAP based web service to create to-do list application in your preferred language.

2. Consider library management system for your college and create REST based web service for it to manage all the functionalities of your college library.

SEMESTER VI

Elective-I (B)

BIG DATA TECHNOLOGY

Objective

The Objective is to provide a practical foundation level training that enables immediate and effective participation in big data projects. The course provides grounding in basic and advanced methods to big data technology and tools, including map Reduce and Hadoop and its ecosystem.

Outcome

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

Unit-I

Introduction –distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications.

Unit-II

Big Data – Apache Hadoop & Hadoop Ecosystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map reduce- Data Serialization.

Unit-III

Introduction –distributed file system-algorithms using map reduce, Matrix – Vector Multiplication by Map Reduce – Hadoop – Understanding the Map Reduce architecture – Writing Hadoop Map Reduce Programs – Loading data into HDFS – Executing the MAP phase – Shuffling and sorting – Reducing phase execution.

Unit-IV

Hadoop Architecture, Hadoop Storage : HDFS, Common Hadoop Shell Commands, Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers –Cluster Setup – SSH & Hadoop Configuration –HDFS Administering – Monitoring & Maintenance.

Unit-V

Hadoop ecosystem components – Schedulers- Fair and Capacity, Hadoop 2.0 New Features – NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

References

1. Boris lublinsky, Kevin t. Smith Alexey Yakubovich, “Professional Hadoop Solutions”. Wiley, ISBN : 9788126551071, 2015.
2. Chris Eaton, Dirk Deroos et al., “Understanding Big Data”, McGraw Hill , 201.
3. Tom White, “HADOOP” : The definitive Guide”, O Reilly 2012.

SEMESTER VI

Elective-I (B)

BIG DATA TECHNOLOGY Through Hadoop LAB

1. Implement the following Data Structures in Java
   a) Linked Lists
   b) Stacks
   c) Queues
   d) Set
   e) Map

2.
   (i) Perform setting up and Installing Hadoop in its three operating modes:
   Standalone
   Pseudo distributed
   Fully distributed
   (ii) Use web based tools to monitor your Hadoop setup.

3. Implement the following file management tasks in Hadoop:
   Adding files and directories
   Retrieving files
   Deleting files

SEMESTER VI

Elective-II (Cluster-A)

1. SECURITY and PRIVACY IN IoT

UNIT-I

Introduction, System Model for the Internet of Things : The Concept of the Internet of Things, Evolution of the Networks

UNIT-II

Vision of the Internet of Things, Large Scale Ubiquitous and Pervasive Connectivity, Context-Aware Computing, Seamless Connectivity and Interoperability, Network Neutrality, Applications of the Internet of Things, Challenges.

UNIT-III

Vulnerable Features and Threats: Vulnerable Features of the Internet of Things, Threat Taxonomy: Definition of Threat, Proposed Taxonomy.

UNIT-IV

System Security Threats, Privacy Threats, Reflective Trust and Reputation Threats.

UNIT-V

Securing the Internet of Things: Making the IoT more secure and private, Protocol and Network Security, Data and Privacy, Identity Management, Trust Management, Fault Tolerance, Standardizations, Governance, Social awareness.

References

SEMESTER VI

Elective-II (Cluster-A)

1. SECURITY and PRIVACY IN IoT LAB

IoT Enabling and Security Research Lab

SEMESTER VI

Elective-II (Cluster-A)

2. IoT IN THE CLOUD

Objectives

- To understand the basics of Internet of Things.
- To get an idea of some of the application areas where Internet of Things can be applied.
- To understand the middileware for Internet of Things.
- To understand the concepts of Web of Things.
- To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing.
- To understand the IOT protocols.

Outcome

Upon completion of the course the students will be able to

- Identify and design the new models for market strategic interaction.
- Design business intelligence and information security for WoB.
- Analyze various protocols for IoT.
- Design a middleware for IoT.
- Analyze and design different models for network dynamics.

UNIT-I : INTRODUCTION

Definition and Functional Requirements – Motivation – Architecture – Web 3.0 View of IoT- Ubiquitous IoT Applications- Four pillars of IoT- DNA of IoT- The Toolkit Approach for End-User Participation in the Internet of Things. Middleware for IoT : Overview – Communication middleware for IoT – IoT Information Security.

UNIT-II : IOT PROTOCOLS

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA – and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802, 15 BAC Not Protocol Modbuo KNX Zignoo Architecture Network layer APS layer Security.

UNIT-III : WEB OF THINGS

Web of Things versus Internet of Things- Two pillars of the Web-Architecture Standardizatio for WoI- Plattform Middleware for WoI- United multitier WoI Architecture –WoI Portals and Business Intelligence Cloud of Things Grid SQA and Cloud Computing – Cloud Middleware –

Cloud Standardization – Cloud Provides and Systems – Mobile Cloud Computing – The Cloud of Things Architecture.

UNIT-IV : INTEGRATED

Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things Network Dynamics : Population Models- Information Cascades – Network Effects – Network Dynamics Structural Models – Cascading Behaviour in Networks – The Small-Word Phenomenon.

UNIT-V : APPLICATION

The Role for the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments – Resource Management in the Internet of Things Clustering Synchron sation and Software Agents Applications – Smart Grid – Electrical Vehicle Charging.

References

1. The Internet of Things in the Cloud. A Middleware Perspective – Honbo Zhou – CRC Press-2012.
2. Architechting the Internet of Things – Dieter Uckelmann, Mark Harrison, Florain Michahells – (Eds.) – Springer – 2011.
3. Networks Crods and Markets, Reasoning About a Highly connected World – David Easley and Jon Kieinberg.
4. The Internet of Things Applications to the Smart Grid and Building Automation by – Oliver Hersent Omar Ellioumi and David Boswarthick –Wiley -2012.
5. Olivler Hersent David Boswarthick Omar Elloumi- The Internet of Things – Key Applicaitons and Protocols, Wiley-2012.

SEMESTER VI

Elective-II (Cluster-A)

3. IoT IN THE CLOUD LAB

SEMESTER VI

Elective-II (Cluster-A)

3. Mobile Internet: Enabling Technologies and Services

UNIT-I

The Evolution toward the Mobile Internet, Internet Access over Wireless LANs,

UNIT-II

Internet Access over GPRS, Mobility Management in Mobile IP Networks,

UNIT-III

Quality of Service in Mobile IP Networks, Multicast in Mobile IP Networks

UNIT-IV

Secure Mobility in Wireless IP Networks, Security Issues in Wireless IP Networks

UNIT-V

Header Compression Schemes for Wireless Internet Access, Video Streaming in Wireless Internet

References:

1. Mobile internet Enabling Technologies and Services by Apostolis K. Salkintzis, crc press

2. Mobile Internet For Dummies By Michael J. O'Farrell, John R. Levine, Jostein

SEMESTER VI

Elective-II (Cluster-A)

3. Mobile Internet: Enabling Technologies and Services LAB

SEMESTER VI

Elective-II (Cluster-B)

1. DATA MINING AND DATA ANALYSIS

Objective

- To learn data analysis techniques.
- To understand Data mining techniques and algorithms.
- Comprehend the data mining environments and application.

Outcome

Students who complete this course will be able to

- Compare various conceptions of data mining as evidenced in both research and application.
- Characterize the various kinds of patterns that can be discovered by association rule mining.
- Evaluate mathematical methods underlying the effective application of data mining.

Unit-I

Data mining-KDD versus data mining, Stages of the Data Mining Process-Task primitives., Data Mining Techniques – Data mining knowledge representation.

Unit-II

Data mining query languages- Integration of Data Mining System with a Data Warehouse-Issues, Data pre-processing – Data Cleaning.

Data transformation – Feature selection – Dimensionality reduction – Discretization and generating concept hierarchies – Mining frequent patterns association – correlation.

Unit-III

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

Model Over fitting: Due to presence of noise, due to lack of representation samples, evaluating the performance of classifier: holdout method, random sub sampling, cross-validation, bootstrap

Unit-IV

Bayesian Classification – Rule Based Classification – Classification by back propagation – Support Vector Machines –Associative Classification – Lazy Learners – Other Classification Methods-

Unit-V

Clustering techniques – Partitioning methods-k-means-Hierarchical Methods – Distance based agglomerative and divisible clustering – Density – Based Methods – Expectation maximization – Grid Based Methods – Model – Based Clustering – Methods – Constraint – Based Cluster Analysis – Outlier Analysis.

References

1. Adelchi Azzalini, Bruno Scapa, "Data Analysis and Data mining" , 2nd Ediiton, Oxford Univeristy Press Inc., 2012.
2. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", 3rd Edition, Morgan Kaufmann Publishers, 2011.
3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", 10th Edition, TataMc Graw Hill Edition , 2007.
4. G.K. Gupta, "Introduction to Data Mining with Case Studies", 1st Edition, Easter Economy Edition, PHI, 2006.

Student Activity

Case Study I: Analysis and Forecasting of House Price Indices

Case Study II: Customer Response Prediction and Profit Optimization

SEMESTER VI

Elective-II (Cluster-B)

1. DATA MINIG AND DATA ANALYSIS LAB

Objectives

- To Analyze the data using statistical methods
- To understand and demonstrate data mining

Outcome

- Use Statistical techniques to carry out the analysis of data
- Gain hands-on skills and experience on data mining tools

List of Experiments

1. Data Analysis – Getting to know the Data (Using ORANGE WEKA)
    - Parametric – Means . T-Test, Correlation
    - Prediction for numerical outcomes – Linear regression
    - Correlation analysis
    - Preparing data for analysis
        - Pre-Processing techniques

2. Data Mining (Using ORANGE WEKA or any source data mining tool)
    - Implement clustering algorithm
    - Implement classification using
        - Decision tree
        - Back Propagation
    - Visualization methods
    - .

SEMESTER VI

Elective-II (Cluster-B)

2. BIG DATA AND IoT

UNIT-I

Big Data Solutions and the Internet of Things, Evaluating the Art of the Possible

UNIT-II

Understanding the Business, Business Information Mapping for Big Data and Internet of Things

UNIT-III

Understanding Organizational Skills, Designing the Future State Information Architecture

UNIT-IV

Defining an Initial Plan and Roadmap, Implementing the Plan.

UNIT-V

Case studies in role of big data and IoT in big data business, market and governance

References

1. Big Data and The Internet of Things: Enterprise Information Architecture by Robert Stackowiak, Art Licht, Venu Mantha, Louis Nagode ,act press

2. Information Fusion and Analytics for Big Data and IoT by Eloi Bosse, Basel Solaiman , ARTECH HOUSE

3. Big-Data Analytics for Cloud, IoT and Cognitive Learning by Kai Hwang, Min Chen, Wiley.

SEMESTER VI

Elective-II (Cluster-B)

3. BIG DATA AND IoT LAB

SEMESTER VI

Elective-II (Cluster-B)

3. SECURITY and Privacy in IoT

UNIT-I

Introduction, System Model for the Internet of Things: The Concept of the Internet of Things, Evolution of the Networks

UNIT-II

Vision of the Internet of Things, Large Scale Ubiquitous and Pervasive Connectivity, Context-Aware Computing, Seamless Connectivity and Interoperability, Network Neutrality, Applications of the Internet of Things, Challenges.

UNIT-III

Vulnerable Features and Threats: Vulnerable Features of the Internet of Things, Threat Taxonomy: Definition of Threat, Proposed Taxonomy.

UNIT-IV

System Security Threats, Privacy Threats, Reflective Trust and Reputation Threats.

UNIT-V

Securing the Internet of Things: Making the IoT more secure and private, Protocol and Network Security, Data and Privacy, Identity Management, Trust Management, Fault Tolerance, Standardizations, Governance, Social awareness.

References

SEMESTER VI

Elective-II (Cluster-B)

3. SECURITY and PRIVACY IN IoT LAB

IoT Enabling and Security Research Lab

WEB ENALBLED TECHNOLOGIES

I YEAR 1 SEMESTER

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Fundamentals of computers, Web, Internet & Python - Programming	4	3	25	75	100
		MS-Word & Python-Programming Lab	2	2	0	50	50
SEMESTER II	II	HTML, CSS & Java Script	4	3	25	75	100
		HTML, CSS & JavaScript Lab	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Graphic Designing : Illustrator Indesign, Advanced Photoshop & Captivate	4	3	25	75	100
		Graphic Designing Lab	2	2	0	50	50
SEMESTER IV	IV	PHP – MySql & Wordpress	4	3	25	75	100
		PHP-MySql & Wordpress Lab	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	Advanced JavaScript : JQuery, Ajax, Angular JS & JSON	3	3	25	75	100
		Advanced JavaScript Lab	2	2	0	50	50
	VI	Mobile APPs Development	3	3	25	75	100
		Mobile APPs Development Lab	2	2	0	50	50
SEMESTER VI	VII (A/B)	**Elective-I**	3	3	25	75	100
		A. OOP using Java					
		B. C#.NET	2	2	0	50	50
		Lab for Elective -1					
	VIII Cluster - A-1,2 Or Cluster – B – 1,2	**Elective-II(cluster A)**					
		1. Java Servlets	3	3	25	75	100
		2. JDBC					
		3. JSP					
		Project Work	2	2	20	30	50
		Elective-II (cluster B)					
		1. ASP.NET	3	3	25	75	100
		2. SQL Server					
		3. ASP.NET MVC					
		Project Work	2	2	20	30	50

Paper-I: Fundamentals of computers, web, Internet & Python-Programming

Course Objectives

To explore basic knowledge on computers, able to write own document in word, solving common types of computing problems, data types and control structures of Python, programming features of Python

Course Outcomes

Upon successful completion of the course, a student will be able to:

understand the working of a digital computer, Analyze a given problem and develop an algorithm to solve the problem, Improve upon a solution to a problem, Use the Python language constructs in the right way and Design, develop and test programs written in Python.

UNIT I

Introduction to computers: Definition, Characteristics and limitations of computers - Elements of Computers - Hardware - CPU - Primary and Secondary memory - Input and Output devices. IT enabled services

UNIT II

Operating System and Windows: Operating Systems: Meaning, Definition, Functions and Types of Operating Systems - Booting process – Disk Operating System: Internal and External Commands – Wild Card Characters – Computer Virus, Cryptology. Windows operating system - Desktop, Start menu, Control panel, Windows accessories. Understanding Web Technologies. Difference between Web Applications and Desktop Applications.

UNIT III

MS Office I : MS Word : Word Processing : Meaning and features of word processing – Advantages and applications of word processing - Parts of MS Word application window – Toolbars – Creating, Saving and closing a document – Opening and editing a document - Moving and copying text – Text and paragraph formatting, applying Bullets and Numbering – Find and Replace – Insertion of Objects, Date and Time, Headers, Footers and Page Breaks – Auto Correct – Spelling and Grammar checking – Graphics, Templates and wizards - Mail Merge : Meaning, purpose and advantages – creating merged letters, mailing labels, envelops and catalogs- Working with Tables – Format Painter. Services available on internet - WWW - ISP. E commerce : Meaning ,advantages and limitations, applications of E commerce - trading stocks online, ordering products / journals / books etc., online, travel and tourism services,

employment placement and job market, internet banking, auctions, online publishing, advertising-Online payment system.

UNIT IV

Introduction to Python Programming

Introductions Etc: Resources, A general description of Python Interactive Python - Lexical matters : Lines, Comments, Names and tokens, Blocks and indentation, Doc strings, Program structure, Operators, Code evaluation - Statements and inspection -- preliminaries - Built-in data-types :Numeric types, Tuples and lists, Strings : The new string.format method, Unicode strings , Dictionaries, Files, Other built-in types :The None value/type, Boolean values, Sets and frozensets - Functions and Classes -- A Preview

UNIT V

Statements : Assignment statement, import statement, print statement, if: elif: else: statement, for: statement, while: statement, continue and break statements, try: except: statement, raise statement, with: statement :Writing a context manager, Using the with: statement, del, case statement - Functions, Modules, Packages, and Debugging : Functions: The def statement, Returning values, Parameters, Arguments, Local variables, Global variables and the global statement, Doc strings for functions, Decorators for functions - lambda, Iterators and generators, Modules: Doc strings for modules - Packages, Classes: A simple class, Defining methods, The constructor, Member variables, Calling methods, Adding inheritance, Class variables, Class methods and static methods, Properties, Interfaces, New-style classes, Doc strings for classes, Private members

Reference Books:

1. Fundamentals of Computers by Reema Thareja from Oxford University Press
2. Microsoft Office 2007 Fundamentals, 1st Edition By Laura Story, Dawna Walls UNIT IV, V.
3. Introduction to Python by Dave Kuhlman

Student Activity:

1. Write a program for preparing the attendance particulars of students of your college at the end of semester according to following guidelines
   a. Above 75 % promoted
   b. Above 65% condoned
   c. Below 65% detained
2. Write a program for creating timetable or your class taking work load of faculty into consideration.

MS-Word & Python Programming Lab

MS-WORD

1. **Design a visiting card for Managing Director of a Company with following specification**
   i. Size of visiting card is 3.5" x 2"
   ii. Name of a company with big font using Water Mark
   iii. Phone number, fax number and e-mail address with appropriate symbols
   iv. Office and residence address separated by line.

2. **Create a letter head of a company**
   i. Name of Company on the top of the page with big font and good style
   ii. Phone numbers, fax numbers, e-mail address with appropriate symbols
   iii. Main products manufactured to be described at the bottom
   iv. Slogans if any should be specified in bold at the bottom

3. **Creation of your Bio-Data:** consisting Name, email-id, Contact Address, Carrier Objective, Educational qualifications, social activities, achievements.

Python Programming Lab

1. Write a Python program to convert temperatures to and from celsius, fahrenheit.
2. Write a Python program that accepts a word from the user and reverse it
3. Write a Python program to get the Fibonacci series between 0 to 50.
4. Write a Python program which takes two digits m (row) and n (column) as input and generates a two-dimensional array. The element value in the i-th row and j-th column of the array should be i*j.
5. Write a Python program that accepts a string and calculate the number of digits and letters
6. Write a Python program to check whether an alphabet is a vowel or consonant
7. Write a Python program to calculate the sum and average of n integer numbers
8. Write a Python program to create the multiplication table (from 1 to 10) of a number
9. Write a Python function to find the Max of three numbers.
10. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.
11. Write a Python function that takes a number as a parameter and check the number is prime or not.
12. Write a Python function to check whether a number is perfect or not.
13. Write a Python function that checks whether a passed string is palindrome or not.
14. Write a Python program for sequential search.
15. Write a Python program to sort a list of elements using the selection sort algorithm.

I YEAR II SEMESTER

Paper-II : HTML, CSS & Java Script

Course Objectives

Creation of static web pages using css and java script

Course Outcomes

Upon successful completion of the course, a student will be able to:
create a static webpage, HTML basic tags, frames, lists, table, create a webpage using cascading style sheets, HTML forms, validation with javascript

UNIT I

HTML: Introduction to HTML, CSS, JavaScript HTML structure, elements, attributes, headings, paragraphs, styles, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML responsive.

UNIT II

HTML forms: HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug ins, youtube. **HTML API'S :** Geolocation, Drag/drop, local storage, HTML SSE.

UNIT III

CSS: CSS home, introduction, syntax, colours, back ground, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters, CSS responsive.

UNIT IV

An introduction to Java Script: What is dynamic html, Java Script, Javascript—The basics, Variables, String manipulation, Mathematical functions, Statements, Operators, Arrays, Functions.

UNIT V

Objects in Java Script: Data and objects in java script, Regular expressions, Exception Handling, Built in objects, Events. Dynamic HTML with Java Script: Data validation, Opening a new window, Messages and Confirmations, The status bar, Writing to a different frame, Rollover buttons, Moving images, Multiple pages in a single download, A text-only menu system, Floating logos.

REFERENCE BOOKS

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Paul S.Wang Sanda S. Katila, An Introduction to Web Design Plus Programming, Thomson(2007).
3. Robert W.Sebesta, Programming the World Wide Web, Third Edition, Pearson Education (2007).
4. Thomas A.Powell, The Complete Reference HTML & XHTML, Fourth Edition, Tata McGraw Hill (2006).
5. Abders Moller and Michael Schwartzbach, An Introduction to XML and Web Technologies, Addison Wesley (2006).
6. Joel Sklar, Principles of Web Design, Thomson (2007).

Student Activity:

1. Create a bio-data format

2. Create a web page for a shopping mall

PROGRAMMING IN HTML, CSS, JavaScript

1. Write a HTML program illustrating text formatting.
2. Illustrate font variations in your HTML code.
3. Prepare a sample code to illustrate links between different sections of the page.
4. Create a simple HTML program to illustrate three types of lists.
5. Embed a real player in your web page.
6. Embed a calendar object in your web page.
7. Create an applet that accepts two numbers and perform all the arithmetic operations on them.
8. Create nested table to store your curriculum.
9. Create a form that accepts the information from the subscriber of a mailing system.
10. Write a Program in Java Script to add two numbers.
11. Write a script to find the factorial of a given number usingfunctions.
12. Write a script to print all primes with in the given range.
13. Write a program to sort the array elements using “Bubble Sort” technique.
14. Write a program in Java Script to implement “Binary Search” technique.
15. Write a script to print all perfect numbers with in the given range.
16. Using DHTML, invert the behavior of <h1> to <h6> tags.
17. Create an inline style sheet for your web page.
18. Create an external style sheet for creating a font family.
19. Illustrate the creation of embedded style sheet.

II YEAR III SEMESTER

Paper-III : Graphic Designing
(Illustrator Indesign, Advanced Photoshop & Captivate)

Course Objectives

Images and animations took major important role in creation of good structured web design. It is necessary to know the creation of own images, editing of created images, 2D animation. This paper provides all above to the students.

Course Outcomes

Upon successful completion of the course, a student will be able to:

know the editing of images, creation of own images, creation of banners, developing of 2D animation

UNIT I

Introduction to Graphic Design: Multimedia fundamentals, What is Graphic Design, What is Raster Graphic & Vector Graphic, Uses & Difference between Raster Graphic & Vector Graphic, Media and Types of Media, difference between multimedia and Graphic Designing, Colour formats, Types of Colour Formats for various types of media. Basic Colours & Colour Theory.

Photoshop: Getting started with Photoshop, page layout and back ground, Photoshop program window-title bar, menu bar, options bar, image window, image title bar, Status bar, ruler, palettes, tool box, screen modes, saving files, reverting files, closing files.

UNIT II

Working with images - image size and resolution, image editing, color modes & adjustments, back grounds. **Making selections** –lasso tools, sections tools, polygon lasso tool, magnetic lasso tool, magic hand tool, grow and similar commands, moving a portion of image, editing selections, filling a selection, transforming selection, painting, drawing and retouching tools. **Layers and Filters :** layers, type tool, converting layers, image masking, filters – the filter menu, artistic filter, blur filter, brush store filters, distort filters, noise filters, pixelate filter, lighting effects, difference clouds, sharpen filters, printing.

UNIT III

In Design: Introduction to Adobe In Design, Creating and Viewing Documents, Understanding Workspace, working with Type, formatting bar, Working with shapes, Working with Colors, Points and Paths, Working with drawing tool bar, Managing and Transforming Objects, Character and Paragraph Formatting, Using Styles, Tables Long and Interactive Documents, Working with effects, Working with menus Packaging and Printing.

UNIT IV

Illustrator : Understanding the GUI of the Illustrator - Understanding Tool Box – Using menus -Drawing Basic Shapes - Drawing with Pencil Tool - Drawing with Pen Tool - Using Brushes - Creating Compound Paths - Working with Color and Strokes - Editing Objects - Layers & Groups- Transparency & Graphic Styles - Transforming & Moving Objects - Basic Text - Blending Shapes& Colors.

UNIT V

Introduction to Animation: What is Animation, types of Animation, how to create animation, Story Board creation, how to measure animation Speed, what is frame to frame animation, what is motion, animation with effects, difference between web animation, TV advertisements and system presentation. Creating a new Captivate project, Recording Your Screen in Captivate, Creating a simulation, Adding text, audio , video, shapes, and animations, Inserting interactive elements such as buttons and rollovers. Creating timeline animations, Applying effects, Creating a drag-and-drop interaction, Adding closed captions for narration, Enabling accessibility, Creating responsive projects, Publishing a Captivate project.

REFERENCE BOOKS

1. Adobe InDesign CS6 Classroom in a Book by Sandee Adobe Creative Team
2. Adobe Photoshop Class Room in a Book by Adobe Creative Team.
3. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color Grading & Graphic...19 February 2016 by David Maxwell
4. Adobe Captivate 8 (E-Learning Uncovered) Paperback – Import, 11 Jun 2014, by Diane Elkins

Student Activity:

1. Creating of a banner for a company

2. Creation of 2D Project

Graphic Designing Lab

PHOTOSHOP:

Commercial Work: Photo base multi color visiting card – Multi color wedding cards – Paper adds (Photo base) Pomp lets (Photo base) Broachers (Photo base) – Advertisement designing – Pomp lets (Photo base) – Broachers (Photo base).

Digital Work: Pass port designing , Maxi Modeling , Digital Modeling - Black and White Photo Color conversation , Marriage album designing.

Flex Modeling: Front light board designing , Back light board designing.

Illustrator:

Cartoon drawing-logo creation – 3D objects creation – move title creation – brush effects based title-filter effects backgrounds.

In Design:

Creating A Multiple Page Document – Paper add designing – Creating A Book Layout – multicolor color photo and text base advertisement – Broacher designing – multicolor pomp let creation – Creating A PDF Presentation.

CAPTIVATE :

1. Captivate installation.
2. Create a new project.
3. Choose a theme for a project.
4. Add text captions and buttons.
5. Adding text effects.
6. Create buttons with roll over image.
7. Create one multiple choice question with three image buttons.
8. Create a time line animation.
9. Inserting an image in a master slide along with audio.
10. Record a captivate screen and output in MP4.
11. Create a drag and drop interaction. For example dropping two apples in a basket.
12. Apply accessibility settings for all the slides.
13. Create one responsive project.
14. Publish your project in either HTML or SWF format.

II YEAR IV SEMESTER

Paper-IV : PHP & MySql, Wordpress

Course Objectives

To introduce the concept of PHP and to give basic Knowledge of PHP. Learn about PHP Syntax., Arrays, PHP Loops, PHP and MySQL connectivity, PHP form validation, PHP form handling. Overview of MySQL and PHPMyAdmin, Understand basic concepts of how a database stores information via tables, Understanding of SQL syntax used with MySQL, Learn how to retrieve and manipulate data from one or more tables, Know how to filter data based upon multiple conditions, Updating and inserting data into existing tables, Learning how the relationships between tables will affect the SQL, The advantages of store procedures with storing data using variables and functions, How SQL can be used with programming languages like PHP to create dynamic websites for visitors, Review of some sample PHP projects interacting with MySQL.

Course Outcomes

After completing this course satisfactorily, a student will be able to:

1. Introduction to web development with PHP
2. How to code a PHP application
3. Introduction to relational databases and MySQL
4. How to use PHP with a MySQL database
5. How to use the MVC pattern to organize your code
6. How to test and debug a PHP application
7. How to work with form data
8. How to code control statements
9. How to work with strings and numbers
10. How to work with dates
11. How to create and use arrays
12. How to work with cookies and sessions
13. How to create and use functions
14. How to use regular expressions, handle exceptions, and validate data

UNIT I

Installing and Configuring MySQL: Current and Future Versions of MySQl, How to Get MySQL, Installing MySQL on Linux, Windows, Trouble Shooting your Installation, Basic Security Guidelines, Introducing MySQL Privilege System, Working with User Privileges. Installing and Configuring Apache: Current and future versions of Apache, Choosing the

Appropriate Installation Method, Installing Apache on Linux, Windows, Apache Configuration File Structure, Apache Log Files, Apache Related Commands, Trouble Shooting. Installing and Configuring PHP: Building PHP on Linux with Apache, Windows, php.ini.Basics, The Basics of PHP scripts. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output.

UNIT II

Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments. Working with Arrays: What are Arrays?, Creating Arrays, Some Array-Related Functions.

Working with Objects: Creating Objects, Object Instance

Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT III

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users. Working with Files and Directories: Including Files with inclue(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru(). Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

UNIT IV

Introduction to MySQL and Interfacing with Databases through PHP

Understanding the database design process: The Importance of Good Database Design, Types of Table Relationships, Understanding Normalization. Learning basic SQL Commands: Learning the MySQL Data types, Learning the Table Creation Syntax, Using Insert Command, Using SELECT Command, Using WHERE in your Queries, Selecting from Multiple Tables, Using the UPDATE command to modify records, Using RELACE Command, Using the DELETE

Command, Frequently used string functions in MySQL, Using Date and Time Functions in MySQL. Using Transaction and stored procedures in MySQL: What is Transaction?, What are Stored Procedures? Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

UNIT V

Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus. Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css .

REFERENCE BOOKS

1. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).
2. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).

Student activity:

1. **Creation of a webpage using wordpress**
2. **Creation of student database of the college**

PHP, MySql & Wordpress LAB

MySQL Lab Cycle

Cycle -1

An Enterprise wishes to maintain the details about his suppliers and other corresponding details. For that he uses the following details.

Suppliers (sid: Integer, sname: string, address: string)

Parts (pid: Integer, pname: string, color: string)

Catalog (sid: integer, pid: integer, cost: real)

The catalog relation lists the prices charged for parts by suppliers.

Write the following queries in SQL:

1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part.
3. Find the snames of supplier who supply every red part.
4. Find the pnames of parts supplied by London Supplier abd by no one else.
5. Find the sid's of suppliers who charge more for some part than the average cost of that part.
6. For each part, find the sname of the supplier who charges the most for that part.
7. Find the sid's of suppliers who supply only red parts.
8. Find the sid's of suppliers who supply a red and a green part.
9. Find the sid's of suppliers who supply a red or green part.
10. Find the total amount has to pay for that suppler by part located from London.

Cycle – 2

An organisation wishes to maintain the status about the working hours made by his employees. For that he uses the following tables.

Emp (eid: integer, ename: string, age: integer, salary: real)

Works (eid: integer, did: integer, pct_time: integer)

Dept (did: integer, budget: real, managerid: integer)

An employee can work in more than one department; the pct_time field of the works relation shows the percentage of time that a given employee works in a given department.

Resolve the following queries.

1. Print the names and ages of each employee who works in both Hardware and Software departments.
2. For each department with more than 20 full time equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did's together with the number of employees that work in that department.
3. Print the name of each employee whose salary exceeds the budget of all of the departments that he or she work in.
4. Find the managerid's of managers who manage only departments with budgets greater than 1,000,000.
5. Find the enames of managers who manage the departments with largest budget.
6. If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerid's of managers who control more than 5,000,000.
7. Find the managerid's of managers who control the highest amount.
8. Find the average manager salary.

PHP Lab Cycle

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display the today's date.
3. Write a PHP Program to read the employee details.
4. Write a PHP Program to display the
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Write a PHP Application to perform demonstrate the college website.
8. Write a PHP application to add new Rows in a Table.
9. Write a PHP application to modify the Rows in a Table.
10. Write a PHP application to delete the Rows from a Table.
11. Write a PHP application to fetch the Rows in a Table.
12. Develop an PHP application to make following Operations
    i. Registration of Users.
    ii. Insert the details of the Users.
    iii. Modify the Details.
    iv. Transaction Maintenance.
        a) No of times Logged in
        b) Time Spent on each login.
        c) Restrict the user for three trials only.
        d) Delete the user if he spent more than 100 Hrs of transaction.

Word press Lab

1. Installation and configuration of word press.
2. Create a site and add a theme to it.

III YEAR V SEMESTER
Paper-V: Advanced Java Script
JQUERY /AJAX / JSON / Angular JS

Course Objective:

to impart knowledge in designing a webpage in a structured way by using advanced java script ie., using different scripting languages.

Course Outcomes

On completing the subject, students will be able to:

create a dyanamic website using advanced features of javascript and create a website with good and attractive design

UNIT I

jQuery – Basics: String, Numbers, Boolean, Objects, Arrays, Functions, Arguments, Scope, Built-in Functions. jQuery – Selectors: CSS Element Selector, CSS Element ID Selector, CSS Element Class Selector, CSS Universal Selector, Multiple Elements E, F, G Selector, Callback Functions. jQuery – DOM Attributes: Get Attribute Value, Set Attribute Value. jQuery – DOM Traversing : Find Elements by index, Filtering out Elements, Locating Descendent Elements, JQuery DOM Traversing Methods.

UNIT II

jQuery – CSS Methods : Apply CSS Properties, Apply Multiple CSS Properties, Setting Element Width & Height, JQuery CSS Methods.jQuery – DOM Manipulation Methods: Content Manipulation, DOM Element Replacement, Removing DOM Elements, Inserting DOM elements, DOM Manipulation Methods. jQuery – Events Handling: Binding event handlers, Removing event handlers, Event Types, The Event Object, The Event Attributes. jQuery – Effects: JQuery Effect Methods, jQuery Hide and Show, jQuery Toggle, jQuery Slide – slideDown, slideUp, slideToggle, jQuery Fade – fadeIn, fadeOut, fadeTo, jQuery Custom Animations

UNIT III

Intro to jQuery UI, Need of jQuery UI in real web sites, Downloading jQuery UI, Importing jQuery UI, Draggable, Droppable, Resizable, Selectable, Sortable, Accordion, Auto Complete, Button Setϖ, Date Picker, Dialog, Menu, Progress Bar, Slider, Spinner, Tabs, Tooltip, Color Animation, Easing Effects, addClass, removeClass, Effects, jQuery UI themes, Customizing jQuery UI widgets / plug-ins, jQuery UI with CDN, Consuming jQuery Plug-ins

from 3rd party web sites jQuery Validations, Intro to jQuery validation plug-in, Using jQuery validation plug-in, Regular expressions.

UNIT IV

Intro to AJAX, Need of AJAX in real web sites, Getting database data using jQuery-AJAX, Inserting, Updating, Deleting database data using jQuery-AJAX Grid Development using jQuery-AJAX

Intro to JSON JSON syntax, Need of JSON in real web sites, JSON object, JSON array, Complex JSON objects, Reading JSON objects using jQuery.

UNIT V

Intro to AngularJS, Need of AngularJS in real web sites, Downloading AngularJS, AngularJS first example, AngularJS built-in directives, AngularJS expressions, AngularJS modules, AngularJS controllers, AngularJS scope AngularJS dependency injection AngularJS, bootstrapping AngularJS data bindings, AngularJS $watch, AngularJS filters, AngularJS events, AngularJS AJAX, Ng-repeat, AngularJS with json arrays, AngularJS registration form and login form, AngularJS CRUD operations, AngularJS Animations, AngularJS validationsϖ AngularJS $q, AngularJS custom values, AngularJS custom factories, AngularJS custom services, AngularJS custom directives, AngularJS custom providers, AngularJS Routing, AngularUI Routing.

Reference Books

1. jQuery UI 1.8: The User Interface Library for jQuery by Dan Wellman
2. jQuery Fundamentals by Rebecca Murphey
3. Ajax: The Complete Reference by Thomas A. Powell
4. Pro AngularJS by Adam Freeman Kindle Edition

Student Activity:

1. Creation of website for a small scale company
2. Creation of website for a student database

III YEAR V SEMESTER

Advanced Java Script
JQUERY /AJAX / JSON / Angular JS

1. Using jQuery find all textareas, and makes a border. Then adds all paragraphs to the jQuery object to set their borders red.

2. Using jQuery add the class "w3r_font_color" and w3r_background to the last paragraph element.

3. Using jQuery add a new class to an element that already has a class.

4. Using jQuery insert some HTML after all paragraphs.

5. Using jQuery insert a DOM element after all paragraphs.

6. Convert three headers and content panels into an accordion. Initialize the accordion and specify the animate option

7. Convert three headers and content panels into an accordion. Initialize the accordion and specify the height.

8. Create a pre-populated list of values and delay in milliseconds between a keystroke occurs and a search is performed.

9. Initialize the button and specify the disable option.

10. Initialize the button and specify an icon on the button.

11. Initialize the button and do not show the label.

12. Create a simple jQuery UI Datepicker. Now pick a date and store it in a textbox.

13. Initialize the datepicker and specify a text to display for the week of the year column heading.

III YEAR V SEMESTER
Paper VI : MOBILE APP Development (Andriod based)

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To demonstrate their understanding of the fundamentals of Android operating systems
3. To demonstrate their skills of using Android software development tools
4. To demonstrate their ability to develop software with reasonable complexity on mobile platform
5. To demonstrate their ability to deploy software to mobile devices
6. To demonstrate their ability to debug programs running on mobile devices

Course outcomes

On completing the subject, students will be able to: develop and debug the mobile apps

UNIT I

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

UNIT II

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types ofAndroid applications,

UNIT III

Tools :Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state chages

UNIT IV

Android User Interface: Measurements – Device and pixel density independent measuring unitsLayouts –Linear, Relative, Grid and Table Layouts User Interface (UI) Components – Editable and non editable TextViews, Buttons, Radio and Toggle Buttons,Checkboxes.

Event Handling:

Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components; Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity,adding, removing and replacing fragments with fragment transactions, interfacing between fragments andActivities, Multi-screen Activities

UNIT V

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, ImplicitIntents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a numberor to send SMS

REFERENCE BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
3. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013.
4. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

Student Activity:

1. Developing of mobile app for a company

III YEAR V SEMESTER
Mobile App Development Lab

1. write a simple Android Application which will print "Hello World!"
2. Develop an application that uses GUI components, Font and Colors.
3. Develop an application that uses Layout Managers and event listeners.
4. Develop a native calculator application.
5. Write an application that draws basic graphical primitives on the screen.
6. Implement an application that implements Multi threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that creates alarm clock

III YEAR VI SEMESTER

Paper-VII: Elective-A

OOP's through JAVA

Course Objectives

As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

Course Outcomes

At the end of this course student will:

1. Understand the concept and underlying principles of Object-Oriented Programming
2. Understand how object-oriented concepts are incorporated into the Java programming language
3. Develop problem-solving and programming skills using OOP concept
4. Understand the benefits of a well structured program
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
6. Develop efficient Java applets and applications using OOP concept
7. Become familiar with the fundamentals and acquire programming skills in the Java language.

UNIT I

FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING : Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features: **OVERVIEW OF JAVA LANGUAGE**: Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments. **CONSTANTS, VARIABLES & DATA TYPES:** Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; **OPERATORS & EXPRESSIONS**.

UNIT II

DECISION MAKING & BRANCHING: Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator. **LOOPING**: Introduction, The While statement, the do-while statement, the for statement, Jumps in loops.

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

UNIT III

INHERITANCE: Extending a class, Overloading methods, Final variables and methods, Final classes, Abstract methods and classes;

ARRAYS, STRINGS AND VECTORS: Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Vectors, Wrapper classes;

INTERFACES: MULTIPLE INHERITANCE: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT IV

MULTITHREADED PROGRAMMING: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.

MANAGING ERRORS AND EXCEPTIONS: Types of errors : Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement,

UNIT V

APPLET PROGRAMMING: local and remote applets, Applets and Applications, Building Applet code, Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state.

PACKAGES: Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

MANAGING INPUT/OUTPUT FILES IN JAVA: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

REFERENCES BOOKS:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.

3. Deitel &Deitel. Java TM: How to Program, PHI (2007)
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik
5. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

Student Activity:

1. Create a front end using JAVA for the student database created
2. Learn the difference between ODBC and JDBC

OBJECT ORIENTED PROGRAMMING USING JAVA LAB

1. Write a program to perform various String Operations
2. Write a program on class and object in java
3. Write a program to illustrate Function Overloading & Function Overriding methods in Java
4. Write a program to illustrate the implementation of abstract class
5. Write a program to implement Exception handling
6. Write a program to create packages in Java
7. Write a program on interface in java
8. Write a program to Create Multiple Threads in Java
9. Write a program to Write Applets to draw the various polygons
10. Write a program which illustrates the implementation of multiple Inheritance using interfaces in Java
11. Write a program to assign priorities to threads in java

III YEAR VI SEMESTER

Paper-VII: Elective-B

C#.NET

Course Objectives

With the introduction of the .NET framework, Microsoft has provided a very powerful platform for developing distributed applications. To utilize and excel in this new development environment, a programmer must be equipped with the knowledge and skills necessary for success. This is what this course provides. A thorough introduction to three most important tool in the .NET framework and how they are used together to build different types of .NET applications.

Course Outcomes

After this course, the student will be able to learn all types of .NET features which are essential for the programmer.

UNIT I

Introduction:Overview, Features of C#.Net, Versions of C#.Net, MSIL, CLR, CTS, CLS, BCL, .NET Framework Architecture; Introduction to Visual Studio: Versions, Editions and System requirements, Installation, Project, Solution, Types of Applications, Compiling, Running application, Data types, Operators, Constants, enum, Casting, Parsing, Conversion methods, Boxing & unboxing, Working with DateTime, Different Ways of Input Statements, Arrays, System Array Class, Reference, Shallow,Deep Copy

UNIT II

OOPS in C#.NET: Introduction to Programming Techniques,Drawbacks of Procedural Programming, Importance, Features, Components of OOPs (class and object), Working with Modifiers, Call by Value(Optional,named Parameters), Call by Reference (Ref, out), Introduction to Inheritance, Shadowing, Casting, Static And Dynamic binding, Sealed methods and Sealed Class, Abstract classes and Methods, Properties-Set and get Blocks, Automatic, Readonly, Interfaces- Implicit and Explicit implementation, Exception Handling- try, catch, finally, throw – Built-in & Customized Exceptions, Collections, Custom, Generic methods, Classes, Built-in generic Classes, Reflection, Operator Overloading, Type Inference, Partial Classes And Partial Methods, Delegates, Anonymous Methods, Lambda Expressions, Events Using Visual Studio, Overview of Garbage Collection System. GC,IDisposable, Destructors, Finalizer/Dispose, Structures vs Classes, String vs String Builder, Object Initializers, Anonymous Types, Extension Methods.

UNIT III

Window Based Programming /GUI Pragramming: Introduction to Windows Forms Application, IDE of Forms, Understanding Form Class Definitions, Working with Multiple Forms, Working with Windows Forms Controls, Graphics, Creating Dialogs, Modal Dialogs-Customized, built-in, Modeless dialogs, MDI Application, User Controls, Runtime Controls, Deployment of Windows Forms Application, Creating Setup Project, installing and uninstalling Windows application; Assemblies And Namespaces: Difference between DLL and EXE, Types of DLLS, Structure of Assembly, Single File And Multi File Assembly, .Net Module, Types of Assemblies, Name Spaces, Accessing Modifiers In and Out of Assembly; Streams: Introduction to streams, Types of Streams – Text Streams, Binary Streams, File Stream , Memory Stream Classes, File, FileInfo, DirectoryInfo Classes,Stream Reader, StreamWriter Classes, Serialization, Deserialization; Multi Threading: Introduction, Types of Scheduling, Thread States, Performing Async operations using Multi Threading, Thread Synchronization

UNIT IV

Task Parallel Library: Multi Threading (vs) Task Parallel Library, Performing Async operations using TPL; ADO.NET – Managed Provider: Introduction to Database, RDMS, SQL, Evolution of ADO.Net, Architecture of ADO.Net, Server Explorer, Connection String – App.Config, UDL File, Connection, Command, Parameter, DataReader as Connection Oriented Model, Introduction to Stored Procedures, Advantages, Executing Stored Procedures Thru C# Application, Transactions- Single Database, Multiple Databases, Overview of Typed Databases-Working with Oracle, Excel, Access, MARS; ADO.NET – Disconnected Model: Dataset, DataTable, DataColumn, DataRow, DataAdapter, DataAdapter Commands, SqlCommandBuilder, Handling Concurrency While Updating Data in DB, DataViews, Purpose of Creating Foreign Key Constraint, DataRelation; ADO.NET –Entity Framework: LINQ to SQL (vs) Entity Framework, DbContent, DbSet, EDM in-XML Representation- Designer Content and Runtime content(SSDL, CSDL, C-S Mapping), Insert, Update, Delete Operations Using EF, DataGridView, Calling Stored Procedures Using EF, Immediate Mode And Differed Mode Execution, Transactions In EF- Single DB, Multiple DBs, Navigation Types : Accessing Data – With and Without Navigation

UNIT V

Net Code Debugging: Breakpoints, Immediate Window, F5,F10,F11; Windows Services XML: Introduction to XML, Rules of XML Document, Structure of XML Document, XML DOM Parser, XML DataDocument, Reading XML using Dataset, XMLtextwriter And XMLtextReader; WPF: Introduction to WPF, Different Views in WPF Environment, Architecture of WPF, Differences Between HTML, XML, XAML, Syntax of XAML, WPF Controls, Multiple WPF Windows, Brushes, Styles, Animations and Transformations, Working with Dataset in DataGrid; Application Architectures:3-tier Architecture and N-tier Architecture

Reference Books:

1. C# 4.0 The Complete Reference by Herbert Schildt
2. C# 5.0 Programmer's Reference Rod Stephens
3. Visual Studio 6: The Complete Reference by John Mueller
4. Professional Visual Studio 2015 by Bruce Johnson

Student Activity:

1. Designing a project on payroll

C#.NET Lab

1. Write a C# Sharp program to find the largest of three numbers.
2. Write a C# Sharp program to read roll no, name and marks of three subjects and calculate the total, percentage and division
3. Write a C# Sharp program to find the sum of first 10 natural numbers.
4. Write a program in C# Sharp to read 10 numbers from keyboard and find their sum and average.
5. Write a program in C# Sharp to display the multiplication table of a given integer.
6. Write a C# Sharp program to calculate the factorial of a given number.
7. Write a C# Sharp program to check whether a given number is armstrong number or not.
8. Write a C# Sharp program to determine whether a given number is prime or not
9. Write a program in C# Sharp to display the first n terms of Fibonacci series.
10. Write a program in C# Sharp to check whether a number is a palindrome or not.
11. Write a program in C# Sharp to count a total number of vowel or consonant in a string.
12. Write a program in C# Sharp to sort a string array in ascending order.
13. Write a program in C# Sharp to create a function to display the n number Fibonacci sequence.
14. Write a program in C# Sharp to create a function to check whether a number is prime or not.
15. Write a program in C# Sharp to find the factorial of a given number using recursion.
16. Write a C# Sharp program to sort a list of elements using Insertion sort.
17. Write a C# Sharp program to search a element in a given list using linear search method

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII: Elective –A-1
Java Servlets

Course Objectives
Advanced Java : Learn the fundamentals of JDBC and using the different interfaces in the JDBC API. Learn how to use Java servlets in the role of Web application control. Identify the options to state management in a Java Web application and understand the pros/cons of each. Understand how JSPs can help to separate Web logic and functionality from page layout. Explore how to make JSPs smaller and more powerful with JSTL, custom tags and expression language. Explore strategies in the exchange of data between Web pages (views) and business processing (model). Learn the meaning and importance of MVC

Course Outcomes
After this course, the student will be able to learn:

1. Servlet Life Cycle
2. javax.servlet package
3. ServletConfig, ServletContext, ServletResponse
4. Supplying initialization parameters to Servlets
5. Performing database operations in Servlets
6. Include and forward mechanisms
7. Applying filters to Servlets
8. javax.servlet.http Package
9. HttpServlet Life Cycle
10. Http request methods GET vs POST
11. HttpServletRequest, HttpServletResponse
12. Session Tracking, purpose
13. Hidden form fields, Cookies
14. Http Session, URL rewriting
15. Event listeners
16. Web application security

UNIT I :

Understanding the need for server side extension, Introducing Java Servlet, Advantages of a Servlet, exploring the Servlet Container: The Standalone Container, The In-Process Container, The Out-Process Containers, Servlet API :javax.servlet package, javax.servlet.http package; Implementing a Servlet Object: javax.servlet.Servlet Interface, the javax.servlet.ServletConfig Interface<H2>, Servlet Life Cycle: Stages of Servlet Life Cycle: Loading a Servlet, Initializing

a Servlet, Handling Request, Destroying a Servlet; Servlet Life Cycle Methods: init(), service(), destroy() methods

UNIT II

Developing the First Servlet Application : creating the home.html page, creating LifeCycleServlet, Creating the Deployment Descriptor, Deploying Web Application, Running the LifeCycle Application; Request Navigation, Request Delegation, GenericServlet Class: creating the Home.html Page, Developing the HelloServlet.java Servlet, Deploying and Running the Application

UNIT III

Understanding Request Processing and HTTP: Implementing the ServletRequest Interface: Managing the Servlet Object as a Throwaway Object, Managing the ServletRequest Object Pool, working with Request Parameters : creating the Login Form, creating the LoginServlet Servlet, creating the Deployment Descriptor File, running the Application; working with Initialization parameter: Exploring the need for Initializing Parameters, Retrieving Initializing Parameters, Handling Servlet Initializing Parameters : creating the Home.html file, creating the InitParamsServlet Servlet, creating the Deployment Descriptor File, running the application; working with Context Initialization Parameters : creating the Home.html file, creating the Login.html file, creating Register.html file, creating the RegistrationServlet Servlet, creating the LoginServlet Servlet, creating the Deployment Descriptor File, running the application, Understanding ServletResponse.

UNIT IV

Understanding Request Dispatching: Navigation, Delegation, getting a RequestDispatcher Object; understanding the include() and forward() methods of Request Dispatcher, creating the home.html file, creating the TestServlets Servlet and TestServlet2 Servlet, creating the deployment descriptor file, running the application, working with Request Attributes, HTTP Status Codes, HttpServletRequest & HttpServletResponse Interfaces, the HttpServlet Lifecycle. Handling Sessions in Servlet: Introducing Session tracking, Exploring URL Rewriting, Exploring Hidden Form Field, working with URL Rewriting and Hidden Form Field, Describing cookies, using cookies, Exploring and working with Http session, Servlet Context Attributes, Scopes of the Web Application Objects, Exploring the Single Thread Model, the ServletOutputStream Class

UNIT V :

Implementing Filters, Listeners and Wrappers: Exploring Filters: Filter Interception Design pattern, Filter API: The Filter Interface, The FilterConfig Interface, The FilterChain Interface, Working with Filters: creating the Home.html page, creating the TestServlet.java File, creating the MyFilter1.java file, creating the MyFilter2.java file, configuring the Filters Application, Running the Application, Types of Listeners, Listener Interfaces, Need of Wrappers, types of Wrapper Classes: The ServletRequestWrapper Class, the ServletResponseWrapper Class, the HttpServletRequestWrapper Class, the HttpServletResponseWrapper Class, creating the home.html page, creating the TestServlet.java File, creating the MyRequestWrapper.java File,

creating the MyResponseWrapper.java File, creating the MyWrapperFilter.java File, creating the Web.xml File, Deploying and Running the Application, Applet to Servlet Communication

Reference Books

1. JDBC, Servlets and JSP (Includes JSF and Design patterns) Black Book by Santosh Kumar K
2. Java Server Programming Java EE6 Black Book, Kogent Learning Solutions

Student Activity:

Project Work : A project on Fee Management using Servlets

III YEAR VI SEMESTER
(Cluster 1) Paper-VIII : Elective –A-2

JSP

Course Objective

Advanced Java : Learn the fundamentals of JDBC and using the different interfaces in the JDBC API. Learn how to use Java servlets in the role of Web application control. Identify the options to state management in a Java Web application and understand the pros/cons of each. Understand how JSPs can help to separate Web logic and functionality from page layout. Explore how to make JSPs smaller and more powerful with JSTL, custom tags and expression language. Explore strategies in the exchange of data between Web pages (views) and business processing (model). Learn the meaning and importance of MVC

Course Outcome
After this course, the student will be able to learn:

1. JSP Life Cycle
2. Creating dynamic Web content with JSP
3. Scripting elements
4. Scriptlet
5. XML syntax for JSP elements
6. JSP directives page, include and taglib
7. JSP implicit objects
8. JSP scopes
9. Error Handling in a JSP
10. JSTL
11. Expression Language
12. Processing XML in a JSP

UNIT I

Introduction to JSP, Advantages of JSP over Servlets, JSP Architecture, JSP Life Cycle, creating simple JSP page. JSP Basic Tags and Implicit Objects: Scripting tags: the Scriptlet Tag, the Declarative Tag, the Expression Tag; Implicit Objects: the request object, the response object, the out object, the page object, the page context object, the application object, the session object, the config object, the exception object; Directive tags: the page directive tag, the include directive, the Taglib Directive.

UNIT II

Working with JavaBeans and Action Tags in JSP: Advantages of using JavaBeans, Action tags: Include Tag, Forward Tag, Param Tag, useBean tag, the setProperty Tag (name, property, value, param), the getProperty Tag (name attribute, property attribute)

UNIT III

Enhancing the JSP tags support: Custom tags, elements of custom tags: Tag Library Descriptor, Tag Handler, Tag Extension API, Empty Tags: Empty Tag Handler Life Cycle, Body Content Tag Interface:Body Tag Handler Life Cycle, Iteration Tag Handler Life Cycle, Life Cycle of Simple Tag Handlers, Difference between Simple tag and classic tag handlers, the TryCatchFinally Interface.

UNIT IV

Understanding JSP Expression Language: Basic Syntax of using EL, types of EL Expression: Immediate, Deferred, Value and Method Expressions, Tag Attribute Types, EL Expression: the EL Resolver Classes, EL Operators, Implicit EL Objects, Functions with EL.

UNIT V :

Working with JSP Standard Tag Library (JSTL): JSTL core tags, General Purpose Tags: The <c:out> tag, The <c:set> tag, The <c:remove> tag, The <c:catch> tag; Conditional and looping Tags, Networking Tags : The <c:import> Tag, The <c:url> Tag, The <c:redirect> Tag, The <c:param> Tag; JSTL SQL Tags: The <sql:query> Tag, The <sql:update> Tag, The <sql:param> Tag, The <sql:dataParam> Tag, The <sql:setDataSource> Tag, The <sql:transaction> Tag; Basic Formatting Tags, Number Formatting Tags, Date Formatting Tags, Time Zone Formatting Tags; JSTL XML Tags: Core Tags, Flow Control Tags, Transformation Tags

Reference Books

3. JDBC, Servlets and JSP (Includes JSF and Design patterns) Black Book by Santosh Kumar K
4. Java Server Programming Java EE6 Black Book, Kogent Learning Solutions

Student Activity:

Project work : A project for Transport Company using JSP

III YEAR VI SEMESTER
(Cluster 1 Paper-VIII : Elective –A-3)

JDBC

Course Objectives

Advanced Java : Learn the fundamentals of JDBC and using the different interfaces in the JDBC API. Learn how to use Java servlets in the role of Web application control. Identify the options to state management in a Java Web application and understand the pros/cons of each. Understand how JSPs can help to separate Web logic and functionality from page layout. Explore how to make JSPs smaller and more powerful with JSTL, custom tags and expression language. Explore strategies in the exchange of data between Web pages (views) and business processing (model). Learn the meaning and importance of MVC

Course Outcomes

After this course, the student will be able to learn

1. JDBC architecture
2. java.sql Package
3. Connection, Statement, ResultSet
4. Prepared Statement
5. Callable Statement
6. Scrollable and Updatable ResultSet
7. Batch Updates
8. ResultSetMetaData
9. Simple Transaction Management
10. Four Levels of JDBC drivers

UNIT I

Introducing JDBC, describing components of JDBC, Listing of features of JDBC, Exploring the JDBC Architecture: The type-I Driver, The type-2 Driver, The type-3 Driver, The type-4 Driver; Working with JDBC APIs: types of JDBC APIs, Describing the Major Classes and Interfaces, communicating with Databases by using JDBC APIs, Understanding various JDBC Drivers

UNIT II

Implementing JDBC Statements and Result Sets: Describing JDBC Statements, working with the Statement Interface, Exploring the Methods of Statements, Using Statement: creating table, inserting a row; Working withe the Prepared Statement Interface, Working with the Callable Statement Interface, Calling Functions by Using Callable Statement, Working with the ResultSet Interface, Handling NULL values, Working with the ResultSetMetaData Interface, Creating SQL Editor in Java

UNIT III

Using Advanced concepts of ResultSet: Exploring characteristics of the ResultSet Object, closing connection, working with the DatabaseMetaData Interface: Retrieving Database and Driver details, Retrieving Table description, Retrieving Column Details, Retrieving Data from a Microsoft Excel Sheet

UNIT IV

Describing Advanced JDBC Concepts: Exploring the SQL 99 Data Types: The BLOB data type(storing, reading), the CLOB datatype(storing, reading), the struct data type : creating a JDBC UDT, Mapping the JDBC UDT, Implementing UDT, using the java.sql.Struct Interface, Array Data Type, the Ref Data Type, Working with the ROWID type, Working with Batch Updates: The Batch Update Methods, The Batch UpdateException

UNIT V

Describing SQL/XML and XML support, Retrieving Auto Generated Keys, working with RowSets in JDBC (Connected, Disconnected), Using the RowSet at Design time : setting the properties of the RowSet Instance, working withe RowSet Events, Using RowSets at Run Time: Setting Parameters values of a RowSet Object, Executing RowSets, Traversing a RowSet, Exploring Connection Pooling, working with Transactions : Describing ACID Properties: Atomicity, Consistency, Isolation, Durability; Types of Transactions, Performing Transaction Management, Describing the Wrapper Interface: The isWrapperFor() Method, the unwrap() Method, Describing SQL Exception

Reference Books

1. JDBC, Servlets and JSP (Includes JSF and Design patterns) Black Book by Santosh Kumar K
2. Java Server Programming Java EE6 Black Book, Kogent Learning Solutions

Student Activity:
Project Work : A project on Student Database Management.

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-1

ASP.NET

Course Objectives

Microsoft designed the ASP.NET technology, as part of its overall .NET strategy to provide a very poweful platform for developing distributed Web applications. The instructional strategy for this course emphasizes project based learning, practicle real-life problem solving skills and getting started with ASP.NET 3.5 programming using Visual Studio 2008.

Course Outcomes
After this course, the student will be able to: develop dynamic website using .NET platform and develoo distributed web applications.

UNIT I

INTRO TO WEB PROGRAMMING: What is internet, Web Site, Web Request, Web Respone?, Web Architecture, Client side web technologies (vs) Server side web technologies; CLIENT SIDE WEB TECHNOLOGIES: HTML, CSS, Javascript; ASP.NET WEB FORMS BASICS: Classic ASP (vs) ASP.NET, Cross-page submission (vs) ASP.NET Postback, Creating ASP.NET Web Site and Web Forms, Programming Model of Web Forms, Need of web.cofig

UNIT II

ASP.NET IMPLICT OBJECTS: Request, Response; ASP.NET WEB CONTROLS: Intro to ASP.NET Web Controls, Standard Web Controls:Post back, Generating controls dynamically, Validation Controls; DATA CONTROLS: GridView indepth, DataList, Repeater, FormView, DetailsView, SqlDataSource; STATE MANAGEMENT: Session, Application, Data Cache, Query String, View State, State-less (vs) State-full, Response.Redict (vs) Server.Transfer, Session state modes, Global.asax; ASP.NET CONFIGURATION: appSettings, Tracing, Target Framework, Custom error

UNIT III

SECURITY: Forms based authentication, Windows based authentication, Overview of Open authentication; NAVIGATION CONTROLS: Web.SiteMap, Menu, Tree View, Site Map Path; MASTER PAGES: Creating master pages and content pages, Working with Content Place Holders; THEMES AND SKINS: Creating themes, Creating .css and .skin files, Applying themes dynamically; WEB USER CONTROLS: Creating Web User controls, Invoking web user controls statically and dynamically

UNIT IV

IIS AND DEPLOYMENT: IIS Architecture, Installing and configuring IIS, Creating IIS Application, Deploying Web Sites into Local IIS; ASP.NET PAGE LIFE CYCLE: Page life cycle Architecture, How web controls processed at server side, Page events; OUTPUT CACHING: Output Caching, Fragment Caching; INTERNATIONALIZATION: Globalization (vs) Localization, Creating Global resources, Applying culture dynamically; ASP.NET AJAX EXTENSIONS: Script Manager, Update Panel, Update Progress, Timer

UNIT V

ASP.NET AJAX CONTROL TOOLKIT: How to download and import, Toolkit Script Manager, Important AJAX Toolkit Controls; WEB SERVICES: Creating and consuming Web Services, Need of XML, WSDL, SOAP in Web Services; WCF: Web Services (vs) WCF, Creating and consuming Simple WCF Services, Deploying WCF Services in Local IIS, Self Hosting Application, Contracts:Service Contract, Operation Contract, Data Contract; Service Host, End Points: Address, Binding, Contract

Reference Books

1. ASP.NET 3.5 Web Programming with VB 2008, July 21, 2008 by Anne Boehm: Murachs
2. ASP.NET 3.5 Unleashed, December 28, 2007 by Stephen Walther
3. Mastering VB.NET and C# by Israel B. Ocbina

Student Activity

1. Designing and developing of a website for a company using .NET platform.

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-2

SQL Server

Course Objectives:

Microsoft Sql Server 2008 is basically designed to suit the requirements of Database design and development. Audience gets complete knowledge on SQL commands, constraints, views, sub queries, indexes etc... as well as how to program with T-SQL i.e..developing stored procedures, triggers, functions, cursors etc. It is essential to learn advanced features of SQL Server 2008 and new features of SQL. Server 2012. This course provides this.

Course Outcomes
After this course, the student will be able to: know the database management using SQL Server.

UNIT I

Basics : Database, DBMS, RDBMS, Oracle and SQL Server; SQL Server Environment: SQL Server 2005 and 2008, 2012, New Features in SQL Server 2005 and 2008, 2012, SQL Server Management Studio Enhancements in SSMS - 2008, SQL Server Business Intelligence Development Studio (BIDS)

UNIT II

SQL Language: DDL, DML (INSERT, UPDATE, DELETE, MERGE), TCL, DDL, DCL Data Integrity: Domain Integrity, Entity Integrity, Referential Integrity; Database Design : Normalization, De Normalization, Database Diagrams (E-R); Joins and Sub Queries: SQL Operators, Simple Queries, Built in Functions, Joins, Sub-Queries, Advanced Queries

UNIT III

Views: Create View, Advantage of Views, Updatable Views, Non Updatable Views, Indexed View; Introduction to T-SQL: Anonymous Block, Stored Block, Anonymous block(including 2008 features) Structured Exception Handling; Cursors: Declaring Cursors, Modifications Thorough Cursors, Types of Cursors, Advantages of Cursors; Stored block Stored; Procedures: System Stored Procedure, User Stored Procedures, Advantages of Procedures, Passing In/Out Parameters, Altering Procedure, Extended Stored Procedures

UNIT IV

User Defined Functions:Scalar UDF, Inline UDF, Multi Statement Table UDF, Table Variables, Temporary Tables; Triggers: DML Triggers, DDL Triggers, Magic Tables, Advantages of Triggers; Transactions and Locks: Implicit Transactions, Explicit Transactions, TCL Commands,

Lock Types, Isolation Levels, Dead Locks, MS-DTC; Indexes: Clustered Index, Non Clustered Index, Creating Index, Advantages of Indexes

UNIT V

XML Integration: FOR XML, OPEN XML, XML Data Type; .NET 2.0 (CLR) Integration: CLR Objects, CLR Stored Procedures, CLR User Defined Functions; Security: Windows Authentication, SQL Server Authentication, Creating Login, Database Permissions, Introduction to Roles, Schema, Droping Login Database Maintenance: Backup Database, Restore Database, Deployment of Database, Generating T-SQL Scripts and Batches, System Databases and System Tables; SQL Server Agent: Jobs, Schedules, Alerts, Operators Data Transformation Services: BCP, DTS Packages / SSIS Packages; Introduction to DBA Concepts: Replication, Performance Monitoring, Service Broker; Features of 2012: Column store indexes, Sequence objects, Pagination, Error handling

Reference Books

1. Microsoft SQL Server 2008 Internals by Kalen Delaney
2. Microsoft SQL Server 2008 Management and Administration by Ross Mistry
3. Beginning Microsoft SQL Server 2008 Programming by Robert Vieira

Student Activity:

1. Creation of database for customers in shopping mall

III YEAR VI SEMESTER
(Cluster 2) Paper-VIII : Elective –B-3

ASP.NET MVC (Model–View–Controller)

Course Objectives:

To make you ready to create a dynamic web site or web application using the latest web standards & mvc architecture using asp.net mvc framework.

Course Outcomes

After this course, the student will be able to: create a dynamic web site or web application uisng MVC architecture.

UNIT I

Introduction to ASP.NET MVC: What is ASP.NET MVC, Advantages of ASP.NET MVC, ASP.NET Web Forms (vs) ASP.NET MVC, ASP.NET MVC Versions; MVC Architecture: Overview to MVC Architecture, Controller, View, Model; ASP.NET MVC – Basic Concepts: Creating Controllers, Creating Views, Creating Models, Request, Response

UNIT II

ASP.NET MVC – Types of Action Result:ContentResult, FileResult, ViewResult, PartialViewResult, JsonResult, RedirectToActionResult; ASP.NET MVC – State Management: ViewData, TempData, ViewBag, Strongly Typed Views, Session, Application, Cache, Query String, Cookies; ASP.NET MVC – Action Filters: Child Action Only, Output Cache, Action Name, Non Action, Handle Error, Http Get, Http Post, Http Put, Http Delete, Validate Anti Forgery Token, Route, RoutePrefix, Authorize, Global Action Filters

UNIT III

ASP.NET MVC – Razor: What is View Engine, ASPX View Engine (vs) Razor View Engine, Razor – Code Blocks, Razor – Expressions, Razor - If, Razor – For, Razor – Foreach, Razor – Literals, Razor – Comments; ASP.NET MVC – Views: Shared Views, Layout iews, _ViewStart.cshtml, Sections in Layout Views, Partial Views, Child Actions; ASP.NET MVC – Entity Framework: Entity Models, Connection Strings, DbContext and DbSet, Data Annotations; ASP.NET MVC – AJAX: Get, Post, Put, Delete

UNIT IV

ASP.NET Web API: Introduction, Advantages, ASP.NET MVC (vs) ASP.NET Web API, Get, Post, Put, Delete; ASP.NET MVC – HTML Helpers: BeginForm, TextBoxFor, TextAreaFor, LabelFor, ValidationMessageFor, ValidationSummary, ActionLink, PasswordFor, CheckBoxFor, RadioButtonFor, DropDownListFor, HiddenFor, AntiForgeryToken, Custom HTML Helpers, Bundling and Minification

UNIT V

ASP.NET MVC – Validations: Required, Range, RegularExpression, Compare, StringLength, Remote, ModelState.IsValid; ASP.NET MVC – N-Tier Architecture: Repository Layer, Service Layer, Domain Models, View Models, Dependency Injection (Unity.Mvc); ASP.NET MVC – Custom Action Filters:FilterAttribute, IAuthorizationFilter, IActionFilter, IResultFilter, IExceptionFilter

Reference Books

1. "Intro to ASP.NET MVC 3 (VB)", by Rick Anderson
2. "ASP.NET MVC Framework", by Scott Guthrie
3. "ASP.NET MVC 2 RC 2 Released", by Phil Haack

Student Activity:

1. Developing a dynamic web applications

PROJECT & VIVA-VOCE

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

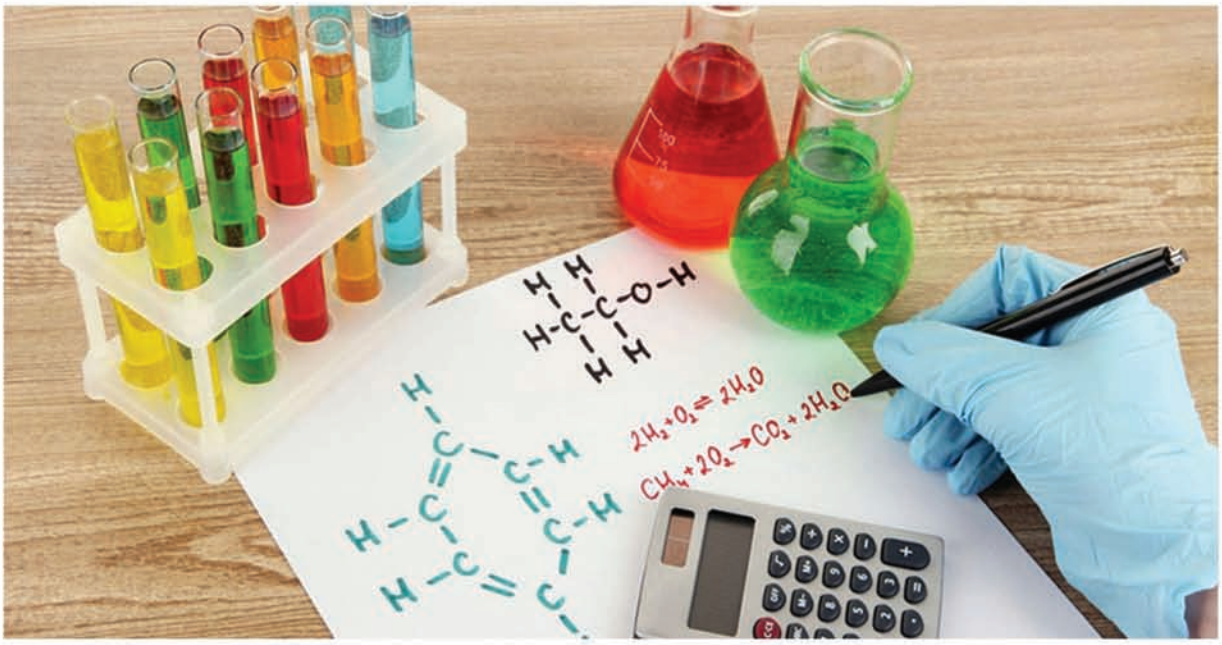
The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

ANALYTICAL CHEMISTRY



Recommended Combinations – B.Sc.;
Chemistry & Analytical Chemistry ***or*** Geology, Chemistry & Analytical Chemistry ***or***
Botany, Chemistry & Analytical Chemistry ***or*** Zoology, Chemistry & Analytical Chemistry

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Basic Principles & Laboratory Operations	100	03
			Practical – I	50	02
	II	II	Quantitative Methods Of Analysis	100	03
			Quantitative Analysis	50	02
II	III	III	Separation Methods – I	100	03
			Separation Techniques	50	02
	IV	IV	Separation Methods – II	100	03
			Separation Techniques	50	02
III	V	V	Analytical Biochemistry and Environmental Chemistry	100	03
			Analysis of Bio Products	50	02
		VI	Instrumental Methods of Analysis	100	03
			Practical – VI	50	02
	* Any one cluster from VIII, A, B and C	VII	Analysis of Applied Industrial Products	100	03
			Analysis of Applied Industrial Products	50	02
		VIII (A)	**Cluster Electives - I :** To be proposed later		
			VIII-A-1	100	03
			VIII-A-2	100	03
			VIII-A-3	100	03
			Practical – 1	50	02
			Practical – 2	50	02
			Practical – 3	50	02

Objectives and outcome of the course Analytical Chemistry

Analytical Chemistry is an applied, experimental field of science and is based not only on chemistry, but also on physics, biology, information theory and many fields of technology. It is of fundamental importance not only to all branches of chemistry but also to all biological sciences, engineering sciences, health, medicine, pharmaceuticals, environment, industrial processes, quality control and implementation of legislation.

The objective of B.Sc Analytical chemistry course is to provide students exposure to chemistry, physics, biological sciences, environmental science, computer application, instrumentation and analytical techniques. In this three year course spread over six semesters, there are 10 papers of Analytical chemistry 7 papers of chemistry and 7 Mathematics. In the last semester of this course, there is a provision for one cluster elective papers out of two cluster elective papers, viz.

After graduating in Analytical Chemistry the students can pursue academics in Chemistry, bioinformatics, forensic science, biochemistry and other disciplines of inter-disciplinary sciences. They can also use it as a stepping stone to pharmaceutical industry and for Research and Development in industry.

Course Structure

All theory papers will have 4 hours per week and practicals will have 2 hours per week upto Semester IV (Second year). In final year all theory papers will have 3 hours per week and practicals will have 2 hours per week in Semester V and V I (Final year).

Each Theory Paper shall be of 100 marks and Practical Paper shall be of 50 marks.

Total Number of Papers: 24

Mathematics : 7 Papers
Chemistry : 7 Papers
Analytical Chemistry : 7 Papers + 1 Cluster elective (3Papers) = 10 Papers

SEMESTER – I

Paper I - ANALYTICAL CHEMISTRY-1 **60hrs (4h/w)**

BASIC PRINCIPLES & LABORATORY OPERATIONS

UNIT – I

I. BASIC CONCEPTS: **12hrs**

A. SI Units

i) Definitions of the Seven Base Units (Mass, Length, Time, Temperature, Amount of substance, Electrical current and Luminous intensity), Derived units, Conversion between units, Significant figures.

B. Chemical concentrations

i) Mole, molar mass

ii) Calculations in grams and moles iii) Solutions and their concentrations:

a) Molar concentration b) Analytical molarity c) Equilibrium molarity of a particular species d) Percent concentration e) Parts per million/billion (ppm, ppb) f) Volume ratios for dilution procedures g) p-functions.

C. Preparation of solutions: standard solutions, primary standards, secondary standards.

UNIT – II

12hrs

INTRODUCTION TO ANALYTICAL CHEMISTRY AND ANALYTICAL METHODS -I

i) General steps in chemical analysis

ii) Introduction to methods of detecting analytes

Physical, Electromagnetic radiations and Electric charge

iii) Single pan analytical balance: (operation and theory of the balance, construction details, errors in weighing, care of an analytical balance).

UNIT III

12hrs

INTRODUCTION TO ANALYTICAL CHEMISTRY AND ANALYTICAL METHODS - II

Description and use of common laboratory apparatus: Volumetric flasks, burettes, pipettes, meniscus readers, weighing bottles, different types of funnels chromatographic columns, chromatographic jars, desiccators, drying ovens, filter crucibles, rubber policeman. Calibration and use of volumetric glass ware.

pH meter: components of pH meter, use of pH Meter, maintenance of pH meter, application of data. Laboratory notebook

UNIT – IV **12hrs**

ERRORS IN CHEMICAL ANALYSIS

Types of errors
Accuracy and Precision, Absolute and relative uncertainty, propagation of uncertainty. The Gaussian distribution, mean and standard deviation, confidence intervals. Statistical tests of data (the F test, the t test, Q test for bad data, the method of least squares). Calibration curve. Laboratory notebook. Safety with chemicals and waste.

UNIT – V

PRINCIPLES OF THERMOGRAVIMETRY: 12hrs

Thermometric methods – Principles of TGA, DTA and Thermometric titrations – application of $CaC_2O.H_2O$, $(CH_3COO)_2$ Ca. H_2O and HCl Vs NaOH Thermometric titrations.

LABORATORY COURSE -I **30** hrs (2 h / w)

Practical-I (At the end of Semester-I)

1. Use and calibration of volumetric equipment (volumetric flasks, pipette's and burette's).
2. Preparation of standard solutions of acids and bases.
3. Estimation of sodium carbonate by titrating with hydrochloric acid.
4. Preparation of standard solution of EDTA.
5. Estimation of magnesium using EDTA.
6. Use of pH meter: determination of pH of given dilute solutions of shampoos and soaps
7. Titration of acid-base using pH meter.
8. Preparation of buffers.

SUGGESTED BOOKS

1. Seamus P.J. Higson: Analytical Chemistry.
2. Douglas A. Skoog and Donald M..West: Fundamentals of Analytical Chemistry.
3. Adion A. Gordus: Schaum's Outline of Analytical Chemistry, Tata McGraw-Hill.
4. Gary D. Christian : Analytical Chemistry .
5. Freifelder and Kealy: Analytical Chemistry .
6. Daniel C Harris: Exploring Chemical Analysis.
7. Daniel C Harris: Quantitative Chemical Analysis.

SEMESTER – II

Paper II - ANALYTICAL CHEMISTRY-2 **60hrs (4h/w)**

QUANTITATIVE METHODS OF ANALYSIS

UNIT – I **12hrs**

GRAVIMETRIC ANALYSIS - I

A. Precipitation methods

B. Volatilization methods. (The analyte or its decomposition products are volatilized at a suitable temperature. The volatile product is then collected and weighed, or, alternatively, the mass of the product is determined indirectly from the loss in mass of the sample. E.g., determination of the sodium hydrogen carbonates content of antacid tablets)

UNIT – II **12hrs**

GRAVIMETRIC ANALYSIS - II

A. Properties of precipitates and precipitating reagents: Particle size, Filterability of Precipitates (factors that determine particle size, formation of precipitates and particle size) - Colloidal Precipitates (coagulation of colloids, peptization of colloids, treatment of colloidal precipitates) - Crystalline Precipitates (particle size and filterability) - Co-precipitation (surface adsorption, mixed-crystal formation, occlusion, and mechanical entrapment, co precipitation errors) - Precipitation from Homogeneous Solution (The use of the technique of homogeneous solutions to effect precipitation).

B. Drying and Ignition of precipitates

C. Practical gravimetric procedures.

UNIT – III **12hrs**

VOLUMETRIC ANALYSIS

A. Definitions: Titrimetry, Volumetric titrimetry, Gravimetric titrimetry, Coulometric titrimetry.

B. The equivalence point, the end point

Classification of volumetric methods, theory of indicators and buffers - Equilibria

Principles - Aqueous and non-aqueous acid-base titration - Redox titrations - Complexometric titrations - Precipitation titrations

C. Typical problems in volumetric titrimetry:

D. Sigmoidal Titration Curves

E. The Henderson-Hasselbalch Equation.

UNIT – IV **12hrs**

CENTRIFUGATION METHODS:

A. Introduction

B. Sedimentation and relative centrifugal force

C. Different types of rotors. D. Density gradient

E. Types of centrifugation techniques.

UNIT – V **12hrs**

INTRODUCTION TO ENVIRONMENTAL ANALYSIS:

A. Sampling method
B. Environmental pollution from industrial effluents and radiochemical waste.
C. Introduction to water and waste analysis.

LABORATORY COURSE -II **30** hrs (2 h / w)

Practical-II Quantitative Analysis

(At the end of Semester-II)

1. Determination of the pKa and Equivalent Weight of a weak acid by potentiometric pH titration.

2. Determination of the strength of the given magnesium sulphate solution using EDTA and Eriochrome black –T as the indicator.

3. Determination of the capacity of an anionic exchange resin.

4. Separation of cadmium and zinc on an ion exchange resin.

5. Homogeneous precipitation of the Nickel as its Dimethylglyoxime.

6. Analysis of soil

i) Determination of pH of soil.

ii) Determination of total soluble salts.

iii) Determination of carbonate and bicarbonate.

iv) Determination of calcium, magnesium and iron.

Suggested Readings:

1. Analytical Chemistry- Methods of Separation (R.V. Dilts).
2. Laboratory Handbook of Chromatographic Methods (O. Mikes, R.A. Chalmers).
3. F.W. Fifield and D. Kealy: Analytical Chemistry.
4. Vogel's textbook of quantitative chemical analysis, 6^{th} edition.
5. Vogel's textbook of quantitative chemical analysis, 7^{th} edition.
6. Keith Wilson and John Walker : Practical Biochemistry.

SEMESTER – III

Paper III - ANALYTICAL CHEMISTRY-3 **60hrs (4h/w)**

SEPARATION METHODS - I

UNIT – I **12hrs**

SOLVENT EXTRACTION:
Introduction,principle,techniques,factors affecting solvent extraction, Batch extraction, continuous extraction and counter current extraction. Synergism., Application - Determination of Iron (III)
ION EXCHANGE :Introduction,action of ion exchange resins,separation of inorganic mixtuers,applications, Solvent extraction: Principle and process,

UNIT – II **12hrs**

CHROMATOGRAPHY:
A. Classification of chromatographic methods: Principle of differential migration, description of the chromatographic process, distribution coefficients, modes of chromatography, performing column chromatography.
B. Chromatography – theory and practice: Introduction, the chromatograph (elution time and volume), capacity factor, column efficiency and resolution, sample preparation

UNIT – III **12hrs**

A. Techniques of paper chromatography: experimental modifications, various modes of development, nature of the paper, detection of spots, retardation factors, factors that affect the reproducibility of Rf values (due to paper, solvent system, sample, development procedure), selection of solvent, quantitative analysis. applications
B. Thin layer chromatography: stationary phase, adsorbents, liquid phase supports, plate preparation, mobile phase, sample application, development, saturation of chamber, detection of spot, Rf values (effect of adsorbent, solvent, solute, development process), quantitative analysis, applications

UNIT – IV **12hrs**

COLUMN CHROMATOGRAPHY.
A. General: columns, matrix materials, stationary phase, column packing, application of sample, column development and sample elution, detectors and fraction collectors, applications.

B. High performance liquid chromatography: Principle, column, matrices and stationary phases, column packing, mobile phase and pumps, application of sample, detectors, applications.
C. Adsorption chromatography: Principle, adsorbents, solvents, nature of solute, operating parameters, retention volumes and times, applications.

UNIT – V **12hrs**

A. Liquid-liquid partition, chromatography: Principle, normal phase chromatography, reversed- phase liquid chromatography, reversed phase liquid chromatography, applications.

B. Ion- exchange chromatography: Principle, ion exchangers, ion- exchange equilibria, ion-exchange resin selectivity, column operations (column development, detection of solute bands), factors affecting retention volumes, applications.

LABORATORY COURSE -III **30** hrs (2 h / w)

Practical-III PRACTICAL ANALYTICAL CHEMISTRY (At the end of Semester-III)

1. Determination of Rf value of amino acids using paper chromatography.

2. Separation and identification of monosaccharide present in a given mixture by paper chromatography.
3. Determination of equivalent conductance of a weak electrolyte (acetic acid) at different concentrations.
4. Determination of adulterant in some common food items:
    i) Chicory in coffee powder,
    ii) Foreign resin in asafetida
    iii) Chilli powder
    iv) Turmeric powder
    v) Pulses

Suggested Readings:

1. F.W. Fifield and D. Kealy : Analytical Chemistry.
2. Daniel C Harris: Exploring chemical analysis.
3. Daniel C Harris: Quantitative chemical analysis.
4. R.V. Dilts Analytical Chemistry- Methods of Separation.
5. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.

SEMESTER – IV

Paper IV - ANALYTICAL CHEMISTRY-4 **60hrs (4h/w)**

SEPARATION METHODS – II

UNIT – I **12hrs**

GEL, AFFINITY AND GAS CHROMATOGRAPHY

A. Gel chromatography: Principle, types of gels, separation by gel chromatography, applications.

B. Affinity chromatography: Principle, materials, selection and attachment of ligand, practical procedure, applications,

C. Gas- liquid chromatography: Apparatus and materials, preparation and application of samples, separation conditions, detectors, applications.

UNIT – II **12hrs**

ELECTROPHORESIS I

Theory and classification, factors affecting mobility, macromolecular size and charge interactions with supporting electrolyte, pH and concentration discontinuities, factors affecting electrophoresis phenomena: electrolysis,

UNIT – III

12hrs

ELECTROPHORESIS II

Electro-osmosis, temperature and supporting media; instrumentation, methodology, preparation of gel-staining and de-staining, preparative zone electrophoresis, continuous electrophoresis, applications.

UNIT – IV **12hrs**

DIALYSIS AND MEMBRANE FILTRATION

A. Filters- nitrocellulose, fiberglass, polycarbonate

B. General laboratory methods.

UNIT – V **12hrs**

CENTRIFUGATION METHODS:

Introduction, sedimentation and relative centrifugal force, different types of rotors, density gradients, types of centrifugation techniques.

LABORATORY COURSE -IV

Practical-IV Separation Techniques **30** hrs (2 h / w)
(At the end of Semester-IV)

1. Determination of the strength of the given HCl solution by titrating it against NaOH solution conductometrically.

2. Separation of a mixture of Ni^{2+} and Cu^{2+} by TLC and identify the ions.
3. Determination of residual chlorine in city water supply using colorimetry.
4. Determination of adsorption isotherm of acetic acid on activated charcoal.
   Determination of the adsorption constant (k)
5. Determination of nicotine content in cigarette tobacco.

Suggested Readings :

1. R.V. Dilts: Analytical Chemistry- Methods of Separation.
2. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic
3. Methods.
4. F.W. Fifield and D.Kealy: Principles and practice of analytical chemistry.
5. Vogel's textbook of quantitative chemical analysis, 6^{th} edition.
6. Vogel's textbook of quantitative chemical analysis, 7^{th} edition.
7. Keith Wilson and John Walker: Practical Biochemistry.
8. *Chromatography: Basic Principles, Sample Preparations and Related Methods by Elsa Lundanes, Leon Reubsaet, Tyge Greibrokk, John Wiley and Sons, 2013*
9. *Introduction to Modern Liquid Chromatography by Lloyd R. Snyder, Joseph J. Kirkland and John W. Dolan, Wiley*
10. *Practical HPLC Method Development by Lloyd R. Snyder, Wiley-Interscience*
11. *Principles & Practices of Chromatography by R. P. W. Scott, Library for Science*
12. *Fundamentals of Analytical Chemistry, VIII Edn., D. A. Skoog, D. M. West, F.J. Holler and S.R.Crouch, Thomson Brooks/Cole Publishers, 2004.*
13. *Principles of Instrumental Analysis by D.A. Skoog, F.J. Holler and T.A. Nieman, 5th Edition (1998), Harcourt Brace & Company, Florida.*
14. *Instrumental Methods of Chemical Analysis, B. K. Sharma, Goel Publishing House, Meerut.*
15. *Instrumental Methods of Chemical Analysis, Chatwal and Anand, Himalaya Publishing House, Meerut.*
16. *Basic Gas Chromatography 2nd Edition by Harold M. McNair, James M. Miller,*

SEMESTER V

Paper – V ANALYTICAL CHEMISTRY-5 45hrs (3h/w)

ANALYTICAL BIOCHEMISTRY AND ENVIRONMENTAL CHEMISTRY

UNIT – I **9 hrs**

BASIC UNDERSTANDING OF THE STRUCTURES, PROPERTIES AND FUNCTIONS OF CARBOHYDRATES, LIPIDS, AND PROTEINS

1. Isolation and characterization of polysaccharides.
2. Classification of lipids, properties, functions and Biochemical functions of steroid hormones.
3. Proteins- structure, classification, isolation, characterization and functions.
4. Biochemistry of peptide hormones.
5. Enzymes- nomenclature, classification, effect of pH, temperature on enzyme activity, enzyme inhibition.
6. Lipoproteins

UNIT – II **9 hrs**

BIOCHEMISTRY OF DISEASE: A DIAGNOSTIC APPROACH

Clinical chemistry: a diagnostic approach by blood/urine analysis.

1. Blood: Composition and functions of blood, blood coagulation.
2. Blood collection and preservation of samples.
3. Anemia
4. Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin.
5. Urine: Collection and preservation of samples.
6. Formation of urine.
7. Composition and estimation of constituents of normal and pathological urine.

Unit-III: **9 hrs**

Microbiological Tests and Assays:

Microbiological assay of antibiotics, (std. preparations and units of activity, test organisms and inoculum, apparatus, methods: cylinder or cup plate method and two level factorial assay (ampicillin), microbial limit test (preliminary testing, medium soyabean casein digest agar medium only) and total microbial count only), test of sterility-membrane filtration method, determination of thiomersal.

Unit-IV: **9 hrs**

Standardization and Quality Control of different Dosage Forms:

Brief introduction to different dosage forms with the IP requirements, analytical methods for the following: Tablets (aspirin), additives used in tablet manufacture, capsules (Rifampicin), powders (Sodium benzoate), solutions (saline, NaCl) suspensions (barium sulphate–limit test for impurity), mouthwashes (Ointments (salicylic acid) and creams dimethicone by IR), injections (Mannitol), ophthalmic preparations (sulphacteamine), aerosols (salbutamol), blood products and reporting protocols.

UNIT - V **9 hrs**

Concept and scope of environmental chemistry –nomenclature –environmental segments – The natural cycles of the environment -the hydrological cycle –the oxygen cycle –the nitrogen cycle.

Classification of water pollutants –Characterization –Dissolved Oxygen –BOD-COD-Waste water treatment (General). Disposal of radioactive wastes. Pollution due to some typical industries like Textile, Pulp and Paper, Electroplating, Dairy, Cane sugar

Practical-V Analysis of Bio Products **30** hrs (2 h / w)

Identification and estimation of the following:

1. Carbohydrates – qualitative and quantitative.
2. Lipids – qualitative.
3. Determination of the iodine number of oil.
4. Determination of the saponification number of oil.
5. Determination of cholesterol using Liebermann- Burchard reaction.
6. Proteins – qualitative.
7. Isolation of protein.
8. Determination of protein by the Biuret reaction.
9. Determination of nucleic acids

Suggested Readings:

1. T. G. Cooper: Tool of Biochemistry.
2. Keith Wilson and John Walker: Practical Biochemistry.
3. Alan H Gowenlock: Varley's Practical Clinical Biochemistry.
4. Thomas M. Devlin: Textbook of Biochemistry.
5. Jeremy M. Berg, John L Tymoczko, Lubert Stryer: Biochemistry.
6. G. P. Talwar and M Srivastava: Textbook of Biochemistry and
7. Human Biology.
8. A.L.Lehninger: Biochemistry.
9. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.
10. Environmental chemistry by A.K.De
11. A text book of Engineering chemistry by S.S.Dara
12. A text book of Industrial chemistry by B.K.Sharma

SEMESTER V

Paper – VI: ANALYTICAL CHEMISTRY-6 45hrs (3h/w)

INSTRUMENTAL METHODS OF ANALYSIS

UNIT –I **9 hrs**

AN INTRODUCTION TO SPECTROSCOPIC METHOD OF ANALYSIS:
(RECAP of the introduction covered in detail in the chemistry syllabus)
UV AND VISIBLE SPECTROPHOTOMETRY:
Lambert-Beer's law: Principles - Instrumentation, Single/double beam instrument and its applications
IR SPECTROSCOPY:
Principle – Instrumentation and applications

UNIT –II **9 hrs**

ATOMIC EMISSION SPECTROSCOPY (Flame photometry):
Principle – Instrumentation – Interferences – Analytical techniques for Flame photometry – Calibration plots (Working curves). Determination of Alkali and Alkaline earth metals in natural water (any two metal ions)

UNIT-III: **9 hrs**

ATOMIC ABSORPTION SPECTROSCOPY:
Principle – Instrumentation – Radiation sourcs (line sources) – Hollow cathode lamps and Discharge lamps. Interferences – Analytical techniques for AAS – Calibration plots. Applications – Determinations of Calcium and Magnesium in tap water.

UNIT-IV: **9 hrs**

POLOROGRAPHY AND COULOMETRY:
(a) Polarography:
Basic Principles – DME – Advantages and Disadvantages Diffusion Current – The llkovic equation (derivation not required). Half – Wave potential – Experimental set up – Applications. Determination of Copper and Zinc in Brass.
(b) Coulometry: Types of coulometric methods: Potentiostatic and amperostatic; principles, instrumentation and applications, applications.

UNIT-V: **9 hrs**

Basic Electro-analytical Chemistry:
Electrochemical cells, cell potentials, electrode potentials, calculation of cell potentials and currents in electrochemical cells, types of polarization, types of electroanalytical methods, problems.
Ion-selective Electrodes:
Types of ion-selective electrodes: Glass, liquid ion exchange membrane, neutral carrier membrane, coated wire, gas sensing, air gap and biomembrane electrodes; theory of ion selective electrode and ion-selectivity coefficient; problems.

Practical VI Instrumental methods of analysis **30** hrs (2 h / w)

Determination of metals in given samples by AAS technique.
Preparation of standard calibration graphs of Pb, Cd, Zn and Fe by AAS

Suggested Readings:

1. P.W. Atkins: Physical Chemistry.
2. G.W. Castellan: Physical Chemistry.
3. C.N. Banwell: Fundamentals of Molecular Spectroscopy.
4. Brian Smith: Infra red Spectral Interpretations: A Systematic Approach.
5. W.J. Moore: Physical Chemistry.

SEMESTER-VI

PAPER – VII:

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS **45 hrs (3 h / w)**

UNIT-I **9 hrs**

ANALYSIS OF SOAPS, DETERGENTS AND PAINTS

Analysis of soaps: moisture and volatile matter,cobined alkali,total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides.

Analysis of paints :Vehicle and pigments ,Barium Sulphate ,total lead, lead chromate,iron pigments, zinc chromate

UNIT- II **9 hrs**

ANALYSIS OF FATS & OILS AND INDUSTRIAL SOLVENTS

Analysis of oils:saponification value,iodine value,acid value,ester value, bromine value, acetyl value.

Analysis of industrial solvents like benzene,acetone,methanol and acetic acid., Determination of methoxyl and N-methyl groups.

UNIT-III **9 hrs**

ANALYSIS OF FERTILIZERS, STARCH, SUGARS AND PAPER

Analysis of fertilizers: urea, NPK fertilizer,super phosphate,

Analysis of DDT,BHC,endrin,endosulfone,malathion,parathion.,

Analysis of starch,sugars,cellulose and paper,

UNIT –IV **9 hrs**

ANALYSIS OF GASES

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydro carbon, unsaturated hydrocarbons, nitrogen, octane number, cetane number

Analysis of Fuel gases like: water gas,producer gas,kerosene (oil) gas.

Ultimate analysis :carbon, hydrogen,nitrogen,oxygen,phosphorus and sulfur.,

UNIT – V **9 hrs**

ANALYSIS OF COMPLEX MATERIALS:

Analysis of cement- loss on ignition, insoluble residu, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydrid.

Analysis of glasses - Determinaiton of silica, sulphur, barium, arsinic, antimony, total R_2O_3, calcium, magnesium, total alkalies,aluminium,chloride,floride

Practical-VII Analysis of Applied Industrial Products **30** hrs (2 h / w)

Analysis of Heavy & Fine Chemicals:

1. Preparation of soaps and detergents.
2. Estimation of EDTA in detergent and shampoo.

3. Assay of soaps and detergent
4. Determination of Na/K/Li/Ca in given sample by flame photometry method.
5. Determination of washing strength of detergents by surface tension method.
6. Determination of CMC of detergents.
7. Preparation and characterization of copper sulphate.
8. Preparation and characterization of methyl orange and methyl red.
9. Estimation of $Na_2CO_3.10H_2O$ in washing soda.
10. Determination of thiosulphate content of a commercial hypo solution.
11. Estimation of available chlorine in the sample of bleaching powder

SUGGESTED BOOKS:

1. F.J.Welcher-Standard methods of analysis,
2. A.I.Vogel-A text book of quantitative Inorganic analysis-ELBS,
3. H.H.Willard and H.Deal- Advanced quantitative analysis- Van Nostrand Co,
4. F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
5. J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.,
6. G.Z.Weig - Analytical methods for pesticides,plant growth regulators and food additives - Vols I to VII,
7. Aanalytical Agricultrual Chemistry by S.L.Chopra & J.S.Kanwar -- Kalyani Publishers
8. F.J.Welcher-Standard methods of analysis,
9. Quantitative analysis of drugs in pharmaceutical formulations by P.D.Sethi, CBS Publishers and Distributors, New Delhi
10. G.Ingram- Methods of organic elemental micro analysis- Chapman and Hall.,
11. H.Wincciam and Bobbles (Henry J)- Instrumental methods of analysis of food additives.,
12. H.Edward-The Chemical analysis of foods;practical treatise on the examination of food stuffs and the detection of adulterants,

SEMESTER VI

Paper VIII

ANALYTICAL CHEMISTRY- VIII **45hrs (3h/w)**

IPR, QA & QC and Regulatory Affairs

UNIT-I: **9 hrs**

INTELLECTUAL PROPERTY RIGHTS:
Concept and fundamentals of IPR, need and economic importance of IPR, detail description of various IP Properties (Patents, Trademarks, Copyrights, Geographical Indications Industrial Designs and Trade secrets), IPR with emphasis on patent regime, factors affecting IP protection, penalties for violation or infringement, trade related aspects of IPR, concepts behind GATT, WTO, TRIPS, TRIMS and GATS.

UNIT-II: **9 hrs**

R & D AND TECHNOLOGY TRANSFER:
Role of R&D, functional structure of R&D, unit research strategies and manufacturing interface, laboratory-industry interface, technology transfer
Pilot Plant Operation and Scale up:
Purpose planning, design and operation, analysis of results, assessment of flexibility of design comprises to cope-up for safety and economic in construction and operation.

UNIT-III: **9 hrs**

QUALITY CONTROL:
Concept of quality and quality control, nature of variability's, design of QC laboratory for chemical, instrumental and microbiological laboratories, schedule L1, standardization of reagents, labeling of reagents, control samples, data generation and storage, QC documentation, LIMS sampling techniques, sampling plans, steps to improve quality with reference to ISO and TQM, preparation of control charts, sampling, inspection, cost reduction & quality improvement.

UNIT-IV: **9 hrs**

QUALITY ASSURANCE:
Concepts of Quality Assurance, Total Quality Management, Philosophy of GMP and cGMP, preparation of audit, Conducting audit, Audit Analysis, Audit Report and Audit follow up. Premises: Location, design, plant layout, construction, maintenance of sterilite areas, control of contamination.

UNIT-V: **9 hrs**

INDUSTRIAL STANDARDS AND CONTROL:
Government standards like Agmark, Hallmark, ISI, MINAS, IP, BP, USP; an introduction of ISO, OSHA, CDSCO, USFDA, ICH, FPO, MHRA, SUPAC

PROJECT WORK

Four weeks duration in any industry / chemical R&D / organization
Each candidate has to submit a project report after completion.

Suggested Books:

- *Harold Koontz, H. Weihrich, and A.R. Aryasri, Principles of Management, Tata McGraw-Hill, New Delhi, 2004.*
- *Dr. B. L.Wadhera-Intellectual Property Law Handbook, Universal Law Publishing Co. Ltd. 2002.*
- *Handbook of Small Scale Industry by P.M. Bhandari.*
- *Dr. T Ramakrishna -Ownership and Enforcement of Intellectual Property Rights, CIPRA, NSLIU-2005.*
- *Intellectual Property Law (Bare Act with short comments) - Universal Law Publishing Co. Ltd. 2007.*
- *The Trade marks Act 1999 (Bare Act with short comments) - Universal Law Publishing Co. Ltd. 2005.*
- *The Patents Act, 1970 (Bare Act with short comments) - as amended by Patents (Amendment) Rules 2006 w.e.f. 5-5-2006. Commercial law publishers (India) Pvt. Ltd. 2006.*
- *Thomas T Gordon and Arthur S Cookfair -Patent Fundamentals for Scientist and Engineers, CRC Press 1995.*
- *Prabuddha Ganguli -Intellectual Property Rights, TMH Publishing Co. Ltd.2001*
- *Steinborn L. GMP/ISO Quality Audit Manual for Healthcare Manufacturers and Their Suppliers, Sixth Edition, (Volume 1 with Checklists and Software Package). Taylor & Francis; 2003.*
- *Hoyle D. ISO 9000 Quality Systems Handbook -updated for the ISO 9001:2008 standards. Routledge; 2012.*

INDUSTRIAL CHEMISTRY

Structure of Industrial Chemistry under CBCS w.e.f. 2017-18

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Material & Energy balances and Utilities in Chemical Industry	100	03
			Practical-I	50	02
	II	II	Inorganic Materials	100	03
			Practical-II	50	02
II	III	III	Cosmetics, Fermentation, Paints & Pigments, Sugar and Industrial Pollution	100	03
			Practical-III	50	02
	IV	IV	Dyes, Leather, Paper, Corrosion and Industrial waste management	100	03
			Practical-IV	50	02
III	V	V	Drugs & Pharmaceuticals, Polymers and Food additives	100	03
			Practical-V	50	02
		VI	Industrial chemical analysis and Instrumental methods of analysis	100	03
			Practical-VI	50	02
	☆ Any one paper from VII (A) and VII (B)	VII (A)	☆Oils, Fats, Fuel Chemistry, Lubricants and Adhesives	100	03
			Practical- VII (A)	50	02
		VII (B)	☆To be Introduced	100	03
			Practical- VII (B)	50	02
	☆☆ Any one Cluster from VIII (A) and VIII (B)	VIII (A)	☆☆Cluster Electives-I VIII-A-1 Chemical Process Economics,Entrepreneurship and IPR VIII-A-2: To be Introduced VIII-A-3: To be Introduced Project Work	 100 100 100 50 50 50	 03 03 03 02 02 02
	VI	VIII (B)	☆☆Cluster Electives-I VIII-B-1: To be Introduced VIII-B-2: To be Introduced VIII-B-3: To be Introduced	 100 100 100 50 50 50	 03 03 03 02 02 02

Semester	Paper	Subject	Hrs	Credits	IA	ES	Total
FIRST YEAR							
SEMESTER I	I	Material & Energy balances and Utilities in Chemical Industry	4	3	25	75	100
		Practical-I	2	2	0	50	50
SEMESTER II	II	Inorganic Materials	4	3	25	75	100
		Practical-II	2	2	0	50	50
SECOND YEAR							
SEMESTER III	III	Cosmetics, Fermentation, Paints & Pigments, Sugar and Industrial Pollution	4	3	25	75	100
		Practical-III	2	2	0	50	50
SEMESTER IV	IV	Dyes, Leather, Paper, Corrosion and Industrial waste management	4	3	25	75	100
		Practical-IV	2	2	0	50	50
THIRD YEAR							
SEMESTER V	V	Drugs & Pharmaceuticals, Polymers and Food additives	3	3	25	75	100
		Practical-V	2	2	0	50	50
	VI	Industrial chemical analysis and Instrumental methods of analysis	3	3	25	75	100
		Practical-VI	2	2	0	50	50
SEMESTER VI Any one elective paper from VII (A) or VII (B) Any one Cluster from VIII (A) or VIII (B)	VII (A)	Elective- Oils, Fats, Fuel Chemistry, Lubricants and Adhesives	3	3	25	75	100
		Practical Paper-VII A	2	2	0	50	50
	VII (B)	☆ Elective	3	3	25	75	100
		Practical Paper-VII B	2	2	0	50	50
	VIII (A)	Cluster elective-VIII-A-1 Chemical Process Economics, Entrepreneurship and IPR	3	3	25	75	100
		Practical Paper-VIII -A-1 -Project work	2	2	0	50	50
		☆Cluster elective-VIII-A-2	3	3	25	75	100
		Practical Paper-VIII -A-2 -Practical	2	2	0	50	50
		☆Cluster elective-VIII-A-3	3	3	25	75	100
		Practical Paper-VIII -A-3-Practical	2	2	0	50	50
	VIII (B)	Cluster elective-VIII-B-1 Chemical Process Economics, Entrepreneurship and IPR	3	3	25	75	100
		Practical Paper-VIII -B-1 -Project work	2	2	0	50	50
		☆Cluster elective-VIII-B-2	3	3	25	75	100
		Practical Paper-VIII -B-2 -Practical	2	2	0	50	50
		☆Cluster elective-VIII-B-3	3	3	25	75	100
		Practical Paper-VIII -B-3-Practical	2	2	0	50	50

Industrial Chemistry curriculum of BSc subject under CBCS pattern was designed with an aim to increase the job potential of the undergraduate students. The curriculum was developed in consultation with industry experts. The curriculum is interdisciplinary in nature. Modules in economics, auditing, IPR, factory acts etc., are part of the curriculum.

The Objectives of the course are

1. To equip the students for job opportunities in industries of both private and public sectors involved in manufacturing and processing.
2. To give the students a comprehensive view on different types of industrial products and knowledge about chemical principles involved in the manufacturing and analysis of industrial materials both organic and inorganic in nature
3. To nurture entrepreneurship in the students

The learning outcomes of the course are (at the end of the course the students can)

1. Have knowledge about manufacturing procedures of different organic and inorganic industrial materials
2. Gain knowledge about several analytical methods used in the characterization and quality analysis of industrial materials
3. Able to understand the basics of resource management and financial management
4. Able to know about the important provisions of Factory Act, sales of goods Act and partnership Act
5. Able to know the process of Licensing andregistration a small scale industry
6. Able to know the Techno-economic feasibility of the projects

Total number of papers = 24

Mathematics= 07 papers
Chemistry= 07 papers and
Industrial Chemistry = 10 papers (including 03 cluster elective papers)

Total number of credits of the proposed restructured course = 158 (same as that of BSc conventional course)

SEMESTER-I

Paper-I

Material & Energy balances and Utilities in Chemical Industry

60hrs (4 hours/week)

Unit-1 **12 hours**

Material and Energy Balance: Dimensions and units: Basic Chemical Calculations -Atomic weight, molecular weight, equivalent weight, Mole, composition of - (i) Liquid mixtures and (ii) gaseous mixtures, ideal gas law, vapour pressure, Humidity and Saturation.

Unit-II **14 hours**

Material Balance without Chemical Reactions: Flow diagram for material balance, simple material balance with or without recycle or by-pass for chemical engineering operations such as distillation, absorption, crystallization, evaporation, extraction, etc.
Material Balance involving chemical reactions: concept of limiting reactant, conversion, yield, selectivity, and liquid phase reaction, gas phase reaction with or without recycle or bypass.

Unit-III **10 hours**

Energy Balance: Heat capacity of pure gases and gaseous mixtures at constant pressures, sensible heat changes in liquids, Enthalpy changes.

Unit-IV **12 hours**
Utilities in Chemical Industry

a) **Boilers**: Types of boilers and their functioning
b) **Water**: Specifications of industrial use, various water treatments.
c) **Steam**: Generation and use.
d) **Air**: Specification of industrial use, processing of air

Unit-V **12 hours**
Fluid flow and Pumps

Fluid flow: Fans, blowers, compressors, vacuum pump, ejector
Pumps: Reciprocating pumps, Gear pumps, centrifugal pumps**.**

Laboratory Course –I **50 Marks**
Practical Paper- I (at the end of semester I) **30 hours (2 hours / week)**

1. Quantitative analysis of calcium in lime stone by complexometric titration.
2. Hardness of water by EDTA titration.
3. Determination of Chemical Oxygen Demand (COD)
4. Determination of Biological Oxygen Demand (BOD)
5. Percentage of available chlorine in bleaching powder

Reference Books

1. B.I. Bhatt and S.M. Vora: *Stoichiometry*, Tata McGraw-Hill publishing Company Ltd, New Delhi.

2. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK

3. R. M. Felder, R. W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi.

4. J. A. Kent: Riegel's*Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.

5. P. C. Jain, M. Jain: *Engineering Chemistry,* Dhanpat Rai & Sons, Delhi.

6.R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry,* Vikas Publications, New Delhi.

7. B. K. Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut
8. S. C. Bhatia: *Chemical Process Industries,* Vol. I & II, CBS Publishers, New Delhi.

9. W. L. McCabe and J. C.Smith: *Unit Operations in Chemical Engineering,* Mc-Graw Hill Book Company, New York.

10. O. P. Vermani, A. K. Narula: *Industrial Chemistry,* Galgotia PublicationsPvt. Ltd., New Delhi.

SEMESTER-II

Paper-II

INORGANIC MATERIALS 60hrs (4 hours/week)

Unit-1 **12 Hours**

Silicate Industries-1

Glass: Glassy state and its properties, classification (silicate and non-silicatelasses).Manufacture and processing of glass. Composition and propertiesof the following types ofglasses: Soda lime glass, lead glass, armouredglass, safety glass, borosilicate glass,fluorosilicate, coloured glass,photosensitive glass.

Unit-2 **14 Hours**

Silicate Industries-2

1. Ceramics: Important clays and feldspar, ceramic, their types andmanufacture. High technology ceramics and their applications, superconducting and semi conducting oxides, fullerenes carbon nanotubes andcarbon fiber.

2. Cements: Classification of cement, ingredients and their role, Manufactureof cement and the setting process, quick setting cements.

Unit-3 **10 Hours**

Fertilizers

Different types of fertilizers. Manufacture of the followingfertilizers: Urea, Ammonium nitrate, Calcium ammonium nitrate, Ammoniumphosphates; Polyphosphate, Super phosphate, Compound and mixed fertilizersPotassium Chloride, Potassium sulphate.

Unit-4 **10 Hours**

Alloys

Classification of alloys, Ferrous and Non-Ferrous alloys, Specific properties ofelements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment(argon treatment, heat treatment, nitriding, carburizing). Composition andproperties of different types of steels.

Unit-5 **14 Hours**

Surface Coatings

Objectives of coatings surfaces, preliminary treatment of surface, classificationof surface coatings. Paints and pigments-formulation, composition and relatedproperties. Oil paint, Vehicle, modified oils, Pigments, toners and lakespigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heatretardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Waxpolishing, Water and Oil paints, additives, Metallic coatings (electrolytic andelectroless), metal spraying and anodizing.

Laboratory Course –II **50 Marks**

Practical Paper- II (at the end of semester II) 30 hours (2 hours/week)

1. Determination of free acidity in ammonium sulphate fertilizer.
2. Estimation of Calcium in Calcium ammonium nitrate fertilizer.
3. Estimation of phosphoric acid in superphosphate fertilizer.
4. Analysis of Cement.
5. Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples.

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: *Introduction to Ceramics,* Wiley Publishers, New Delhi.

3. J. A. Kent: Riegel's*Handbook of Industrial Chemistry*, CBS Publishers,New Delhi.

4. P. C. Jain, M. Jain: *Engineering Chemistry,* Dhanpat Rai & Sons, Delhi.

5.R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry,* VikasPublications, New Delhi.

6. B. K. Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut
7. S. C. Bhatia: *Chemical Process Industries,* Vol. I & II, CBS Publishers, New Delhi.

8. O. P. Vermani, A. K. Narula: *Industrial Chemistry,* Galgotia PublicationsPvt. Ltd., New Delhi.

SEMESTER-III

Paper-III

Cosmetics, Fermentation, Paints & Pigments, Sugar and Industrial Pollution

60hrs (4 hours/week)

Unit-1 **12 Hours**

Cosmetics and Perfumes

A general study including preparation and uses of the following: Hair dye, hairspray, Shampoo, Sun-tan lotions, face powder, lipsticks, talcum powder, nailenamel, creams (cold, vanishing and shaving creams), antiperspirants andartificial flavours. Essential oils and their importance in cosmetic industries withreference to Eugenol, Geraniol, sandalwood oil, eucalyptus, rose oil, phenylethyl alcohol, Jasmone, Civetone, Muscone.

Unit-2 **10 hours**

Fermentation Industries

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid,(ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii)Lysine, Glutamic acid, Vitamin B2,Vitamin B12 and Vitamin C.

Unit-3 **14 hours**

Paints and Pigments

Paints- Ingredients and their functions required properties of paint, paints constituents and their functions, manufacture of paint.

Pigments- Characteristics of pigment, uses in paint, emulsion paints, special paints, paint remover, varnishes, lacquers, enamels.

Unit-4 **10 hours**

Sugar Chemistry

Introduction – Manufacture of cane sugar, recovery of cane sugar from molasses, preparation of Celotex and manufacture of sucrose from beat root, testing and estimation of sugar.

Unit-5 **14 hours**

Industrial pollution

Pollutants and their statutory limits

Air Pollution- various pollutants

Water pollution- Organic and Inorganic pollutants

Noise pollution

Radiation pollution

Laboratory Course –III **50 Marks**

Practical Paper- III (at the end of semester III) 30 hours (2 hours/week)

1. Preparation of pigment (zinc oxide).
2. Analysis of oils and fats (iodine value, saponification value, acid value)
3. Testing of turmeric powder, milk and mustard oil for adulterants.
4. Estimation of glucose in food samples.
5.Preparation of talcum powder, nail polish and face cream

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. J. A. Kent: Riegel's*Handbook of Industrial Chemistry*, CBS Publishers,New Delhi.
3. P. C. Jain, M. Jain: *Engineering Chemistry,* Dhanpat Rai & Sons, Delhi.
4. Water Analysis Hand Book – NEERI
5. Practicals and Calculation in Engineering Chemistry – S.S. Dara
6. A. K. De, *Environmental Chemistry*: New Age International Pvt, Ltd, New Delhi.
7. S.P. MAHAJAN: *Pollution control in process industries,* Tata McGraw-Hillpublishing company limited, New Delhi.
8. C.k. Varshney: *Water Pollution and Management*, Wiley Eastern Limited, Chennai

SEMESTER-IV

Paper-IV

Dyes, Leather, Paper, Corrosion and Industrial waste management

60hrs (4 hours/week)

Unit-1 **12 hours**

Dyes

Introduction, Classification with special reference to textile and edible dyes and fabric brighteners. Industrial preparation and uses of methyl orange, malachite green, indigo, bismark brown, alizarin.

Unit-2 **08 hours**

Leather Chemistry- Introduction, Manufacture of Leather and Preparation of hides for tanning, vegetable, chrome and oil tanning, byproduct.

Unit-3

Paper Industry **10 hours**

Pulp and Paper- Introduction, Manufacture of pulp, sulphate or kraft pulp, soda pulp, sulphite pulp, rag pulp, beating, refining, filling, sizing and coloring, manufacture of paper.

Unit-4 **15 hours**

Corrosion and its control

Introduction - Economic aspects of corrosion - Dry or Chemical Corrosion - Wet or electrochemical corrosion -Mechanism of Electrochemical Corrosion.

Galvanic Corrosion - Concentration Cell Corrosion - Differential aeration. Corrosion - Pitting Corrosion - Underground or soil corrosion.- Passivity.

Factors Influencing Corrosion - Microbiological Corrosion – GalvanicSeries - Atmospheric corrosion - Corrosion Control - Proper designing -Using pure metal - Using metal alloys - Cathodic protection.

Chemical conversion - Coating - Phosphating - Chromising– Treatmentof metal surfaces hot dipping - Use of inhibitors.

Unit-5 **15 hours**

Industrial Waste Management

Waste management - primary, secondary& tertiary treatment

Solid Waste Management Pyramid – Key Technologies for SWM (collection, handling, transformation, landfills, incinerators, composting)

Water treatment andpurification (reverse osmosis, electro dialysis, ion exchange)

Laboratory Course –IV **50 Marks**

Practical Paper- IV (at the end of semester IV) 30 hours (2 hours/week)

1. Preparation of Methyl Orange.
2. Synthesis of common industrial compounds involving two step reactions, e.g. 4- bromo aniline, 3-nitroaniline, sulphanilamide, 4-amino benzoic acid, 4-nitro benzoic acid, dihalobenzenes, nitrohalobenzenes, paracetamol, oil of winter green).(**ANY FIVE**)

Reference Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. J. A. Kent: Riegel's*Handbook of Industrial Chemistry*, CBS Publishers,New Delhi.
3. P. C. Jain, M. Jain: *Engineering Chemistry,* Dhanpat Rai & Sons, Delhi.
4. Water Analysis Hand Book – NEERI
5. Practicals and Calculation in Engineering Chemistry – S.S. Dara
6. A. K. De, *Environmental Chemistry*: New Age International Pvt, Ltd, New Delhi.
7. S.P. MAHAJAN: *Pollution control in process industries,* Tata McGraw-Hillpublishing company limited, New Delhi.
8. C.k. Varshney: *Water Pollution and Management*, Wiley Eastern Limited, Chennai

SEMESTER-V
Paper-V
Drugs & Pharmaceuticals, Polymers and Food additives 45 hrs (3 hours/week)

Unit-1 **10 hours**

Drugs and Pharmaceuticals

Synthesis of the representative drugs of the following classes: analgesics agents,antipyretic agents, anti-inflammatory agents (Aspirin, paracetamol, lbuprofen);antibiotics (Chloramphenicol); antibacterial and antifungal agents(Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviralagents (Acyclovir), Central Nervous System agents (Phenobarbital,Diazepam),Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIVAIDSrelated drugs (AZT- Zidovudine).

Unit-2 **9 hours**

Organic Polymers-1

Preparation, Properties, Classification, Structureproperty relationship (Thermoplastic and Thermosetting). Industrialmanufacture of the monomers and the following polymers, Polystyrene,Polyacrylonitrile, Polymethacrylate, Polymethylmethacrylate, Polyethene, Polybutadiene, Polyvinylidene, Polycarbonates, Polyesters, Polyurethanes,Nylon (6, 66,610), Phenolic polyesters, Polyamides, Polysulphones,Alkyds.

Unit-3 **9 hours**

Organic Polymers-2

Speciality Polymers (Electro-luminescent, Biopolymers,Conducting polymers), Rubbers (synthetic and natural) and their processing,Elastomers, Cellulosics, Natural and Synthetic fibers, fiber processing, anti-wrinkle and flame retardant. Comparison of natural and synthetic polymers,relation between molecular structure and properties. Polymer Processing:Moulding, compounding, blending. Polymer designing: packaging, certification and process evaluation.

Unit-4 **7 hours**

Inorganic Polymers: Classification, preparation, properties and uses ofboron containing polymers, phosphorus containing polymers, siliconcontaining polymers, Silicones (fluid, elastomers and resins) and Sulphur containing polymers(SN)x.

Unit-5 **10 hours**

Food additives

A general study of food flavours- Flavoring agents: Vanilla , diacetyl, isoamyl acetate, limonene, ethylpropionate, allyl hexanoate, colours:Briliant blue FCF, fast green FCF, tertrazine, erytrhosine, sunset yellow FCF and preservatives: Sodium carbonate, sodium benzoate, sorbic acid, artificial sweetners.

Laboratory Course –V **50 Marks**

Practical Paper- V (at the end of semester V) 30 hours (2 hours/week)

1. Extraction of natural coloring and flavoring agents from flowers and fruits (extraction of any three coloring and flavoring agents)
2. Preparation of nylon 6,6
3. Application of TLC and paper chromatography in the separation of organic compounds

Reference Books

1. G.L. Patrick: *Introduction toMedicinal Chemistry, Oxford University* Press, UK.
2. Hakishan, V.K. Kapoor: *Medicinal and Pharmaceutical Chemistry,* Vallabh Prakashan, Pitampura, New Delhi.
3. William O. Foye, Thomas L., Lemke, David A. William: *Principles of Medicinal Chemistry*, B.I. Waverly Pvt Ltd. New Delhi.
4. Jayashree Ghosh: *Text Book of Pharmaceutical Chemistry*, 2nd edition, S,Chand& Company, New Delhi
5. 1. K.J. Saunders: *Organic Polymer Chemistry*, Chapmann & Hall, London.
6. P.J. Flory: *Principles of Polymer Chemistry*, Cornell University Press, NY.
7. G. Odian: *Principles of Polymerization*, John Wiley & Sons Inc, NY.
8. James E. Mark, HaryAllcock, Robert West, *Inorganic Polymers*, PrenticeHall Englewood.

SEMESTER-V
Paper-VI
Industrial chemical analysis and Instrumental methods of analysis
45 hrs (3 hours/week)

Unit-1 **09 hours**

Industrial Chemical Analysis- Sampling procedure, sampling of bulk materials, techniques of sampling Solid, liquids and gases. Collecting and processing data.

Limitation of analytical methods, accuracy, precision, Classification of errors and their minimization significant figures and computations.

Unit-2 **08 hours**

Spectroscopic Methods- Principle and its industrial application of UV-Visible spectrophotometers, IR, NMR and ESR.

Unit-3 **10 hours**

Electro analytical techniques- Potentiometry, voltametry, polarography and Colorimetry principle, instrumentation and their industrial applications.

Unit-4 **10 hours**

Thermo analytical techniques- Thermal gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetric (DSC) – principle and their industrial applications.

Unit-5 **08 hours**
Spectrophotometry and Atomic spectroscopy

Spectrophotometer- Principle, instrumentation for absorption measurements, qualitative and quantitative applications.
Atomic Spectroscopy-flame photometry, Atomic absorption spectroscopy and their industrial applications.

Laboratory Course –VI **50 Marks**

Practical Paper- VI (at the end of semester V) 30 hours (2 hours/week)

1. Class exercises on the interpretation of IR, Mass, UV and NMR spectra of organic compounds for structural elucidation
2. Determination of concentration of Na^+ and K^+ using Flame Photometry.
3. Determination of Fe^{+3} by colorimetry
4. Verification of Beer Lambert's by using spectrophotometry

Reference Books

1. H.H. Willard, L.L. Merrit, J.A. Dean, F. A. Settle*: Instrumental Methods of Chemical Analysis*, Wadsworth Publishing Company, California.

2. G. D. Christian: *Analytical Chemistry*, John Wiley, NY.

3. S.M. Khopkar: *Basic Concepts of Analytical Chemistry*,Wiley Eastern Ltd,New Delhi.

4. D.A. Skoog, D.M.West, F.J. Holler: *Fundamentals of Analytical Chemistry*, Cengage Learning.

5. Practicals and Calculation in Engineering Chemistry – S.S. Dara

6. William Kemp, *Organic Spectroscopy*, Palgrave Publishers

7. Pavia, Lampman and Kriz*Introduction to Spectroscopy*, Cengagae Learning

SEMESTER-VI
Elective
PAPER-VIIA

Oils, Fats, Fuel Chemistry, Lubricants and Adhesives
45 hrs (3 hours/week)

Unit-1 **8 Hours**
Oils and Fats

Classification of oils, fat splitting, distillation of completely miscible and non-miscibleoils, hydrogenation of oils, rancidity, saponification value, iodinenumber, acid value, Soap and Synthetic Detergent, preparation of soap anddetergent, different types of soap and their composition, surfactants (LAS, ABS,LABS), detergent binders and builders.

Unit-2 **10 Hours**

Fuel Chemistry-1

Review of energy sources (renewable and non-renewable).
Renewable Natural Resources: Cellulose, Starch- preparation, Properties and industrial applications.

Classification offuels and their calorific value.
Coal: Uses of coal (fuel and non-fuel) in various industries, its composition,carbonization of coal.Coal gas, producer gas and water gas-compositionand uses. Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (HydroGasification and Catalytic gasification), Coal liquefaction and SolventRefining.

Unit-3 **12 Hours**
Fuel Chemistry-2
Petroleum and Petrochemical Industry: Composition of crude petroleum,Refining and different types of petroleum products and their applications.Fractional Distillation (Principle and process), Cracking (Thermal andcatalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG,CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, syntheticfuels (gaseous and liquids), clean fuels. Petrochemicals: Vinyl acetate,Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.

Unit-4 **7 Hour**

Lubricants: Classification of lubricants, lubricating oils (conducting andnon-conducting) Solid and semisolid lubricants, synthetic lubricants.Properties of lubricants (viscosity index, cloud point, pore point) and theirdetermination.

Unit-5 **8 Hours**

Adhesives- Introduction- Classification of adhesives, adhesives action, development of adhesive strength, chemical factors influencing adhesive action, bonding processes by adhesives, advantages and limitations, examples.

Laboratory Course –VII **50 Marks**

Practical Paper- VIIA (at the end of semester VI) 30 hours (2 hours/week)

1. Determination of Flash point and Ignition point of liquids.

2. Determination of smoke point of a fuel

3. Preparation of soap

4. Separation of essential oils by Soxhlet extractor

Suggested Readings

1. E. Stocchi: *Industrial Chemistry*, Vol -I, Ellis Horwood Ltd. UK.
2. P.C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
3. B.K. Sharma: *Industrial Chemistry,* Goel Publishing House, Meerut.
4. O. P. Vermani, A. K. Narula: *Industrial Chemistry,* Galgotia Publications Pvt. Ltd., New Delhi.
5. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
6.S. C. Bhatia: *Chemical Process Industries,* Vol. I & II, CBS Publishers, New Delhi.

7. S.S. Dara,*Textbook of Engineering chemistry*, S Chand and Company Ltd, New Delhi.
8. B.K. Sharma: *Fuels and Petroleum Processing (including petrochemicals and industrial organic synthesis)*Goel Publishing House, Meerut

SEMESTER-VI
Cluster elective
PAPER-VIII A- 1
Chemical Process Economics, Entrepreneurship and IPR
45 hrs (3 hours/week)

Unit-1 **11 hours**

Chemical Process Economics

1. Factors involved in project cost estimation, methods employed for the estimation of capital Investment. Capital formation, elements of cost accounting. Interest and investment costs, timevalue of money equivalence.

2. Depreciation, methods of determining depreciation. Some aspects of marketing, pricing policy, profitability criteria, economics of selecting alternatives, variation of cost with capacity, break-even point, optimum batch sizes, production scheduling etc.

Unit-2 **8 hours**

Entrepreneurship-1
1. Need, scope and characteristics of entrepreneurship, special schemes for technical entrepreneurs development (STED), exposure to demand based, resource based,service based. Import substitute and export promotion industries, criteria for principles of products selection and developments.

2. Choice of technology: plant and equipment. Techno-economic feasibility of the projects. Plant layout and process planning for the project.

Unit-3 **8 hours**

Entrepreneurship-2
1. Financial Institutions, their procedure and incentives, financial ratio and their significance. Books of accounts, financial statements and Funds flow analysis. Energy requirement and utilization.

2. Resources management: men, machine and materials. Creativity and Innovations.Problem solving approach. Strength, weakness, opportunity and threat (SWOT)techniques.

Unit-4 **08 hours**

Entrepreneurship-3

1. Quality control, quality assurance and testing of the product. Packaging and advertising. After sales service.

2. Sickness in small scale Industries and their remedial measures. Licensing andregistration. Important provisions of Factory Act, sales of goods Act, partnership Actof marks – Collectivemarks, certification marks, service marks, Trade names, etc.Differences from Designs.

Unit-5 **10 hours**

Introduction to Intellectual Property Rights

Historical Perspective, Different Types of IP, Importance ofprotecting IP.

Trade Marks: Introduction, How to obtain, Different types, PCT system

Industrial Designs: Definition, How to obtain, features, International design registration.

Patents: Historical Perspective, Basic and associated right, WIPO

Laboratory Course –VIII 50 Marks

Practical Paper- VIII A (at the end of semester VI)

30 hours (2 hours/week)

Project Work or on the Job Training in a local industry

Every student should undergo training Programme or carry out a research project for the preparation and characterization of an industrial useful chemical/ any other investigatory project, in order to promote innovativeness, under the guidance and supervision of concerned faculty of college.

Suggested Readings

1.Arthur Raphael Miller, MichealH.Davis; *Intellectual Property: Patents,Trademarks and Copyright in a Nutshell,* West Group Publishers (2000).

2.P. Ganguli, Intellectual Property Rights: *Unleashing the KnowledgeEconomy,* Tata McGraw-Hill (2001).

3. N.K. Acharya: *Textbook on intellectual property rights*, Asia Law House(2001).

4.Happel John, *Chemical process economics (Chemical processing and engineering)*

CEMENT CHEMISTRY

Course Structure of Subject: **Cement Chemistry**
Recommended Combinations in B.Sc.: M C Cement Chem or Geol Chem Cement Chem

Semester	Part	Subject	Hours	Credits	IA	ES	Total
I	I	Introduction to Cement, Cement Raw Materials, Geology & Mining of Limestone	4	3	25	75	100
		Practicals	2	2	0	50	50
II	II	Raw Mix Design and Chemistry of Cement	4	3	25	75	100
		Practicals	2	2	0	50	50
III	III	Pyro processing and Clinker Formation	4	3	25	75	100
		Practicals	2	2	0	50	50
IV	IV	Utility and Maintenance in Cement Plant	4	3	25	75	100
		Practicals	2	2	0	50	50
V	V	Performance of Cement	4	3	25	75	100
		Practicals	2	2	0	50	50
V	VI	Refractory Science and Applications	4	3	25	75	100
		Practicals	2	2	0	50	50
VI	VII	Fuels and Firing System	4	3	25	75	100
		Practicals	2	2	0	50	50
VI	VIII	Safety, Health and Environment System	4	3	25	75	100
		Practicals	2	2	0	50	50

Syllabus of Cement Chemistry

Semester-I

Paper I

Introduction to Cement, Cement Raw Materials, Geology & Mining of Limestone

Objective: The course is design to know the history of cement, chemical and Physical characteristics of Cement Raw Materials, Distribution of limestone deposits in India, Assessment of limestone deposit of cement manufacture and preliminary idea about mine planning and production scheduling of Limestone

Unit-I: Introduction to cement manufacturing process (12 hours)

Introduction to Cement and cement manufacturing process: What is cement and its importance in construction, History of cement and Cement manufacturing process, material composition of cement, various unit operation of cement manufacture, the present status and future of cement industry in India.

Unit-II: Types of Cement (12 hours)

Types of Cement: Description and use of various type of Cement such as Ordinary Portland Cement, ortland Pozzalana Cement, Portland Slag Cement, Sulphate Resistant Cement, White Portland Cement and heat Cement, Masonry Cement, Oil Well Cement.

Unit-III: Calcareous and Argillaceous Raw Materials (12 hours)

Calcareous Raw Materials: Source of Lime, Limestone, Chalk, Marl, Industrial waste, geological distribution of limestone deposits in India, Assessment of limestone deposits for Cement manufacture.

Argillaceous Raw Materials: Sources of Silica, Alumina, Iron Oxide, Shale and effect of coal ash and additives use as corrective materials, Fly ash, Slag, Lime sludge as cement raw materials.

Unit-IV: Deposit Evaluation (12 hours)

Deposit Evaluation: Prospecting and Exploration of limestone deposit, Classification of limestone deposit, Reserve Estimation, Statistical and Geo statistical evaluation, Computer Aided Deposit Evaluation.

Unit-V: Mine Planning (12 hours)

Mine Planning: Introduction to surface mining, method of mining of limestone deposits, estimation of block size and bench height, estimation of block wise bench wise grade and tonnage, selection of mining equipment(Excavator, Dozer, Dumper etc.), Blasting techniques,

type of explosive use , Mine production scheduling, Advance method of limestone mining, equipment safety in mining operation, pit head quality control.

PRACTICALS: TESTING OF CEMENT RAW MATERIALS PRACTICAL

List of Experiments:

1. Physical Identification of Limestone
2. Physical Analysis of Limestone
    a. Determination of specific gravity
    b. Hardness
    c. Compressive Strength

Text Books / Reference Books:

1. Chemistry of Cement and Concrete: F M Lea, Arnold, London
2. Cement Data Book: W. H Duda, Verlag G m Bh, Berlin
3. Chemical process control: Stephnopolous, G. PHI 199
4. Norms for limestone exploration for cement manufacture: NCCBM
5. National Inventory of cement grade limestone deposits in India: NCCBM
6. Text Book of Geology: P K Mukherjee
7. Surface Mining Technology

Cement Chemistry

Semester-II

Paper II

Raw Mix Design and Chemistry of Cement

Objective: The objective of the course to understand chemical aspect of cement, its composition, manufacture and its influence on performance.

Unit-I: Sampling and pre blending of cement raw materials (12 hours)

Sampling and pre blending of cement raw materials, estimation of Silica Modulus, Alumina Modulus, Hydraulic Modulus, Lime saturation Factor, Liquid Content, method of proportioning, 2, 3 and 4 component mixes, impact of moduli values on cement manufacturing process and quality of clinker.

Unit-II: Composition of various types cement (12 hours)

Cement manufacturing process, chemical composition of various types cement, cement component and their phase relation, Binary and ternary compounds of cement and formation of eutectic.

Unit-III: Clinkerization (12 hours)

Bauge's calculation, clinker minerals, absorption of constituents in clinkers phases, phase diagram, chemical reaction during clinkersation, Role of miner constituents in clinkerization, Thermo chemistry of clinker formation

Unit-IV: Mineralizers (12 hours)

Mineralizer, Role of additive in clinker formation, various minerilizer and fluxes, their role in manufacture of clinker.

Unit-V: Hydration Process (12 hours)

Hydration of clinker minerals, role of gypsum in cement hydration process, hydration of Portland cement and strength of Portland cement.

List of Experiments:

1. Determination of CC and MC of Limestone

2. Chemical analysis and determination of LOI, CaO, SiO2, Al2O3, Fe2O3, MgO, Na20, K2O,Cl of Limestone

Text Books / Reference Books:

1. Chemistry of Cement and Concrete: F M Lea, Arnold, London

2. Cement Data Book: W. H Duda, Verlag G m Bh, Berlin

3. R. H. Bouge, Chemistry of Portland Cement, Reinhold, Newyork

Cement Chemistry

Semester-III

Paper III

Pyro processing and Clinker Formation

OBJECTIVE: The emphasis of the course will be on description of operations in cement kiln and manufacture of cement.

Course outcome: On completion of this course, a student will be familiar with the operation in a cement kiln and controls.

UNIT-I: The cement Kiln Operation (12 hours)

The cement Kiln Operation: Types of Kilns, different types of clinkerization process, wet process, semi-wet process, dry process, advantages- disadvantages of each process, chain type sytem in wet process, Lepol garte kiln, heat requirement in each process, L/D ratio. Thermal calculations, sizzling of kiln. Heat balance of kiln, air balance of kiln, inlet seal, methods used to feed raw materials to kiln, different types of preheaters, their advantages and disadvantages, selection of preheaters, affect of leakages on kiln operation, optimization of kiln output, factors affecting kiln output, factors affecting kiln output and determination of litre weight of clinker.

UNIT-II: Firing system (12 hours)

Firing system: Different types of firing systems, their advantages and disadvantages, conveying of pulverized coal to kiln, calcinations and its control, process parameters like velocity, temperature and draught at various stages.

UNIT-III: Coal grinding Plant (12 hours)

Coal grinding Plant: Preparation of fuel burning, sampling of coal, proximate and ultimate analysis of coal, calorific value of coal and its determination, crushing and grinding of coal, diferent types of mills, ball milss, vertical roller mills, advantages and disadvantages of each operation, L/D ratio of mills, residue and moisture determination and their control, removal off fine coal from dust-laden gases, different equipments used, cyclones, bag filters and ESPS.

UNIT-IV: Cooling of Clinker (12 hours)

Cooling of Clinker: Different types of coolers used their operation and control, planatory coolers, grate coolers, cooling efficiency, air requirement for cooling operation. harer mill, drag chain, different methods of clinker cooling and their advantages, methods of clinker storage-silo and granty.

UNIT-V: Refractories (12 hours)

Refractories: Temperature profile inside kilns, functions of refractories, different types of refractories, ceramic phase diagrams, coating and ring formation.

PRACTICALS: Physical & Chemical Testing Of Cement Lab

List of Experiments:

1. Physical Identification of Limestone
2. Physical Analysis of Limestone
    a. Determination of specific gravity
    b. Hardness
    c. Compressive Strength

Text Books / Reference Books:

1. Chemistry of Cement and Concrete: F M Lea, Arnold, London
2. The Rotary Cement Kiln, K.E. Perey, Edward Arnold
3. Cement Chemistry, H. F. W Taylor , Academic Press, London
4. Innovations in Portland Cement Manufacturing, Bhatty

Cement Chemistry

Semester-IV

Paper IV

Utility and Maintenance in Cement Plant

Objective: The course design is to familiarize with the cement utilities, maintenance and operation problem.

UNIT-I: Operation Problems (12 hours)

Operation Problem: Cause and measure to solve them, coating, ball formation, cyclone jamming, other emerging conditions, wear in cement plant-abrasion, erosion, corrosion, causes and control measures.

UNIT-II: Packing and Dispatch (12 hours)

Packing and Dispatch: Finish grinding of clinker with gypsum and other additives, combined grinding and separate grinding packing machines, use of grinding aids, type of packing medium, tolerances, bag and bulk supply, dispatch of cement.

UNIT-III: Maintenance (12 hours)

Maintenance: Maintenance strategies, preventive maintenance, condition monitoring for predictive Maintenance, check for kiln alignment and shell ovality, annual maintenance, shutdown maintenance, economic life of refractories and machineries, checklists, shutdowns, upset kiln conditions-causes and controls.

UNIT-IV: Material handling layout for water (12 hours)

Material handling layout for water: Water supply in cement plant, requirement in plant and colonies, water for cooling and quenching, water for firefighting, water treatment.

UNIT-V: Material handling layout for air (12 hours)

Material handling layout for air: Air supply to kiln system, compressed air, blowers and compressors, exhaust, pumps, movement of materials, conveyors, F K pumps, dense phase transport.

PRACTICALS: UTILITY AND MAINTENANCE LAB:

List of Experiments:

1. Determination of CC and MC of Limestone

2. Chemical analysis and determination of LOI, CaO, SiO_2, Al_2O_3, Fe_2O_3, MgO, Na_2O, K_2O,Cl of Limestone

Text Books/ Reference Books:

1. Cement Data Book: W. H Duda, Verlag Gm Bh, Berlin

2. Handbook of material Handling

3. Maintenance Engineers Handbook,

4. Cement Enginners Hand Book: Labhaanand Kolhaans

5. Operational Nprms for cement plant: NCCBM publication

Cement Chemistry

Semester-V

Paper V

Performance of Cement

Objective: To get a broad perspective of cement and concrete performance

UNIT-I: Application of Cement and Performance Requirement (12 hours)

Application of Cement and Performance Requirement: Concrete and mortars, introduction to various infrastructure and use of cement. Requirement of setting and durability of different concrete constructions, effect of chemical composition and physical characteristic of cement on performance, fineness and particle size distribution, tailoring performance of cements.

UNIT-II: Durability and Effects of Concrete (12 hours)

Durability consideration of concrete, sulphate attacks, corrosion of reinforcing steel in concrete, attack by acid and other aggressive agencies.

UNIT-III: Performance of fresh and hardened concrete (12 hours)

Performance of fresh and hardened concrete: Workability and its measurement, factors affecting workability , requirements of workablility, estimation of errors, Strength of concrete, stress and starin characteristic of concrete, dimensional stability- shrinkage and creep, creep of concrete, permiability of concrete, durability of concrete, concrete in marine environment, acid attack, efflorescence, fire resistance, thermal properties of concrete.

UNIT-V: Chemical Admixtures and Mineral Additives (12 hours)

Chemical Admixtures and Mineral Additives: Function of admixtures, classification of admixtures, physical requirement of admixtures, Indian Standard specifications, Mineral or supplementary additives.

PRACTICALS: Application of Cement Lab

1. Preparation of Laboratory scale clinker

2. . Preparation of PPC flyash based in the laboratory

3. Preparation of PSC in the laboratory

4. Performance study of PPC and PSC prepared in the lab.

Text Books / Reference Books:

1. Chemistry of Cement and Concrete: F M Lea, Arnold, London

2. Properties of Concrete: Neville, A.M. Longmans

3. Cement Industry Data Book, CAM Delhi

4. World Cement Directory: CEM Bureau

5. Concrete Technology: M L Gambhir

Cement Chemistry

Semester-V

Paper VI

Refractory Science and Applications

Objective: This course is designed such that a student can understand the refractories and its use in cement plant.

UNIT-1: Refractories-I (12 hours)

Fundamentals of refractory, their classification, importance of refractories for cement production, types of refractories, its application, factors effecting wear of refractories in cement industry. Catables, its types and composition, mortars.

UNIT-II: : Refractories-II (12 hours)

Drying and firing phase diagram, manufacture and properties of silica, alumina silicate refractories, periclase, magnesite, magnasite-chrome, dolomite, high and low temperature insulating refractories, acid proof bricks and carbon based refractories.

UNIT-III: Characteristics of Refractories (12 hours)

Properties and measurement of porosity, bulk density, fusion point, permeability, cold crushing strength, refractoriness under load, hot modulus of rapture, creep behavior, abrasive resistance, thermal conductivity, thermal expansion and spelling, reaction of refractories, slag, glasses carbon monoxide, acids, alkalise, flue gases, corrosion of regenerated refractories by flue gases.

UNIT-IV: Preparation of Refractories (12 hours)

Subdivision of burning process & selection of refractory in kiln drying zone, preheating zone, calcinating zone, transition zone, sintering zone, cooling zone, lining of preheater, kiln hood, coolers, features of refractory installation (brick joints, lining methods, rotating methods, screw jack method etc)

UNIT-V: Selection of refractories (12 hours)

Selection of refractories and castables for different location of Cement plant, procedure for laying start up and stoppage of kiln for cement plant, measures to improve refractory life in rotary kiln in cement plant, cost effectiveness, case studies for payback calculation.

PRACTICAL: Refractory Applications Practical

List of Experiments:

Determination of

a. Sp. Gravity

b. Bulk Density

c. Porosity

d. Permeability

e. Thermal Spalling

f. PCE (Refractoriness)

g. Refractory Under Load

h. Thermal Conductivity

i. Coefficient of thermal expansion

TEXTBOOKS:

Refractory Engineering and Kiln Maintenance in Cement Plant: J P Saxena, CRC Press, Technology & Engineering

Refractory Lining of Cement Kiln System: Process Technology, Cement Seminar, Holderbank

Reference Books:

Hand Book of Industrial Refractories Technology, Stephen C, Carniglia Godon L Barma, Noyes Publication

Refractory Linings: Thermo mechanical Design and Applications: Charles Schacht, CRC Press, Technology & Engineering

Cement Chemistry

Semester-VI

Paper VII

Fuels and Firing System

Objective: This course is designed such that a student can understand the fuel requirement and firing systems in manufacturing of clinker

UNIT-I: Introduction to Fuels (12 hours)

Introduction: Type of fuels, coal, Lignite, Oil and Natural gas, geological origin and distribution of coal lignite and oil and natural gas. Distribution of coal and lignite deposits in India. Introduction to alternative fuels for cement manufacture.

UNIT-II: Characteristics of Fuels (12 hours)

Characteristics of Fuel: Physical and chemical characteristics of different types of fuel, ultimate and proximate analysis of coal, calculation of theoretical air requirement, characteristics of coal & lignite and their influence in burning of clinker, preparation and handling of fuel, safety hazards.

UNIT-III: Firing System -I (12 hours)

Firing System -I: Introduction to various types of firing system in cement plant, their advantages and disadvantages.

Coal Firing System: Introduction to coal firing system, classification of firing system, selection criteria for coal firing, pulverized coal ash flame, pulverized coal ash burner.

UNIT-IV: Firing System -II (12 hours)

Firing System - II:

Oil Firing System: Introduction to fuel oil, Fuel oil transport and storage, fuel oil atomization, fuel oil burners, control loops in fuel oil plant.

Gas Firing System: Natural gas, Natural gas preparation, natural gas burners, flame adjustment, safety precautions.

UNIT-V: Flame & Burners (12 hours)

Flame & Burners:

Introduction, types of flame, flame characteristics, flame adjustment, flame momentum,

secondary firing and pre-calcinator, combustion indications. Burners, types of burners, applications.

PRACTICALS: FUELS and FIRING SYSTEM

List of Experiments:

1. Analysis of Coal, Lignite and Pet Coke

a. Proximate Analysis

i. Moisture Content

ii. Volatile Matter

iii. Fixed Carbon

iv. Ash Content

b. Ultimate Analysis

i. Wt % of Carbon

ii. Hydrogen

iii. Oxygen

iv. Sulphur

v. Nitrogen

c. Determination of Gross Calorific Value

Text Books:

1. Fuels and combustion: Samir Sarkar, New Delhi

Reference Books:

1. Firing System: Process Technology: Cement seminar, Holderbank

2. Flame & Burners: Process Technology: Cement Seminar, Holderbank

Cement Chemistry

Semester-VI

Paper VIII

Safety, Health and Environment

Objective: The course content is designed to familiar the student with Safety and Environment of cement plant operation.

UNIT-I: Safety (12 hours)

Safety: Introduction to process of safety, importance of safety, type of accident & causes, direct and Indirect effect of accident, accident and loss statistics, safety consideration and design of cement plant, protective and safety devices for personal and general hygienic and management in and around premises, respirators and ventilation system- local and dilution. Measure of risk, laws, rules and regulation conserving safety in cement plant for prevention of accident, managerial aspect of safety.

UNIT-II: Dust Generation and Control (12 hours)

Dust Generation and Control: Both fugitive and point source of dust emission in cement plant, classification of particle size distribution of dust, cement kiln distribution of dust, cement kiln characteristics, dust emission standards, health effects on workers exposure to dust, method of adoption to control of dust at filters and ESP with GCT efficiency of collection.

UNIT- III: Air pollution Control (12 hours)

Air pollution Control: Emission source of CO, CO2, NOx and SOx, concerns about green house gas emissions and climate change, health concern, source model- release and flow of toxic gases and particulates from the stack factors affecting their dispersion and modeling. Measuring equipment of exit gases, SOx, NOx and CO. Regulatory requirements, equipment required to control gaseous pollutants, recent development.

UNIT-IV: Noise Abatement (12 hours)

Noise Abatement: Noise of running machinery and mills, method of noise suppression, balancing of equipment, noise barriers, effect of plantation, effect on human health, regulatory requirement.

UNIT-V: Environment around Mines (12 hours)

Environment around Mines:

Use of explosives, blasting and resultant vibration, controlled and sequential blasting, ecological and environmental conditions around limestone mines, plantation, roads, water bodies, social

forestry and safety measure.

Management Techniques: Concept of clean development mechanism, Environmental Impact Analysis (EIA) and Environmental Management Plan (EMP).

PRACTICALS: SAFETY, HEALTH AND ENVIRONMENT

List of Experiments:

1. Determination of Biological Oxygen Demand (BOD)

2. Determination of Chemical Oxygen Demand (COD)

3. Measurement of Dissolved Oxygen (DO)

4. Water Quality assessment

5. Orsat Analysis

6. High volume sampler

7. Spectrophotometer (Colored material concentration)

8. Study of Fire Extinguishers

9. Study of safety valves, pressure relief values etc.,

10. Determination of sound intensity (decibel meters)

Text Books/ Reference Books:

1. Chemical Process Safety: Roy E. Sanders, Butter Worth Heinemann, New Delhi

2. Safety related acts and regulations

3. Environmental Pollution Control Engineering: CS Rao

4. Environmental Engineering: Peavy and Rowe

Proposed Electives

I. **Project and Plant Management**
II. **Environmental Science Applications**
III. **Energy Management**

Note: The syllabus for these electives can be drafted in course of time.

ORGANIC FARMING

ORGANIC FARMING
Structure of Course under CBCS

Year	*Semester*	*Paper*	*Title*	*Hours*	*Marks*	*Credits*
I	I	I	Principles of Organic farming	4	100	03
			Practical – 1	2	50	02
	II	II	Vermicomposting Technology	4	100	03
			Practical – 2	2	50	02
II	III	III	Elementary Microbiology	4	100	03
			Practical – 3	2	50	02
	IV	IV	Biology of Bio-fertilizers	4	100	03
			Practical – 4	2	50	02
III	V	V	Production and Application technologies of Bio-fertilizers	4	100	03
			Practical – 5	2	50	02
		VI	#Bio-pesticides Technology	4	100	03
			Practical – 6	2	50	02
	VI	VII*	Discipline Specific Electives			
		A	Principles of Agronomy	3	100	03
			Practical – 7 A	2	50	02
		B	Principles of Plant Pathology*			
			Practical – 7 B#			
		C	Integrated Pest Management*			
			Practical – 7 C#			
		VIII**	Cluster Electives (Interdisciplinary)			

		A1	Organic cultivation of Vegetable crops	3	100	03
			Practical – 8 A1	2	50	02
		A2	Organic cultivation of Ornamental plants #	3	100	03
			Practical – 8 A2#	2	50	02
		A3	Organic cultivation of Medicinal & Aromatic plants#	3	100	03
			Project work	2	50	02
		B1	Principles of Nursery Management**			
			Practical – 8 B1#			
		B2	Production Technology of Vegetables and Flowers**			
			Practical – 8 B2#			
		B3	Diseases of Horticultural Plants and their Management**			
			Project work			
				Total credits		**50**

* Any one Elective from A, B and C is to be selected

**Any one Cluster VIII A 1-3 or VIII B 1-3 is to be selected in the place of other two core Subjects of BSc programme

Content will be submitted later

Bio-pesticides Technology: Practical work related to production technology to be conducted in the nearby production Unit utilizing MOU (It is clearly mentioned at the requirements for the introduction of course that it is must to have an actively run production unit in the feasible vicinity of the college)

* As content for Advanced Biofertilizers/Biopesticides is not available they are substituted with the Organic farming related papers for which syllabus is there

**Changed the titles which are relevant to Horticulture and the syllabus is developed already under the Horticulture Restructured Course

Paper I

Title of the Paper: **PRINCIPLES OF ORGANIC FARMING**

Syllabus

THEORY

Course code: OFT 01 Number of Instructional hours: 60

Unit I: Organic Farming – Scope (10Hrs)

1. Introduction, concept and development of organic farming
2. Relevance in present context, Organic production requirements
3. Methods of Organic Farming

Unit II: Plant Nutrition (10 Hrs)

1. Nutrition- types of nutrients
2. Role and deficiency symptoms of macro elements
3. Role and deficiency symptoms of micro elements

Unit III: Nutrient Management (12 Hrs)

1. Inorganic nutrient management-impact
2. Biological intensive nutrient management
3. Types of organic fertilizers- Green manures, Vermicompost and Biofertilizers

Unit IV: Pests and Disease Management (14Hrs)

1. Characters of pests of major crop plants- Paddy, Red-gram and Groundnut
2. Microbial diseases of major crops-symptoms and control measures- Bhendi Vein Clearing, Chillies little leaf and Citrus Canker
3. Fungal diseases of major crops - Blast of paddy, Wilt of red-gram and Tikka of groundnut
4. Biological control-outlines

Unit V: Organic Manures Management (14 Hrs)

1. Recycling of organic residues
2. Compost manure-preparation and application
3. Green manures- species, Cropping and application
4. Cow-based agriculture

Paper I

Title of the Paper: **PRINCIPLES OF ORGANIC FARMING**

Syllabus

PRACTICALS

Course code: OFP 01 Number of Instructional hours: 30

Activities of Practical Work

1. Study of the deficiency symptoms of macro nutrients
2. Study of the deficiency symptoms of micro nutrients
3. Study of soil properties- composition, pH, water holding capacity
4. Adverse effects of inorganic fertilizers on soil properties-pH, salinity
5. Morphological study of pest infested plant parts
6. Symptoms of bacterial diseases
7. Symptoms of viral diseases
8. Morphological study of green manure species
9. Preparation of compost
10. Types of green manures

Field activities:

- Collection and identification of mineral nutrient deficiency symptoms
- Visit to farms using organic manures

Project works:

- Organic farming Case studies- within and outside thestates.
- Govt. schemes of promoting organic farming

References:

1. Organic Farming: Theory and Practice- S. Palaniappa and K. Annadurai
2. A Hand Book of Organic Farming- A. K. Sharma
3. Organic Agriculture – J. C. Tarafdar
4. Organic farming for sustainable Horticulture- P. Parvatha Reddy
5. Related Web resources

Paper II

Title of the Paper: **VERMICOMPOST TECHNOLOGY**

Syllabus

THEORY

Course code: VTT 02 Number of Instructional hours: 60

Unit I: Vermicompost Technology- Scope (08Hrs)

1. Introduction to vermiculture – definition, history, economic and environmental importance-maintenance of soil structure
2. The organic matter and humus cycle- transformation process in organic matter
3. Useful species of earthworms- local and exotic species

Unit II:Earthworm biology and rearing -A (12 Hrs)

1. Key to identify the species of earthworms
2. Biology of *Eisenia fetida*- anatomy, physiology and reproduction
3. Vital cycle – alimentation, fecundity, annual reproducer potentiality and limiting factors (gases, diet, humidity, temperature, pH, light and other climatic factors)

Unit III:Earthworm biology and rearing -B (12 Hrs)

1. Taxonomy of *Eudrilus eugeniae*
2. Biology of *Eudrilus eugeniae* - anatomy, physiology and reproduction
3. Vital cycle – alimentation, fecundity, annual reproducer potentiality and limiting factors (gases, diet, humidity, temperature, pH, light and other climatic factors)

Unit IV:Vermicompost Technology- Methods and Products (20 Hrs)

1. Small scale earthworm farming for home gardens
2. Earthworm composting large scale
3. Earthworm farming, extraction, vermicomposting, harvest and processing
4. Nutritional composition of vermicompost for plants in comparison with other types of fertilizers
5. Vermiwash collection, composition and use

Unit V: Vermicompost Technology- Problems (04hrs)

1. Toxins released by earthworms
2. Sickness and enemies of earthworms
3. Diseases and Enemies of earthworms-Prevention and control measures

Paper II

Title of the Paper: **VERMICOMPOST TECHNOLOGY**

PRACTICALS

Course code: VTP 02 Number of Instructional hours: 30

1. Key to identify the different types of earthworms
2. Study of the morphological features of *Eiseniafetida*
3. Study of the life stages and development of *Eiseniafetida*
4. Study of the morphological features of *Eudriluseugeniae*
5. Study of the life stages and development of *Eudriluseugeniae*
6. Study of vermicompost technology equipments and devices
7. Vermibeds – preparation, maintenance and climatic conditions
8. Vermicompost- harvesting, packaging, transport and storage
9. Study of verms diseases and enemies
10. Vermiwash-preparation, maintenance, composition
11. Study of impact of vermicompost on kitchen garden/potted plants/poly house/shade-net cultivation
12. Study of vermiwash on short duration horticultural plants

Field activities:

- Collection and identification of local earthworms
- Visit to production units- hands on experience

Project works:

- Effect of sewage water / climatic conditions / soil properties on the growth and activity of earthworms
- Case Study on the selected field crop / vegetable crop using Vermicomposting / vermiwash

References:

1. Role of earthworms in agriculture- J V Bhatt & SR Khambata
2. Biology of Earthworms – CA Edwards & J R Lofty
3. Verms & Vermicomposting – M. C. Das et al. Proceedings of National Seminar
4. Related Web resources

Paper III

Title of the Paper: **ELEMENTARY MICROBIOLOGY**

Syllabus

THEORY

Course code: EMT 03 Number of Instructional hours: 60

Unit I: Microbiology-Concepts (08Hrs)

1. Definition and development of Microbiology
2. Microbiology-scope of study
3. Applications of Microbiology

Unit II: Microbial World (12 Hrs)

1. Classification of microorganisms with specific reference to bacteria, viruses and fungi
2. Characteristics of prokaryotes and eukaryotes
3. General account of Cyanobacteria with particular reference to the Nitrogen fixing species
4. Brief account of phytophages and bacteriophages- structure and replication

Unit III: Bacteria & Fungi (14Hrs)

1. Bacteria-morphology, structure, and nutrition with emphasis on N_2 fixing bacteria. Gram positive and negative types.
2. Growth and reproduction in bacteria
3. Factors affecting growth of microorganisms
4. Fungi- morphology, structure, nutrition, reproduction and economic importance.

Unit IV: Microbiological lab techniques-A(12Hrs)

1. Nutrient media- types, composition, preparation.
2. Sterilisation methods-nutrient medium, equipment used in culture room.
3. Bacterial culture techniques-types: Broth culture, Agar plate, sub cultures.

Unit V: Microbiological lab techniques-B (12Hrs)

1. Principles of Microscopy- types of microscopes-Simple, Compound and Electron Microscopes.
2. Simple and Gram staining of bacteria
3. Isolation and identification of bacteria/fungi

Paper III

Title of the Paper: **ELEMENTARY MICROBIOLOGY**

Syllabus

PRACTICALS

Course code: EMP 03 Number of Instructional hours: 30

1. Study of different types of microscopes
2. Microscopic techniques
3. Study of the morphological features of Nitrogen fixing bacteria - *Rhizobium* Cyanobacteria-*Anabaena, Nostoc etc.*
4. Study of the morphology and structure of bacteria
5. Simple and Gram staining of bacteria
6. Preparation of different types of nutrient media
7. Isolation and culture of local nitrogen fixing bacteria
8. Enumeration and measurement of bacteria
9. Study of mycorrhizal fungal members
10. Isolation and culture of useful fungal members

Field activities:

- Collection and identification of local soil microorganisms
- Visit to well established Microbiology laboratories

Project works:

- Study of effects of various factors on the growth of useful bacterial and fungal members.
- Study on the cyanobacterial members in the local Rice fields

References:

1. Introduction to Soil Microbiology-M. Alexander
2. Agricultural Microbiology- G. Rangaswami

Paper IV

Title of the Paper: **BIOLOGY OF BIOFERTILIZERS**

Syllabus

THEORY

Course code: BBT 04 Number of Instructional hours: 60

Unit I: Biofertilizers- General account (08Hrs)

1. Introduction and scope of biofertilizers
2. Properties of biofertilizers
3. Classification of organisms used as biofertilizers.

Unit II: Biofertilizers - Physiology (10Hrs)

1. Types of nitrogen fixation-Abiological and Biological
2. Biochemistry of nitrogen fixation
3. Phosphate solubilisation and mobilisation

Unit III: Cyanobacterial Biofertilizers (16 Hrs)

1. Morphology, growth and reproduction of *Anabaena and Nostoc*
2. Morphology, growth and reproduction of *Plectonema*
3. Algalization: Azolla-Anabaena
4.

Unit IV: Bacterial Biofertilizers (16 Hrs)

1. Morphology, growth and importance of *Azospirillum and Azatobactor*
2. Morphology, growth and importance of *Rhizobium*
3. Morphology, growth and importance of *Phosphobacteria*

Unit V: Fungal Biofertilizers (10 Hrs)

1. Mycorrhizae – definition and biological significance
2. Types of mycorrhizae- Ecto, Endo Ectendo and AM
3. Mycorrhizae in Agriculture-Beneficial effects

Paper IV

Title of the Paper: **BIOLOGY OF BIOFERTILIZERS**

Syllabus

PRACTICALS

Course code: BBP 04 Number of Instructional hours: 30

1. Characters of biofertilizers products
2. Study of the morphological features of *Cyanobacteria* as per the examples mentioned in theory.
3. Study of the morphological features of *bacteria* used as biofertilizers as per the examples mentioned in theory
4. Study of the morphological features of *mycorrhizal fungi*
5. Estimation of Nitrogen fixation.

Field activities:

- Collection and identification of soil microflora
- Visit to the nearest well established Microbiology laboratory

Project works:

- Effect of temperature / climatic conditions / pH etc. on the growth and activity of microorganisms of economic importance
- Study on the prevalence of nitrogen fixing bacteria in pulse fields

References:

1. Hand Book of Organic Farming and Biofertilizers – A C Gaur
2. Biofertilizers in Agriculture – N S Subba Rao
3. Manures and Fertilizers – KS Yawalkar

Course: **ORGANIC FARMING**

Semester: V

Curriculum

Paper V

Title of the Paper: **PRODUCTION & APPLICATION TECHNOLOGIES OF BIOFERTILIZERS**

Syllabus

THEORY

Course code: PAT 05 Number of Instructional hours: 60

Unit I: Cyanobacterial Biofertilizers (10Hrs)

1. Isolation and culture of Cyanobacteria
2. Mass cultivation of *Azolla,Anabaena*
3. Field application of Cyanobacterial inoculants

Unit II:Bacterial Biofertilizers (16Hrs)

1. Isolation and culture of bacteria- *Azatobacter, Rhizobium etc.*
2. Mass production of *Azatobacter, Rhizobium etc.*
3. Field application of bacterial inoculants / bio-fertilizers

Unit III:Fungal Bio fertilizers (10 Hrs)

1. Collection and culture of Mycorrhizal fungi
2. Mass production of mycorrhizal inoculum
3. Field application of mycorrhizal inoculants

Unit IV:Bulk Production Management (12 Hrs)

1. Production of biofertilizers by Fermentation-equipment, procedure and problems
2. Output quality standards- Viable cell count, pH, contamination level
3. Quality Management –Density of strain, effect on target crop

Unit V:Marketing Management (12Hrs)

1. Definition, Information system, targeting and positioning, price fluctuations
2. Products profiles- classification of products and efficiency characters
3. Sampling strategies- Sampling Units, methods of Survey and types of sampling

Paper V

Title of the Paper: **PRODUCTION & APPLICATION TECHNOLOGIES OF BIOFERTILIZERS**

Syllabus

PRACTICALS

Course code: PAP 05 Number of Instructional hours: 30

1. Isolation and culture techniques of 3 types of biofertilizers as per the theory syllabus
2. Mass production- tools, techniques , methods
3. Solving techniques for the problems and issues of mass production
4. Field application methods and means of different biofertilizers
5. Operation of machines and equipment – fermenters etc.
6. Mass culture and Growth testing
7. Output quality testing
8. Packaging techniques
9. Properties of products
10. Basic cultivation techniques - Nursery raising, sowing, transplantation etc.
11. Sampling techniques

Field activities:

- Visit to the nearest well established Biofertilizers production unit for hands on experience

Project works:

- Case study on one Production unit functioning in local area.
- Case study on one field crop cultivated with organic fertilizers.
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References:

1. Hand Book of Organic Farming and Biofertilizers – A C Gaur
2. Biofertilizers in Agriculture – N S Subba Rao
3. Manures and Fertilizers – KS Yawalkar

Paper VI

Title of the Paper: **BIOPESTICIDES TECHNOLOGY**

Syllabus

THEORY

Course code: BPT 06 Number of Instructional hours: 60

Unit I: Biological control of pests and diseases (10Hrs)

1. Introduction, concept, history and scope
2. Biological control agents and their characteristics
3. Methods of biological control

Unit II:Biopesticides- (12 Hrs)

1. Introduction, concept, history and scope of Biopesticides
2. Types of biopesticides
3. Advantages and disadvantages of biopesticides

Unit III:Botanical biopesticides and Biopesticides (14 Hrs)

1. Properties of botanical biopesticides
2. Pesticide products in *Azadirachta, Pongamia and Annona*
3. Morphology of biopesticides-*Trichoderma, Fusarium and Pseudomonas.*
4. Production and processing of biopesticides- *Trichoderma* sps, *Bacillus subtilis,*

Unit IV:Bio insecticides and nematicides (14 Hrs)

1. Mode of action of bio insecticides/nematicides
2. Characteristics of bio insecticides-*Bacillus thuringiensis, Metrahizium, Ha – NPV and SL-NPV*
3. Production and processing of biological insecticides
4. Biological nematicides – *Baciilus firmu,*

Unit V: Biopesticides Application management (08 Hrs)

1. Types of applications
2. Compatibility and selectivity
3. Application equipments

Paper VI

Title of the Paper: **BIOPESTICIDES TECHNOLOGY**

Syllabus

PRACTICALS

Course code: BPP 06 Number of Instructional hours: 30

1. Pests of major crops-symptoms, mode of damage
2. Identification of biological control agents
3. Laboratory culture of important natural enemies
4. Biopesticides of *Azadirachta, Pongamia and Annona*
5. Study of the *Trichoderma, Fusarium and Pseudomonas*
6. Study of *Bacillus thuringiensis, Metrahizium, Beauvaria bassiana; Ha – NPV and SL-NPV*
7. Mass culture of biological insecticides
5. Study of biological nematicides – *Bacillus firmus, Paecilomycis lilacinus*
8. Safe handling of biopesticides-precautions, first aid treatment
9. Demonstration of application equipments
10. Calculations of dosage and application technique
11. Study of biopesticides impact on short duration horticultural plants

Field activities:

- Visit to nearest bio-control labs
- Visit to production units- hands on experience

Project works:

- Effect of microbial bio-pesticides on the short duration local field crops-Case studies
- Management of bio-pesticides production units-Case studies

References:

1. Theory and Practice of Biological Control- C B Huffaker
2. Pesticide application methods – G. Mathews et al.

Paper VII

Title of the Paper: **PRINCIPLES OF AGRONOMY**

Syllabus

THEORY

Course code: PAT 07 Number of Instructional hours: 60

Unit I: Scope of Agronomy (10Hrs)

1. Definition, Relationship with other sciences, Role of Agronomist
2. Agroclimatic Zones in India
3. Regional Agricultural Research Stations in AP

Unit II: Soil Management (12 Hrs)

4. Properties of soil and factors affecting properties
5. Soil quality and productivity
6. Tillage and tilth- instruments used, modern concepts

Unit III: Seed and Crop stand Management (14 Hrs)

7. Seed testing and quality seed multiplication
8. Seed treatment and sowing
9. Crop stand establishment
10. Planting geometry-effect on growth and yield

Unit IV: Fertilizers & Disease Management (12 Hrs)

11. Plant nutrients and crop production
12. Types of fertilizers and application strategies
13. Types of pesticides and application strategies

Unit V: Harvesting and Storage Management (10 Hrs)

14. Signs of harvest maturity- Visual indicators of leaf and product: colour, appearance, size, texture etc.
15. Harvesting methods-Importance, traditional and machinery
16. Processing and storage of produce-drying, grading, packing; Storage-, structures of storage factors affecting quality.

Paper VII

Title of the Paper: **PRINCIPLES OF AGRONOMY**

PRACTICALS

Course code: PAC 07 *Number of Instructional hours: 30*

1. Identification of seeds and crop plants at different growth stages.
2. Study of Primary Tillage implements and practice of ploughing
3. Importance of puddling in low land paddy cultivation, study of puddling implements and practice of puddling
4. Study of secondary tillage implements and working with them
5. Determination of purity and germination percentage of seed
6. Study of viability, dormancy and practice of seed treatments in different field crops
7. Study of different methods of sowing, seeding implements and working with them.
8. Calculation of Plant Population, Seed rate and fertilizer doses for different field crops
9. Study of different methods of manures and fertilizer application and their application practice in important field crops
10. Identification and classification of different types of manures and fertilizers
11. Study of different Intercultural Implements and working with them
12. Preparation of FYM and compost
13. Preparation of vermicompost, green manuring
14. Identification of different weeds
15. Participation in ongoing field operations and actual working in the field for raising field crops

References:

1. Crop production and field experimentation by V.G. Vaidya, K.R. Sahastrabudhe and V.S. Khuspe. Continental Prakashan, Vijaynagar, Pune.
2. Hand book of Agriculture, ICAR Publication.
3. Modern techniques of raising field corps by Chidda Singh. Oxford and IBH Publishing Co. Ltd., Bangalore.
4. Principles of Agronomy by Sankaran S. and V.T. Subbiah Mudliyar, 1991. The Bangalore Printing and Publishing Co. Ltd., Bangalore.

Paper VIII

Title of the Paper: **ORGANIC CULTIVATION OF VEGETABLE CROPS**

Syllabus

THEORY

Course code: CVT 08 Number of Instructional hours: 60

Unit I: General Aspects (12Hrs)

1. Background, present status, problems
2. Importance in dietary and economic value
3. Morphology of local vegetable crop species- tomato, brinjal, chillies etc. (examples are to be selected based on the common crops grown in the area where college is located)

Unit II: Requirements (12 Hrs)

4. Soil quality and productivity (specifications for the selected crops)
5. Climatic conditions and productivity (effect of climatic conditions on productivity)
6. Land preparation and irrigation facilities

Unit III: Cultivation Method (12 Hrs)

7. Planting- types and methods
8. Manures, tillage, thinning and weeding
9. Pests and disease management

Unit IV: Production Technology (Selected crops) (14 Hrs)

10. Tomato and Brinjal
11. Lady's finger and Chillies
12. Carrot and Cabbage

Unit V: Post-harvest Management (10 Hrs)

13. Selection and grading – Separation of produce based on Market quality
14. Packaging and storing – reasons for packaging, materials used; place and conditions for storage
15. Marketing of different vegetables – Selection of place and Transportation

Paper VIII

Title of the Paper: : **ORGANIC CULTIVATION OF VEGETABLE CROPS**

PRACTICALS

Course code: CVT 08 *Number of Instructional hours: 30*

1. Identification of vegetables, vegetable seeds and seedlings
2. Computing manures and fertilizers for vegetables cultivation
3. Computing seed rates in vegetable production
4. Practicing intercultural operations in vegetable cultivation
5. Preparation of seedbed and raising of vegetable seedlings
6. Methods of planting vegetable crops
7. Field layout and cultivation of vegetables in plot
8. Visit to a vegetable producing and processing farm
9. Morphological study of vegetable crops
10. Vegetable seedling evaluation test
11. Determination of cost benefit ratio of potato, tomato and cabbage
12. Extraction and processing of tomato, brinjal and bottle gourd seeds
13. Grading and packaging of vegetables

References:

1. S. P. Singh. 1997. Principles of Vegetable Production. Mrs. Geeta Somani. Agrotech. Publishing Academy, Udaypur, India.
2. I. P. Mathew and S. K. Karikari. 1986. Horticulture: Principles and Practices. Macmillian Intermediate Agriculture Series, America.
3. K. G. Shanmugavelu. 1989. Production Technology of Vegetable Crops. Oxford and IBH Publishing Co. Pvt. Ltd. NewDelhi, India.
4. P. Work and J. Carew. 1970. Vegetable Production and Marketing. Willey Eastern Pvt. Ltd. , NewDelhi, India.
5. T. K. Bose and M. G. Som. 1986. Vegetable Crops in India. Naya Prokash, Calcutta, India.

Question Paper Pattern

(As followed in the affiliated colleges of Rayalseema University, Kurnool)

THEORY

Time: 3 Hrs Max. Mks: 70

Note: Draw well labelled diagrams wherever necessary.

Section-A

(Short answer type)

Answer any 5 of the following: 4 X 5 = 20

(Open choice)

1 to 10 Questions

2 Questions from each Unit are to be selected

Section-B

(Long answer type)

Answer the following: 10 X 5=50

(Internal choice)

2 Questions from each Unit with either or choice are to be selected

PRACTICAL

Time: 3 Hrs Max. Mks: 50

1) Identification of spotters	3X5 = 15
2) Demonstration of Minor skill/Experimentation	5X1=05
3) Demonstration of Major skill/Experimentation	15X1=15
4) Field Report / Viva / Project work	05
5) Submission of Record	10

HORTICULTURE

Course Structure and Syllabus of HORTICULTURE

Semester	Paper	Subject	Hrs.	Credits	CCE	E.E.	Total
FIRST YEAR							
Sem-1	I	Basic concepts of Horticulture and Soil Science	4	3	25	75	100
		Practical –I	2	2	-	50	50
Sem-2	II	Plant propagation methods and nursery management	4	3	25	75	100
		Practical-II	2	2	-	50	50
SECOND YEAR							
Sem -3	III	Olericulture	4	3	25	75	100
		Practical –III	2	2	-	50	50
Sem-4	IV	Ornamental Horticulture, Floriculture and Landscaping	4	3	25	75	100
		Practical –IV	2	2	-	50	50
THIRD YEAR							
Sem -5	V	Concepts of Pomology	3	3	25	75	100
		Practical –V	2	2	-	50	50
	VI	Diseases of Horticultural plants and their management	3	3	25	75	100
		Practical –VI	2	2	-	50	50
	VII (A/B/C)	**Elective – I**	3	3	25	75	100
		A. Breeding of Horticultural crops (Syllabus will be finalized in due course)					
		B. Weed and Water Management in					

		Horticultural Crops (Syllabus will be finalized in due course)					
		C. Nutrition of Horticultural crops and its management (Syllabus will be finalized in due course)					
		Practical - VII	2	2	-	50	50
	VIII – Cluster Elec. A-1, 2 & 3 (OR) B-1, 2 & 3	**Elective – II (Cluster – A)**	3	3	25	75	100
		1. Protected cultivation of Horticultural crops					
		2. Post-harvest technology of Horticultural crops (Syllabus will be finalized in due course)					
		3. Horticulture extension and value added products					
		Project work	2	2	20	30	50
		Elective – II (Cluster – B)	3	3	25	75	100
		1. Seed Production Technology of Horticultural Crops (Syllabus will be finalized in due course)					
		2. Production Technology of Medicinal and Aromatic Crops (Syllabus will be finalized in due course)					
		3. Production Technology of Spices and Plantation Crops (Syllabus will be finalized in due course)					
		Project work	2	2	20	30	50

Semester – I :Basic concepts of Horticulture and Soil Science

Theory (60 Hours/Semester)

Unit I : Introduction to Horticulture (12 Hrs.)

1. Definition of Horticulture, Importance of horticulture in terms of economy, production,
2. Employment generation, environmental protection and human resource development.
3. Scope for horticulture in India.
4. Divisions of horticulture with suitable examples and their importance.
   Fruit and Vegetable zones of India and Andhra Pradesh.

Unit II :Classification and Nutritional values of Horticulture crops (12 Hrs.)

1. Classification of Horticultural crops based on soil and climatic requirements.
2. Nutritive value of horticultural crops.
3. Global scenario of horticultural crops- horticultural therapy
4. Export and import of horticulture plants

Unit III :Environmental factors - Horticulture crops (12 Hrs.)

1. Influence of soil – physical and chemical properties
2. Climatic factors – light, photoperiod, temperature, relative humidity, rainfall.
3. Micro climate, pollution
4. Influence of biotic and abiotic stresses on crop production.

Unit IV :Soil as a Medium for Plant Growth (12 Hrs.)

1. Minerals and Weathering to Form Soils; Factors of Soil Formation.
2. Soil Taxonomy; Soil color, texture and structure; Other Physical Properties and Stability.
3. Soil Colloids and Charges; Ion adsorption and exchange.
4. Soil pH and Acidity; Soil Alkalinity and Salinity

UnitV :Mineral nutrition of plants (12 Hrs.)

1. Macro and micronutrients.
2. Soil organic matter.
3. Soil Microorganisms; Soil faunal Ecology.
4. Integrated nutrient management and soil tests.

Semester – I :Basic concepts of Horticulture and Soil Science

Practicals (30 Hours/Semester)

1. Study of tools and implements in horticulture.
2. Layout of different planting systems.
3. Layout of nutrition garden.
4. Preparation of nursery beds for sowing of vegetable seeds.
5. Digging of pits for fruit plants.
6. Preparation of fertilizer mixtures and field application.
7. Identification and management of nutritional disorders in vegetables.
8. Collection and preparation of soil samples, estimation of moisture, EC, pH and bulk density.
9. Textural analysis of soil by Robinson‟ s pipette method, chemical analysis of soil – Fe_2O_3, P, K, Ca, Mg and S, total N, organic carbon and cation exchange capacity

Suggested readings :

- Kumar, N. 1990. Introduction to Horticulture, Rajyalakshmi Publications, Nagarcoil, Tamilnadu.
- Jitendra Sing, 2002. Basic Horticulture, Kalyani Publishers, Hyderabad.
- Yerima Bernard P.K. and E. van Ranst, 2005. Introduction to Soil Science, Trafford Publishing.

Semester – II : Plant propagation methods and nursery management

Theory (60 Hours/Semester)

Unit -1 :Basics of propagation; structures and media for propagation (12 Hrs.)

1. Introduction, principles and classification of plant propagation methods.
2. Selection of site for commercial nursery.
3. Ecological and economic factors.
4. Plant propagation structures, containers and media.

Unit – 2 : Sexual propagation/Seed propagation (12 Hrs.)

1. Sexual propagation and its importance.
2. Seed germination, process of seed germination.
3. Factors affecting seed germination
4. pre-germination treatments and viability tests.

Unit – 3 : Propagation through vegetative organs (12 Hrs.)

1. Asexual propagation and its importance.
2. Underground vegetative organs for plant multiplication (macropropagation).
3. Orchid propagation by rhizome.
4. Propagation by division and separation.

Unit – 4 :Vegetative propagation techniques (12 Hrs.)

1. Propagation by cuttings : Root, leaf and stem cuttings
2. Plant propagation by layering – Simple, serpentine, mound and air layering.
3. Plant propagation by grafting – approached and detached (whip , cleft, side veneer and bark)
4. Plant propagation by budding – T-, patch and chip budding techniques.

Unit –5 : Nursery management practices (12 Hrs.)

1. Definition of nursery; Nursery- site selection, lay out, records
2. Different types of nursery beds – flat beds, raised beds and sunken beds, their merits and demerits.
3. Nursery structures - Potting, repotting; Different nursery techniques and their management.
4. Problems in nursery management and its control; Nursery accreditation and certification.

Semester – II : Plant propagation methods and nursery management

Practicals (30 Hours/Semester)

1. Media for propagation of plants in nursery beds, pot and mist chamber.
2. Preparation of nursery beds and sowing of seeds. Raising of rootstock.
3. Seed treatments for breaking dormancy.
4. Preparation of plant material for potting. Hardening plants in the nursery.
5. Practicing different types of cuttings, layering, graftings and buddings.
6. Preparation of plant growth regulators for seed germination and vegetative propagation.

Suggested readings :

- Sadhu, M.K. 1996. Plant Propagation. New Age International Publishers, New Delhi.
- Sarma, R.R. 2002.Propagation of Horticultural Crops: Principles and Practices, Kalyani Publishers, New Delhi.
- Hartman, HT and Kester, D.E.1976. Plant Propagation. Principles and Practices, Prentice Hall of India Pvt. Ltd. Bombay.

Semester – III :Olericulture

Theory (60 Hours/Semester)

Unit – 1 : Solanaceous vegetables (12 Hrs.)

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

1. Cultivation of Brinjal
2. Cultivation of omato
3. Cultivation of *Capsicum*

Unit – 2 : Leafy vegetables (12 Hrs.)

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

1. Cultivation of Amaranth and Spinach
2. Cultivation of Coriander and *Mentha*

Unit – 3 : Root and Tuber crops (12 Hrs.)

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

1. Cultivation of *Colocasia* and *Dioscorea*
2. Cultivation of Sweet Potato and Tapioca
3. Cultivation of Carrot and Beet root

Unit – 4 : Cole crops (12 Hrs.)

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

1. Cultivation of Cabbage
2. Cultivation of Cauliflower
3. Cultivation of Knoll-khol

Unit – 5 : Leguminous vegetables (12 Hrs.)

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

1. Cultivation of Cluster bean and double bean
2. Cultivation of Cow pea and *Dolichos*
3. Cultivation of Pea.

Semester – III :Olericulture

Practicals (30 Hours/Semester)

1. Identification of vegetable seeds and vegetable crops at different growth stages
2. Sowing/ transplanting of vegetables in main field
3. Determining the germination percentage of vegetable seed
4. Preparing vegetable nursery beds
5. Raising vegetable seedlings in nursery bed and portrays
6. Land preparation for sowing/ transplanting of vegetable crops
7. Fertilizer application for vegetable growing
8. Identification of major diseases and insect pests of vegetables
9. Visit to vegetable field to study methods of vegetable cultivation

Suggested readings :

- Bose T K et al. (2003) Vegetable crops, Naya Udhyog Publishers, Kolkata.
- Singh D K (2007) Modern vegetable varieties and production, IBN Publisher Technologies, International Book Distributing Co, Lucknow.
- Premnath, Sundari Velayudhan and D P Sing (1987) Vegetables for the tropical region, ICAR, New Delhi

Semester IV : Ornamental Horticulture, Floriculture and Landscaping

Theory (60 Hours/Semester)

Unit – 1 : Leafy and flower ornamentals (12 Hrs.)

1. Introduction and classification of ornamentals.
2. Different types of leafy ornamentals.
3. Different types of flower ornamentals.
4. Commercial value of ornamentals in India and abroad.

Unit – 2 :Fundamentals of Landscaping (14 Hrs.)

1. Principles, importance and scope of landscaping.
2. History, art principles, important terms of landscape gardening; garden adornments.
3. Garden features : wall, fencing, steps, garden, garden drives and paths, hedges, edges and arches; pergola, lawn, carpet bedding; flower beds, shrubbery, boarders, rockery, water gardens, bonsai, topiary.
4. Garden types and styles : Indoor and outdoor gardens; Formal, informal, free style, special type, terrace, rock and sunken garden styles.

Unit – 3 :Cultivation of ornamentals (16 Hrs.)

1. Importance, description, cultivation and use of annuals; biennials, herbaceous perennials, woody perennials and bulbous plants.
2. Identification, classification and growth habits of ornamental trees, shrubs and climbers used for various purposes.
3. Cacti and succulents, ferns, palms and foliage plants. Bonsai – care and maintenance.
4. Flower shows, judging. Flower arrangements. Growing of flowers for exhibitions and competitions.

Unit – 4 : Commercial floriculture (10 Hrs.)

1. Scope and importance of commercial floriculture in India and overseas.
2. Cultivation of Rose, Jasmine, *Chrysanthemum* and Marigold
3. Cultivation of Tuberose, Aster and Dahlia
4. Cultivation of Gerbera, Gladiolus and Carnation.

Unit – 5 :Management practices for ornamental plants (08 Hrs.)

1. Plant protection; use of Plant Growth Regulators.
2. Special horticultural practices.
3. Harvesting and post harvest handling.
4. Grading, packing, storage and marketing of ornamental flowers.

Semester V : Ornamental Horticulture, Floriculture and Landscaping

Practicals (30 Hours/Semester)

1. Identification, classification and description of annuals, herbaceous perennials, bulbous plants, cacti and succulents, foliage plants, ferns and palms.
2. Bonsai culture and flower arrangements.
3. Identification of garden components, lawn, annuals, shrubs, climbers, creepers, cactus, succulents, trees with specialized gardens, line roof garden, Japanese garden.
4. Visit to floriculture farms.
5. Visit to different gardens to observe landscaping components and styles.

Suggested readings :

- Das P, G Maiti and R S Duha (1999)Floriculture and Landscaping,N P Sales Pvt.Ltd.
- Sabina, GT and Peter KV. 2008. Ornamental Plants for Gardens. New India Publ. Agency.
- Lauria A and Victor HR. 2001. Floriculture – Fundamentals and Practices Agrobios.
- Nambisan KMP.1992. Design Elements of Landscape Gardening. Oxford IBH.

Semester V : Concepts of Pomology
Theory (60 Hours/Semester)

Unit – 1 :Introduction to Fruit crops (10 Hrs.)

1. Importance of growing fruit crops in India and Andhra Pradesh.
2. Nutritive value of fruits.
3. Area and production of fruit crops in Andhra Pradesh and India
4. Export and import potential of fruits in India. Constraints in fruit production and remedies to overcome them.

Unit – 2 :Tropical Fruit Crops (12 Hrs.)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following tropical fruit crops:

1. Mango 2. Guava 3. Papaya

Unit – 3 :Sub-tropical and temperate fruit crops (12 Hrs.)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following sub-tropical and temperate fruit crops:

1. Grapes 2. Pomegranate 3. Apple

Unit – 4 :Arid and minor fruit crops (16 Hrs.)

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield, diseases and pests of the following arid fruit crops:

1. Amla 2. Ber 3. Bael 4. Wood apple

Unit – 5 : Management practices for fruit crops (10 Hrs.)

1. Sustainable Production Practices for Local Fruit Production
2. Integrated Orchard Management/Principles of Integrated Pest Management.
3. Harvesting and Labor Concerns
4. Grading, packing, storage and marketing of fruits.

Semester V : Concepts of Pomology
Practicals (30 Hours/Semester)

1. Study of varieties of Mango and Banana.
2. Study of varieties of Grape and Citrus.
3. Study of varieties of Papaya and Guava.
4. Manure and fertilizer application including biofertilizers in different fruit crops
5. Methods of application, calculation of the required quantity of manure and fertilizers based on the nutrient content.
6. Study of varieties of Pomegranate, Custard apple and Ber
7. Study of varieties of Apple.
8. Study of varieties of minor fruit crops.
9. Use of growth regulators in fruit crops.
10. Identification and collection of important pests in fruit crops.
11. Identification and collection of important diseases in fruit crops and Herbarium preparation.
12. Visit to a fruit market/commercial orchids.

Suggested readings :

- Chattopadhyay, T.K.1997. Text book on Pomology (Fundamentals of fruit growing), Kalyani Publishers, Hyderabad.
- Chundawat, B.S. 1990. Arid Fruit Culture, Oxford and IBH, New Delhi.
- Gourley J H 2009. Text book of Pomology, Read Books Publ.

Semester – V : Diseases of horticulture plants and their management
(Theory (60 Hours/Semester)

Unit – 1 :Diseases of Vegetable crops (10 Hrs.)

1. Brinjal : Wilt, Phomopsis blight, Sclerotinia foot rot, Little leaf of brinjal
2. Tomato : Late blight, early blight, leaf curl
3. Chilli: Anthracnose, leaf curl

Unit – 2 : Diseases of ornamental crops (16 Hrs.)

1. Rose : dieback, black spot
2. *Chrysanthemum* : Septoria leaf spot, Basal stem rots
3. Jasmine : Leaf blight, Rust
4. Marigold : leaf spot and bud rot
5. Tuberose : foot and tuber rot, Blossom blight
6. Gerbera : Blossom blight, powdery mildew
7. Gladiolus : Corm rot, Flower rot

Unit – 3 : Diseases of Fruit crops (12 Hrs.)

1. Mango: Malformation, Anthracnose, Black tip
2. Grape: Downy Mildew
3. Papaya : Papaya mosaic, Papaya ring spot, Papaya leaf curl
4. Citrus : Canker, Tristeza, root rot

Unit – 4 : Integrated Pest and disease management (12 Hrs.)

1. Pesticide classification on use, chemical nature, formulation, toxicity and action.
2. Pesticide Dissipation, Residue Dynamics, Different methods/ Steps in residue analysis.
3. Maximum Residue Levels in pesticide
4. Pesticide Management.

Unit – 5 : Pesticides (10 Hrs.)

1. Integrated Pest and Disease Management practices in Fruits, Vegetables, Flower crops, Medicinal and Plantation crops.
2. Insect pests in horticulture crops and their management.
3. Nematode pests in horticulture crops and their management.

Semester – V : Diseases of horticulture plants and their management (Adv.Elective-1)
Practicals (30 Hours/Semester)

1. Field visit and acquaintance with diseases of crops
2. Study of pathogens where possible; important diseases are :
    i. Late blight of Potato
    ii. Wilt of Tomato
    iii. Anthracnose of beans
    iv. Powdery mildew of pea
    v. Rhizome rot of Ginger
    vi. Stem gall of coriander
    vii. Powdery mildew
    viii. Downy mildew of cucurbits
    ix. Stemphylium blight
    x. Rust of onion and garlic
    xi. Dieback of Rose
3. Acquaintance with common fungicides and their methods of application.

Suggested readings :

- Verma L R and R C Sharma 1999. Diseases of Horticultural Crops – Fruits, Indus Publishing, New Delhi.

- Diseses of Horticulture Crops and their management, TNAU Publ. Agrimoon.Com

- Jagatap G P, D N Dhutraj and Utpal Dey. 2001. Diseases of Horticultural crops and their management, Agrobios Publications

Semester VI : Protected cultivation of Horticultural crops

Theory (60 Hours/Semester)

Unit – 1 :Protected structures (16 Hrs.)

1. Importance and scope of protected cultivation of vegetable crops.
2. Principles used in protected cultivation, energy management, low cost structures; training methods; engineering aspects.
3. Regulatory structures used in protected structures; types of greenhouse/ polyhouse/ shade nets, hot beds, cold frames,
4. Effect of environmental factors, viz. temperature, light, CO_2 and humidity on growth of different vegetables, manipulation of CO_2, light and temperature for vegetable production, fertigation.

Unit – 2 :Agriculture finance and management (14 Hrs.)

1. Credit, Meaning, Importance and credit control. Definition, need for finance in agriculture, characteristics of good agricultural finance (credit)
2. Decision on the use of credit, Principles of farm credit (Equity or Increasing Risk), Added Cost and Added Return, Cost of Credit and no loss no profit goal of farming and opportunity cost Principle.
3. Types of loans and classification of agricultural credit.
4. Sources of agricultural finance (Commercial banks, RRB, Lead Bank, NABARD, Cooperative Credit (PACs, Land Development Banks, National Cooperative Federation, Farmers Service Cooperatives).

Unit – 3 :Nursery production (08 Hrs.)

1. Nursery raising in protected structures like poly-tunnels,
2. Types of benches and containers
3. Different media for growing nursery under cover.

Unit – 4 :Cultivation of Horticulture crops in protected ways (12 Hrs.)

1. Regulation of flowering and fruiting in vegetable crops, technology for raising tomato, sweet pepper, cucumber and other vegetables in protected structures.
2. Training and staking in protected crops, varieties and hybrids for growing vegetables in protected structures.
3. Problem of growing vegetables in protected structures and their remedies.
4. Insect and disease management in protected structures; soil-less culture, use of protected structures for seed production.

Unit – 5 : Crop protection (10 Hrs.)

1. Recognition and Causes of Crop Disorders; Recognition, Biology and Control of Weeds.
2. Recognition, Biology and Control of Pests; Recognition, Biology and Control of Diseases.
3. Composition, Activity and Persistence of Crop Protection Chemicals and Biological agents.

4. Application of Crop Protection Chemicals; Safe Use, Handling, Transport and Storage of Crop, Protection Chemicals.

Semester VI : Protected cultivation
Practicals (30 Hours/Semester)

1. Study of various types of structures.
2. Fertigation and nutrient management
3. Methods to control temperature, CO_2, light, media, training and pruning
4. Maintenance of parental lines and hybrid seed production of vegetables
5. Control of insect-pests and diseases in greenhouse
6. Economics of protected cultivation
7. Visit to established green/polyhouse/net house/shade house in the region.

Suggested readings :

- Chandra S &SomV. 2000. Cultivating Vegetables in Green House. IndianHorticulture 60: 17-18.
- Prasad S & Kumar U. 2005.Greenhouse Management for HorticulturalCrops. Agrobios.
- Tiwari GN. 2003. Green House Technology for Controlled Environment.Narosa Publ. House.

Semester VI : Horticulture extension and value added products

Theory (60 Hours/Semester)

Unit – 1 : Basics of Horticulture Extension (14 Hrs.)

1. Extension education: meaning, definition, nature, scope, objectives, principles, approaches and history.
2. Motivation of women community, children, youth and voluntary organizations for horticulture extension work.
3. Transfer of technology programmes like lab to land programme (LLP) national demonstration (ND), front line demonstration (FLD) Krishi Vigyan Kendras (KVK).
4. Scope and importance of Participatory Rural Appraisal (PRA) & Rapid Rural Appraisal (RRA).

Unit – 2 : Communication and programme planning (12 Hrs.)

1. Communication – meaning, definition, models, elements and their characteristics.
2. Types and barriers in communication.
3. Programme planning – meaning, definition, principles, steps in programme development process and monitoring.
4. Evaluation of extension programmes.

Unit – 3 : Modern communication gadgets (10 Hrs.)

1. Modern communication sources – internet, video and teleconferencing.
2. Interactive Multimedia Compact Disk (IMCD) village kiosks,
3. Kissan Call Centre (KCC), mobile phone.

Unit – 4 : Processing and value addition (12 Hrs.)

1. Processing using sugar: principle – processing of jam, jelly, marmalade, squash, RTS, nectar, fruit bar, preserves and candies.
2. Processing using salt: Principle – brining preservation of horticultural produces - preparation of pickles and sauces.
3. Processing of dehydrated fruit, fruit pulps, vegetable and spice products,.
4. Canning: principles, methods – preparation of canned products - spoilage of canned foods and its prevention.

Unit – 5 : Principles of preservation (12 Hrs.)

1. Preservation by low temperature: definition, principle, method, suitability, refrigeration,
2. Freezing - preparation of frozen foods, preservation by controlled atmosphere, modified atmosphere: definition, principle, method, suitability.
3. Processing by irradiation: definition, principle, method, suitability – application of irradiation in food industry.

Semester VI : Horticulture extension and value added products (Skill based Elective-2)
Practicals (30 Hours/Semester)

1. Different types of communication systems for extension.

2. Identification and documentation- propagation in medicinal crops. Visit to commercial medicinal plants field, Visit to GMP. Packaging of medicinal and aromatic plants using different packing materials. Waxing, methods of storage. Drying technology of medicinal plants.

3. Identification of major spices and plantation crops varieties - Rapid multiplication technique and nursery management.

4. Equipment used in food processing unit, preparation of beverages – Squash, RTS, Nectar, Cordial, Crush, Syrup, Wine and juice concentrate,preservation With sugar – Jam, Jelly, Marmalade, Candy, Preserve, Glazed candies and Crystallized fruits preservation with salt & vinegar – Pickle, Chutney, Sauce – dehydration of horticultural produces, by products from waste – freezing of fruit and vegetables, canning of fruit and vegetables – value added product from spices, preparation of herbal drinks quality control of value added products – quality analysis of horticultural produces –visit to food processing industries, spice and coffee board.

Suggested readings :

- Jitendra Singh. 2008. Spices and Plantation Crops. Aavishkar Publishers, Distributors, Jaipur.

- Tiwari, R.S and Ankur Agarwal 2004. Production technology of spices. International book distributing Co., Lucknow.

- Farooqi, M. M. Khan and M. Vasundhara. 2004. Production technology of medicinal and aromatic crops. Publ. Natural Remedies Pvt. Ltd., Bangalore

SEED TECHNOLOGY

Structure of New Subject: Seed Technology

Semester	Paper	Subject	Hrs.	Credits	CCE	E.E.	Total
FIRST YEAR							
Sem-1	I	Principles of Plant Genetics	4	3	25	75	100
		Practical –I	2	2	-	50	50
Sem-2	II	Principles of Plant Breeding	4	3	25	75	100
		Practical-II	2	2	-	50	50
SECOND YEAR							
Sem -3	III	Seed Physiology	4	3	25	75	100
		Practical –III	2	2	-	50	50
Sem-4	IV	Seed production Technology	4	3	25	75	100
		Practical –IV	2	2	-	50	50
THIRD YEAR							
Sem -5	V	Seed Pathology and Entomology	3	3	25	75	100
		Practical –V	2	2	-	50	50
	VI	Seed Processing	3	3	25	75	100
		Practical –VI	2	2	-	50	50
Sem -6	VII (A/B/C)	**Elective – I** A. Diseases of Field Crops and their Management (Syllabus will be finalized in due course) B. Agronomy of major cereals and pulses (Syllabus will be finalized in due course) C. Agronomy of oilseeds, commercial and fibre crops (Syllabus will be finalized in due course)	3	3	25	75	100
		Practical - VII	2	2	-	50	50
	VIII – Cluster	**Elective – II (Cluster – A)**	3	3	25	75	100

	Elec. A-1, 2 & 3 (OR) B-1, 2 & 3	1. Seed quality control and standards					
		2. Seed testing, legislations and Certification.					
		3. Seed Farm Management and Marketing.					
		Project work	2	2	20	30	50
		Elective- II (Cluster – B)					
		1. Tissue culture technology (Syllabus will be finalized in due course)					
		2. Molecular breeding in field crops. (Syllabus will be finalized in due course)	3	3	25	75	100
		3. Hybrid seed production (Syllabus will be finalized in due course)					
		Project work	2	2	20	30	50

Semester – I :Principles of Plant Genetics
Theory Paper (60 hours/Semester)

Unit -1 :Mendelian concepts (12 Hrs.)

1. Introduction to Genetics
2. Pea plant as experimental material
3. Monohybrid and dihybrid crossing experiments
4. Mendel's laws of inheritance
5. Incomplete dominance and codominance; Interaction of genes

Unit -2 :Qualitative and quantitative Genetics (12 Hrs.)

1. Qualitative and quantitative traits
2. Multiple allelism
3. Linkage and crossing over
4. Additive genes, Polygenic inheritance

Unit -3 :Chromosomal and gene mutations (12 Hrs.)

1. Concept of mutations – physical and chemical mutagens
2. Structural changes in chromosomes
3. Numerical changes in chromosomes
4. Gene mutations

Unit -4 :Structure and replication of Genetic material (12 Hrs.)

1. Concept of genetic material – RNA and DNA
2. Elucidation of DNA structure
3. Double helical structure of DNA
4. Replication of DNA

Unit -5 :Gene expression and control (12 Hrs.)

1. Gene structure in prokaryotes and eukaryotes
2. Lac operon concept
3. Trp operon concept
4. Expression and control of genes in eukaryotes

Semester – 1 :Principles of Plant Genetics
Practicals (30 hours/Semester)

1. Problems on Mendelian Genetics
2. Problems on interaction of genes
3. Problems on quantitative genetics
4. Laboratory exercises in probability and chi-square
5. Chromosome mapping using three point test cross
6. Structure of DNA and RNA
7. Exercises on gene expression and control

Suggested readings :

- Snustad DP & Simmons MJ. 2006. Genetics. 4th Ed. John Wiley & Sons.
- Strickberger MW. 2005. Genetics (III Ed). Prentice Hall, New Delhi, India
- Tamarin RH. 1999. Principles of Genetics. Wm. C. Brown Publs.
- Uppal S, Yadav R, Subhadra & Saharan RP. 2005. Practical Manual on Basic and Applied Genetics. Dept. of Genetics, CCS HAU Hisar.

Semester – II :Principles of Plant Breeding
Theory Paper (60 hours/Semester)

Unit – 1 :Genetic basis of plant breeding (12 Hrs.)

1. History and objectives of plant breeding
2. Origin of crop plants – Vavilov centres of origin
3. Characteristics improved by plant breeding
4. Genetic basis of plant breeding in self and cross pollinated crops – self incompatibility and male sterility and their commercial exploitation

Unit – 2 :Breeding practices in Self and Cross pollinated crops (12 Hrs.)

1. Pollination mechanisms in plants
2. Concept of self and cross pollinated crops - Introduction
3. Pureline theory – mass, pureline and pedigree selection methods
4. Mass selection, recurrent and hybridization

Unit -3 :Breeding practices for vegetatively propagated crops(12 Hrs.)

1. Different types of vegetatively propagated crops
2. Asexual propagules for vegetative propagation
3. Clonal selection
4. Apomixis and its exploitation

Unit -4 :Breeding for abiotic and biotic stresses (12 Hrs.)

1. Concept of ideotype and its role in crop improvement
2. Transgressive breeding
3. Mutation breeding
4. Breeding for abiotic and biotic stresses

Unit -5 :Cultivar development (12 Hrs.)

1. Cultivar development – testing, release and notification
2. Participatory plant breeding
3. Plant breeders' rights and regulations for plant variety protection
4. Farmers rights

Semester – II Principles of Plant Breeding
Practicals (30 hours/Semester)

1. Floral biology in self and cross pollinated species.
2. Selfing and crossing techniques.
3. Selection methods in segregating populations and evaluation of breeding material.
4. Analysis of variance (ANOVA).
5. Estimation of heritability and genetic advance.
6. Maintenance of experimental records.
7. Learning techniques in hybrid seed production using male-sterility in field crops.

Suggested readings :

- Allard RW. 1981. Principles of Plant Breeding. John Wiley & Sons.
- Chopra VL. 2004. Plant Breeding. Oxford & IBH.
- Gupta S K. 2005. Practical Plant Breeding. Agribios.
- Roy D. 2003. Plant Breeding, Analysis and Exploitation of Variation. Narosa Publ. House.
- Singh BD. 2006. Plant Breeding. Kalyani. Singh P. 2006. Essentials of Plant Breeding. Kalyani.
- Singh S & Pawar IS. 2006. Genetic Bases and Methods of Plant Breeding. CBS

Semester III : Seed Physiology
(Theory 60 hours)

Unit -1 :Physiology of seed development (12 Hrs.)

1. Physiology of seed development
2. Factors affecting seed set. Seed ripening and maturation process.
3. Chemical composition of seeds.
4. Synthesis of food reserves (Carbohydrates, proteins & fats).

Unit - 2:Factors affecting seed germination (12 Hrs.)

1. Factors affecting germination its implications.
2. Physiological changes during seed germination
3. Seedling establishment & role of endosperm and embryo size on seedling establishment.
4. Seedling abnormalities

Unit – 3 :Seed viability, vigour and longevity (12 Hrs.)

1. Seed viability and factors affecting it.
2. Seed vigour, its measurement and crops productivity.
3. Methods to minimize seed aging and deterioration.
4. Seed longevity and specific problems of dormancy and seed longevity in some important crop species.

Unit – 4 :Physiology of seeds during storage (12 Hrs.)

1. Seed storage; importance and factors affecting it.
2. Physiological, biochemical and cytological changes in seed during storage.
3. Causes of seed deterioration.
4. Concepts and significance of moisture equilibrium, methods of maintaining safe seed moisture content. Thumb rule and its relevance,

Unit – 5 :Methods to improve seed performance in field (12 Hrs.)

1. Environmental factors affecting seed performance
2. Physiological and biochemical factors
3. Evaluation of seed priming methods for maize, cotton, Paddy, redgram, Jowar, bajra, chilli, tomato, brinjal and bhendi.
4. Predicting performance of seed in field

Semester III : Seed Physiology
(Practicals 30 Hours/Semester)

1. Different types of seed germination and evaluation.
2. Methods for breaking seed dormancy in different crop species.
3. Seed vigour tests.
4. Accelerated ageing tests.
5. Tetrazolium test.
6. Priming and invigoration treatments for improving germination and vigour.

Suggested readings :

- Prakash M, 2011 Seed Physiology of Crops. Satish Serial Publishing House.
- Benech-Arnold R L and R A Sanchez (2004) Hand Book of Seed Physiology : Applications to Agriculture, CRC Press

Semester – IV :Seed production Technology
Theory Paper (60 hours/Semester)

Unit -1 : Plant propagules (12 Hrs.)

1. Vegetative propagules, Apomictics – improvement
2. Sexual reproduction in plants - Seed development
3. Morphology of seeds in monocots and dicots
4. Seed dormancy and methods to break dormancy

Unit – 2 :Floral morphology, pollination and seed production(12 Hrs.)

1. Flower morphology in important crop plants
2. Pollination practices in self and cross pollinated crops – Hand and insect
3. Utilization of male sterility and self-incompatibility
4. Hybrid seed production – exploitation of heterosis

Unit –3 :Development and training of varieties (12 Hrs.)

1. Importance of Seed Production, Seed policy
2. Seed demand forecasting and planning for certified, foundation and breeder seed production
3. Deterioration of crop varieties, Factors affecting deterioration and their control
4. Maintenance of genetic purity during seed production

Unit -4 : Seed production (12 Hrs.)

1. Definition of variety and its type
2. Selection of site for seed production -Compact area approach,
3. Sowing, row spacing, fertilizer and irrigation.
4. Isolation, planting ratio and seed rate; Roguing and pollen shedders.

Unit – 5 :Varietal purity and its maintenance (12 Hrs.)

1. Characters of good quality seed, Different classes of seed, Production of nucleus & breeders seed
2. Maintenance and multiplication of pre-release and newly released varieties in self and cross-pollinated crops
3. Varieties, hybrids, synthetics and composites
4. Varietal Identification through Grow–Out Test and Electrophoresis

Semester – IV :Seed production Technology
(Practicals 30 Hours/Semester)

1. Studies on floral morphology of some important vegetable crop plants.
2. Emasculation and pollination studies vegetable crops.
3. Study of anther arrangement and time of anthesis
4. Seed extraction method in Tomato and Brinjal.
5. Nursery requirements and Management for different vegetable crops
6. Study of In vitro and in vivo germination of pollen (water, sugar and other media) and determination of percent pollen viability.
7. Visit to seed production farms.

Suggested readings :

- Umaraniet. al. 2006. Experimental Seed Science and Technology, Agrobios, Jodhpur
- Singh, 2009. Plant Breeding: Principles and Methods. Kalyani Publishers, New Delhi
- Agrawal, 2005. Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
- Reddy, 2008. Principles of crop production. Kalyani Publishers, New Delhi

Semester – V : Seed Pathology and Entomology
Theory Paper (60 hours/Semester)

Unit – 1 :Plant disease epidemiology (12 Hrs.)

1. Epidemiology of crop diseases - maize, cotton, Paddy, redgram, Jowar, bajra, chilli, tomato, brinjal and bhendi.
2. History of seed pathology
3. Importance of seed pathology
4. Influence of seed borne diseases

Unit -2 :Seed borne diseases (12 Hrs.)

1. Concept of seed borne and storage fungi and their differences
2. Common seed borne and seed storage fungi
3. Seed borne bacteria and viruses
4. Transmission of seed borne diseases

Unit -3 :Insect pests of seeds (12 Hrs.)

1. Definition and history of insect pests
2. Relation of insects and plants
3. Insects as vector of plant diseases
4. Insect pests of Lepidoptera, Diptera, Hemiptera, Isoptera and Coleoptera

Unit – 4 :Plant quarantine, WTO and IPRs (12 Hrs.)

1. Quarantine rules and regulations at International and national level; inspection on transport and introduction of plant propagules and seeds
2. WTO, TRIPS and WIPO; Trademarks and copy rights
3. IPR, organization of patent system in India; Plant variety and farmers right act.
4. Patentable and non-patentable matters in India; Undisclosed information and trade secrets

Unit – 5 :Management of seed borne diseases (12 Hrs.)

1. Management of seed borne plant pathogens/diseases
2. Procedure for healthy seed production
3. Different seed health testing methods for detecting microorganisms;
4. Treatments to control seed borne diseases.

Semester – V :Seed pathology and Entomology
Practicals (30 hours/Semester)

- Techniques of seed health testing - visual examination of seeds, washing test, incubation methods, embryo count method, seed soak method for the detection of certain seed born pathogens.
- Methods of seed treatment
- Identification and collection of important storage grain pest.
- Knowledge about the fumigation
- Various type of tools for dusting and spraying insecticides.
- Storage structure and damage material.

Suggested readings :

- Agarwal V K and J B Sinclair 1996, Principles of Seed Pathology, CRC Press
- Srivastava K. P., 2009., A Text Book of Applied Entomology, Kalyani Publishers, Ludhiana
- McDonald , M.B. and L.O. Copland . 1999. Seed Science and Technology Laboratory Manual. Scientific Publishers, Jodhpur

Semester V : Seed Processing

(Theory 60 hours/Semester)

Unit – 1 :Basics of seed processing (12 Hrs.)

1. Introduction: Principles of seed processing
2. Methods of seed drying including dehumidification and its impact on seed quality.
3. Relative humidity and equilibrium moisture content of seed.
4. Thumb rules of seed storage; loss of viability in important agricultural and horticultural crops, viability equations and application of nomograph.

Unit –2 :Equipment for seed processing (12 Hrs.)

1. Seed cleaning equipment and their functions: Preparing seed for processing
2. Functions of scalper debearder, scarifier, huller, seed cleaner and grader.
3. Screen cleaners, specific gravity separator, indented cylinder, velvet-spiral-disc separators, colour sorter, delinting machines.
4. Seed blending.

Unit -3 :Seed processing procedures (12 Hrs.)

1. Assembly line of processing and storage
2. Receiving, elevating and conveying equipments
3. Plant design and layout, requirements
4. Economic feasibility of seed processing plant.

Unit -4 :Seed health and protection (12 Hrs.)

1. Seed health testing
2. Study of different plant protection chemicals - their formulations, dosage
3. Methods of usage and compatibility of agrochemicals; use of plant protection appliance.
4. Seed treatment methods, spraying and dusting

Unit – 5 :Seed treatment and packaging (12 Hrs.)

1. Seed treatments-methods of seed treatment
2. Seed treating formulations and equipments,
3. Seed disinfestations, identification of treated seeds.
4. Packaging: principles, practices and materials; bagging and labeling.

Semester V : Seed Processing

(Practicals 30 Hours/Semester)

1. Determination of physical properties of seeds of different crops.
2. Measurement of seed moisture content by O S W A & moisture meter / oven drying method.
3. Study of seed –pre-cleaner , maize sheller & dehusker.
4. Study of air screen cleaner cum grader. 6. Study of magnetic separator.
5. Study of specific gravity separator. 8. Study of seed treatment machines.
6. Study of seed packaging equipment
7. Study of bucket elevator, screw conveyers and pneumatic elevators
8. Study of threshing machine and its use.

Suggested readings :

- Desai B D (2004) Seeds Hand Book : Processing and Storage, CRC Press
- Ashworth S and K Whealy (2002) Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners, Seed Savers Exchange

Semester – VI : Seed quality control and standards
Theory Paper (60 hours/Semester)

Unit – 1 : Basic concepts of seed quality (12 Hrs.)

1. Seed quality: objectives, concept and components and their role in seed quality control.
2. Instruments, devices and tools used in seed testing.
3. ISTA and its role in seed testing.
4. Protection of Plant Varieties and Farmers Rights Authority in India; PPVFR act 2001.

Unit -2 : Seed sampling methods (12 Hrs.)

1. Seed Sampling: definition, objectives, seed-lot and its size.
2. Types of samples; sampling devices; procedure of seed sampling.
3. Sampling intensity; methods of preparing composite and submitted samples.
4. Sub-sampling techniques, dispatch, receipt and registration of submitted sample in the laboratory, sampling in the seed testing laboratory.

Unit -3 :Purity analysis (12 Hrs.)

1. Physical Purity: definition, objective and procedure, weight of working samples for physical purity analysis.
2. Components of purity analysis and their definitions and criteria.
3. Pure seed definitions applicable to specific genera and families; multiple seed units.
4. General procedure of purity analysis; calculation and reporting of results, prescribed seed purity standards.

Unit – 4 : Seed moisture determination (12 Hrs.)

1. Seed moisture content: importance of moisture content; equilibrium moisture content.
2. Principles and methods of moisture estimation - types, instruments and devices used.
3. Predrying and grinding requirements, procedural steps in moisture estimation.
4. Calculation and reporting of results.

Unit – 5 : Seed viability and vigour testing (12 Hrs.)

1. Germination: importance, definitions, requirements for germination, instrument and substrata required.
2. Principle and methods of seed germination testing; working sample and choice of method.
3. Viability tests; quick viability test (TZ- test) - advantages, principle, preparation of seeds and solutions, procedure, evaluation and calculation of test results.
4. Vigour testing: concept, historical development, definitions, principles and procedures of different methods used for testing vigour.

Semester –VI : Seed quality control and standards
(Practicals 30 Hours/Semester)

1. Step in seed testing; sampling, entry in records, dividing and mixing.
2. Purity analysis, test weight. Identification of weed and crop seeds.
3. Moisture estimation, germination test, quick viability test (Tetrazolium test).
4. Accelerated ageing test, use of tolerance tables.
5. Maintenance and handling of seed testing equipements.
6. Maintenance and handling of seed testing results and its communication.

Suggested readings :

- Amarjit Basra (2006) Hand Book of Seed Science and Technology, CRC Press
- Copeland L O and M B Mc Donald (1999) Principles of Seed Science and Technology, Springer
- Santhy V et al. Legislations for seed quality regulation in India, CICR Technical bulletin No: 38
- Seed and Seed Quality: Technical Information for FAO Emergency Staff, FAO Seed and Plant Genetic Resources Service Rome, Italy

Semester –VI :Seed testing, legislations and certification
(Theory 60 Hours / Semester)

Unit – 1 :Introduction and Organizations (12 Hrs.)

1. History of seed testing – Role of FAO
2. International Seed Testing Association
3. Association of Official Seed Analysts
4. Seed testing laboratories in India

Unit -2 :Seed testing laboratory (12 Hrs.)

1. Seed testing laboratory layout and furnishing.
2. Seed testing equipments and their maintenance.
3. Seed testing laboratory management and functioning.
4. Modern tools for seed testing

Unit -3 :Seed testing and analysis (12 Hrs.)

1. Seed sampling, dividing.Heterogenic test.
2. Handling and testing of the sample; Physical purity analysis.
3. Determination of Other Distinguishable Varieties (varieties unrelated to testing plant).
4. Germination test, seed vigour test, TZ test

Unit - 4 :Legislations (12 Hrs.)

1. Objectives - Indian seed Act,
2. Seed rules & seed order.
3. Seed Inspector: Duties and responsibilities.
4. New seed policy (1988)

Unit - 5 :Certification procedures (12 Hrs.)

1. Definition, concept, classes of seeds, phases of certification standards (i.e. Land requirement, isolation distance) etc.
2. Issue of certificates, tags and sealing.
3. Pre and post control check: Genetic purity verification, certification, records and reporting.
4. Revalidation of seed lot: Procedure, issuing of certificate.

Semester –VI :Seed testing, legislations and certification
Practicals(30 Hours / Semester)

1. General procedure of seed certification ; identification of weed and other crop seeds as per specific crops.
2. field inspection at different stages of a crop and observations recorded on contaminants and reporting of results.
3. Inspection and sampling at harvesting/threshing, processing and after processing for seed law enforcement.
4. Testing physical purity, germination and moisture;
5. Specifications for tags and labels to be used for certification purpose.
6. Grow-out tests for pre and post-harvest quality control.
7. Visits to regulatory seed testing laboratory, including plant quarantine lab and seed certification agency.

Suggested readings :

- Agarwal RL. 1997. Seed Technology. Oxford & IBH.
- Anonymous 1992. Legislation on Seeds. NSC Ltd., Department of Agriculture and Cooperation, Ministry of Agriculture, New Delhi.
- Nema NP. 1986. Principles of Seed Certification and Testing. Allied Publs.
- Tunwar NS & Singh SN. 1988. Indian Minimum Seed Certification Standards. CSCB, Ministry of Agriculture, New Delhi.

Semester – VI : Seed Farm Management and Marketing
Theory Paper (60 hours/Semester)

Unit -1 :Basic concepts of farm management (12 Hrs.)

1. Scope, basic principles in farm management; Field or farm management
2. Decision making operation & control
3. Decision making based on production, cost and capital investment, cost analysis
4. Law of diminishing returns, opportunity cost, most profitable combination of input and output

Unit -2 :Farm area selection and usage (12 Hrs.)

1. Farm planning , Construction of farm buildings, implement shed, strong structures
2. Farm business analysis, farm size, factors affecting profit and economic size of farm
3. Farm budgeting procedure and uses, farm efficiency measures, farm records & their uses
4. Farm surveys, data collection & analysis; Acquisition & management of land labour & capital.

Unit – 3 :Farm labour management (12 Hrs.)

1. Staff selection process, Directing – Training, Communication & motivation
2. Controlling- Significance, Process, Techniques, Standards & Benchmarks, Management Audit
3. Nature, Scope and Significance of Organizational behaviour
4. Organizational culture or climate-concept, dimensions, ethos, determinants

Unit - 4 :Farm book keeping and accounting (12 Hrs.)

1. System of book keeping.
2. Types of Farman record and act physical of financial.
3. Principles involved in Farm Management decision.
4. Management of Farm labour and wage record.

Unit -5 :Seed marketing (12 Hrs.)

1. Basic concept, supply and demand, price equilibrium, seed transportation and storage – cost and returns, cost of processing and packaging,
2. Marketing organization for seed marketing, seed market in India, structure and working.
3. Seed market survey, projections of supply and demand for different kinds of seeds in India – seed pricing Breeder / Foundation / Certified Seeds.

Semester – VI : Seed Farm Management and Marketing
Practicals (30 hours/Semester)

- Each student must study the management of a farm block of the college farm, and makes its different kind of soil location, its part of cropping. Present cropping plan and management.
- Student must be familiar with the programme at work. He/she should have acquaintance with the farm, the profit and loss account, balance sheets and other final statements of financial importance for the farm.
- Student must undertake the survey of the cultivation and management practices of at least five farmers and prepare a note in improved practices of oral production and farm management.
- Handling a farm machinery, selection of good seeds, Judging and valuing crops grading of farm produce, study market rates and marketing of produce.
- Preparation of dropping scheme and working out seed, manure, labour and capital requirements for different conditions in A.P.
- Study tour of marketing centres and research stations of the state.

Suggested readings :

- Amarjit Basra (2006) Hand Book of Seed Science and Technology, CRC Press
- Copeland L O and M B Mc Donald (1999) Principles of Seed Science and Technology, Springer
- Desai B D (2004) Seeds Hand Book : Processing and Storage, CRC Press
- Ashworth S and K Whealy (2002) Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners, Seed Savers Exchange

AQUACULTURE

Course Structure of **Aquaculture Technology** under CBCS

Year	Semester	paper	TITLE	Marks	credits
i	I	I	BASIC PRINCIPLES OF AQUACULTURE	100	03
			Practical - I	50	02
	II	II	BIOLOGY OF FIN FISH & SHELL FISH	100	03
			Practical - II	50	02
II	III	III	FISH NUTRITION & FEED TECHNOLOGY	100	03
			Practical - III	50	02
	IV	IV	FRESHWATER & BRACKISHWATER AQUACULTURE	100	03
			Practical - IV	50	02
III	V	V	FISH HEALTH MANAGEMENT	100	03
			Practical - V	50	02
		VI	FISHERIES EXTENSION, ECONOMICS & MARKETING	100	03
			Practical - VI	50	02
	VI	VII A*	ORNAMENTAL FISHERY	100	03
			Practical - VII A	50	02
		VII B*	FISHERY ENGINEERING	100	03
			Practical - VII B	50	02
		VIII (I)**	Cluster Elective - I :: FISHERY PROCESSING TECHNOLOGY I. Fish Processing Technology – I-A Practical - VIII (1-1) II. Title : Fishery Microbiology and Fishery By-Products I-B	100 50 100	03 02 03

			Practical - VIII (1-2) III. Quality Control In Processing Plants - IC Practical - VIII(1-3): Proj.	50 100 50	02 03 02
		VIII (II)**	Cluster Elective - II :: COASTAL AQUACULTURE I. Crustacean Culture II - A Practical - VIII (2-1) II. Molluscan & Seaweed Culture II - B Practical - VIII (2-2) III. Marine Finfish Culture II - C Practical - VIII(2-3)/ Proj.	 100 50 100 50 100 50	03 02 03 02 03 02

* Recommended Combination: Zoology, Chemistry & Aquaculture Technology

AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - I – PAPER-1
BASIC PRINCIPLES OF AQUACULTURE

UNIT-I: INTRODUCTION

1-1 Concept of Blue Revolution - History and definition of Aquaculture
1-2 Scope of Aquaculture at global Level, India and Andhra Pradesh
1-3 Fresh water aquaculture, brackish water aquaculture and mariculture
1-4 Different Aquaculture systems – Pond, Cage, Pen, Running water, Extensive, Intensive and & Semi-Intensive Systems and their significance. Monoculture, Polyculture and Monosex culture systems
1-5 Aquaculture versus Agriculture; Present day needs with special reference to Andhra Pradesh

UNIT-II: POND ECOSYSTEM

2-1 General Concepts of Ecology, Carrying Capacity and Food Chains
2-2 Lotic and lentic systems, streams and springs
2-2 Nutrient Cycles in Culture Ponds – Phosphorus, Carbon and Nitrogen
2-3 Importance of Plankton and Benthos in culture ponds, nutrient dynamics and algal blooms
2-4 Concepts of Productivity, estimation and improvement of productivity

UNIT-III: TYPES OF FISH PONDS

3-1 Classification of ponds based on water resources – spring, rain water, flood water, well water and water course ponds
3-2 Functional classification of ponds – head pond, hatchery, nursery, rearing, production, stocking and quarantine ponds
3-3 Hatchery design

UNIT- IV: POND PREPARATION

4-1 Important factors in the construction of an ideal fish pond – site selection, topography, nature of the soil, water resources
4-2 Lay out and arrangements of ponds in a fish farm
4-3 Construction of an ideal fish pond – space allocation, structure and components of barrage pond

UNIT-V: POND MANAGEMENT FACTORS

5-1 Need of fertilizer and manure application in culture ponds; Role of nutrients; NPK contents of different fertilizers and manures used in aquaculture; and precautions in their application

5-2 Physico-chemical conditions of soil and water optimum for culture –temperature, depth, turbidity, light, water and shore currents, PH, DOD, CO_2 and nutrients; measures to increase oxygen and reduce ammonia & hydrogen sulphide in culture ponds; correction of PH

5-3 Eradication of predators and weed control – advantages and disadvantages of weed, weed plants in culture ponds, aquatic weeds, weed fish, toxins used for weed control and control of predators

PRACTICALS:

1. Estimation of Carbonates, Bicarbonates in water samples
2. Estimation of Chlorides in water samples
3. Estimation of dissolved oxygen
4. Estimation of ammonia in water
5. Field visit to nursery, rearing and stocking ponds of aqua farms
6. Field visit to hatchery
7. Study of algal blooms and their control
8. Collection & identification of zooplankton and phytoplankton
9. Study of aeration devices
10. Determination of soil nitrogen and phosphorus
11. Collection and study of aquatic weeds
12. Filed survey of nearby habitat for dietary dependency on and requirement of aqua-products

PRESCRIBED BOOK(S):

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi
2. Pillay TVR, 1996. Aquaculture Principles and Practices, Fishing News Books Ltd., London

REFERENCES:

1. Pillay TVR & M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc. 1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsivier Scientific Publishing Company.
4. Bose AN et.al., 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt.Ltd.

SEMESTER – II PAPER-1I
BIOLOGY OF FIN FISH & SHELL FISH

UNIT-I: GENERAL CHARACTERS & CLASSIFICATION OF CULTIVABLE FIN & SHELL FISH

1-1 General Characters and classification of fishes, crustaceans and molluscs up to the level of Class.
1-2 Fish, Crustaceans and Molluscs of commercial importance
1-3 Sense organs of fishes, crustaceans and molluscs
1-4 Specialized organs in fishes – electric organ, venom and toxins
1-5 Buoyancy in fishes- swim bladder and mechanism of gas secretion

UNIT-II: FOOD, FEEDING AND GROWTH

2-1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, structural modifications in relation to feeding habits, forage ratio and food selectivity index
2-2 Principles of Age and growth determination; growth regulation, Growth rate measurement – scale method, otolith method, skeletal parts as age indicators
2-3 Genetic, biotic & ecological factors in determining the longevity of fishes, length-frequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate, asymptomatic length, fitting of growth curve
2-4 Length-weight relationship, condition factor/Ponderal index, relative condition factor

UNIT-III: REPRODUCTIVE BIOLOGY

3-1 Breeding in fishes, breeding places, breeding habits & places, breeding in natural environment and in artificial ponds, courtship and reproductive cycles
3-2 Induced breeding in fishes
3-4 Breeding in shrimp, oysters, mussels, clams, pearl oyster, pila, freshwater mussel and cephalopods

UNIT – IV: DEVELOPMENT

4-1 Parental care in fishes, ovo-viviparity, oviparity, viviparity, nest building and brooding
4-2 Embryonic and larval development of fishes
4-3 Embryonic and larval development of shrimp, crabs and molluscs of commercial importance
4-4 Environmental factors affecting reproduction and development of cultivable aquatic fin & shell fish

UNIT-V: HORMONES & GROWTH

5-1 Endocrine system in fishes

5-2 Neurosecretary cells, androgenic gland, ovary, Y-organ, chromatophores, pericardial glands and cuticle.
5-3 Molting, molting stages, metamorphosis in crustacean shell fish

PRACTICALS:

1. Study of mouth parts in herbivorous and carnivorous fishes
2. Comparative study of digestive system of herbivorous and carnivorous fishes
3. Length-weight relationship of fishes
4. Gut content analysis in fishes and shrimp
5. Mouth parts and appendages of cultivable prawns, shrimps and other crustaceans
6. Study of eggs of fishes, shrimps, prawns and other crustaceans
7. Study of oyster eggs
8. Embryonic and larval development of fish
9. Study of gonadal maturity and fecundity in fishes and shellfish
10. Observation of crustacean larvae
11. Observation of molluscan larvae
12. Study of nest building and brooding of fishes

PRESCRIBED BOOK(S):

1. Bone Q et al., 1995. Biology of fishes, Blackie academic & professional, LONDON
2. Saxena AB 1996. Life of Crustaceans. Anmol Publications Pvt.Ltd., New Delhi

REFERENCES:

1. Tandon KK & Johal MS 1996. Age and Growth in Indian Fresh Water Fishes. Narendra Publishing House, New Delhi.
2. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, New York
3. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management.
4. Barrington FJW 1971. Invertebrates: Structure and Function.ELBS
5. Parker F & Haswell 1992. The text book of Zoology, VolI. Invertebrates (eds. Marshal AJ & Williams). ELBS & Mc Millan & Co.

SEMESTER III – PAPER-1II
FISH NUTRITION & FEED TECHNOLOGY

UNIT-I: NUTRITIONAL REQUIREMENTS OF CULTIVABLE FISH

1-1 Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns
1-2 Essential aminoacids and fatty acids, protein t0 energy ratio, nutrient interactions and protein sparing effect
1-3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, check tray
1-4 Factors affecting energy partitioning and feeding

UNIT-II: FORMS OF FEEDS & FEEDING METHODS

2-1 Fed conversion efficiency, feed conversion ratio and protein efficiency ratio
2-2 Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets, advantages of pelletization
2-3 Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding and tray feeding
2-4 Frequency of feeding

UNIT-III: FEED MANUFACTURE & STORAGE

3-1 Feed ingredients and their selection, nutrient composition and nutrient availability of feed ingredients
3-2 Feed formulation – extrusion processing and steam pelleting, grinding, mixing and drying, pelletization, and packing
3-3 Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulated feeds and micro-bound diets
3-4 Microbial, insect and rodent damage of feed, chemical spoilage during storage period and proper storage methods

UNIT-IV: FEED ADDITIVES & NON-NUTRIENT INGREDIENTS

4-1 Binders, anti-oxidants, probiotics
4-2 Feed attractants and feed stimulants
4-3 Enzymes, hormones, growth promoters and pigments
4-4 Anti-metabolites, afflatoxins and fiber

UNIT-V: NUTRITIONAL DEFICIENCY IN CULTIVABLE FISH

5-1 Protein deficiency, vitamin and mineral deficiency symptoms
5-2 Nutritional pathology and ant-nutrients
5-3 Importance of natural and supplementary feeds, balanced diet

PRACTICALS:

1. Estimation of protein content in aquaculture feeds
2. Estimation of carbohydrate content in aquaculture feeds
3. Estimation of lipid content in aquaculture feeds
4. Estimation of ash in aquaculture feed
5. Study of water stability of pellet feeds
6. Feed formulation and preparation in the lab
7. Study of binders used in aquaculture feeds
8. Study of feed packing materials
9. Study of physical and chemical change during storage
10. Study on physical characteristics of floating and sinking feeds
11. Visit to a aqua-feed production unit
12. Visit to a farm for studying feeding practices

PRESCRIBED BOOK(S):

1. HALVER JE 1989. Fish nutrition. Academic press, San diego

REFERENCES:

1. Lovell rt 1998. Nutrition and feeding of fishes, Chapmann & Hall, New York
2. Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture**.** Chapmann & Hall, New York

SEMESTER IV – PAPER-1V
FRESH WATER & BRACKISHWATER AQUACULTURE

UNIT-1: INTRODUCTION TO FRESHWATER AQUACULTURE

1-1.1 Status, scope and prospects of fresh water aquaculture in the world, India and AP
1-1.2 Different fresh water aquaculture systems

UNIT-II: CARP CULTURE

2-1 Major cultivable Indian carps – Labeo, Catla and Cirrhinus & Minor carps
2-2 Exotic fish species introduced to India – Tilapia, Pangassius and Clarius sp.
2-3 Composite fish culture system of Indian and exotic carps
2-4 Impact of exotic fish, Compatibility of Indian and exotic carps and competition among them

UNIT-III: CULTURE OF AIR-BREATHING AND COLD WATER FISH

3-1 Recent developments in the culture of clarius, anabas, murrels,
3-2 Advantages and constraints in the culture of air-breathing and cold water fishes- seed resources, feeding, management and production
3-3 Special systems of Aquaculture- brief study of culture in running water, re-circulatory systems, cages and pens, sewage-fed fish culture

UNIT-IV: CULTURE OF PRAWN

4-1 Fresh water prawns of India - commercial value
4-2 *Macrobrachium rosenbergii* and *M. Malcomsonii* – biology, seed production, pond preparation, stocking, management of nursery and grow-out ponds, feeding, mprphotypes and harvesting

UNIT-V: CULTURE OF BRACKISHWATER SPECIES

5-1 Culture of P.mondon – Hatchery technology and Culture practices including feed and disease management
5-2 Culture of L. vannamei – hatchery technology and culture practices including feed and disease management.
5-3 Mixed culture of fish and prawns

PRACTICALS:

1. Identification of important cultivable carps
2. Identification of important cultivable air-breathing fishes
3. Identification of important cultivable fresh water prawns
4. Identification of different life history stages of fish
5. Identification of different life history stages of fresh water prawn

6. Collection and study of weed fish
7. Identification of commercially viable crabs – Scylla cerrata, Portunus pelagicus, P.sanguinolentus, Neptunus pelagicus, N. Sanguinolentus
8. Identification of lobsters – Panulirus polyphagus, P.ornatus, P.homarus, P.sewelli, *P.penicillatus*
9. Identification of oysters of nutritional significance – Crossostrea madrasensis, C.gryphoides, C. cucullata, C.rivularis , Picnodanta
10. Identification of mussels and clams
11. Identification of developmental stages of oysters
12. Field visit to aqua farm and study of different components like dykes etc.

PRESCRIBED BOOK(S):

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi

REFERENCES:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford-IBH, New Delhi
2. Srivatsava 1993. Fresh water aquaculture in India, Oxford-IBH, New Delhi
3. Marcel H 1972. Text book of fish culture.Oxford fishing news books

SEMESTER V– PAPER-V
FISH HEALTH MANGEMENT

UNIT I: PATHOLOGY AND PARASITOLOGY

1-1 Introduction to fish diseases –Definition and categories of diseases – Disease and environment
1-2 Disturbance in cell structure – changes in cell metabolism, progressive and retrogressive tissue changes, types of degeneration, infiltration, necrosis, cell death and causes
1-3 Atrophy, hypertrophy, neoplasms, inflammation, healing and repair

UNIT II: DISEASES OF FIN FISH

2-1 Fungal diseases (both of shell and finfish) – Saprolegniosis, brachiomycosis, ichthyophorus diseases – Lagenidium diseases – Fusarium disease, prevention and therapy
2-2 Viral diseases – Emerging viral diseases in fish, haemorrhagic scepticemia, spring viremia of carps, infectious hematopoietic necrosis in trout, infectious pancreatic necrosis in salmonids, swim-bladder inflammation in cyprinids, channel cat fish viral disease, prevention and therapy
2-3 Baterial diseases – Emerging bacterial diseases, aermonas, pseudomonas and vibrio infections, columnaris, furunculosis, epizootic ulcerative syndrome, infectious abdominal dropsy, bacterial gill disease, enteric red mouth, bacterial kidney disease, proliferative kidney disease, prevention and therapy

UNIT III: DISEASES OF SHELL FISH

3-1 Major shrimp viral diseases – Bacculovirus penaeii, Monodon Bacculovirus, Bacculoviral midgut necrosis, Infectious hypodermal and haematopoietic necrosis virus, Hepatopancreatic parvo like virus, Yellow head bacculovirus, white spot bacculovirus.
3-2 Bacterial diseases of shell fish – aeromonas, pseudomonas and vibrio infections, luminous bacterial disease, filamentous bacterial disease. Prevention and therapy
3-3 Protozoan diseases- Ichthyophthiriasis, Costiasis, whirling diseases, trypanosomiasis. Prevention and therapy

UNIT IV: NUTRITIONAL DISEASES

4-1 Nutritional pathology – lipid liver degeneration, Vitamin and mineral deficiency diseases. Aflatoxin and dinoflagellates.
4-2 Antibiotic and chemotherapeutics. Nutritional cataract. Genetically and environmentally induced diseases.

UNIT V: FISH HEALTH MANAGEMENT

5-1 Diagnostic tools – immune detection- DNA/RNA techniques, General preventive methods and prophylaxis. Application and development of vaccines.
5-2 Quarantine – Significance, methods and regulations for transplants.

5-3 Production of disease-free seeds. Evaluation criteria of healthy seeds.
5-4 Good Feed management for healthy organisms, Zero water exchange, Probiotics in health management, Issues of biosecurity.

PRACTICALS:

1. Enumeration of Bacteria by TPC Method
2. Enumeration of total Coliforms
3. Observation of gross pathology and external lesions of fish and prawn with reference to the common diseases in aquaculture
4. Examination of pathological changes in gills and gut lumen, lymphoid organ, muscles and nerves of fish
5. Examination of pathological changes in gut lumen, hepatopncreas, lymphoid organ, muscles and nerves of prawn and shrimp
6. Collection, processing and analysis of data for epedemeiological investigations of viral diseases
7. Bacterial pathogens – isolation, culture and characterization
8. Identification of parasites in fishes: Protozoan, Helmiths, Crustaceans
9. Antibiograms – preparation and evaluation
10. Molecular and immunological techniques; Biochemical tests; PCR; ELISA; Agglutination test; Challenge tests; Purification of virus for development of vaccines (Demonstration at institutes/labs)
11. Estimation of dose, calculation of concentration, methods of administration of various chemotherapeutics to fish and shell fish
12. Estimation of antibiotics used in aquaculture practices
13. Estimation of probiotics used in aquaculture
14. Field visit to farm for health monitoring and disease diagnosis

PRESCRIBED BOOK(S):

1. Shaperclaus W. 1991 Fish Diseases- Vol.I & II. Oxonian Press Pvt.ltd
2. Roberts RJ 1989. Fish pathology. Bailliere Tindall, New York
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandray and medicine. Pergamon Press. Oxford

REFERENCES:

1. Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCO Publ. Sindermann CJ. 1990
2. Walker P & Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish and Shellfish. Vols. I, II. 2nd Ed. Academic Press
3. DNA Based Molecular Diagnostic Techniques: Research Needs for Standardization and Validation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ. Wedmeyer G, Meyer FP & Smith L. 1999.
4. Bullock G et.al., 1972 Bacterial diseases of fishes. TFH publications, New Jersey
5. Post G 1987. Text book of Fish Health. TFH publications, New Jersey
6. Johnson SK 1995. Handbook of shrimp diseases. Texas A & M University, Texas

SEMESTER V – PAPER-VI
FISHERIES EXTENSION, ECONOMICS & MARKETING

UNIT – 1 INTRODUCTION

1-1 Meaning and scope of economics with reference to fisheries
1-2 Basic concepts of economics – goods, services, wants and utility, demand and supply, value price, market demand and individual demand, elasticity of demand**,** law of diminishing marginal utility
1-3 Theory of production, production function in fisheries
1-4 Various factors influencing the fishery product's price

UNIT – I1 FISHERIES MARKETING

2-1 Basic marketing functions, consumer behaviour and demand, fishery market survey and test marketing a product
2-2 Fish marketing – prices and price determination of fishes
2-3 Marketing institutions- primary(producer fishermen, fishermen cooperatives, and fisheries corporations) and secondary (merchant/agent/speculative middlemen)
2-4 Methods of economic analysis of business organizations
2-5 Preparation of project and project appraisal

UNIT-III FISHERIES CONOMICS

3-1 Aquaculture economics- application of economics principles to aquaculture operations
3-2 Various inputs and production function. Assumptions of production function in aquaculture analysis, least cost combination of inputs, laws of variable proportions
3-3 Cost and earnings of aquaculture systems – carp culture, shrimp farming systems, hatcheries, Cost and earnings of fishing units and freezing plants
3-4 Socio-economic conditions of fishermen in Andhra Pradesh, Role of Matsyafed and NABARD in uplifting fishermen's conditions, fishermen cooperatives
3-5 Contribution of fisheries to the national economy

UNIT-IV FISHERIES EXTENSION

4-1 Fisheries extension – scope and objectives, principles and features of fisheries extension education
4-1.1 Fisheries extension methods and rural development
4-3 Adoption and diffusion of innovations

UNIT-V TRANSFER OF TECHNOLOGY

5-1 ICAR programs – salient features of ORP, NDS, LLP, IRDP, ITDA, KVK, FFDA, FCS, FTI, TRYSEM
5-2 Training – meaning, training vs. education and teaching

5-3 DAATT centres and their role in tot programs, video conferencing, education of farmers through print and electronic media

PRACTICAL:
Project work/on-job training at industry

PRESCRIBED BOOK(S):

1. Adivi Reddy sv 1997. An introduction to extension education. Oxford & IBH Co.Pvt. Ltd. New Delhi
2. Jayaraman R 1996. Fisheries Economics. Tamilnadu Veterinary and Animal Science University. Tuticorn
3. Subba Rao N 1986. Economics of Fisheries. Daya publishing house, Delhi

REFERENCES:

1. Dewwett KK and Varma JD 1993. Elementary economic theory. S.chand, New Delhi
2. Korakandy R 1996. Economics of Fisheries Mangement. Daya Publishing House, Delhi
3. Tripathi SD 1992. Aquaculture Economics. Asian Fisheries Society, Mangalore.

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SEMESTER VI – PAPER-VIIA

ORNAMENTAL FISHERY

UNIT I: INTRODUCTION

1-1 Aquarium and ornamental fishes – introduction
1-2 Present status of Aquarium trade in the world and India
1-3 Aquarium accessories – aerators, filters, lighters and heaters
1-4 Water quality needs and different kinds of feeds

UNIT II: FRESH WATER ORNAMENTAL FISHES

2-1 Live bearers, gold fish, koi, gourami, barbs abd tetras, angel fish and cichlid fish
2-2 Brood stock development, breeding, larval rearing and grow out
2-3 Larval feeds and feeding

UNIT III: MARINE ORNAMENTAL FISHES

3-1 Varieties and habitat of marine ornamental fishes
3-2 major marine ornamental fish resources of India
3-3 Collection and transportation of live fish, use of anaesthetics
3-4 Breeding of marine ornamental fish
3-5 Other aquarium animals – sea anemones, lobsters, worms, shrimps, octopus and starfish

UNIT IV: AQUARIUM MANAGEMENT

4-1 Setting up fresh water, marine and reef aquariums
4-2 Water quality management for different types of aquariums
4-3 Common diseases of aquarium fish, diagnosis and treatment
4-4 Temperature acclimatization and oxygen packing for aquarium fish

UNIT V: COMMERCIAL PRODUCTION OF AQUARIUM FISH AND PLANTS

5-1 Commercial production units of ornamental fish- requirements and design
5-2 Commercial production of goldfish, live bearers, gouramies, barbs, angels and tetras
5-3 Mass production of aquarium plants
5-4 Retail marketing and export of ornamental fish

PRACTICALS:

1. Study of aerators – types and structures
2. Water circulation methods in aquarium and filtration
3. Collection and identification of aquarium plants
4. Identification of common marine aquarium fishes
5. Identification of common fresh water aquarium fishes
6. Breeding of egg layers

7. Breeding of live bearers
8. Evaluation of significance of aquaria for commercial and domestic use

PRESCRIBED BOOK(S):

1. Dick Mills 1998. Aquarium fishes, Dorling Kindersly Ltd, London
2. Van Ramshort JD 1978. The complete aquarium encyclopaedia, Elseveir

REFERENCES:

1. Jameson JD and Santhanan R 1996. Manual of ornamental fishes and farming technologies, Fisheries College and research institute, Tuticorn
2. Stephen Spotte 1993. Marine aquarium keeping. John wiley and sons, USA

SEMESTER VI – PAPER-VII - B
FISHERY ENGINEERING

UNIT I: FISHING CRAFTS

1-1 Different types of fishing crafts in India- inland and marine– traditional,motorized and mechanized.
1-2 Classification of fishing craft.
1-3 Boat building materials - wood, steel, FRP, ferro-cement, aluminum etc.,
1-4 Mechanization of fishing craft and its impact

UNIT II: FISHING GEAR

2-1 Evolution of fishing methods and gear- principles
2-2 Design of fishing gear and fish catching methods
2-3 Fishing accessories, Netting materials – natural and synthetic fishing gear materials and yarn numbering system
2.4 Active fishing gear - classification and description of modern fishing gears.- Design and operation of –trawls, purse seines, ring seines, beach / shore seine, boat seine, pole and line, squid jigs, trolling.

UNIT III: ANCHORS, FISH FINDING & NAVIGATIONAL EQUIPMENT (INTRODUCTORY)

3-1 Types of Anchors – Chains, ropes, blocks, leads and drogues
3-2 Echo sounders, fish finders, sonar and net sonde
3-3 Sextant, chronometer, gyro compass, radar, decca, omega etc.

UNIT IV: EXPLORATION OF FISH AND CONSERVATION

4-1 Remote sensing applications in fish finding and catching
4-2 Turtle exclusion devices
4-3 By-catch reduction devices
4-4 Destructive and prohibited fishing practices
4-5 Fish aggregating devices and artificial reefs

UNIT V: FISH PROCESSING EQUIPMENT

5-1 Ice making machinery, Brine tank
5-2 Arrangements for leak detection
5-3 Operation of various freezing machinery
5-4 Machinery for sausage making, canning and packaging
5-5 Special equipment for freeze-drying, irradiation and cryogenics
5-6 General maintenance of freezing plant and cold storage ice plant

PRACTICALS:

1. Site survey: preparation of site map and contour map
2. Ice making and harvesting
3. Testing different netting materials- natural and synthetic
4. Estimation of buoyancy and de-buoyancy of different floating and sinking materials
5. Designing trawl net by conducting survey
6. Solving problems on finding position of gravity, flotation and buoyancy
7. Visit to fishing harbor to study deck machinery
8. Visit to fishing harbor to study hull equipment
9. Visit to boat building yard and dry docking yard
10. Visit to a fish processing unit to study the equipment used in fish processing

PRESCRIBED BOOKS:

1. Fridman Al 1992. Calculations for fishing gear designs. FAO, USA. Fishing news books Ltd, England
2. Gerhard Klust 1982. Netting material for fishing gears. FAO, USA. Fishing news books Ltd, England
3. Jan-Olf- Traung 1992. Fishing boats of the world- Volumes – 1, 2, & 3. FAO, USA. Fishing news books Ltd, England

REFERENCES:

1. Dag Pike 1992. Fishing boats and their equipment. FAO, USA. Fishing news books Ltd, England

SEMESTER VI
CLUSTER ELECTIVE – 1
POST HARVEST TECHNOLOGY
PAPER VIII – 1A) FISH PROCESSING TECHNOLOGY

Unit 1: Introduction: Principles of fish preservation. Importance of hygiene and sanitation in fish handling. Quality of water and ice in fish handling and processing. Preparation of ice. Different types of ice used in the seafood industry and their merits. Preservation by refrigerated seawater and chilled sea water

Unit 2: Freezing and Canning: Fundamental principles involved in chilling and freezing of fish and fishery products. Various freezing methods. Freezing of shrimps and fishes. Changes during the cold storage of fish and fishery products. Principles involved in canning of fish. Different types of containers. Different stages of canning of Tuna. Retortable pouch processing.

Unit 3: Drying, Smoking and Freeze-drying: (9 Hrs) Principles of smoking, drying and salting of fish, factors affecting drying. Traditional drying / curing methods. Different types of drying. Drying of fish and prawns. Packing and storage of dried products. Spoilage of dried products. Preventive measures. Standards for dry fish products. Cold smoking. Principles of freeze drying. Accelerated freeze drying and packing of freeze dried products. Modern methods of preservation by irradiation and modified atmospheric storage.

Unit 4: Packing, Cold Storage and Export of Fishery Products: Functions of packing. Different types of packing materials and its quality evaluation. Packing requirements for frozen and cured products. Statutory requirements for packing. Labeling requirements. Different types of cold storages. Insulated and refrigerated vehicles.

Unit 5: Export of fishery products from India - major countries, important products, export documents and procedures. Prospects and constraints in export including tariff and non- tariff barriers, marine insurance, export incentives, registered exporters

Text books:

1. K.Gopakumar, Fish Processing Technology, ICAR, New Delhi
2. T.K. Govindan, Fish Processing Technology Oxfor & IBH Publication Co.
3. K.K. Balachandran Fish Canning – Principles & Practices.
4. Borgstrom,G. Fish as Food.
5. K.K. Balachandran, Postharvest Technology in Fish and Fishery Products. 6. Moorjani,M.V. Fish Processing in India.
7. Connell,J.J. Advances in Fishery science and Technology.
8. CIFT. Manual of Quality Control in Fish and Fishery Products. 9. Gopakumar,K. Fish Packaging Technology

Reference Books:

1. A.M.Martin, Fisheries – Processing Chapman & Hall, Madras 2. Ed.G.M.Hall – Fish Processing Technology Chopra & Hall. Madras.

SEMESTER VI

CLUSTER ELECTIVE – 1

POST HARVEST TECHNOLOGY

PAPER VIII – 1B) FISHERY MICROBIOLOGY AND FISHERY BY-PRODUCTS

Unit 1: Introduction: History and development of microbiology –Different members of the microbial community – General characteristics of bacteria, fungi, viruses, algae and protozoans. Ultrastructure of prokaryotic cell – structure and function of bacterial cell wall, plasma membrane, capsule, flagella and endospore. Structure of fungi and yeast cell. Ultrastructure of virus – classification of viruses, Llfe cycle bacteriophages - lytic and lysogenic cycle.

Unit 2: Aquatic Microbiology: Microflora of aquatic environment, Different culture techniques. Nutrition and growth of bacteria – different types of media for isolation of bacteria and fungi. Isolation, enumeration, preservation and maintenance of cultures. Routine tests for indentification of bacteria – morphological, cultural biocehemical and serological. Basics of mycological and virologial techniques.

Unit 3: Fish Microbiology: Perishability of seafood – Fish as an excellent medium for growth of microorganisms. Spoilage microflora of fish and shellfish. Intrinsic and extrinsic factors affecting spoilage.

Unit 4: Fishery By-Products: Fish meal, fish protein concentrate, shark fin rays, fish maws, isinglass, fish liver oil, fish body oil, fish hydrolysates, chitin, chitosan, glucosamine hydrochloride, squalene, pearl essence, ambergris, gelatin, beche-de-mer, fish silage, fish ensilage and seaweed products like agar, alginic acid and carragenan.

Unit 5: Value Added Products. Value addition in sea food. Different types of value added products from fish and shell fishes – status of value addition in Indian seafood sector. Advantages of value addition. Fish mince and Surimi. Analog and fabricated products. Preparation of coated fishery products. Different types of batter and breading and its applications. Preparation of products viz. fish / prawn pickle, fish wafers, prawn chutney powder, fish soup powder, fish protein hydrolysate, fish stacks, fillets, fish curry, mussel products, marinated products.

Text Books:

1. Pelzar, Reid & Chan – Microbiology
2. Prescolt, Harley & Klein – Microbiology
3. Adelogerg, Ingra & Wheates – Introduction to Microbial World
4. Windsor and Barlow. Introduction to Fishery Byproducts.
5. CIFT. Proceedings on Summer Institute on Non-traditional Diversified Fish Products &Byproducts.

6. Anon. Productivity in Aquatic Bodies.
7. Chincheste,C.O. and Graham,H.D. Microbial Safety of Fishery Products.
8. Amerine,M.A. and Pangborm,R.M. Principles of Sensory Evaluation of Foods.
9. Connell,J.J. Control of Fish Quality
10. Bigh,E.G. Seafood Science and Technology
11. Gopakumar.K Tropical Fishery Products

Reference Books

1. Kreuzer,R. Fishery Products.
2. Borgstrom,G .Fish as Food
3. Suzuki,T. Fish and Krill Protein: Processing Technology

SEMESTER VI
CLUSTER ELECTIVE – 1
POST HARVEST TECHNOLOGY
PAPER VIII – 1C) QUALITY CONTROL IN PROCESSING PLANTS

Unit I:

Quality management, total quality concept and application in fish trade. Quality assessment of fish and fishery products - physical, chemical, organoleptic and microbiological. Quality standards. Quality Assurance. Inspection and quality assurance:

Unit 2:
Fish inspection in India, process; water quality in fishery industry, product quality, water analysis, treatments, chlorination, ozonisation, UV radiation, reverse osmosis, techniques to remove pesticides and heavy metals.

Unit 3:
Sensory evaluation of fish and fish products, basic aspects, different methods of evaluation, taste panel selection & constitution, statistical analysis Quality problem in fishery products: good manufacturing practices. HACCP and ISO 9000 series of quality assurance system, validation and audit. national and international standards, EU regulation for fish export trade,

Unit 4:
IDP and SAT formations in certification of export worthiness of fish processing units, regulations for fishing vessels pre-processing and processing plants, eu regulations. Factory sanitation and hygiene: National and international requirements, SSOP.

Unit 5:
Hazards in sea foods: Sea food toxins, biogenic amines, heavy metals and industrial pollutants. Infection and immunity, Microbial food poisoning, bacteria of public health significance in fish / fishery products / environments - Salmonella, Clostridia, Staphylococcus ,E. coli, Streptococcus, Vibrio, Aeromonas, Listeria, Yersinia, Bacillus. Laboratory techniques for detection and identification of food poisoning bacteria. Mycotoxins in cured fish, bacterial associated with fish disease.

Reference Books

1. Ellis Harward. 18 Felix S, Riji John K, Prince Jeyaseelan MJ & Sundararaj V. 2001 Bacterial Fish Pathogens (Diseases in Farm and Wild)
2. Fish Disease Diagnosis and Health Management. Fisheries College and Research Institute, T.N. Veterinary and Animal Sciences University. Thoothukkudi. Inglis V, Roberts RJ & Bromage NR. 1993.

Practical I Title : Fish Processing Technology and Quality Control

Experiments:

1. Determination of moisture content in fish and fishery products 2. General description – freezing 3. Processing shrimp 4. Filleting of fish 5. Drying of fish 6. Organoloptic analysis of fish 7. Preparation of fishery by products 8. Preparation of shark fin rays fish maws, chitin, fish wafer 9. Fish pickling 10. Value added fishery products, fish curry, cutlets fish finger. 11. Preparation of surimi

Filed visit:

1. Visit to sea food pre-processing plants 2. Visit to fish processing plants

Practical II Title : Fishery Microbiology and Quality Control

Experiments/Activities 1. Sterilization technique- dry heating, autoclaving 2. Media preparation 3. Isolation and maintenance of bacteria from fishes and water. 4. Gram staining of bacteria 5. Enumeration of bacteria by TPC method 6. Enumeration of total coli forms.7. Evaluation of fish / fishery products for organoleptic, chemical and microbial quality

Collection:

1. Collection of fishery by-products

Practical III – PROJECT WORK

SEMESTER VI

CLUSTER ELECTIVE – 2 - COASTAL AQUACULTURE

PAPER VIII - 2 A) CRUSTACEAN CULTURE

Unit – 1

Status of Crustacean farming in India; Food and Export value of Crustaceans; Present status of their resources and culture practices.

Unit 2 –

Important cultivable species of shrimps and prawns, their food and feeding habits and their reproductive biology. Types of farming: traditional, extensive, semi-intensive and intensive methods; their management techniques.

Unit 3 –

Crustaceans culture in cages, re-circulatory systems, rice fields and superintensive and ultra-intensive systems. Supplementary feeding: dry feeds, wet feeds, role of artificial feeds; feed ingredients and nutritional quality.

Unit 4 -

Farming of Prawns and Shrimps – Pond and Large Scale farming; Composite Culture; Farming of Crab and Lobster.

Unit 5-

Diseases of Crustaceans – Bacterial, Fungal and Viral diseases encountered during large scale culture of Crustaceans

References:

Shigueno K Shrimp culture of Japan AITP, Tokyo

Milne PH Fish & shellfish farming in coastal waters FNB

McVey JP Crustacean aquaculture CRC handbook CRC press

Korringa P Farming of marine fishes & shrimps Elseiver

Walne PR Culture of bivalve mollusks PNB

SEMESTER VI

CLUSTER ELECTIVE – 2 COASTAL AQUACULTURE

PAPER VIII - 2B) MOLLUSCAN AND SEAWEED CULTURE

Unit - 1
Present status of molluscan farming: Life cycles of cultivable molluss. Oyster and mussel farming: growth, fattening and greening.

Unit - 2
Hatchery management and seed production oyster, pearl-oysters, mussels and seaweeds.
Feed and nutrition. Harvesting of fry, packaging and transport of fry; Small scale hatcheries. Nursery Management: preparation of nurseries; Effect of physico-chemical factors, feeding and control of predators.

Unit -3
Culture of pearl oyster and pearl production; Culture of cephalopods. Different types of Culture methods

Unit - 4
Water quality management and biofouling. Harvesting, post-harvest technology, management, production and economics.

Unit- 5
Seaweed farming: present status.Life cycles of cultivable seaweeds. Culture practices of seaweeds in india and abroad: improvement of breed.

References:
Bardach JE et al aquaculture wiley Interscience
Milne ph fish and shellfish farming fnb
In coastal waters
Walne Pr culture of bivalve mollusks pnb
Pillay & dill advances in aquaculture fao
Korringa p farming of the oyster Elsevier

SEMESTER VI

CLUSTER ELECTIVE – 2 COASTAL AQUACULTURE

PAPER VIII - 2C) MARINE FINFISH CULTURE

Unit 1
Important cultivable finfish species and the life history of milk fish, seabass, yellow tail.

Unit 2
Criteria for selection of finfish for culture. Classification of culture systems: ponds, pens, cages, raceways. Pond preparation and fertilization; eradication of weed and Predatory finfishes.

Unit 3:
Hatchery management and seed production of mullets, milkfish, seabass.
Feed and nutrition. Harvesting of fry, packaging and transport of fry; Small scale hatcheries.
Nursery Management: preparation of nurseries; effect of physico-chemical factors, feeding and control of predators

Unit - 4
Culture practices of milkfish, mullets, seabass and yellowtail. Monoculture and polyculture : principles and practices. Integrated farming, organic farming and their management. Harvesting and post-harvesting technology of cultured finfish. Production, quality control, marketing and economics.

Unit – 5
Aquaranching – Principles and Practices, Large Scale culture in Natural waters, Ranching methods and implements.

References:
Bardach JE et al Aquaculture Wiley Interscience
Huet & Timmermans Textbook of fish culture FNB
Pillay TVR Aquaculture: principles and practices FNB
Santhanam R et al Coastal aquaculture CBS

Practical I Title : Crustacean Culture

Experiments:

Identification of cultivable species of Crustaceans – Penaeus monodon, P. Vannamei, P. indicus; Scylla serrata, Scylla tranquibarica: Palinurus.

Feed formulation for shrimp using square method and algebraic method.

Proximate analysis of commercially available shrimp feed – Carbohydarate, protein , Fats and Ash content.

Filed visit:

1. Visit to shrimp farming farms and hatcheries. Submission of field note book.

Practical II Title : Molluscan, Seaweed and Marine Fish culture

Identification of cultivable species: Pinctada fucata, P. margaratifera, P. indica. Edible oysters – Crassostreea madresensis, C. cucullata. Mussels – Perna indica and P. viridis. Clams – Paphia, Anadara, Meretrix.

Identification of cultivable and edible seaweeds – Gracillaria, Sargassum, Turbinaria, Gelidiella.

Identification of cultivable marine fish: Lates calcarifer, Chanos chanos, Mugil cephalus

Field visit:

Visit to marine fish farms and submission of field note book.

1. Collection of fishery by-products

Practical III – PROJECT WORK

SERI CULTURE

Course Structure of Subject: **Sericulture Technology**

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	**SERICULTURAL BOTANY & SILKWORM BIOLOGY**	100	03
			Practical – I	50	02
	II	II	**MULBERRY PHYSIOLOGY & CULTIVATION**	100	03
			Practical - II	50	02
II	III	III	**DISEASES & PESTS OF MULBERRY**	100	03
			Practical - III	50	02
	IV	IV	**SILKWORM PHYSIOLOGY & REARING**	100	03
			Practical – IV	50	02
III	V	V	**DISEASES & PESTS OF SILKWORM**	100	03
			Practical - V	50	02
		VI	**SILKWORM SEED PRODUCTION & BASICS OF BIOTECHNOLOGY**	100	03
			Practical - VI	50	02
	VI	VII A*	**GENETICS & BREEDING OF MULBERRY & SILKWORM**	100	03
			Practical - VII A	50	02
		VII B*	**NON-MULBERRY SERICULTURE**	100	03
			Practical - VII B	50	02
		VIII (I)**	**Cluster Elective - I :: SILK TECHNOLOGY** **I. COCOON PROCESSING TECHNOLOGY – I-A** Practical - VIII (1-1) **II. SILK TECHNOLOGY I-B** Practical - VIII (1-2) **III. ECONOMICS OF SERICULTURE INDUSTRY – I_C** Practical - VIII(1-3): Proj.	**100** **50** **100** **50** **100** **50**	**03** **02** **03** **02** **03** **02**
		VIII (II)**	**Cluster Elective - II :: ENTREPRENEURISHIP DEVELOPMENT** **I. ENTREPRENEURSHIP IN SERICULTURE** – II - A Practical - VIII (2-1) **II. SERICULTURE EXTENSION & MANAGEMENT** II - B Practical - VIII (2-2) **III. WOMEN EMPOWERMENT IN SERICULTURE** II - C Practical - VIII(2-3)/ Proj.	**100** **50** **100** **50** **100** **50**	**03** **02** **03** **02** **03** **02**

SERICULTURE TECHNOLOGY SYLLABUS: I SEMESTER
PAPER- 1. SERICULTURAL BOTANY AND SILKWORM BIOLOGY

Unit-1

A general introduction to Sericulture

1. Introduction to Sericulture-Origin and history of Sericulture- Silk road, spread of Sericulture to Europe, South Korea, Japan, India and other countries.
2. Sericulture map of India and World: Components of Sericulture.
3. Sericultural practices in tropical and temperate climate.
5. Textile fibres: Types- natural and synthetic fibres- types of silk produced in India; Importance of mulberry silk:.
6. Sericulture organization in India; role of state departments of Sericulture, Central Silk Board and NGOs in Sericulture development

Unit-2

Sericultural Botany.

1. Taxonomy of mulberry and food plants of silkworms: Study of salient features of the families-Moraceae.
2. Morphology of mulberry: different varieties of mulberry.

Unit-3

1. 10. Anatomy of mulberry: internal structure of stem, root and leaf; secondary growth in root and stem.
2. Floral biology of mulberry: Sexual behavior, different types of anther and ovule in mulberry; micro- and megasporogenesis; development of male and female gametophytes; pollination, fertilization; development of endosperm, embryo and seed; polyembryony and parthenocarpy in mulberry. 6 Hrs.

Unit-4

Silkworm Biology.

1. Characteristic features of the order Lepidoptera; detailed study of the families-Saturnidae and Bombycidae. Classification of sericigenous insects. 2 Hrs.
2. Classification of silkworms based on moultinism, voltinism and geographical distribution; popular silkworm breeds and hybrids of Karnataka; their economic traits. 3 Hrs.
3. Life cycle of *Bombyx mori;* morphology of egg, larva, pupa and adult. 3Hrs

Unit-5

Morphotology and Anatomy

1. Morphology and anatomy of digestive, circulatory, excretory, respiratory, nervous system of silkworm larva.
2. Morphology and anatomy of reproductive systems of silk moth.
3. Morphology and anatomical structure of Silk gland.

PRACTICAL-1- SERICULTURAL BOTANY AND SILKWORM BIOLOGY. 15
Practicals -2 hrs each
General Sericulture;
1. Sericulture maps: (a) World maps and Silk Road.
(b) Sericulture map of India and Karnataka. 1 Prat.
2. Preparation of histograms and pie charts on:
(a) Production of textile fibers in India.
(b) World silk production.
(c) Pie chart on mulberry and non-mulberry silk production in India. 1 Prat.
Sericultural Botany;
3. Taxonomic description of mulberry. 1Prct.
4. Study of five popular mulberry cultivars of Karnataka(Mysore local, K2, S36, S13 and V1) 1Prct.
5. Mounting of Pollen grains, Ovary and Embryo 1 Prct.
6. Anatomy of petiole, leaf lamina, stem and root 2 Prct
7. Weeds of mulberry garden. 1 Prct
Silkworm Biology;
8. Life cycle of *Bombyx mori*- Morphology of egg, larva, pupa and adult of *Bombyx mori.* 1 Prct.
9. Sex separation in larva, pupa and adult of the silkworm *Bombyx mori* 1 Prct.
10. Dissection and display of:
(a) Digestive system of larva.
(b) Silk glands.
(c) Reproductive system of male and female moths.
(d) Mounting of larval mouth parts and spiracle.
(e) Nervous system of silkworm larva.

References

1. Bongale, U.D (1995) Fertilizers in mulberry cultivation. Pushpa Sree Publications, Thalaghattapura, Bangalore.
2. Dokuhon, Z.S (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co, Pvt. Ltd, New Delhi, Calcutta.
3. Guptta, R.K & Mittal, R.K (1983) Bibliography of Indian Weeds. Associated Pub. Co. New Dehli.
4. Hasao Aruga (1994) Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co, Pvt. Ltd, New Delhi.

II SEMESTER
PAPER- II. MULBERRY CULTIVATION & PHYSIOLOGY

Unit- 1

1. Definition of soil, different types of soils in india
2. Importance of soils with reference to mulberry cultivation; soil analysis- soil sampling, soil pH, organic carbon and NPK level.
3. Propagation of mulberry- seedling, sapling , grafting and layering.
4. Raising of commercial nursery.
5. Application of root inducing hormones.

Unit –2

6. Establishment of mulberry garden under rain-fed and irrigated conditions:
(a) Planting season.
(b) Selection and preparation of land.
(c) Planting systems
(d) Selection and preparation of planting material
(e) Manuring, intercultivation and irrigation.
(f) Initial harvesting.
(g) Chawki garden; importance and maintenance.

7. Manures and fertilizers: Types, dosage, application and schedule; biofertilizers and foliar nutrition; micro nutrients; composting and vermicomposting. 3 Hrs.
8. Intercultivation practices: Purpose, methods, time and frequency; mulching; Weeding. 1 Hrs.

Unit-3

9. Irrigation: Importance, Source, methods, periodicity and quantity of irrigation, over-irrigation and its effects. 2 Hrs.
10. Leaf harvesting: harvesting methods (leaf and shoot harvests); transportation and preservation of harvested leaf. 2 Hrs.
11. Estimation of leaf yield in rainfed and irrigated conditions: Importance of leaf quality 1 Hrs.
12. Integrated weed management

Physiology of Mulberry.

Unit –4

13. Absorption of water and solutes by roots; effect of external conditions; root pressure; ion exchange and active absorption.
14. Mineral nutrition- macro and micro nutrients; their physiological role.
15. Brief account of photosynthesis: Outline of the process; types of carbon fixation (C3 and C4); brief account of photorespiration and its significance.
16. Role of environmental factors on mulberry growth.

Unit-5

17. Biochemical composition of mulberry leaf.
18. Transpiration: Significance; stomata- mechanism of opening and closing; regulation of water loss by stomata; factors influencing the rate of transpiration.

19. Brief account of biological nitrogen fixation; types- importance in mulberry cultivation.
20. Plant growth regulators: Importance and application in mulberry, agriculture and horticulture.
21. Biofertilizers, types and its significance.

PRACTICAL –2: MULBERRY CULTIVATION

Mulberry cultivation;

1. Determination of soil ph and water holding capacity.
2. Farm implements.
3. Preparation of land, pits and rows; preparation of rooting media (fieldwork).
4. Raising of sapling and seedling (field work).
5. Intercultivation, mulching, irrigation, pruning and estimation of leaf yield.
(demonstration and exercise).
6. Grafting and layering in mulberry.
7. Harvesting and preservation techniques; leaf selection for different instars.

Physiology of mulberry;

1. Estimation of stomatal index
2. Estimation of leaf protein
3. Separation of leaf photosynthetic pigments of mulberry through paper chromatography.
4. Extraction of photosynthetic pigments by solvent wash method.
5. Determination of water potential of potato tubers.
6. Estimation of moisture percentage and moisture retention capacity of mulberry leaf.

References:

1. Hortmann and Kesler (1993) Plant Propagation, principles and practices. Prentice Hall, Hemel Nemstead.
2. Krishnamurthy, N. (1981) Plant growth substances including application in Agriculture. Tata McGraw Hill Pub. Co. Ltd. New Delhi.
3. Shankar, M.A (1998) Handbook on mulberry Nutrition, Multiplex, Bangalore.
8. Subba Rao, N.S (1998) Biofertilisers in Agriculture. Oxford & IBH Pub. Co, Pvt. Ltd, New Delhi.
4. A text Book on Mulberry Crop Protection. Govindaiah, V.P Gupta, D.D Sharma, S. Rajadurai and V. Nishitha Naik, Published by Central Silk Board, Bangalore-68, India. 2005.
5. Rajanna L, Das P.K, Ravindra S, Bhogesha K, Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005

III SEMESTER

PAPER- III. DISEASES AND PESTS OF MULBERRY

Unit-1

1. Introduction to plant diseases and importance of plant protection.
2. Classification of mulberry diseases.
3. Influence of biotic and abiotic factors on the incidence of plant diseases.

Unit-2

4. Fungal diseases of mulberry: Occurrence, symptoms, etiology and preventive and control measures of the following diseases :
(a) Powdery mildew.
(b) Leaf spot.
(c) Leaf rust.
(d) Leaf blight.
(e) Root rot. 5 Hrs.

Unit - 3

5. Root-knot disease of mulberry- occurrence, symptoms and preventive and control measures. 1 Hrs.
6. Viral, bacterial and dwarf diseases of mulberry- their occurrence- symptoms and preventive and control measures. 2 Hrs.
7. Pest: Definition; pest outbreak; pest forecasting . 1 Hrs.

Unit-4

8. Major pests: leaf roller, Bihar hairy caterpillar, mealy bug and thrips – their preventive and control measures 3 Hrs.
9. Minor pests: girdlers, termites and mites-their preventive and control measures. 2 Hrs.
10. Biological control of mulberry pests. 2

Unit – 5

11. Mineral deficiency symptoms in mulberry.
12. Pesticides: Forms, formulations,calculation and application.

PRACTICAL – 3

Diseases and pests of Mulberry;

1. Study of powdery mildew, leaf spot and leaf rust through sectioning, staining and temporary mounting.
2. Study of root-knot nematode in mulberry
3. Collection, mounting/preservation of insect pests of mulberry (field work).
4. Identification of mulberry pests. Study of nature of damage of the following pests: Leaf roller, Bihar hairy caterpillar, scale insect, mealy bug, thrips, beetles, jassids and grasshoppers.
5. Identification of fungicides, pesticides- their formulation. Study of various types of Insecticide applicators (sprayers and dusters).

References:

1. Hortmann and Kesler (1993) Plant Propagation, principles and practices. Prentice Hall, Hemel Nemstead.
2. Krishnamurthy, N. (1981) Plant growth substances including application in Agriculture. Tata McGraw Hill Pub. Co. Ltd. New Delhi.
3. Shankar, M.A (1998) Handbook on mulberry Nutrition, Multiplex, Bangalore.
8. Subba Rao, N.S (1998) Biofertilisers in Agriculture. Oxford & IBH Pub. Co, Pvt. Ltd, New Delhi.
4. A text Book on Mulberry Crop Protection. Govindaiah, V.P Gupta, D.D Sharma, S. Rajadurai and V. Nishitha Naik, Published by Central Silk Board, Bangalore-68, India. 2005.
5. Rajanna L, Das P.K, Ravindra S, Bhogesha K, Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005

IV SEMESTER

PAPER- IV. SILKWORM PHYSIOLOGY AND REARING

Unit-1

1. Morphology and structure of silkworm egg, fertilization, cleavage, blastoderm, germ band formation. Diapause development. Digestion: structure and function of digestive system; digestive enzyme; process of digestion.

Unit-2

Excretion: structure and function of excretory system: Nervous system; Structure and distribution of endocrine glands. Sense organs: Photoreceptors, Chemoreceptors and Mechanoreceptors.

Unit - 3

Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house. Rearing appliances-shelf and shoot rearing; requirements of rearing appliances (per unit rearing of 100dfls). Disinfection of rearing house and rearing appliances; disinfectants formalin, bleaching powder, chlorine dioxide, slaked lime and iodine compounds); rearing and personal hygiene.

Unit-4

Incubation- definition, requirement of environmental conditions, incubation devices; identification of stages of development; black boxing and its importance. Chawki rearing: Preparation; brushing and its methods; types of chawki rearing - traditional and improved method; optimum environmental conditions; methods and frequency of feeding; methods of bed cleaning; spacing; moulting and care during moult.

Unit -5

Late age silkworm rearing: Methods; optimum environmental conditions; feeding quantity and frequency; methods of bed cleaning; spacing; moulting and care during moult. Identification of spinning larva; spinning; mounting and mounting density; types of mountages, their advantages and disadvantages; environmental requirements during spinning. Harvesting: Time of harvesting; sorting, storage/ preservation, packaging and transport of cocoons; leaf-cocoon ratio; maintenance of rearing records.

PRACTICAL – IV

SILKWORM PHYSIOLOGY AND REARING

Physiology of silkworm:

1. Morphology of silkworm egg and mounting of 7th, 8th and 9th day old embryos.
2. Estimation of proteins in haemolymph/egg, haemolymph glucose level.
3. Morphology of haemocytes in silkworm. .
4. Estimation of SDH activity in the eggs/tissue.

Silkworm rearing:

1. Rearing houses- model rearing house and low-cost rearing house.
2. Rearing appliances.
3. Disinfection- Types of disinfectants- concentration and dosage requirement; preparation of spray formulation of disinfectants.
4. Incubation of silkworm eggs- Methods; black boxing; maintenance of temperature and humidity; Brushing: Methods; chawki rearing; use of paraffin paper and blue polythene sheet.
5. Bed cleaning: use of bed cleaning net and disposal of bed refuses and silkworm litter.
6. Moulting: Identification of moulting larva, care during moulting; mounting and mounting density; harvesting of cocoons; assessment of cocoons; types of mountages;
7. Maintenance of records for silkworm rearing.

References:

1. Charsley, S.R. (1982). Culture and Sericulture. Academic Press Inc., New York, U.S.A

2. Chowdhury, S.N. (1998) Muga Culture. Central Silk Board, Bangalore, India

3. Dokuhon, Z.S. (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co., Pvt. Ltd. Calcutta.

4. Hamamura, Y. (2001). Silkworm rearing on Artificial Diet. Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.

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V SEMESTER

PAPER- V. DISEASES AND PESTS OF SILKWORM

Unit-1

Introduction; classification of silkworm diseases. Protozoan disease – symptomatology, structure of pebrine spore, life cycle of Nosema bombycis, source, mode of infection and transmission, cross infectivity, prevention and control.

Unit – 2

Bacterial diseases - causative agents, symptoms, factors influencing flacherie, source, mode of infection and transmission prevention and control.

Unit-3

Viral diseases (grasserie, infectious flacherie, cytoplasmic polyhedrosis, densonucleosis and gattine)- causative agents- symptoms – sources, mode of infection and transmission- prevention and control.

Unit – 4

Fungal diseases: white and green muscardine and aspergillosis- causative agentssymptoms - structure and life cycle of fungal pathogen- mode of infection and transmission- prevention and control. Integrated management of silkworm diseases.

Unit-5

Life cycle of Indian uzifly; seasonal occurrence; oviposition and host-age preference; nature and extent of damage; prevention and control; integrated management of Indian uzifly. Cocoon pests of silkworm: Dermestid beetle- life cycle; nature and extent of damage; prevention and control measures. Brief account of methods of pest control: Cultural, mechanical, physical, legislative (Quarantine), chemical, genetical / autocidal, biological and IPM.

PRACTICAL – V

DISEASES AND PESTS OF SILKWORM

1. Identification of different diseased silkworms based on external symptoms (grasserie,flacherie, muscardine and pebrine).
2. Identification of pathogens associated with silkworm diseases.
3. Staining and preparation of temporary slides of bacteria, spores of pebrine, polyhedra of nuclear polyhedrosis virus and mycelial mat of muscardine.
4. Methods of application of silkworm bed disinfectants for management of silkworm diseases.
5. Life cycle of Uzi fly; Identification of uzi-infested silkworms and cocoons.
6. Life cycle of dermestid beetles: Dermestid infested silkworm cocoons and estimation of incidence.

References:

1. Rajan, R.K. Hemanth Raju 2005, Text Book on silkworm rearing, Central Silk Board, Bangalore.

2. Techniques of Silkworm rearing in the tropics. Economic and Social commission of Asia and the Pacific. United Nations, New York. 1993.

V SEMESTER

PAPER- VI. SILKWORM SEED PRODUCTION AND BIOTECHNOLOGY

Unit-1

A general account of silkworm seed, grainages, production and demand trends. Silkworm seed organisation, significance of seed organization; Basic seed multiplication centres-P4, P3, P2 and P1; Seed areas- identification, concept of selected seed rearers/villages- Seed Legislation Act-maintenance of seed crops. Seed cocoon markets- pupal examination, certification of seed cocoon lots- price fixation for seed cocoons.

Unit-2

Disinfection and hygiene in seed production units. Seed production centres (grainages)- types of grainages- organisation and functions of grainages- plan for model grainage- grainage equipments and their use – Seed production plan. Procurement and transportation of seed cocoons- processing and preservation of seed cocoons- sex separation in seed cocoons.

Unit-3

Moth emergence and synchronisation; sex separation in moth; effect of improper synchronisation on egg hatching and quality-safe duration. Coupling and decoupling; oviposition; method of egg production; refrigeration of male moths; mother moth examinations- individual and mass methods- dry moth examination; environmental conditions for grainage activity. Egg disinfection- handling of multivoltine eggs- preservation of eggs to postpone hatching- ideal embryonic stages for cold storage- maximum duration of cold storage.

Unit-4

Handling of bivoltine eggs for early hatching- physical and chemical methods- hot and cold acid treatment. Postponement of hatching; hibernation schedule for 3, 4, 6 and 10 month's duration. Preparation of loose egg- advantages- handling of loose eggs; Incubation of eggs.

Unit-5

Nucleic acids: Introduction- chemical structure of DNA and RNA- Watson and Crick model of DNA- Types of RNA- tRNA, mRNA and rRNA- DNA replication. Protein synthesis: Synthesis of mRNA, RNA polymerase- polyribosomes- translation. Genetic code- salient features. Introduction to recombinant DNA technology. Brief account of tissue culture and morphogenesis; Its applications in crop improvement. Brief account of genetic engineering-concept and technique. Applications in sericulture.

PAPER- VI. SILKWORM SEED PRODUCTION AND BIOTECHNOLOGY

1. Model grainage plan and Grainage equipments.
2. Seed cocoon processing/handling- deflossing, sorting and preservation- pupal examination and Sex separation of pupa and moth. Moth emergence- selection of moths-pairing and de-pairing- oviposition- preservation of male moths- preparation of disease free layings- sheet egg and loose egg preparation. Mother moth examination for Pebrine spores- Individual and Mass moth examination- surface disinfection of silkworm eggs.
3. Acid treatment of bivoltine eggs- hot acid and cold acid treatment. & Incubation of eggs-Visit to cold storage to know preservation and handling of hibernated eggs for 3, 4, 6 and 10 month hibernation schedules.
4. Tissue culture technique (Demonstration and/visit to any research institute).
5. Extraction of DNA from plant and animal sources.
6. Quantification of DNA by Spectrophotometer/DPA method.

REFERENCES

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2. Callow, J.A., Ford-Loyd, B.V. and Newbury, H.J (1970) Biotechnology and Plant Genetic Resources, Conservation and use. CAB International (Available through Oxford University Press).
3. Chopra, V.L (1985). Plant Breeding: Theory and Practice. Oxford &IBH Publishing Co, Pvt. Ltd. New Delhi.
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5. Gupta, P.K (1995). Cytogenesis. Rastogi Publication, Meerut.
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7. Narayanaswamy, S (1994) Plant Cell and Tissue culture. Tata Mc graw-Hill Publishing Co. ltd. New Delhi.
8. Shantharam, S. and Montgomery, J.F (1999) Biotechnology, Biosafety and Biodiversity, Science Publisher, Inc. USA.
9. Sharma, A.K and Sharma, A (1970) Chromosome Technique: theory and Practice. Butterworth and Co., London University Park Press, Baltimore.

VI SEMESTER

PAPER- VII A. GENETICS AND BREEDING OF SILKWORM & MULBERRY

1 Unit-I: Mendelism and quantitative genetics**.** Monohybrid and dihybrid cross. Laws of inheritance. Back cross ratio and test cross ratio. Three-way cross and double cross hybrids. Quantitative inheritance Genetics of cocoon colour. Heredity traits of egg, larva, cocoon, pupa and adult characters. Types of linkage, linkage groups, linkage map

Unit-II: Inheritance and Sex determination. Inheritance of voltinism and moultinism. Determination of sex—system of sex chromosomes role of W and Z chromosome, sex linked and sex limited traits. Chromosome, polyploidy, pathogenesis, gynogenesis and androgenesis. Induction of mutation by radiation and chemical mutagenes and economic utility.

Unit-III : Silkworm breeding Silkworm breeding —Tropical and temperate races, advantages and disadvantages. Heterosis, utilization of heterosis in sericulture. In-breeding and out-breeding, homozygasity, autosexing, economic advantages. Maintenance of silkworm races and large-scale multiplication.

Unit-IV : Mulberry genetics - Genetic viability in Mulberry-Wild, hybrid, indigenous and exotic species and chromosomal variation. Inheritance of mulberry and large-scale multiplication. Genetic consequences of self-and cross-pollination. Genetic control of disease resistance

Unit-V : Mulberry breeding - Principles of plant breeding. Pure line, clonal and mass selection—Application, advantages and limitations. Hybridization-Procedure, application, heterosis, selection in F1 progeny, advantages and limitations. Specific breeding—Drought resistant varieties.

PRACTICAL-VII A

Squash preparation of chromosome from larval testis. Identification of sex linked traits in egg, larva and cocoon. Determination of quantitative traits—Fecundity, larva weight, larval duration, cocoon weight, shell weight and shell ratio.
Morpohological variations of Exotic and Indigenous varieties of Mulberry. Demonstration of chromosomes—Root tip/pollen mother cells. Determination of a number of frequencies of stomata and stomatal chloroplast. Morphological variability in diploid, triploid, tetraploids and mutants.

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2. Callow, J.A., Ford-Loyd, B.V. and Newbury, H.J (1970) Biotechnology and Plant Genetic Resources, Conservation and use. CAB International (Available through Oxford University Press).

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7. Narayanaswamy, S (1994) Plant Cell and Tissue culture. Tata Mc graw-Hill Publishing Co. ltd. New Delhi.
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9. Sharma, A.K and Sharma, A (1970) Chromosome Technique: theory and Practice. Butterworth and Co., London University Park Press, Baltimore.

VI SEMESTER

PAPER- VII B. NON-MULBERRY SERICULTURE

Unit-I : Tasar Culture (Biology and Rearing)

Tropical tasar : Distribution, life cycle, morphology of egg, larva, pupa, cocoon, moth larval behavior. Anatomy : Silk gland, digestive, respiratory, reproductive system in larva and moth. Food plants : Primary and secondary food plants, distribution, taxonomy, morphology, propagation and plantation. Rearing : Rearing operations—brushing, maintenance of larval population, improved rearing techniques for young and late age tasar.

Unit-II: Grainage (Seed production)

Seed cocoons : Procurement—cocoons of different ecotypes, preservation of cocoons, synchronization of moth emergence, production of disease-free egg layings. Diseases and pests : Types, incidences, preventive and control measures.Breeding : Character of the ecoraces, selection and hybridization. Genetics : Inheritance of larval body colour, cocoon colour, moth colour and chromosome number.

Unit-III : Tasar Silkworm (Taxonomy, Biochemistry and Reeling)

Taxonomic aspects of *Antherea* : Imprints of egg shell, setae, wing venation pigments, phytohormones. Silk reeling and spinning : Chemical composition of haemolymph, enzymes, sex attractants, pigments, hytohormones.Silkreeling and spinning : Sorting, shifting, reeling—methods, appliances, modified reeling machine, reeling machines. Temperature tasar : Fauna, distribution, food plant and rearing.

Unit-IV : Muga and Eri culture (Biology, Rearing and silk production)

Muga silkworm: Distribution, Life cycle, Rearing, Brushing, traditional and improved methods. Muga silk reeling: Stifling, degumming and reeling. Eri Silkworm: Distribution, life cycle and food plants, Rearing of eri silkworm, Brushing, feeding, moulting and care, cocooning, mounting and harvesting. Spinning of cocoons: stifling, degumming, spinning appliances—band spinning, takli, charkha, spinning machines and marketing.

Unit – V Taxonomy of food plants

Taxonomy of food plants of non-mulberry silkworms: Study of salient features of the families, Magnoliaceae, Caesalpiniaceae, Euphorbiaceae, Combretaceae, Apocyanaceae, giving more emphasis on the plants of Sericultural importance. Cultivation of primary food plants of tasar, muga, and eri silkworms- Terminalia arjuna,, Machilus bombycina, Ricinus communis and their systematic position.

PRACTICAL- VII B. NON-MULBERRY SERICULTURE

1. Rearing appliances used in rearing and seed preparation of non mulberry silkworms (drawing sketches) .

2. Taxonomic features of non-mulberry food plants (Terminalia arjuna, Terminalia catapa, Ricinus communis, Michilia champaca, Quercus sp., Bauhinea vareigata and Manihot utilissima).

3. Life cycle and morphology of egg, larva, pupa, cocoon and moths of different non- mulberry silkworms.

4. Determination of physical and commercial characters of cocoon study of different reeling and sinning machines (drawings), identification of different types of yarn, spun silks and wastes.

REFERENCES :

1. Charsley, S.R. (1982). Culture and Sericulture. Academic Press Inc., New York, U.S.A
2. Chowdhury, S.N. (1998) Muga Culture. Central Silk Board, Bangalore, India
3. Dokuhon, Z.S. (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co., Pvt. Ltd. Calcutta.
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6. Sarkar, D.C. (1998) Eri Culture. Central Silk Board, Bangalore
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SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PAPER VIII 1A – COCOON PROCESSING TECHNOLOGY

Unit 1: SILK INDUSTRY

Activities of silk industry in India, China, Japan and S. Korea. Silk production, export and import of silk and silk products. Cocoons, Cocoon classification. Cocoon characteristics-Mulberry, eri, tasar and muga. -colour, shape, size, compactness, grains, weight, shell ratio, filament length, denier, reliability, raw silk percentage, neatness. Factors influencing cocoon quality.

Unit 2: COCOON PROCESSING

Composition and structure of mulberry and non-mulberry cocoon filament. Scientific methods of cocoon testing and grading -Methods practiced in India, China and Japan. Estimation of renditta, kakame cost. Cocoon drying/stifling Introduction, objective of cocoon drying/stifling, techniques of drying. Methods of drying / stifling-sun drying, steaming, hot air-conveyor system, methods. Merits and demerits of different methods. Cocoon conditioning and its importance. Cocoon sorting and storage.

Unit 3: Pre-reeling process.

Cocoon Cooking-basic principles, objectives, cocoon cooking equipments and processes-open pan, three pan, pressurized system. Factors influencing cocoon cooking basin. Chemical reactions in cocoon cooking basin. Evaluation of cooked cocoons. Cocoon brushing-objectives, various methods of brushing. Reeling water: Consumption of water in silk reeling Properties of filature water, Influence of water quality on cooking and reeling efficiency, Water quality standards for silk reeling, Treatment methods.

Unit 4: SILK REELING TECHNOLOGY

Introduction, Direct and Indirect system of reeling, various devices charaka, cottage basin, multiend, automatic reeling machines. Reeling devices for tasar and muga cocoons. Important parts of the reeling machine and their functions Jetteboute, button, guide pulleys, tension pulley, denier-controlling devices. Reeling process-Passage of thread in different reeling devices. Influencing factors for quality raw silk. Reeling speed, calculation of production efficiency. Silk re-reeling Objectives, re-reeling machine, pretreatment, process of re-reeling . Skein finishing and packing

Unit 5: RAW SILK TESTING

Introduction to raw silk testing, importance of raw silk testing Conditioned weight test, boil off test Quality tests-visual examination, winding, size, evenness, cleanness and neatness, tenacity and elongation, cohesion and exfoliation tests. Raw silk grading-Aims, BIS and ISA standards. Yarn numbering-Direct and Indirect systems-Dinier, tex Count (Ne) By-products, and their utilization in silk industry for value addition

REFERENCES

1. Anon. 1972 Manual on Sericulture, Vol.3 Silk Reeling FAO, Agriculture Service Bulletin No. 72/3.

2. Byong Ho Kim. 1989. Filature water Engineering, Seoul national University Press, Republic of Korea.

3. Huang Guo Rui. 1988. Silk reeling, Oxford and IBH Publishing Co. Pvt. New Delhi.

4. Mahadeveppa, D., Halliyal, V.g., Shankar, A.G. and Bhandiwad, R. 2000 Mulberry Silk Reeling Technology, Oxford and IBh publishing Co. Pvt. Ltd. New Delhi.

5. Song, K.E and Lee, Y.W. 1973. Modern Silk Reeling Technology. Sericulture Expt. Station, Republic of Korea

6. Sonwalker, T.N. Handbook of silk Technology, New Age International Pvt.,ltd.

7. Yong Woo Lee. 1999. Silk Reeling and Testing Manual, FAO Agricultural services bulletin No. 136, Rome, Italy.

SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PAPER VIII 1B –SILK PROCESSING TECHNOLOGY

Unit 1: TEXTILE FIBERS

Introduction to textile fibers, classification of textile fibers, basic requirement of textile fibers. Comparative properties of natural, regenerated and synthetic fibers- vegetable fibers, protein fibers, regenerated celluloses, regenerated protein fibers, polyamide fibers, polyester fibers, poly olefin fibers, vinyl fibers, high performance fibers, inorganic fiber and end users. Physical and chemical properties of silk and uses.

Unit 2: SPUN SILK YARN.

Introduction to spinning, importance of silk spinning w.r.t. wastes and non-mulberry cocoons. Processing of silk wastes for yarn spinning-hand spinning-mill spinning. Processes in spun silk mills-degumming-dressing-preparatory-spinning-finishing. Spinning of non mulberry cocoons.

Unit 3: SILK THROWING & WEAVING

Objectives, Types and methods, winding-doubling-twisting setting of twist, rewinding. Types of twisted yarns-singles, organzine, tram, crepe, voile, georgette. Blended yarns. Preparatory processes-Preparation of warp and weft. Different machinery employed in small scale and organized sectors. Handloom, powerloom- shutte looms shuttles looms. Weaving process and its mechanism. Special loom attachments-Dobby, Jacquard, Pile, Leno. Application of computers in weaving and designing. General characteristics of fundamental weaves, fabric properties.

Unit 4: SILK WET PROCESSING

Degumming –objectives, methods of degumming-hot water extraction, soap, soap-soda, enzymatic, acid, amines-Degumming process. Bleaching –objectives, methods, process, whitening agents. Dyeing-Dye classificaytion-Acid, basic, azoic, direct, disperse, moedant, premetallized, reactive, sulphur, vat. -Natural dyes-importance, application on silk. -General theory of dyeing silk. -Process of dyeing yarn and fabric.

Unit 5: SILK MARKETING

Fabrics-Different types. Silk knitting: Introduction to knitting warp and weft knit structures, knitting machines. Evaluation of colour matching. -Computer colour matching. Printing-objectives, auxiliaries, printing methods-block printing, screen printing, discharge printing, batik, roller, rotary printing. Marketing of silk materials. Planning and Management - Factors to be considered before setting up of silk reeling, throwing, weaving, dyeing, printing and

spinning, units-Availability of raw material-water source-labour, marketing facility, source of gunds, staff, maintenance. Silk law enforcement.

REFERENCES

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SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PAPER VIII 1C –ECONOMICS OF SERICULTURE INDUSTRY

Unit 1:

Sericulture scenario in India- History and region wise pattern of growth Sericulture in South India. History, Recent trends, development programmes, problems and prospects. Infrastructure development –Grainages, TSC, Cocoon markets, Silk exchange, institutional finance, R & D base, filature, weaving factories and spun silk mills. Principles of farm management cost concepts and cost computation techniques. Law of diminishing marginal returns as applied to sericulture.

Unit 2:

Economics of mulberry cultivation and silkworm rearing. Costs & returns under rain fed and irrigated conditions, leaf –cocoon ratio. Cost – benefit ratio of improved sericulture practices vis – a- vis traditional practices Income and employment generation in sericulture vis- a- vis other compotative crops. Economics of seed production

Unit 3:

Cost and returns. Cocoon-Dfls ratio. Economics of silk reeling. Comparative economics between charaka, cottage basin and multi-end basin Economic viability of filature in public sector. Silk by –products; their nature, extent and re-utilization (value addition).

Unit 4:

Economics of silk weaving. Comparative economics between hand loom and power loom. Value addition due printing, dyeing and finishing. Economics of tasar Eri and Muga cultivation.

Unit 5:

Exports of silk products - a. Extent, composition, and direction of India silk trade. b. Export and import policies. c. Impact of silk import on domestic silk industry. d. Impact of WTO on sericulture industry. Environmental issues in sericulture industry

REFERENCES:

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SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PRACTICAL VIII -1A

1. Evaluation of cocoons.

a. Sorting of cocoons, percentage determination of good and defective cocoons by weight of different races and varieties.

b. Estimation of renditta on the basis of shell percentage and defective cocoons of different varieties.

c. Commercial characteristics of different varieties of cocoons.

d. Assessment of single cocoon weight, shell weight, shell percentage, average filament length, non breakable filament length, raw silk percentage, denier, and renditta.

2. Estimation of drying percentage of cocoons.

3. Estimation of fibroin and sericin percentage of polyvotine, bivoltine and cross breed cocoons.

4. Assessment of water pH and water hardness.

5. Commercial reeling of cooons on charaka, cottage basin, multiend reeling machine-assessment of renditta, raw silk percentage, waste percentage, production efficiency for bivoltine and cross breed cocoons.

6. Re-reeling of raw silk-lacing and skeining.

SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PRACTICAL VIII -1B

1. Visit to atleast TWO silk processing center and submission of a detailed filed study report

SEMESTER VI

CLUSTER ELECTIVE – 1 SILK TECHNOLOGY

PRACTICAL VIII -1C

PROJECT WORK

SEMESTER VI

CLUSTER ELECTIVE – 2 ENTREPRENEURSHIP DEVELOPMENT

PAPER VIII 2A – ENTREPRENEURSHIP IN SERICULTURE

Unit 1:

Entrepreneurship-

1. concept
2. characteristic features of enterpreunership
3. Factors contributing to women enterpreunership ¡V Social, cultural and economic factors
4. Role of family in capacity building of women enterpreunership

Unit 2:

Entrepreneurship Development programmes and institutional support-

a. Women enterpreunership development ¡V trends, patterns and development

b. Role of Central Silk Board and the State to promote Entrepreneurship in Sericulture.

Unit 3:

Technical knowhow pertaining to:

(i) mulberry cultivation

(ii) seed production and

(iii) chawki rearing

Unit 4:

(iv) silkworm rearing

(v) Reeling and twisting

(vi) Weaving

Unit 5:

a. Entrepreneurship opportunities in Sericulture ¡V

(i) SWOT analysis

(ii) Management techniques ¡V planning, budgeting, coordinating, controlling and decision making

(iii) Management of seri-entrepreneurship activities ¡V

„h Entrepreneurship in sericulture production of vermicompost, disinfect, Biofertilizers and grainages.

„h Mulberry and cocoon production, seed production, chawki rearing, silk reeling and weaving Achievements in sericulture by progressive farmers.

REFERENCES:

1. David E. Gumpert, How to Create a successful Business Plan, Inc. Publishing, 1990.

2. Robert D. Hisrich and Michael P. Peters, Entrepreneurship: Starting, Developing, and Managing a New Enterprise, 3rd edition, Irwin, 1995.

3. Ronald E. Merrill and Henry D. Sedgwick, The Mew Venture Handbook: Everything you Need to Know to start and Run Your Own Business, new and updated edition, AMACOM, 1993.

4. Karl, H. Vesper, (1990) New Venture Strategies, revised edition, Prentice Hall.

PRACTICAL VIII A –

1. CASE STUDIES
2. FIELD VISITS
3. INTERACTION WITH ENTREPRENEURS

SEMESTER VI

CLUSTER ELECTIVE – 2 ENTREPRENEURSHIP DEVELOPMENT

PAPER VIII 2B – SERICULTURE EXTENSION AND MANAGEMENT

Unit 1:
Extension education – Meaning; Principles; Philosophy; Communication; Definition and meaning. Role of communication in extension education. Communication process-the smcre model. Determinants of communication. Extension methods - Individual contact model; Group contact methods; Mass contact methods. Application of extension methods in sericulture. Extension programme planning - Principles of programme planning and its process.

Unit 2:
Programme formulation-concept of PRA techniques-mapping, season diagramming, extension, programme historical transact walk. Programme extension, steps in extension programme planning, group profiles, ranking scoring etc. Role of state government: in sericulture extension programme, sericulture extension organization and infrastructure, ngos, self-help groups and quality clubs. An overview of extension system in the world ¡vusa, japan, china & india problems of extension systems and client systems in diffusion of sericultural innovations.

Unit 3:
Management - concept, definition, objectives and principles of management. Functions of management planning ; importance of planning in extension organization ; definition, importance and advantages of planning six Ps of planning, characteristic of good plan. Definition and concept. Organizing and staffing (meaning and steps in staffing): importance, principle, requisites of an efficient business organization.

Unit 4
Staffing: meaning and steps in staffing. Direction and coordination: definition, importance and technique of effective co-ordination and direction. Budgeting: meaning and types of budget role of budgeting in effective management. Controlling: meaning and its role in achieving management goals. Farm management - Concept and meaning; Fm as a decision making process. Resource management and record maintenance.

Unit 5
Application of management technique in sericulture.
Management of mulberry leaf production and its supply. Rearing programme and input management. Management of cocoon marketing. Management of grainages. Management techniques in silk industry. Management of reeling units-procurement of raw material and human resource management. Management of by-products. Marketing of raw silk. Management in fabric production, finishing and marketing. Human resource management.

References:
1. Taylor (1961) agricultural extension ¡vworld wise institutional and force of change. Amsterden.
2. Fulmer, r.m (1976): supervision-principles of professional management, gleucoe press lodon.
3. Adavi reddy (1978): extension education, sree lakshmi press bapatla.
4. Kahlon and singh (1983): farm management
5. Mc grath, e.h (1986): basic managerial skill for all. Prentice hal of india pvt, ltd.,new delhi
6. Mories (1991): extension alternatives in tropical agriculture, odi, london.
7. Supe, s.v (1999): an introduction to extension education. O &ibh, new delhi (second edition)
8. Dhama, o.p. and bhatnagar (1984): education and communication for development
9. FAO agricultural extension manual (second edition)

PRACTICAL VIII A –

1. CASE STUDIES
2. FIELD VISITS
3. INTERACTION WITH SERICULTURE INDUSTRIES

SEMESTER VI

CLUSTER ELECTIVE – 2 ENTREPRENEURSHIP DEVELOPMENT

PAPER VIII 2C – WOMEN EMPOWERMENT IN SERICULTURE

Unit 1:
Empowerment-
(i) concept, ii) levels (iii) processes (iv) empowerment measures.

Unit 2:
Women work and empowerment . Concept of work . Productive and unproductive work, measurement of womens. Participation in production process and participation of women in sericultural activities.

Unit 3:
Role of women in sericulture-
Mulberry cultivation, silkworm rearing, grainage operation, reeling sector,
Role of sericulture in empowering women through sustainable livelihood security.
Employment and income generation for women in sericulture

Unit 4:
Environmental issues in sericulture . Health hazards in various sericultural activities and their impact on empowerment of women

Unit 5:
Role of state is capacity building of women sericulturists .
(i) extension programmes
(ii) institutional finance . Micro credit and credit support
(iii) womens. Development programme

References
1. Karl, m. Women and empowerment participant and decision making.
2. Kothari jay (1995). Women and empowerment. Gjan publishing house, new delhi.
3. Sangeetha purushotham (1998). The empowerment of women in india, sage publication, new delhi.
4. Surhma sahay (1998) women and empowerment approaches and strategies, discovery publishing house, new delhi.
5. Hall c.m (1992). Women and empowerment, hemisphere, publishing corporation, london.

PRACTICAL 3 IS PROJECT WORK

PARAMEDICAL

Course Structure of Subject **Paramedical Technology**

YEAR	SEM	PAPER	TITLE	MARKS	CREDITS
I	I	I	**HUMAN ANATOMY**	100	03
			Practical - I	50	02
	II	II	**HUMAN PHYSIOLOGY**	100	03
			Practical - II	50	02
II	III	III	**BASIC PRINCIPLES OF BIOCHEMISTRY**	100	03
			Practical - III	50	02
	IV	IV	**CLINICAL BIOCHEMISTRY**	100	03
			Practical - IV	50	02
III	V	V	**CLINICAL HEMATOLOGY**	100	03
			Practical - V	50	02
		VI	**CLINICAL MICROBIOLOGY**	100	03
			Practical - VI	50	02
	VI	VII A*	**BIOMEDICAL TECHNOLOGY**	100	03
			Practical - VII A	50	02
		VII B*	**MEDICAL TRANSCRIPTION AND TELEMEDICINE**	100	03
			Practical - VII B	50	02
		VIII (I)**	**Cluster Elective - I :: CLINICAL PATHOLOGY**		
			I. Theory IA	**100**	**03**
			Practical - VIII (1-1)	**50**	**02**
			II. Theory IB	**100**	**03**
			Practical - VIII (1-2)	**50**	**02**
			III. Theory - IC	**100**	**03**
			Practical - VIII (1-3): Proj.	**50**	**02**
		VIII (II)**	**Cluster Elective - II :: HOSPITAL ADMINISTRATION**		
			I. Theory II - A	**100**	**03**
			Practical - VIII (2-1)	**50**	**02**
			II. Theory II - B	**100**	**03**
			Practical - VIII (2-2)	**50**	**02**
			III. Theory II - C	**100**	**03**
			Practical - VIII(2-3)/ Proj.	**50**	**02**

* Recommended Combination: Zoology, Chemistry & Paramedical Technology

Syllabus of Subject **Paramedical Technology**

FIRST YEAR -SEMESTER-I - PAPER-I

HUMAN ANATOMY

UNIT- 1

Cell and its structure, Cell organelles and its functions, Types of cells- Eukaryotic, Prokaryotic and its difference, Tissues- types, properties, differences.

UNIT- 2

Digestion & Absorption. Breathing - Exchange of Gases.

UNIT- 3

Excretory System – Excretory Products and their Elimination. Cardio Vascular System- Structure of Heart, Cardiac Cycle.

UNIT-4

Hepataobiliary system- Liver and its Functions. Endocrine System- Hormonal regulation.

UNIT-5

Nervous System- Neurotransmitters. Reproductive System – Male and Female Genitals.

Reference Books:

1. Ross & Wilson Anatomy & Physiology in Health & Illness by Waugh (A).
2. Textbook of Medical Physiology by G.K. Pal.
3. Review of Medical Physiology by Ganong.
4. Text book of Medical Physiology by Guyton(AC)

FIRST YEAR -SEMESTER-I- PAPER-I

PRACTICAL SYLLABUS

HUMAN ANATOMY

1. Structure and Parts of Human Digestive System.
2. Structure and Parts of Circulatory System.
3. Structure and Parts of Reproductive System.
4. Structure and Parts of Central Nervous System.
5. Structure and Parts of Respiratory System.
6. Structure and Parts of Excretory System.
7. Different Types of Tissues.
8. Structure and Parts of Eye.
9. Structure and Parts of Ear
10. Structure and Parts of Nose
11. Cell structure
12. Cell Organelles and its structures
13. Endocrine Glands and Its Functions

FIRST YEAR - SEMESTER-II -PAPER-II

HUMAN PHYSIOLOGY

UNIT- 1

Anatomy & Physiology of Muscle:Muscle types&functions, Microscopic anatomy of skeletal muscles skeletal muscle activity;Structure in brief, mechanism of muscle contraction, isotonic and isometric contractions, energy sources of muscle contractions, motor unit. Excitation – contraction coupling Muscle movement's types, and Types of body movements

UNIT- 2

Support & Movement : Skin and Its Appendages,Skeletal Tissues,Skeletal SystemArticulations,Classification of body membranes (cutaneous, mucous, serous, and connective membranes), Integumentary system (skin), Basic skin functions, Structure of the skin (epidermis & dermis), Skin color.

UNIT- 3

Gastro intestinal tract: Functional anatomy of G.I.T, functions of G.I secretions, principles of secretion andmovements of GIT.

UNIT-4

Special Senses: Vision: Structure of eyeball, retina, visual pathway, accommodation, visual acuity,error of refraction, color vision.Hearing: Brief account external, middle and inner ear, hearing tests.Taste& Smell: receptors, pathways, method of transduction.

UNIT-5

Cell junctions, cell membrane transport- a)Simple diffusion through lipid layer, protein layer, types of protein channels or ion channels .b) passive transport c) active transport-Primary active transport, Secondary active transport, Electroencephalogram (EEG), Physiology of sleep, Epilepsy.

Reference Books:

1. Ross & Wilson Anatomy & Physiology in Health & Illness by Waugh (A).
2. Textbook of Medical Physiology by G.K. Pal.
3. Review of Medical Physiology by Ganong.
4. Samson Wrights Applied Physiology.
5. Text book of Medical Physiology by Guyton(AC)
6. Seeley's Essentials of Anatomy & Physiology, 9th Edition.

FIRST YEAR -SEMESTER-II- PAPER-II

PRACTICAL SYLLABUS

HUMAN PHYSIOLOGY

1. Measurement of human electrocardiogram (ECG).
2. Analysis of human blood pressure.
3. Measuring the respiratory function
4. Monitoring of muscle activity by electromyography (EMG).
5. Experiments on the hearing system- Rinne tuning fork test
6. Measuring hearing acuity by pure tone audiometry (PTA).
7. Sometosensory receptors
8. The optical system of the eye and the retina.
9. Examination of bioelectrical signals accompanying brain function(EEG)
10. Rapid immunological assay determining human chorionic gonadotropin (HCG)
11. Descriptions of the used physical, chemical and mathematical units, concepts and procedures.

SECOND YEAR - SEMESTER-III - PAPER-III
PRINCIPLES OF BIOCHEMISTRY

UNIT- 1

Water – Physical Properties, Structure and its interactions, Role of Water in Life.

PH & Buffers- Bronsted-Lowry Theory of Acids and Bases, Buffers- Biological Buffer Systems.

UNIT- 2

Carbohydrates: – Monosaccharides, Polysaccharides - Definition, Classification, Properties & Reactions.

UNIT- 3

Proteins: – Definition, Classification, Properties& Reactions.

Amino acids: - Definition, Classification, Properties & Reactions.

UNIT- 4

Lipids: – Definition, Classification, Properties& Reactions.

Enzymes: - Definition, Classification, Properties & Reactions.

UNIT- 5

Vitamins &Minerals: A, B, C, D, E& K- Nomenclature, Sources, Occurrences, Functions and its Metabolisms.

Reference Books

1. A Text book of Medical Biochemistry- Chatterjae&Shinde.
2. A Text book of Biochemistry- C.B.Powar&Chatwal.
3. Principles of Biochemistry- Nelson Cox.
4. Medical laboratory Procedure Manual (T-M) by K.L. Mukherjee 1987, Vol.I, II & III Tata

SECOND YEAR - SEMESTER-III - PAPER-III

PRACTICAL SYLLABUS

PRINCIPLES OF BIOCHEMISTRY-I

1. General Instructions
2. Units of Measurements
3. First Aid Equipment Kitkept in a Laboratory
4. Collection of Specimen and Preservation
5. Types of blood used for tests
6. Qualitative Analysis of Carbohydrates Sample- 1
7. Qualitative Analysis of Carbohydrates Sample -2
8. Qualitative Analysis of Proteins Sample -1
9. Qualitative Analysis of Proteins Sample-2
10. Identification of unknown Amino acids by Paper Chromatography.
11. Identification of unknown Sugars by Paper Chromatography.
12. Estimation of Blood Glucose by GOD –POD Method.
13. Estimation of Serum Bilirubin by Enzymatic Method

SECOND YEAR -SEMESTER-IV- PAPER-IV

CLINICAL BIOCHEMISTRY

UNIT-I

Chemistry of carbohydrates & their related metabolism -

Brief outline of Metabolism: Glycogenesis &Glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level, Metabolic disorders.

UNIT -2

Chemistry of Proteins & their related metabolism -

Brief outline of Metabolism: Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle, Metabolic disorders in urea cycle, catabolism of amino acids especially Phenylalanine, Tyrosine & Tryptophan, Creatine, Creatinine , Proteinuria.

UNIT -3

Chemistry of Lipids & their related metabolism -

Introduction, definition, classification, biomedical importance, essential fatty acids. Brief out line of metabolism: β- oxidation of fatty acids, fatty liver, Ketosis, Cholesterol & it's clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis.

UNIT- 4

Chemistry of Enzymes& their related Metabolism -

Diagnostic value of serum enzymes -Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT,Amylase, Lipase, Carbonic anhydrase etc. Acidosis, Alkalosis

UNIT- 5

Hyperglycemia & hypoglycemia -

Diabetes mellitus - definition, types, features, gestation diabetes mellitus, glucose tolerance test, Glycosuria,Hypoglycemia & its causes

Reference Books

1. A Text book of Medical Biochemistry- Chatterjae&Shinde.
2. A Text book of Biochemistry- C.B.Powar&Chatwal.
3. Principles of Biochemistry- Nelson Cox.
4. Medical laboratory Procedure Manual (T-M) by K.L. Mukherjee 1987, Vol.I, II & III Tata

SECOND YEAR -SEMESTER-IV- PAPER-IV

PRACTICAL SYLLABUS

CLINICAL BIOCHEMISTRY

1. Oral Glucose Tolerance Test
2. Estimation of Blood Urea by DAM Method
3. Estimation of Serum Creatinine by Jaffe's Method
4. Estimation of Serum Cholesterol & Total Lipid Profile.
5. Estimation of SGOT & SGPT.
6. Estimation of Triacylglycerol by both Enzymatic and Non-Enzymatic Methods
7. Determination of Electrolytes.
8. Determination of Serum Inorganic Phosphate.
9. Determination of Acid Phosphatase
10. Determination of Serum Inorganic Phosphorus
11. Estimation of Serum Calcium by OCPC Method
12. Estimation of Uric Acid by Uricase –Peroxidase Reaction Method
13. Estimation of Serum Proteins by Biuret Method

THIRD YEAR -SEMESTER-V- PAPER-V

CLINICAL HEMATOLOGY

UNIT-1

Prevention, Safety and first aid in lab accidents, Water Chemicals and related substances – a. Purity of Chemicals, b. Corrosives, c. Hygroscopic Substances.

UNIT-2

Body Fluids – Differential count of Peritoneal, Pericardial, Pleural Fluids and CSF, Charging Chamber, Identification and Counting the Cells.

Collection of Specimens:

a. Blood: Types of Specimens, Collection, Precautions during collection processing and preservation.
b. Urine: types of Specimens, Collection, Precautions during collection, Processing and Preservation.

UNIT-3

Hematology & Blood Analysis: - Blood cell formation & Function, Normal Count of Blood Cells and their variations, Total Count of RBC, WBC, Platelet, and Reticulocytes. Hemoglobin estimation, Foetal Hemoglobin estimation.Hemoglobin electrophoresis, Serum electrophoresis, Complete Hemogram.

UNIT-4

Urine Analysis: - Physical Examination: Specific gravity, PH, reaction, colour. Chemical Examination: Sugar, Albumins, Bile salts, Bile pigments etc. Microscopic Examination: Sediment for RBC, WBC, Epithelial cells, Casts, Crystals & Parasites.

UNIT-5

Sputum Analysis: - Physical Examination: Preparation & Staining. Smear for Microscopic Examination.

Cerebrospinal Fluid Analysis: - Composition of normal CSF, Collection and processing of specimens. Routine CSF Analysis: Physical, Chemical & Microscopic Examination.

Reference Books

1. A Text book of Medical Physiology- Guyton and Hall
2. A Text book of Medical Pathology- Robins

THIRD YEAR -SEMESTER-V- PAPER-V

PRACTICAL SYLLABUS

CLINCAL HEMATOLOGY

1. Drawing of Capillary Blood & Venous Blood.
2. Determination of Bleeding Time & Clotting Time.
3. Physical, Chemical & Microscopic Analysis of Urine Sample.
4. Human Chorionic Gonadotropin Test.
5. Identification of Blood Groups.
6. Study of Blood Smear for differential Count.
7. Estimation of Hemoglobin.
8. Total count of RBC.
9. Total Count of WBC
10. Determination of Platelet Count.
11. Determination of ESR.
12. Detection of Malaria Parasite.
13. Sickle Cell Test

THIRD YEAR -SEMESTER-V- PAPER-VI

CLINICAL MICROBIOLOGY

UNIT- 1

Introduction to Microbiology: Meaning and definition of microbiology- Brief history of microbiology and contribution by Antony van Leuwenhoek, Robert Koch, Louis Pasteur in the field of microbiology- organisms included in the study of microbiology- meaning and definition of microorganisms and its types- Brief overview of diseases caused by microorganisms and it preventive measures.

UNIT- 2

Cell structure, functions and structure of Bacteria: Definition, Structure and functions of the cell- Types of cells- Eukaryotic and Prokaryotic cells- Structure of Bacteria- Types of Bacteria- Classification of Bacteria on the bases of shapes- Structure of Gram positive and Gram negative bacteria with special reference to the cell wall.

UNIT- 3

Common equipments used in Microbiology laboratory: Introduction to common equipments- Types of equipments used in Microbiology laboratory- Principle and Uses of Incubator, Hot Air Oven, Water Bath, Anaerobic Jar, Centrifuge, Autoclave, Microscope- Safety Measures in handling microbiology equipments.

UNIT- 4

Concept of Sterilization, Antiseptics & Disinfectants: Meaning and definition- Role of Sterilization- Classification and Uses of Sterilization- General Principles of Sterilization- Meaning, Definition, Uses of Antiseptics and Disinfectants- Types and Mode of action.

UNIT- 5

Collection and Transportation of Specimen for Microbiological Investigation: Introduction of collection and transportation of specimen- Rules for collection and transportation of specimen- Methods of collecting different Samples- Blood, Urine, Feces, Sputum, Pus, Body Fluids, Swab- Methods of preservation- Types of container and criteria for rejection of specimens- Staining Methods –Grams Staining & Ziehl Neelsen Staining.

Reference Books

1. Text book of Medical Microbiology - Prescott.
2. A Text book of Microbiology- Ananthanarayanan.
3. An Introduction to Microbiology - Gerad J. Tortora

THIRD YEAR -SEMESTER-V- PAPER-VI

PRACTICALS YLLABUS

CLINICAL MICROBIOLOGY

Study with charts, models & power point presentations

a. Structure and Morphology of Bacteria
b. Equipments – Construction and Working Principles

Topics:

1. Components and setting of the compound microscope
2. Preparation of swabs/ sterile tubes and bottles
3. Identification, principle and Working of instruments
   a. Incubator,
   b. Hot Air Oven,
   c. Water Bath,
   d. Anaerobic Jar,
   e. Centrifuge,
   f. Autoclave, &
   g. Microscope
4. Identification of common Microbes: Classification Bacteria Based on their Shape
5. Growth and Maintenance of Microbes
6. Staining Techniques: Grams staining & Ziehl Neelsen Staining.
7. Sterilization and Disinfectants techniques
8. Preparation of Smear.
9. Separation of Serum and Plasma
10. Collection & Analysis of water samples from various Areas for Microbiological Evaluation
11. Antibiotic Sensitivity Testing.

THIRD YEAR -SEMESTER-VI - PAPER-VII A*

(A) BIOMEDICAL TECHNOLOGY

UNIT-1:

ECG, Angiography and Cine Studies /DSA Angiography equipments history –Conventional angiography X-Ray equipment - Equipment construction-principle - DSA system basics - digital techniques -subtraction process- procedures for subtraction - care, choice and installation of the equipment –equipment, pitfalls and complications -pressure injectors- contrast media - accessories-catheters, guide wires-uses of serial imaging devices- cine camera - video-recorder - film processing-radiation protection.

UNIT-2:

Ultrasonography/ Doppler systems: Basic acoustics principle- Basic physics of sound propagation in different media, production of Ultrasound (piezoelectric effect), ultrasound terminologies Techniques of Sonography-selection- Preparations - instructions and positioning of patient for TAS, TVS, TRUS, neck USG and extremities- patient care and maintenance protocols- clinical applications display methods –quality image reproducible extend -assurance to patients.

UNIT-3:

CT scan systems: History- generations of scanners-CT technology -helical/spiral & multi slice C.T- ultra fast scanners-system components - performance parameters - image quality and methods of image reconstruction- radiation dose measurements and technical aspects of Q.A - calibration and image acquisition-Recent Advances in Imaging Systems Mobile units of Computer Radiography & Digital Radiography system. 3D/4D Sonography systems 128 slice & higher slice C.T equipments. Picture Archiving and Communication Systems (PACS)-newer advancements – updates systems designs-transfer restrictions.

UNIT-4:

MRI Scanners: History - basic physical principle - Physical principles -NMR signals– instrumentation- hard ware-MR system components- magnet system- Magnetic shielding- RF shielding- bio effects of MRI- site selection and safety -reconstruction system - different coils used -NMR signals advantage -imaging methods – pulse imaging sequences - spectroscopy parameters -calibration and image acquisition - reconstructions- 3D images- - image contrast – factors affecting image quality - artifacts - difference between CT and MRI images- host computer -viewing archiving- hard copy - image formation and storage device. 3 Tesla & higher T MRI scanners Image processing & Display systems-Recent advances, concepts and applications in processing of images in digital form using computer based systems.

UNIT-5:

Mammography: The Mammography as a clinical diagnostic tool- immobilization and identification techniques- positioning techniques for various projections - exposure factors- Conventional & Digital studies- quality and advantage- diagnosis and screening- Characteristics of benign and malignant lesions – patient care – female attendant - interventional procedures - radiation dose- recent advances in mammography techniques -mammo tomogram & Sonomammography procedures- advantages & limitations

Reference Books

1. Step by Step CT; Step by Step MRI and MRI made Easy for beginners – Govind B. Chavhan – Jaypee brothers and Medical Publishers (p) Ltd, New .
2. CT & MRI protocol – Satish K. Bhargava, CBS publishers.
3. Text Book of Radiology for Residents & Technicians – 4th Edition – Satish K. Bhargava CBS publishers & Distributor (p) ltd.

THIRD YEAR - SEMESTER-VI- PAPER-VII

PRACTICALSYLLABUS

(A) BIOMEDICAL TECHNOLOGY

Study with charts, models & power point presentations involving students to present and discuss.

a. Mammography
b. Angiography
c. MRI Scanners

Topics:

1. Construction and working principle of Hands on training on the equipments
2. Picture Archiving and Communication Systems.
3. Mammography
4. X-ray Equipment
5. Ultrasonography
6. ECG Equipment and its Working Principle
7. EEG Equipment and its Working Principle
8. CT Scan
9. UV- VIS Spectrophotometer Single Beam Equipment and its working Principle
10. A Report On lab training at local Hospital Radiology department.

THIRD YEAR - SEMESTER-VI - PAPER-VII B*
MEDICAL TRANSCRIPTION & TELEMEDICINE

UNIT-1:

Fundamentals of Medical Terminology, Word Roots • Prefix • Suffix • Abbreviations & Symbols, Introduction to Anatomy & Physiology, Organs & Systems,Gastro Intestinal, Respiratory, Circulatory, Renal, Reproductive, Nervous.

UNIT-2:

Common Diseases & Procedures, (a) Gastro Intestinal: Cholecystitis, Cholelithiasis, Appendicitis, Intestinal Obstruction, Hernia, Peritonitis,Gastroscopy: Endoscopy, Laparotomy& Laparoscopy. (b) Respiratory:Tuberculosis, Bronchial Asthma, Respiratory Failure, Pulmonary Embolison, Pneumonia, Bronchoscopy, Pulmonary Function Test, Cardio-Pulmonary Resuscitation,

UNIT-3:

Common Diseases & Procedures: Reproductive: Female – Breast Cancer/Self Examination, Menstrual Disorders, Dysmenorrhoea, Premenstrual Syndrome (PMS), Menorrhagia Ovarian Cyst, Fibroids, Malignancy, Infertility Mammography, Ultra Sound, Laparoscopy, IVF, Tubectomy,D&C.Male - Prostate Enlargement, Hydrocele, Impotence,Transurethral Resection of Prostate (TURA).

UNIT-4:

Common Diseases & Procedures: Circulatory:Hypertension, Coronary Artery Disease, Arrhythmias, Cardiac Arrest,and Shock. Deep Vein Thrombosis (DVT), ECG, 2D Echo Cardiogram, Coronary Angiography, Cardiac Catheterization, Stress Test, Pacemaker. (e) Renal: Nephrotic Syndrome, Urinary Tract Infection, Renal Failure, Renal / Bladder Stones Intravenous Pylography, Cystoscopy, Urinalysis Hemodialysis, Peritoneal Dialysis.Nervous: Stroke (Cerebro Vascular Accident), Brain Tumor, Brain Injuries, Spinal Cord Injuries, Lumbar Puncture, Myelography,

UNIT-5:

History of Telemedicine, Block diagram of telemedicine system, Definition of telemedicine, Tele health, Tele care, origins and Development of Telemedicine, Scope, Benefits and limitations of Telemedicine.

REFERENCES:

1. Principles of Anatomy & Physiology – By Gerard J. Tortora.
2. Anatomy & Physiology for Nurses – By Evelyn Pearce – Indian Edition – Jaypee Brothers, New Delhi.
3. Dorland's Pocket Medical Dictionary.

PRACTICALS: Listening to Voice and record the Cases – Minimum 10 Cases should be recorded.

THIRD YEAR - SEMESTER-VI- PAPER-VIII (A)
(A/1) CLINICAL PATHOLOGY

UNIT-1

Cellular pathology: Cellular Adaptations of Growth and Differentiation, Hyperplasia, Hypertrophy, Atrophy, Metaplasia Cell Injury and Cell Death, Necrosis, Apoptosis Intracellular Accumulations, Lipids, Proteins, Glycogen, Pigments.

UNIT-2

Acute and Chronic Inflammation, Acute Inflammation Morphologic patterns e.g. abscess, Chronic Inflammation Morphologic patterns e.g. granulomata.

UNIT-3

Haemodynamic Disorders, Thrombosis and Shock, Oedema, Hyperaemia and Congestion, Haemorrhage, Haemostasis and Thrombosis, Embolism, Infarction, Shock; Tissue Regeneration and Repair, Regeneration, Repair: scar formation, Fibrosis, Healing in Specialized Tissue e.g. healing of fracture

UNIT-4

Diseases of the Immune System, Hypersensitivity Reactions, Autoimmune Diseases, Systemic lupus erythematosus, Sjogren's syndrome, Systemic sclerosis (scleroderma), Immunodeficiency Syndromes, Acquired immunodeficiency syndrome, Amyloidosis

UNIT-5

Neoplasia, Nomenclature o Benign tumours, Malignant tumours, Characteristics of benign and malignant tumours, Differentiation, Local Invasion, Metastasis Pathways of Spread, Epidemiology, Cancer Incidence, Geographic and Environmental Factors, Carcinogenic Agents, Age, Genetic predisposition, Acquired predisposing conditions, Clinical Aspects of Neoplasia, Local and Hormonal Effects, Cancer Cachexia, Paraneoplastic Syndromes

Reference Books

1. A Text book of Medical Physiology- Guyton and Hall
2. A Text book of Medical Pathology- Robins
3. Nathan and Oski's Hematology of Infancy and Childhood

THIRD YEAR -SEMESTER-VI- PAPER-VIII (A)

PRACTICAL SYLLABUS

(A/1) CLINICAL PATHOLOGY

1. Coomb's Test
2. Estimation of Serum Ferritin
3. Blood Component Preparation and Storage
4. Donor evaluation and recruitment
5. Phlebotomy of Donors.
6. Practical and administrative procedures involved in issuing and transfusing blood
7. Practical steps in the laboratory investigation of transfusion reactions.
8. Immunocytochemistry relevant to Hematology
9. Techniques of cytology include cytospins in relation to body fluid of patients with hematological disorders.
10. Procedure for general processing of tissues, especially Lymph Node Biopsy.
11. Absolute Eosinophil Count, Direct, Indirect
12. Seminal Fluid Analysis
13. Faeces Occult Blood test

THIRD YEAR - SEMESTER-VI- PAPER-VIII (A)
(A/2) SYSTEMIC PATHOLOGY

UNIT-1

Cardio-Vascular: Heart failure, Rheumatic heart disease, Valvular heart disease, Atherosclerosis, Myocardial infarction, Hypertensive heart dis., Infective endocarditis, Pericarditis; **Respiratory:** Pneumonia, Pulm, Tuberculosis, COPD – Bronchial asthma, Bronchiectasis, Emphysema, Chr. Bronchitis, Bronchogenic carcinoma.

UNIT-2

Gastro-Intestinal: Salivary tumors- PSA, Esophageal carcinoma, Peptic ulcer, Gastric carcinoma, Intestinal ulcers, Chron's disease & Ulcerative colitis, colorectal cancer; **Hepato-Biliary:** Viral hepatitis, Fatty liver , Portal cirrhosis, Hepatic failure, Hepatocellular carcinoma, Metastatic deposit in liver, Gall stones.

UNIT-3

Renal: Glomerulonephritis – an overview with nephritic & Nephrotic syndrome, Pyelonephritis, Renal arteriosclerosis, Hydronephrosis, Renal cell carcinoma; **Endocrine:** Thyroid – Goitre, Hashimoto's thyroiditis, Addison's disease; Central **Nervous System:** Meningitis – Pyogenic & Tuberculous, CNS tumors–an overview, Meningioma.

UNIT-4

Bone: Pyogenic Osteomyelitis, Tubercul, Osteomyelitis , Classification of bone tumors, Osteogenic Sarcoma, Euing's Sarcoma, Giant cell tumor, Osteoporosis & Rickets; **Lymph Node:** Reactive hyperplasia- an overview, TB lymph node, Metastatic lymph node, Hodgkin's disease, NHL – an overview.

UNIT-5

Female Genital: Endometrium in health and disease – TB, Menorrhagia, Hormone, Uterine leiomyoma, Cervical carcinoma, Ovarian tumors –overview; **Female Breast**: Non-neoplastic diseases – an overview, Fibroadenoma, Carcinoma breast; **Male Genital:** Carcinoma penis, Testicular tumors – classification, Seminoma, BHP, Prostatic carcinoma – an overview.

THIRD YEAR - SEMESTER-VI- PAPER-VIII (A)

PRACTICAL SYLLABUS

(A/2) SYSTEMIC PATHOLOGY

Note: As per the theory Practicals should be conducted wherever necessary with the Sample Specimens Collected from the Hospitals.

THIRD YEAR - SEMESTER-VI- PAPER-VIII (A)
(A/3) HISTOLOGY & CYTOPATHOLOGY

UNIT-1

Organization of Histology Laboratory, Histological equipments, Reception and recording of tissue specimen, Tissue processing and Microtomy including frozen.

UNIT-2

Theory of staining, Preparation and quality control of all routine and special stains used in Histopathology, All staining techniques and their interpretation, Immunohistochemistry.

UNIT-3

Molecular markers of malignant neoplasms, Molecular techniques, Immunofluorescent techniques, Enzyme histochemistry, Museum techniques, Autopsy Techniques, Automation in Histological Techniques.

UNIT-4

Morphology and Physiology of cell, Cytology of - Female genital Tract - Urinary Tract - Gastrointestinal Tract - Respiratory Tract - Effusions - Miscellaneous Fluids, Collection, Preservation, Fixation and Processing of various Cytological Specimen.

UNIT-5

Preparation and Quality control of various stains and reagents used in cytology, All routine and special Staining techniques in cytology, FNAC, Immunocytochemistry, Flowcytometry, Automation in Cytology

REFERENCES:

1. Theory and practice of histological Techniques John.D.Bancroft
2. Hand book of histopathological Techniques. CFA Culling
3. Practical haematology. Davie & Lewis
4. Wintrobes Practical haematology
5. Diagnostic Cytology Koss. Volume I & II
6. Basic Histopathology – Stevens.
7. Practical Cytology – Astarita.

THIRD YEAR - SEMESTER-VI- PAPER-VIII (A)

PRACTICAL SYLLABUS

(A/3) HISTOLOGY & CYTOPATHOLOGY

1. Histological equipments
2. Tissue processing and Microtomy including frozen
3. staining techniques and their interpretation
4. Molecular techniques
5. Immunofluorescent techniques,
6. Enzyme histochemistry,
7. Museum techniques,
8. Autopsy Techniques
9. Collection, Preservation, Fixation and Processing of various cytological specimens.
10. Flowcytometry
11. Special Staining techniques in cytology

THIRD YEAR - SEMESTER-VI - PAPER-VIII (II) **

HOSPITAL ADMINISTRATION

(IIA) HOSPITAL PLANNING & ADMINISTRATION

UNIT-1:

Steps in Hospital Planning: Need Assessment, Appointment of Planning Teams/Consultant, Appointment of Architect, Size of the Hospital, Design of the Hospital, and Selection of the Contractor.Preparation of Architect's Brief, Preparation of the Master plan, Preparation of Schedule of Accommodation, Layout, Grouping, Zoning & Phasing of Activities, Circulation & Movements of Patients, Staff, Visitors

UNIT-2:

Planning for: Out Patient Department/Accident/Emergency, Indoor accommodation, Ward design, Bed wise planning, and Special requirements of certain departments such as: ICU, OT, Pediatric, Maternity ward, Water supply, Electricity, Drainage,& Sewage disposal, Equipments & Purchase, and Planning for various categories of Staff, Administrative action for Appointment and Training.

UNIT-3:

Routine Admission/Discharge Procedures/Discharge Summary, Hospital Utilization Statistics, Average Length of Stay (ALS), Bed Occupancy Rare, Turn over Interval, Daily Reports / Returns, Hospital Census, Matron's Report, Medical Officer's Report, Casualty

Report, Medico-Legal Cases, Report from ICU / ICCU, Security Report, Maintenance Department Report, OT List , Patient's Complaints, Medical Certificates**.**

UNIT-4:

Minutes of the Meetings, Follow up Actions, Patient Satisfaction, Administration of Patient Related Schemes- Medical Insurance (Cashless Benefit), CGHS, ECHS, CSMA, TPA, ESI.Front Office: Duties &Responsibilities.

UNIT-5:

Duties & Responsibilities of the Hospital Administrator/CEO.Marketing of Hospital, Telephone Courtesy, Guest Lectures, Organization of Camps, Seminars, Workshops, Continuous Medical Education, Public Participation, Hospital Security, Staff, Patients, New born babies, Female staff/Patients, Stores. Application of Hospital Information System (HIS) & Management Information System (MIS) Negotiation Skills, Standard Operating Procedures (SOPs).

REFERENCES:

1.Hospital & Nursing Homes: Planning, Organization, & Management – By Syed Amin Tabish Jaypee Brothers.
2.Principles of Hospital Administration & Planning – By B.M. Sakharkar– Jaypee Brothers,
3.Hospitals Planning, Design & Management – By Kunders & Gopinath
4.Sana's Guidelines for Hospital Infection Control – By Mohd. S. Khan – Jaypee Brothers.
5.Medical Records, Organization& Management – By G.P. Mogli –Jaypee Brothers, New Delhi.
6.Hospital Waste Management – By A.G. Chandorkar – Paras Medical Publisher.

**** PRACTICALS: Duty In hospital for 1 Week**

THIRD YEAR - SEMESTER-VI - PAPER-VIII (II) **

HOSPITAL ADMINISTRATION

(II B) HUMAN RESOURCE MANAGEMENT

UNIT-1:

Functions of Human Resource Management: The Managerial Perspective, Objectives of Personnel Department, Human Resource Development (HRD), Position of the Personnel Department, Organization of the Personnel Department, Line – Staff Relationship.

UNIT-2:

Manpower Planning & Development, Manpower Needs, Job Analysis, Job Description & Specifications for Hospital Staff, Selection & Recruitment, Orientation.

UNIT-3:

Manpower Developing & Training, Counseling, Career Planning,Promotion Policies, Separation, Employee Turnover, Wage Administration, Salary Administration, Employee Benefits & Social Security.

UNIT-4:

Performance Appraisals: Techniques & Practices, Industrial Relations: Unions & their role -Settlement of disputes, Industrial Dispute Act, Collective bargaining, Employee Communication, Dynamics of Behaviour at Individual Level: Group Dynamics.

UNIT-5:

Issues Relating to Management of Professionals, Consultants, Specialists, Medical Officers, Nursing Staff, Other Paramedical Staff, Development of staff: In service Training, on job Training, Higher Courses, Specialized Training, Discipline:Punctuality, Dress code, Identification, Behaviors of staff, Disciplinary action, Law of natural justice.

REFERENCES:

1. Personnel Management & Industrial Relations – By Rustom S. Davar Vikas Publishing House.
2. Human Resource & Personnel Management – By Aswathappa – Tata McGraw Hill.
3. Human Resource Management – By Khan.
4. Human Resource Management – By Garry Dessler – Prentice Hall India.

**** PRACTICALS: Duty In hospital for 1 Week**

THIRD YEAR - SEMESTER-VI - PAPER-VIII (II) **

HOSPITAL ADMINISTRATION

(II C) MANAGERIAL ACCOUNTING & FINANCIAL MANAGEMENT

UNIT-1:

Introduction, Origin of Accounting & its importance, Different disciplines in Accounting Difference between Accounts, Costing, Finance, Taxation, Audit, etc. Double Entry System of Accounts, Transactions – Debit & Credit, Classification of Accounts, Rules of Accounts, Convention, concepts & norms of Accounts, Advantages of Double Entry System of Accounts.

UNIT-2:

Journal, Types of Journals/Subsidiary Books, Passing of Journal Entries, writing of narrations, Ledger, Posting in Ledger, Balancing of Ledger Accounts.

UNIT-3:

Preparation of Trial Balance, Correction of mistakes in Trial Balance, Difficulties in locating the mistakes & its consequences, Depreciation- Why depreciation? Mode of Depreciations**.**

UNIT-4:

Preparation of Final Accounts, Profit making Hospitals, Non-profit making Hospitals, Working Capital Management, Needs of Working Capital, Estimation of Working Capital requirement, Different sources of funds, Norms to be considered for Bank Loans Changes in Financial Statements, Ratio Analysis, and Limitation of Ratio Analysis.

UNIT-5:

Budgetary Control, Difference between Budget, Estimate & Projection, Types of Budget – with special reference to Functional Budget, How to monitor a Budget, Elements of Cost of a Product/Service, Direct & Indirect Cost, Allocation of Overhead Cost, Analysis of Marginal Costing & Unit Costing

REFERENCES:

1. Basic Accounts & Finance for Non-Accounts – By Prof. D.K.Chatterjee, Himalaya Publishing House.
2. Handbook on Accounting for Hospital Management– By Prof. D. K. Chatterjee - Himalaya Publishing House.
3. Financial Management – By Prasanna Chandra – Tata McGraw Hill.
4. Principles & Practices of Cost Accounting – By N. K. Prasad.
5. Cost Accounting Methods & Problems – By B. K. Bhor.

III PRACTICAL IS PROJECT WORK TO BE SUBMITTED

TOURISM AND TRAVEL MANAGEMENT

Course Structure and Syllabus of Subject Tourism & Travel Management

Course Structure

S.No	Sem	**PAPERS**
1	I	Paper I - Basics Of Tourism
2	II	Paper II - Principles And Practices Of Tourism
3	III	Paper III - Tourism Resources
4	IV	Paper IV - Cultural Tourism In Andhra Pradesh
5	V	Paper V - Guiding And Negotiation Skills For Tourism
6		Paper VI - Travel Agency And Tour Operation Business
7	VI	***Elective*** **–** I Paper VII A- Tour Packaging And Itinerary Planning
8		Paper VII B - Tourism Marketing & Hospitality Management
9		**Elective – II** **Cluster A** Paper VIII A1 - Tourism & International Business
10		Paper VIII A2 - MICE TOURISM: Meetings, Incentives, Conferences & Exhibitions
11		Paper VIII A3 - Public Relations And Tourism Journalism
12		**Cluster B** Paper VIII B1 - Culture of Indian Cuisine
13		Paper VIII B2 - Contemporary Food Service
14		Paper VIII B3 - Leadership For Chefs

*Teaching Hours, Marks and Credits are as in History and Economics under CBCS

**Recommended Combination in BA: History, Economics & Tourism and Travel Management.

Syllabus of Subject Tourism & Travel Management

Semester: I

Paper – I: BASICS OF TOURISM

Module 1
Tourism – Definition – Nature and Scope – History of Tourism and its Developments –Types of Tourism – Domestic and International Tourism – causes of rapid growth of tourism
Module 2
Travel and Travelers in ancient India - Growth and development of tourism in India – Travel during Medieval age - European trade links - Tourism in Independent India – Constitutional provision of Indian Tourism

Module 3
Socio-economic significance of Tourism – Tourism as an industry – Ancillary industries in Tourism – Tourism organizations, national and International – Role of State and Centre Governments in promotion & Development of Tourism.
Module 4
Demand & Supply in Tourism – Need for measuring tourism – General problems of measurement Importance of Tourist Statistics — Types of Tourist statistics – Methods of Measurement Tourism Demand

Module 5
Structure of State and Central Tourism DePaperments & Tourism Development Corporations - Tourism Promotion Councils etc – District Tourism Promotion Councils & Bureaus
References:

1. Pran Nath Seth (2006) : Successful tourism Management , Sterling, NewDelhi (Vol. 1 & 2)
2. A.K Bhatia (2010) : International Tourism Management , Sterling, NewDelhi
3. A.K Bhatia (1997): Tourism Management & Marketing. Aph Publishing Corporations,
4. Cooper, Fletcher et al, (1993), Tourism Principles and Practices, Pitman.
5. P.N. Seth (2006) : Successful Tourism Development Vol.1 and 2, Sterling Publishers, New Delhi
6. Page, Stephen (2011) : Tourism Management, Routledge, London
7. https://en.wikiversity.org
8. www.unwto.org
9. www.lin.ied.edu
10. www.responsibletravel.org

Semester: II

Paper- II: PRINCIPLES AND PRACTICES OF TOURISM

Module 1

Tourism development and state intervention –National economic goals – political legislation, equity and social needs, social investment, regulation and government controls, regional development in Tourism

Module 2

Tourist motivation – Factors – types – Push and Pull factors – Determinants of tourism – Theories of Motivation - psychological, cultural, economic, personal and social barriers to travel

Module 3

Impact of tourism – Meaning, positive and negative –Social, cultural, economic and environmental impacts of tourism – Employment and Revenue generation – Tourist impact analysis

Module 4

Components of Tourism - Types of transportation – Railways, airways, waterways and roadways– Role of railways in promoting tourism in India – Accommodation and food

Module 5

Tourism finance – Introduction, meaning, nature, scope and functions of finance – Application of financial management in tourism industry – Tourism Finance Corporation of India and other Organizations – Aims, objectives and functions

References:

1. Pran Nath Seth (2006) : Successful tourism Management , Sterling, NewDelhi (Vol. 1 & 2)
2. Mill and Morrison, (1992), The Tourism System: An Introductory Text, Prentice Hall. London
3. Cooper, Fletcher et al, (1993), Tourism Principles and Practices, Pitman.
4. Bhatia, A.K. (2010) : International Tourism Management, Sterling, New Delhi
5. Burkart and Medlik, (1981), Tourism: Past, Present and Future, Heinemann, ELBS.
6. Christopher.J. Hollway; Longman (2012) ; The Business of Tourism, Pearson , New York
7. Babu et al., Tourism Development: Sage publishers , New Delhi
8. https://ethics.unwto.org

Semester: III

Paper – III: TOURISM PRODUCTS

Module 1

Definitions - Concept, types and characteristics of tourism products, elements of tourism products –geographical elements and other tourist attractions – Different levels of models and layers – Product life cycle

Module 2

Geography of Tourism– Definition, scope and contents of geography of tourism –Major land forms – Mountains, Plains, Plateaus; Natural regions of the World-Impact of weather and climate on tourism, seasonal rhythm - Geographical components and tourism development – Linkages

Module 3

Natural Tourist resources – Important national parks and wildlife sanctuaries – examples from South India, Beaches and Islands, waterfalls; Desert tourism, Desert safaris and festivals – Recreation and Adventure Tourism (land, water and air based)

Module 4

Concept of Tourism and Pilgrimage in India – Select Hindu, Buddhist, Jain, Sikh, Islam and Christian pilgrim centers and related circuits

Module 5

Performing arts & Handicrafts of India –Music and Dance (tribal, folk & classical) – Tourism Festivals – Introduction to Medical, Health and Wellness Tourism – World Heritage Sites in India

References:

1.Ranga Mukesh, Tourism Potential in India
2.Sarkar H, Museums and Protection of Monuments and Antiquities in India
3.Vijayalaxmi K.S., History of Tourism
4. Williams S (1998); Tourism Geography, Routledge, London
5. http://www.buzzle.com
6. www.international.icomos.org
7. www.unesco.org
8. www.pondiuni.edu.in
9. www.globalpropertyguide.com
10. www.amazon.in

Semester IV

Paper IV: CULTURAL TOURISM IN ANDHRA PRADESH

Module 1

Definition to History, Heritage and Culture (Tangible and Intangible) – Brief history of – Salient features of AP Culture

Module 2

Pre and proto history – Art and Architecture of AP as Tourism Products – Major Museums and Art Galleries – Major pilgrim centers (Temple, Church and Mosque) in AP

Module 3

Performing Arts and Handicrafts – Andhra paintings and Stone crafts – Music and Dance (Tribal, Fold and Classical)

Module 4

Language and Literature – Dress and Ornaments – Food (cuisine) and Health (medical systems)

Module 5

Tribal Culture of AP – Tribes of AP – Geographical spread - Identity – Society – Economy – Religion and Culture – Need for conservation of cultural heritage – UNESCO Initiatives – Field Visits

References:

1. APTDC Publications
2.Sivanagi Reddy, E., - *Andhra Pradeshlo Tourism; Vanarulu – Avakasalu* [Telugu], Hyderabad, 2003
3. www.aptdc.gov.in
4. www.aptourism.gov.in
5. www.trawell.in/Andhra

Semester: V

Paper – 5: GUIDING AND INTERPRETATION SKILLS FOR TOURISM

Module 1

Introduction to Guiding and escorting- Meaning; concept and types of tour guide, duties and responsibilities of Guides and Escorts , various role of tour guide, the business of guiding, organizing a guiding business

Module 2

The guiding techniques- leadership and social skills, presentation and communication skills - The guide's personality - working with different age groups, working under difficult circumstances

Module 3

Guest Relationship Management- Handling emergency situations- medical, personal, official, VISA/passport, Death, handling guest with special needs/different abilities; Skills required for adventure tours; Knowledge of local security, route chart; Personal hygiene and grooming, tour responsibilities, checklist, leading a group, code of conduct

Module 4

Conducting tours: Pre tour planning, modes of transportation, conducting various types of tours, understanding client needs, security measures, relationship with fellow guides, Coordination with hospitality institutions; points to remember while guiding and escorting

Module 5

Professional development; Interpretative planning; training staff for interpretation; evaluation techniques; negotiation skills-types of negotiating techniques; negotiating a business deal in tourism.

References:

1. Jagmohan Negi (2006); Travel Agency and Tour Operations, Kanishka Publishers, New Delhi
2. Mohinder Chand (2009); Travel Agency and Tour Operations: An Introductory Text ,Anmol Publications Pvt. Limited, New Delhi
3. Dennis L Foster – Introduction to Travel Agency Management
4. Pat Yale(1995); Business of Tour Operations,Longman Scientific & Technical, New Delhi
5.Pond K L(1993) ; The professional guide: Dynamics of tour guiding
6. www.tourism.gov.in
7. www.qtic.com
8. www.cedeop.europe

Semester: V

Paper – 6: TRAVEL AGENCY AND TOUR OPERATION BUSINESS

Module 1

Introduction to Travel trade – Origin & History of travel agencies – responsibilities & functions of travel agents - source of income of a travel agent- setting up of travel agency

Module 2

Travel agency and tour operations – Difference between travel agent and tour operator – linkages and arrangements with hotel – travel agencies and airlines – tour escorts and guides

Module 3

Organization structure of a travel agency – Information counseling, ticketing, documentation, laisoning, staffing, directing, planning, organizing, and controlling

Module 4

Organization of tour operation – concept and nature of tour operation – functions – types of tour operations and of tour operators

Module 5

Tourism Practical (few examples are given above – the faculty can include many more items)

Travel Agency Management

1. Filling up of Passport Application Form
2. Filling up of sample Visa Forms
3. Knowledge of visas various countries
4. Ticket booking using online travel sites

Tour Operations

1. Preparation of Tour Itinerary – Inbound and Outbound
2. Model costing of Tour Packages
3. Preparation of special interest tours in your region
4. Sample Tour Brochure study and preparation
5. Voucher preparation and filling
6. Visit to a Travel / Tour Company

References:

1. Jagmohan Negi (2006); Travel Agency and Tour Operations, Kanishka Publishers, New Delhi
2. Mohinder Chand (2009); Travel Agency and Tour Operations: An Introductory Text ,Anmol Publications Pvt. Limited, New Delhi
3. Jane Archer,(2006); Manual of Travel Agency Practice – Butterworth Heinemann Pub, London
4. https://www.tichk.org
5. www.growourregion.com
6. www.usaidg.gov.com

Semester: VI

Elective – 1

Paper – VII A: TOUR PACKAGING AND ITINERARY PLANNING

Module 1

Tour package-origin and growth, components of a tour package Types of tour packages – Precautions – Crisis handling

Module 2

Tour designing process- meaning and steps – tour research, development of tour itinerary, negotiation with travel vendors, Designing and printing of tour brochure; Tour costing and pricing and Tour promotion; Laisoning and negotiation

Module 3

Itinerary preparation- meaning, types, Do's and Don'ts of itinerary preparation; Limitations and constraints; factors to be considered while preparing an itinerary

Module 4

Tour costing and pricing-cost concept, types of costs; Tour cost sheet; Procedure of costing; group tour, independent tours, and business tours pricing in tour operation industry;

Module 5

Developing tour packages for business travelers; Pilgrimage tourists – special interests - adventure sports, deserts and beach resorts; Special interest tours; Study of outbound tour packages offered by major tour operators of India- Cox and Kings, American Express, Thomas Cook, Southern Travels etc

References:

1. Gee, Chuck and y. Makens,(2000) Professional Travel Agency Management, Prentice hall, New York..
2. Mohinder Chand,,(2007), Travel Agency Management: An Introductory Text,Anmol publication Pvt. Ltd. New Delhi.
3. Foster, D.L.(2010) ; The Business of Travel Agency Operations and Administration, McGrawHill, Singapore.
4. Frenmount P.,(2000), How to open and run a Money Making Travel Agency, Johan Wiley and Sons, New York.
5. https://www.easytoursofindia.com
6. www.thomascook.in
7. www.iata.org
8. www.webcrawler.com

Semester: VI

Elective 1

Paper – VII B: TOURISM MARKETING & HOSPITALITY MANAGEMENT

Module 1
Definition of Tourism Marketing characteristics – philosophies of marketing management– Customer relationship management – relationship between hospitality and tourism industry – Service Culture
Module 2
Micro environment – Company, suppliers, marketing intermediaries, customers, public – Macro environmental forces and trends – Marketing information systems & research process – Promotion **Module 3**
Introduction to hospitality industry – Nature, scope and components - Accommodation types and forms –Important dePaperments of hotel – Front office, Housekeeping, Food and Beverage, maintenance and engineering – function and co- ordination with other dePaperments – Classification, categorization, registration and approval –handling emergencies
Module 4
Guest cycle - Guest stay process in a hotel – Major processes and stages associated with it – Reservation, Registration, Guest complaints etc – Study of the working of selected hotels/motels/restaurants – Different types of catering establishments – Managerial issues
Module 5
Tourism Practical (few examples are given below – the faculty can include many more items)
Transportation Management
1. Ticket booking for Indian Railways using IRCTC and bus services like Red bus
2. Study and simple costing of vehicle rates for package tours – cars, medium size vehicles and buses

Hospitality Management
1. Case study of important Hotel properties
2. Practical aspects of Bed making
3. Service etiquettes
4. Menu Card preparation
5. Visit to Hotels / Resorts

References:
1. Ravi Shankar (2002); Service Marketing, Excel Books India, New Delhi
2. Philip Kotler, Bowens and James Makens (2010); Marketing for Tourism and Hospitality ,Pearson, NewDelhi
3. Naresh Malhotra (2010); Marketing Research , Pearson Prentice Hall, New Delhi
4.Janet Macdonald (2000), Travel Writing, Robert Hale, London
5. www.ilo.org
6. https://riginstitute.com
7. https://alison.com
8. nitahm.ac.in

Sem VI

Elective – II

(Paper VIII Cluster A: 1, 2, 3)

Paper – VIII A 1: TOURISM & INTERNATIONAL BUSINESS

Module 1

Meaning and definition of foreign exchange – Balance of Trade and Balance of Payment –India's Balance of Payments Problems

Module 2

Globalization of markets – production – Investment and Technology – Export Import Procedures

Module 3

Asian countries, capitals and currencies

Module 4

Indian airports and their three later codes

Module 5

IT enabled services for the travel and tourism industry - Amadeus & Galileo (flight ticket booking portals)

References:

1. Prof. J.V. Prabhakara Rao; International Business;
2. Francis Cherunilam (2010); International Business, PHI Learning Pvt. Ltd, New, Delhi
3. P.G. Apte (2010); International Financial Management , Tata McGraw-Hill, Education, New Delhi
4. Justin Paul (2011); International Business , PHI Learning Pvt. Ltd, New Delhi
5. Amadeus e-learning
6. www.tradeforum.org
7. www.education.com
8. www.internationalrelationsedu.org

Semester: VI

Paper – VIII A 2: MICE TOURISM: Meetings, Incentives, Conferences & Exhibitions

Module 1

Understanding of Meetings, Incentives, Conferences & Events – Comparisons between 'business' and 'leisure' tourism products and consumers

Module 2

Development of the MICE sector in India – An overview of current key providers and consumers – Factors influencing MICE buyers – Role of the professional conference

Module 3

Operational issues of MICE industry – Budgeting for MICE events, meeting delegate requirements, food and beverage provision in the conference setting and logistical management of multiple events at individual venues

Module 4

Significance and contribution of the MICE sector within the broader context of business tourism – Scope, size and development of the MICE sector in India –

Module 5

Skills for MCIE Business - Project planning development - Meeting planner - convention manager – Organizing and planning events – Major attributes of meeting planners, Types of meeting planners – Convention and visitor bureaus, Bureaus structure and funding –

Practical work: Students should be asked to organize/anchor events in the college also to take Paper in outside events.

References:

1. Avrieh, Barry (1994), Event and Entertainment Marketing, Vikas Publications, New Delhi.
2. Gaur Sanjay Singh (2001), Event Marketing and Management, Vikas Publications, New Delhi.
3. Diwakar Sharma (2009), Event Planning and Management, Deep & Deep Publications. New Delhi
4. Cindy Lemaire Mardi Foster- Walker- Event Planning Business, Jaico Publ House; Mumbai.
5. www.publisingindia.com
6. www.amity.edu
7. www.indiatourismreview.com
8. indianbusiness.nic.in

Semester: VI

Paper – VIII A 3: PUBLIC RELATIONS AND TRAVEL WRITING

Module 1

Public Relations & its principles – Ethics – Mass Communication –Communication skills – Image building – Goodwill, Feedback

Module 2

Advertising Photographer– Conferences –PR in Tourism Industry

Module 3

Meaning and scope of Travel Writing – Editing – Tourism press in India – Print media –Radio & Electronic Media

Module 4

Web-based promotion of travel writing –Languages and Styles – News Agencies – Travel Writing as a Carrier and Profession

Module 5

Qualities required as a reporter –Design and Make-up – Picture Editing and Caption –Media representation in tourism – Development of tourism literature; brochures, posters, books, booklets, circuit guides, guide books, CDs, promo filming etc.

Practical work: Students should be asked to report all the events organized in the college; they should also be sent to cover various programs taking place in nearby localities under supervision of local reporters.

References:

1. Public Relation; Jeth Waney
2. Public Relation Hand Book
3. Janet Macdonald (2000), Travel Writing, Robert Hale, London.
4. Neilson C. (2001), Tourism and the Media: Tourist Decision Making, Information and Communication, Hospitality Press, Melbourne
5. Arvaham E. & Ketter E. (2008), Media Strategies for Marketing Places in Crisis, Elsevier, UK
6. www.du.ac.in
7. persmin.gov.in
8. https://targetstudy.com
9. www.journals.elseview.com

Sem VI

Elective – II

(Paper VIII Cluster B: 1, 2, 3)

Paper – VIII B I - INDIAN CUISINE

Module 1

Introduction of Indian cuisine – Regional variations - Foreign influence on Indian cuisine, factors influencing Indian cuisine, cultural and philosophical influence on Indian cuisine

Module 2

Basic Types of Indian cooking & spices, herbs, seasonings, and flavors - dum cooking, tandoor cooking - Pastes, types of salts, types of vinegar, types of coloring agents

Module 3

Basic gravies in different region, Masala and paste, thickening agent in Indian cuisine Specialty regional gravies and pastes

Module 4

Regional cuisine - the specialty, geographical influence, cultural and religious influence, popular regional cuisine – Study of Andhra cuisine

Module 5

Culinary Internship for a week to provide the students with industrial experience (students will get exposed to commercial environment of culinary operations, as well as to the philosophies and aims of an organization)

References:

1.Arvind Saraswat; Professional Chef (the art of fine cooking)
2.Rocky Mohan; Art of Indian Cuisine
3.Dr Sathya Prakash Sagar; Food and Drinks in Mughal India
4. www.indianfoodforever.com
5. www.livescience.com
6. www.foodbycountry.com

Semester: VI

Paper – VIII B 2: CONTEMPORARY FOOD SERVICE

Module 1

Knowledge of Equipment: -Visit to a local Star Hotel or a reputed hotel (depending on availability) & Familiarize with Food Service Areas, Identifying Operating Equipment, Methods of Cleaning and Upkeep of Silver, Use of Brass and Silver, Cleaning of Glassware, Knowledge of Side Boards-Upkeep, Usage, Layouts & Types.

Module 2

Restaurant Linen: Laying of a Table cloth and slip cloth, Napkin folding – Formal / Semiformal - Cover Setting - Laying the Cover for Various Meals, Laying the Cover for Different Cuisines, Laying the Cover for Different Outlets

Module 3

Guest Handling: -Service Cycle – Complete Service Procedure, Basic Formal Dining Etiquettes, Rules for Waiting at a Table – Etiquettes, Standard Phrases, Restaurant Bookings, Role – Play with Case Studies

Module 4

Service Procedure - Service Cycle – Complete Service Procedure, Order Taking – Using of KOT, Rules for Waiting at a Table, Guest Bill Settlement and Presentation

Module 5

Room Service: -Setting of Tray and Trolley for Various Meals, Placement in Room Service, Order Taking over Telephone, Use of forms and formats in Room Service, Standard Operational Procedures

References:

1.Peter Dias; The Steward
2. Micheal Anker, Vinay K Bhatta; Basic Restaurant Theory and Practice
3. John Fuller; Modern Restaurant Service
4. www.foodwiththought.org
5. www.hospitalitymagazine.com.au
6. www.cafeconceptsonline

Semester: VI

Paper – VIII B 3: LEADERSHIP SKILLS FOR CHEFS

Module 1

Basic approaches to Leadership and Motivation - Leadership styles, Leaders and Managers, Leadership theories, Motivational theories, Work Motivation related to Hospitality Workforce

Module 2

Human Resource in Food Service Industry- Organizational structure Recruitment, Selection,& Induction Case studies in human resource Management issues - Understanding the Behavior of Consumers in Food Service Industry: Factors influencing the consumer behavior, The buyer decision making process

Module 3

Key Skills for Management: Importance of Self Management, Time management, Decision making, Communication, Positive balanced management, Team work, How to win commitment from staff

Module 4

Developing Trust and Support with Managers Assess your line manager - Learn to understand your managers strength and weakness, Analyze his or her style - Making decisions

Module 5

Managing People - Developing trust & support of colleagues & team members. Supportive team practices, Motivating a team, Leading a team, Minimizing interpersonal conflict- Management of security system, Main security risk in hotels

References:

1.Philip Kotler, James C. Makens, John T. Bowen, Marketing for Hospitality and Tourism
2. Ahmed Ismail, Catering Sales and Convention Services
3. Ashwathappa, K., Human Resource Management: Text and cases
4. restaurantgroup.com
5. www.thebalance.com
6. www.bighospitality.com
7. www.chefacademyoflondon
8. www.profitablehospitality.com

ARCHAEOLOGY

Course Structure of Subject Archeology

S. No	Sem	PAPERS
1	I	Part I - Principles and Methods of Archaeology
2	II	Part II - Historic Building Conservation
3	III	Part III - Indian Epigraphy
4	IV	Part IV - Indian Numismatics
5	V	Part V - Ideas and Images in Indian Art
6		Part VI - Indian Religions
7	VI	**Elective - I** Part VII A- Indian Art History
8		Part VII B- Archaeological Cultures & Sequences
9		**Elective – II** **Cluster A** Part VIII A1 - Introduction to Indian Archaeology
10		Part VIII A2 - Pre & Proto History of Indian Archaeology
11		Part VIII A3 - Principles and Practices of Museology
12		**Cluster B** Part VIII B1 - Archaeology and Application of Tourism
13		Part VIII B2 - Principles of Field Archaeology
14		Part VIII B3 - On-site Project Work

*Teaching hours, Marks and Credits are as in History and Economics under CBCS.

**Recommended Combination in BA: History, Economics and Archeology

Semester: I

Part – I: PRINCIPLES AND METHODS OF ARCHAEOLOGY

Module-1

Definition, Nature and Scope of Archaeology- Relation with Anthropology and pure sciences

Module - 2

Exploration-Surface Exploration- Surface -Indication-Study of Maps-Aerial Survey and Photography- Under Water Exploration

Module – 3

Excavation: vertical and horizontal excavation -Excavation of circular features-Three-dimensional recording-pottery yard

Module-4

Chronology-Relative chronology-Typology, stratography and Fluorine Test-Absolute Chronology-Dendron Chronology and Radio Carbon dating

Module – 5

Use of Ethnographic data for cultural reconstruction- Archaeological sites Natural and manmade-

Principles of Conservation of Cultural property - Transplantation of Nagarjunakonda and Srisailam Monuments

References:

1. Raman, K.V. Principles and Methods of Archaeology
2. Ray,Surindranath. The story of Indian Archaeology
3. Renfew Collin & Paul Bhan. Archaeology London
4. NeelakanthaSastri, KAN. PuratatvaShstraParichya

Semester – II

Part-II: HISTORIC BUILDING CONSERVATION

Module-1
Definition, nature & scope of Conservation - Context of Conservation and the Built Environment

Module-2
Conservation, Legislation and Regulation

Module-3
Applied Conservation-Measurement and Analysis

Module-4
Traditional Building Construction Repair

Module-5
Advanced Skills for the Building Conservation Surveyor

References:

1. Dictionary of building preservation / edited by Ward Bucher; Preservation Press; N.Y., 1996.
2. Encyclopedia of archaeology: history and discoveries
3. Readings in historic preservation: why? what? how? edited by Norman Williams, Jr. Rutgers University, 1983
4. UNESCO, Vienna Memorandum on World Heritage and Contemporary Architecture – Managing the Historic Urban Landscape, World Heritage Centre, UNESCO, Paris (2005)
5. Fladmark, Magnus (ed.), Heritage Conservation, Interpretation and Enterprise, Donhead Publishing, Donhead St Mary (1993)

Semester – III

Part- III: INDIAN EPIGRAPHY

Module-1

Nature and scope of Epigraphy-Origin and History of writing in India-Decipherment of Brahmi Script

Module-2

Writing Materials-Paleographical formulae -Types of Records-Dating of the Inscriptions

Module-3

Evolution of Telugu script from Brahmi- Estampage taking and Editing of Inscriptions

Module-4

Study of the content of the few selected Inscriptions- Asokan Edicts, Hatihgumpha Nanaghat, Girnar, Nagarjunakonda andAllahabad Pillar Inscription of Samudra Gupta

Module-5

Historical Importance of few Inscriptions- Aihole, Tundi, Addanki, Chebrolu and Sasntansagara Inscription of Pedakomati Vemareddi

References:

1. Buhlar, G. Indian Paleography
2. Pandey, R.B. Indian Paleography
3. Pani, A.H. Indian Paleography
4. Sircasr, D.C. Indian Epigraphy

Semester – IV

Part-IV: INDIAN NUMISMATICS

Module-1

Numismatics as source material for the reconstruction of Ancient Indian History-Origin and Evolution of Coinage in India-Punch- Marked coins-Indo-Greek Coinage

Module-2

Coinage of the Kushanas- Kaniska and his successors-The Gupta Coinage

Module-3

The pre-Satavahana Coins-Satavahana Coinage-Coinage of GautamaputraSatakarni- Later Satavahanas, theIkshvakus, Vishnukunsins, EasternChalukya, Pallava, Chola, Pandya, Hoyasala, Kakatiyas, Vijayanagara Kings

Module-4

Coinage of the Delhi Sultanate- Mughals, Bahamani, Qutub Shahis- The Asaf Jahis

Module-5

Coinage of the East India Company-Indo European Coins- Coins of The Princely States of India-Coinage of Independent India- Currency Notes

References:

1. Guptas, P.L. Coins

2. Altekar, A.S. The Gupta Coinage of Gupta Empire

3.Narian, A.K. Indo-Greek Coins

4.Gopinath Rao, F.A. Elements of Hindu Iconography

Semester – V

Part V: IDEAS & IMAGES IN INDIAN ART

Module 1

Symbolism in Indian Art- pre-historic Rock-Art- Terracotta Art in Historical sites

Module 2

Art of the Harappan Times-Art of Maurya -Sunga Times-Kushana times-Gupta period

Module 3

Chandella Art-Khajuraho-Eastern Ganga Art- Bhuwaneshwar, Puri and Konark

Module 4

Sculptural Art of Amaravati-Nagarjunakonda -Sculptural Art of the Chalukyas-the Holayas-the Kakatiyas and the Vijayanagara Period

Module 5

Bronzes of the Satavahana, Ikshvakus, Pallava, Chola, Pandya Hoyasala, Kakatiya and Vijayanagara periods-Murals(paintings) of the Satavahana, Gupta-Vakataka, ChalukyasCholaPandya, Vijayanagara periods, miniature paintings of the Mughal, Pahadi, Kangra, Rajasthani-Bengal School of Art

References:

1. Barrett, Douglas. Sculptures from Amaravati in the British Museum
2. Coomaraswamy, A.K. History of Indian and Indonesian Art
3. Gopalakrishna Murthy, S. The Kakatiya Sculpture
4. Ray, Niranjan. Ideas and Images in Indian Art

Semester V

Part - VI : INDIAN RELIGIONS

Module 1

Introductiion: Religions of Indian origin: Hinduism-Pre-Vedic, Vedic, post Vedic- Main Sects-Bhakti Movement-Brahmasamaj, AryaSamaj-RamaKrishna Paramahamsa

Module 2

Jainism-Origin and spread- Svetambara and Digambaras-24 Thirthankaras- teachings of Mahavira

Module 3

Buddhism-Origin and spread – Main school- Theravada, Mahayana and Vajrayana-Teachings of Gautama Buddha

Module 4

Religions of non-Indian origin: Islam-Origin & spread- Main Tenets-Impact of Islam on Indian Culture

Module 5

Advent, Spread of Christianity-Main Tenets- Impact of Christian religion on Indian culture-Origin of Sikhism and Sikh Gurus- Gurudwaras

References:

1.Barathi. A. The Religions of India
2.Hopkins, E.W. The Religions of India
3.Basham, A.L. The Wonder that was India
4.Ramaswamy, Hinduism, Christianity and Islam
5.Gopal, S.R. Religious History of India

Semester VI

Cluster – 1

Part – VII A: INDIAN ART HISTORY

Module 1

Definition, Meaning of Art-Kinds of Artistic Expressions- Audio and Visual Arts in Early India

Module 2

Art & Society – Symbols and Conventions- Textual References

Module 3

Theories regarding Art and Aesthetics, variations in basic character of art and subject matter-Reasons

Module 4

Role of Art History and Art Historians with emphasis on Socio, Economic, Geographic, Political, philosophical & religious aspects of India-visits to select museums for practical study

Module 5

Elements in a work of Art-Line, Color, Tone-Form and Structure-Techniques of Execution-Comparative study of Indian and Western Aesthetics

References:

1. Allic Miller, Tradition in Sculpture
2. Read Herbret, Meaning of Art
3. Irwin Edmund, Art and the Man
4. Coomaraswamy, Transformation of Nature in Art

Sem VI

Part – VII B: ARCHAEOLOGICAL CULTURES & SEQUENCES

Module 1:
Human Evolution – Evolution of Man – Ramapithecus, Australopithecus, Homo Erectus, Neanderthal man, Homo Sapiens

Module 2:
Geographical Aspects- Lower Paleolithic - Sohan valley - Kortalayar valley
Narmada Valley - Middle Paleolithic Industries in India

Module 3:
Upper Paleolithic Industries in India - Faunal remains from Kurnool
Caves, Renigunta area - Microlithic Phase in India - Neolithic culture – Mehrgar - South Indian Neolithic culture – Ash Mounds – Utnur – Kupgal

Module 4:
Chalcolithic culture of Western India - Copper hoards of the Gangetic valley - Chalcolithic cultures of Deccan

Module 5:
Iron Age in India - The Megaliths of Deccan and South India – Typology – Material culture

References:

1. Allchin, F.R., et.al., - *The Rise of Civilization in India and Pakistan,* Cambridge
2. Allchin, Bidget and Raymond., - *The Birth of Indian Civilization,* London
3. Sankalia, H.D., - *Pre-History and Proto History in India and Pakistan*
4. Subba Rao, B., - *Personality of India*
5. Dhavalikar, M.K., - *Indian Proto History*
6. Gregory Possehl, - *Ancient Cities of the Indus*
7. I. S. Banerjee, N.R., - *The Iron Age in India*
8. Dilip K Chakrabarthi, - *India - An Archaeological History*
9. S. Settar, Ravi Korisettar [ed], *Indian Archaeology in Retrospect Prehistory, Archaeology of South Asia*

Sem VI

Elective – II

(Part VIII Cluster A: 1, 2, 3)

Part – VIII A 1: INTRODUCTION TO INDIAN ARCHAEOLOGY

Module 1
Introduction-Definition- Aim-Scope and Function of Archaeology
Module 2
Archaeology and its relation with Social Sciences, Natural Sciences,
Physical Sciences
Module 3
Pre-Proto and Early historical periods
Module 4
Indian Epigraphy-Scope, use and function- Origin of writing in India -Ancient Scripts and languages -Paleographic formula-writing material -
Module 5
Numismatics-Scope, use and function-Origin of Coinage in India- Examination of coins

References:

1. H.D. Sankalia, Pre and Proto History India & Pakistan
2. Allchin Bridge & Birth of Indian Civilisation
3.Panday, R.B. Indian Paleography
4.Gupta, P.L. Coins
5.Frank Hole &Rosham Introduction to proto Historic Archaeology

Sem VI

Part – VIII A 2: PRE & PROTO HISTORY OF INDIA

Module 1

Introduction- periodisation in Archaeology -Terminology Techniques of tool making- Different kinds of Tools in Indian Context

Module 2

Geology-Geological Ages with special reference to Quaternary periods – climate during Pleistocene Era – Glacial and Inter-glacial periods

Module 3

Paleolithic cultures of India: Lower, Middle and the Upper with examples of sites and tools

Module 4

Chalicolithic Cultures of India-Indus valley Civilization and Copper Hoard Cultures-Chalcolithic Culture in South India - study of select sites

Module 5

Iron Age cultures of India- Megaliths, Types of Burials of Deccan and South Indian Megaliths - study of Material Culture-study of select excavated sites-visits to local museums for field study

References:

1.H.D,Sankalia, Stone Age Archaeology Tools
2.H.D.Sankalia, Pre & Proto-History of India & Pakistan
3.Rao,S.R. Neolithic Cultures of India
4.Babin Clark, Elements of Paleontology
5.Britzer, K.W. Environmental Archaeology

Sem VI

Part – VIII A 3: PRINCIPLES & PRACTICES OF MUSEOLOGY

Module 1

History of Museum Movement in the world and India-Types of Museums-Art Galleries

Module 2

Planning and Organization of Museum-Gallery - policies-vision and mission- Museum Administration-staff of the museums-study of select museums (State/ASI)

Module 3

Collection of Objects, Cataloging and Indexing

Module 4

Chemical Preservation and Techniques of Display of Museum Objects- Chemical Conservation Lab-Visit to a Lab

Module 5

Educative value of Museums and organizing periodical Exhibitions-Organizing Art Schools-special shows and events of children museum- publications and Cafeteria-Library-organization of special lectures by experts in this field

References:

1. Parker, A.C. A Manual for History Museum
2. Sivaramamurti,C. Directory of Museum in India
3. UNESCO, Organisation of Museum

Sem VI

Elective – II

(Part VIII Cluster B: 1, 2, 3)

Part – VIII B I - ARCHAEOLOGY AND APPLICATION OF TOURISM

Module 1

Meaning and Nature of Tourism-Basic components and elements of Tourism- Brief History of Tourism in India-Travel Agencies and Tour Operators- Destination Development-Marketing and promotion

Module 2

Archaeological sites and Monuments as Tourist destinations in India-study of select sites and monuments

Module 3

Important Archaeological and Historic Circuits- Bhimbetka Sanchi- Khajuraho, Belur-Halebidu- Hampi- Warangal, Amaravati- Nagarjunakonda , Mahabalipuram- Kanchipuram-Tanjavur, Madhura, Tirupati

Module 4

Tourism Products of Andhra Pradesh, Nature: Hills, Valleys, Waterfalls and Beaches- Eco Tourism areas

Module 5

Cultural Heritage of Andhra Pradesh: Culture base Products: Archaeological sites , Historic Buildings, Monuments, Development of Tourism circuits based on Nature and Culture based Products-Fairs and Festivals-Folk, Tribal and classical music and dance
Forms-Tourism festivals in A.P-Event Management

References:

1. Bhatia, A.K. Tourism Development : Principles & Practice
2. ASI-Relevant Guide for Monument
3. Srinivasan, K.R. Temples of South India

Sem VI

Part – VIII B 2 - PRINCIPLES OF FIELD ARCHAEOLOGY

Module 1

Introduction: What is field archaeology - Theoretical basis of field archaeology - What is an archaeological site?

Module 2

Finding archaeological sites:
Existing knowledge-Documents - Aerial photography - Ground survey - Geophysical survey Chemical survey- Accidental discovery-Recording archaeological sites - Written description - Archaeological surveying - Photography-Planning the excavation - Permission - Funding and the law- Site safety – Staff & equipment

Module 3

Digging the site- Excavation- Recurrent types of context and their excavation-Sites without features- Artifacts and Eco-facts, their recovery - Recording archaeological excavations: The written record- The drawn record- The photographic record -The finds record.

Module 4

Post-fieldwork planning, processing and finds analysis - Pottery- Stone- Metals- Organic artifacts- Eco-facts - Bones- Shells- Seeds and other plant remains- environmental samples Pollen analysis-Land snails-Soils and sediments- Other environmental analyses

Module 5

Interpreting the evidence- Interpretation the site's environment-Interpretation of the household and its activity areas- Interpretation of the community and its activity areas- Interpretation of how people lived- Publishing the report: Archaeological illustration- Writing a report- Getting a report published

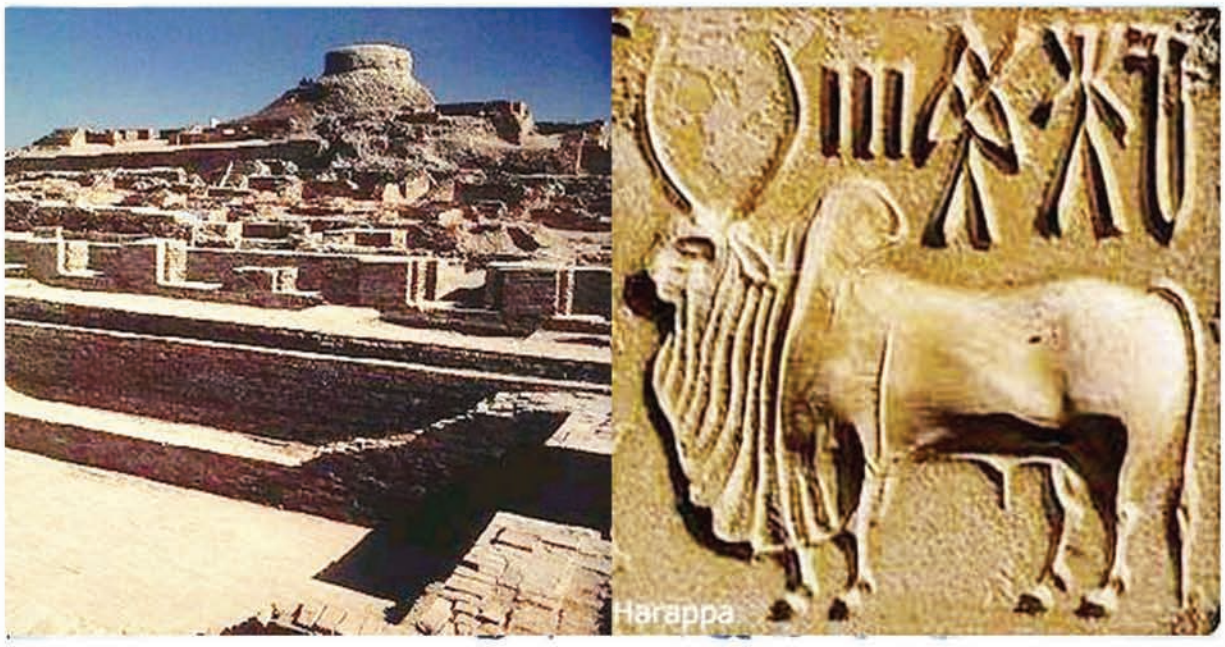
References:

1. Catherine Sease., *A Conservation Manual for the Field Archaeologist*, 1991
2. GREENE K., Moore, Th., Archaeology. An Introduction, 2010
3. BARKER G., Companion Encyclopedia of Archaeology, 1999
4. CARVER M., Archaeological Investigation, 2009

Sem VI

Part – VIII B 3 - On-site Project Work

HISTORY



Course Structure of History Writing under CBCS

S. No	Sem	PAPERS
1	I	Part I - Concepts of History Writing
2	II	Part II - Ancient India History Writing
3	III	Part III - Medieval Indian History Writing
4	IV	Part IV - Modern Indian History Writing
5	V	Part V - Western History Writing
6		Part VI - Global History Writing
7	VI	**Elective – I** Part VII A- Business History
8		Part VII Gender Studies in History
9		**Elective – II** **Cluster A** Part VIII A1 - Community History
10		Part VIII A2 - Geography in History
11		Part VIII A3 - Art History
12		**Cluster B** Part VIII B1 - Archival Science
13		Part VIII B2 - Cartography
14		Part VIII B3 - Project Work on Book Reviews

*Teaching hours, Marks and Credits are as in History and Economics under CBCS.

**Recommended Combination in BA: History, Economics and Archeology

Semester: I

Part – I: CONCEPTS OF HISTORY WRITING

Module 1

History meaning and scope, Sources in context: written, oral, visual and archaeological

Module 2

Historical facts, interpretation, hypothesis, argumentation, historical judgment

Module 3

Objectivity, causality, internal criticism and external criticism

Module 4

Philosophy of history, critical and speculative, explanation in history,
Quantitative methods, oral history

Module 5

History as interdisciplinary practice, regional Vs national history,
Project work on eminent historians or local history or temples or
family history of freedom fighters and their contribution.

References:

1. 1. E. H Carr, what is history, penguin, 2008
2. R.G. Colling wood, The idea of history, hespereides press, 2008
3. B. Sheik Ali, History its theory and method, Macmillon, 1978
4. K. Rajayyan, History in theory and method, Ratna, Madurai 1999
5. Sumit sarkar, Beyond Nationalist Frames, Delhi permanent black 2005
6. peter Burke, The Annales, Cambridge University press, 1989

Semester: II

Part- II: Ancient Indian History writing

Module 1

Nature of Source material for Ancient Indian History, Epics: Ramayana and Mahabharata and puranas

Module 2

Archaeological sources, exploration, excavation, epigraphy, numismatics, monuments and inscriptions

Module 3

Coinage of Indo-Greeks, Kanishka and Guptas as source material for reconstruction of their History

Module 4

Foreign Accounts,Accounts of Megasthenese,Fahien,Hieutsang and Alberuni

Module 5

Historiography of Social Religious History-writing in Ancient India

References:

1. R.C. Majumdar, Social and Cultural History of Ancient India:Vedic Age, Bombay.
2. Romila Thapar, The history Early India from the origins to 1300AD, penguin, 2003
3. Kosambi ,D.D, An Introduction to the study of Indian History, Bombay, 1975
4. Singh G.P, Ancient Indian Historiography sources and Interpretations, printworld, 2003
5. Ray,N,R, Sources for the History of India, Newdelhi, 1978

Semester: III

Part – III: MEDIEVAL INDIAN HISTORY WRITING

Module 1
Problems of Indian Historiography in Medieval India

Module 2
Broad Trends in the writings of ziauddin Barani, Hasan Nizami,Minhasus Siraj

Module 3
Amirkhusrau as Historian,Yaheyabin Ahmad

Module 4
Baduni, Khafikhan, Ibnbatuta

Module 5
Abbaskhan, Sarwari, Abdul Lahori Hamid

References:

1.Hardly peter, Historians of Medieval India: Studies in Indo-Muslim Historical Writing
2 Hasan,M, Historians of Medieval India, Meerut, Meenakshi prakasan
3.Nizami,k,A,On Historians and Historiography in Medieval India,Delhi,
4.Satish Chandra, History of Medieval India
5.Lal,KS, Early Muslims in India, Newdelhi

Semester: IV

Part - IV: MODERN INDIA HISTORY WRITING

Module 1: Contesting view points about India in early 19th century, Conservatives, orientalists, Christian Missionaries, Liberal Utilitarianism

Module 2: Main features of the Historical writings of James Mill, Elphinstone, Vincent Smith, H.H.Wilson, Maxmuller and William Jones

Module 3: Main features of writings on Economic History of Modern India, Dadabhai naoroji, R.C.Dutt,M.G.Ranade

Module 4: Administrator Historians, Chief Characteristics of their writings, Differences between early and Later British Historical writings, H. H. Dodwell, JohnStrachey

Module 5: British perspectives of Indian National Movement in the 19th century

- Nationalist – Marxist – Subaltern Schools

References:

1.Majumdar,Rc, Historiography in Modern India, Asia Pub.House,1970
2.Ramasundari,M, The Origins of Modern Historiography in India,Peterson,2013
3.Said,Edward, Orientalism,Penguin Books,1978
4.Sreedharan,E,A Text Book of Historiography,500BC to AD
5.Cannon,Garland, The Letters of Sir William Jones, Oxford,Clarendon,1970

Semester: V

Part-V: WESTERN HISTORY WRITING

Module 1: The Foundation: The Greek-Roman roots, The Judaeo-Christian Legacy, the Renaissance

Module 2: The Secularization of History, Vico and anti-cartesianism, the Enlightenment, Gibbon, the Romantic Revival, Hegel

Module 3: The Berlin Revolution, Ranke, Empiricism and positivism, Marx and Historical Materialism, Histographical impact, later developments

Module 4: The Annals Tradition, the pioneers Lucien Febvre and Marc Bloch .Ferdinand Braudel and the Second Generation, mentalities, new questions in History

Module 5: The widening horizons, Psycho history, quantitative methods, post-Structuralism and post- modernism, History as social science

References:

1.Collingwood, R,G, The Idea of History, Hesperidespress,2008
2.Finley,M.I,The GreekHistorians,penguin,1997
3.Thomson,Jw, A History of Historical Writings 2Vol.Macmillan,1942
4.Cohen,GA, KarlMarx's Theory of History A Defense,2000
5.PieterGeyl,DebateswithHistorians,Collins,1962

Semester: V

Part – VI: GLOBAL HISTORY WRITING

Module 1: Concepts of World and Global History

Module 2: Narratives of Global History, Genealogy and pre History of Globalization, Archaic globalization, Globalization in world History

Module 3: Regions in Global history, Europe in world History the Discovery of New World, the unity and divergences of the America-Eurasia

Module 4: Themes of Global History, gender in World History, Empires and imperial regions in World History

Module 5: Liberalization in Global History, Free Trade in Global History

References:

1.Braudel,Ferdinand,A History of Civilisations, Viking Peguin,Newyork
2.Bayly,CA,The Birth of Modern World:Global Connections and Comparisions1780-1914,Oxford,UK
3.Hopkins,AG,Globalisation inWorld History Nortan&Co
4.Chaudari,KN,Asia Before Europe: Economy and Civilisation of the Indian Ocean from the rise to Islam to1750,Cambridge ,UK
5.Stearns,Peter N, Gender in World History, 2000,Newyork and London

Semester: VI

Elective – I

Part – VII A: BUSINESS HISTORY

Module 1: Historical background, growth of Indian business- Indian business and foreign mercantile Groups, agency houses, trade banking, share market and internal system

Module 2: Trade and commercial development, Bombay's commercial profile and opium trade, technological development and rise of trade, industries in cotton and others.

Module 3: Rise of modern industrial development, Bombay, Calcutta, Madras and other cities, Transport and communication, road ways, rail ways, shipping and labour movements, Traditional and modern banking system

Module 4: Nationalism trend in Indian business, impact of world wars and rise of new entrepreneurship, Private enterprises in independent India, liberalization, globalization, public sector and private Sector

Module 5: Project work To write history of local business units

References:

1. Agarwala PN, The history of Indian business, A complete account of trade exchanges from 3000 BC to the present day, New Delhi, Vikas Publishing, 1985.
2. Bagchi AK, Private investment in India 1900 to 1939, Cambridge University press, 1972.
3. Bipan Chandra, Rise and growth of economic Nationalism in India, Peoples publishing house, New Delhi, 1966

4.Tripati D., The Oxford History of Indian business, New Delhi, 2004

Semester: VI

Part – VII B: GENDER STUDIES IN HISTORY

Module 1:
Key Concepts and Terminologies – Sex & Sexuality – Gender, Gendering, Parenting – Patriarchy, Matriarchy – Domestic Violence – Household Management – Wife – Widow – Rape – Trafficking – Prostitution – Third Gender – LGBT

Module 2:
Gender Studies as a Discipline– the Creation of Patriarchy– The Second Sex – Problem of Invisibility and Marginalization – Women as Property of Men

Module 3:
Gender Studies – The Indian Scenario – Altekarian Paradigm – Brahmanical Patriarchy – Seed and Earth – Food and Caste – Ecological Feminism – women as Creators of Life – Green Revolution and Destabilization of Women – the Subaltern Women

Module 4:
Preventive Acts – minimum Wage Act, 1948 – Dowry Prohibition Act, 1961 - Family Courts Act, 1986 – Immoral Traffic Prevention Act, 1986 – Domestic Violence Acts and other latest Acts – Their Impact and Limitations

Module 5:
Gender, Development & Culture – Issues of Labour & Health – Access to Resources – Gender Audit

References:

1. Kamla Bhasin, Understanding Gender
2. Uma Chakravarti, Gendering Caste through a Feminist Lens
3. Gerda Lerner, Creation of Patriarchy
4. A.S. Altekar, The Position of Women in Hindu Civilization: From Pre-Historic Times to the Present Day
5. Vandana Shiva, Staying Alive: Women, Ecology and Development
6. Sharmila Rege, Writing Caste/ Writing Gender: Reading Dalit Women's Testimonies
7. Vijaya Ramaswamy, Walking Naked: Women, Society and Spirituality in South India

Semester: VI

Elective – II

(Part VIII Cluster A: 1, 2, 3)

Part – VIII A 1: COMMUNITY HISTORY

Module 1: Community history, elite studies, folk lore roots

Module 2: Oral history assignments, methods, legal interpretation, important.

Module 3: Archival history assignments.

Module 4: Local literature and news paper reviews.

Module 5: Project Work: Documenting local history

. **References:**

1. EP Thomson, The making of English working class, Harmondsworth, 1963
2. Alison Twills, Remembering of the future : Community History and a Neighbourhood regeneration

Semester: VI

Part – VIII A 2: GEOGRAPHY IN HISTORY

Module 1: Geographical concepts

Module 2: Geographical inquiry skills

Module 3: Geographical tools

Module 4: Impact/integration of History and Geography

Module 5: Project work- Documenting local culture/economy/society under influence of geography

References:

1. William W, Larm Dilsaver, The mountainous West : Explorations in historical Geography, University of Nebraska Press 1995.
2. RA Butlin, RA Dodgshon, An Historical Geography of Europe, Oxford Press, 1998

David Turnock, Eastern Europe : An Historical Geography, 1815 – 1945, Routledge, 1989

Semester: VI

Part VIII A 3 : ART HISTORY

Module 1: History of Dance, Drama and Music, Dance forms, Performing Arts, Social Practices, Music and its Types

Module 2: History of painting

Module 3: Heritage crafts (clay, stone work, metal crafts, textiles etc..,)

Module 4: Modern trends in Indian Art, British school, Raja Ravivarma, Bengal school, Santhi Niketan, post independence

Module 5: Project work (Assignment on crafts, craft communities, artisans found in their respective villages/towns)

References:

1. Agarwala VS, Indian Art (A history of Indian Art from earliest times up to third century AD (Volume-1), Prithivi Prakashan, Varanasi, 1965
2. Anboyer Jeanim : Daily life in Ancient India from Approximately 200BC 700AD London 1961
3. Ray, Niharanjan, An Approach to Indian Art, Punjab University, Publication Bureau Chandigarh 1974.

Semester: VI

Elective – II

(Part VIII Cluster B: 1, 2, 3)

Part – VIII B I - ARCHIVAL SCIENCE

Module 1: History and principles of Archives and Records

Module 2: Archival administration writing and documentation

Module 3: Understanding archives and records, narrative and history

Module 4: Ethics and information technology

Module 5: Project works (Covering specific aspects like archives, preservation, information architecture, Security)

References:

1. Annstoler, Along the Archival Grain : Epistemic Anxities and colonial common sense, 2009
2. Ranjit Guha, The Small Voice of History, Permanent block, 2010.
3.Bernand Cohn, An Anthropologist among Historians and other Essays, Oxford Press, 2010

Semester: VI

Part – VIII B 2 – CARTOGRAPHY

Module 1: History of Cartography- Introduction to Cartography, what is map

Module 2: Map scale, components of map, map types, basic issues of design.

Module 3: Fundamentals of general Cartography, two dimensional diagrams, three dimensional diagrams, distributional map.

Module 4: Statistical methods- Quality of GI, Geography and cartography.

Module 5: Frame work and conventions**,** distinguishing of geographic information

References:

1. Erwin Raisz, General Cartography, ML Graw hill Book Company.
2. GRP Lawrence, Cartographic Methods, Methum
3. AH Robinson, Elements of Cartography.
4. Wood D, The Power of maps, Scientific American, 1993.

Sem VI

Part – VIII B 3 - Project Work on Book Reviews

ECONOMETRICS

Course Structure of Subject **Econometrics** under CBCS w.e.f.2017-18

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
FIRST YEAR							
Semester I	Paper-I	Microeconomics	6	5	25	75	100
Semester II	Paper-II	Macroeconomics	6	5	25	75	100
SECOND YEAR							
Semester III	Paper-III	Mathematical Economics	6	5	25	75	100
Semester IV	Paper-IV	Quantitative Techniques	6	5	25	75	100
THIRD YEAR							
Semester V	Paper-V	Econometric Methods-I	5	5	25	75	100
	Paper-VI	Econometric Methods-II	5	5	25	75	100
Semester VI	Paper-VII	Computers and its applications Or Advanced Optimization Methods	5	5	25	75	100
Semester VI	Cluster-1	Economics of Insurance	5	5	25	75	100
		Econometric Tools in Business	5	5	25	75	100
		Project	5	5	25	75	100
	Cluster-2	Applied Econometrics	5	5	25	75	100
		Advanced Econometrics	5	5	25	75	100
		Project	5	5	25	75	100

* Recommended Combination: BA - Economics, Statistics & Econometrics
B.Sc. - Economics, Mathematics & Econometrics

Syllabus of Subject - Econometrics
Semester-I

Microeconomics Paper -I

Unit 1: Introduction **hours:12**

Nature and scope of economics; Methodology in economics; Choice as an economic problem; distinction between microand macro economics, uses and limitations of micro economics, basic postulates; Role of price mechanism; Demand and supply; Basic framework — applications; Market equilibrium.

Unit 2: Consumer's Behaviour **hours:12**

Utility — Cardinal and ordinal approaches; Indifference curve; Consumer's equilibrium (Hicks and concept utility and nature of utility function Slutsky); Giffin goods; Compensated demand; Elasticity of demand — Price, income and cross; Consumer's surplus; Engel curve.

Unit 3 : Theory of the firm **hours:12**

Production decisions; Production function; Iso-quant; Factor substitution; law of variable proportions; returns to scale; economies of scale; Different concepts of cost and their interrelation; Equilibrium of the firm; Expansion path;

Unit 4: Market Structure **hours:12**

Market forms — Perfect and imperfect markets; Equilibrium of a firm — Perfect competition, monopoly and price discrimination; Measure of monopoly power; Monopolistic competition; characteristic features of Duopoly, Oligopoly;

Unit 5 : Factor Pricing **hours:12**

Marginal productivity theory of distribution; Theories of wage determination; Wages and collective bargaining; Wage differentials; Rent — Scarcity rent; Differential rent; Quasi rent; Interest — Classical and Keynesian theories; Profits — Innovation, risk and uncertainty theories.

BASIC READING LIST

1. Bach, G.L. (1977), Economics, Prentice Hall of India, New Delhi.
2. Gauld, J.P. and Edward P. L. (1996), Microeconomic Theory, Richard. Irwin, Homewood.
3. Henderson J. and R.E. Quandt (1980), Microeconomic Theory : A Mathematical Approach, McGraw Hill, New Delhi.
4. Heathfield and Wibe (1987), An Introduction to Cost and Production Functions, Macmillan, London.
5. Koutsoyiannis, A. (1990), Modern Microeconomics, Macmillan.
6. Lipsey, R.G. and K.A. Chrystal (1999), Principles of Economics (9th Edition), Oxford University Press, Oxford.
7. Mansfield, E. (1997), Microeconomics (9th Edition), W.W. Norton and Company, New York.
8. Ray, N.C. (1975), An Introduction to Microeconomics, Macmillan Company of India Ltd., Delhi.
9. Ryan, W.J.L. (1962), Price Theory, Macmillan and CO. Limited, London.
10. Samuelson, P.A. and W.D. Nordhaus (1998), Economics, Tata McGraw Hill, New Delhi.
11. Stonier, A.W. and D.C. Hague (1972), A Textbook of Economic Theory, ELBS & Longman Group, London.
12. Varian, H.R. (2000), Intermediate Microeconomics : A Modern Approach (5th Edition), East-West Press, New Delhi.

Proposed Syllabus - Econometrics
Semester-II
Macroeconomics Paper –II

Unit 1 : National Income and Social Accounts **hours:12**
Concet of stock and flow variables, endogeneous, exogeneous,and macro economics variables, macro economic models, and scope of macro economics. Concept and measurement of national income; National income identities with government and international trade; incorporation of environmental concerns in national accounts — green accounting.
Unit 2 : Theories of income determination and consumption **hours:12**
Say's law of markets and the classical theory of employment; Keynes' objection to the classical theory; Aggregate demand and aggregate supply functions; The principle of effective demand; Consumption function — Average and marginal propensity to consume; Factors influencing consumption spending;

Unit 3 : Theories of investment **hours:12**
Keynes theory of investiment, marginal efficiency of capital and investment. The accelerator and investment behaviour of inflations, influence of policy measures
Unit 4 : Trade Cycles **hours:12**
Nature and characteristics; Hawtrey's monetary theory; Hayek's over-investment theory; Keynes' view on trade cycle; The concept of accelerator; Samuelson and Hicks multiplier-accelerator interaction model; Control of trade cycles.
Unit 5 : Economic Growth and Development **hours:12**
Concept of economics growth, and economic development, features effecting economic growth, Sources of growth;— Harrod and Domar theories of economic growth, classical theory maximum approach; Instability of equilibrium;
Neo-classical growth models — Solow; Economic growth and technical progress.

BASIC READING LIST

1. Ackley, G. (1976), Macroeconomics : Theory and Policy, Macmillan Publishing Company,New York.
2. Day, A.C.L. (1960), Outline of Monetary Economics, Oxford University Press, Oxford.
3. Gupta, S.B. (1994), Monetary Economics, S. Chand and Co., Delhi.
4. Heijdra, B.J. and F.V. Ploeg (2001), Foundations of Modern Macroeconomics, Oxford University Press, Oxford.
5. Lewis, M.K. and P.D. Mizan (2000), Monetary Economics, Oxford University Press, New Delhi.
6. Shapiro, E. (1996), Macroeconomic Analysis, Galgotia Publications, New Delhi.

Proposed Syllabus - Econometrics
Semester-III
Mathematical Economics Paper –III

Unit 1 : Quantitative Methods **hours:12**
Variable, constants and parameters; Simple functional relationship and their graphs; Elementary ideas of differential and integral calculus; Matrix and determinants; Solution of simultaneous equations; Quadratic equations; Difference and differential equations.

Unit 2 : Theory of equilibrium **hours:12**
Indifference curves, Utility function; budget line; Constrained optimization; Consumer's equilibrium; Income effect; substitution effect and price effect; Slutsky equation; Derivation of demand curve; Elasticity of demand; Consumer's surplus.

Unit 3 : Theory of Production and costs **hours:12**
Properties of production function — Homogeneous and non-homogeneous; Cobb-Douglas, CES, Returns to scale; Technology progress and production function; Choice of optimal combination of factors of production; Cost and revenue functions; Derivation of cost curves; Relation between total, average and marginal cost and revenue; Producer's surplus; Production possibility curve; Adding up theorem.
Unit 4 : Market Structure/Pricing **hours:12**
Concept of equilibrium; Equilibrium of the firm under perfect competition, monopoly, price discrimination, monopolistic competition; Subsidies and taxes; Economies of scale; Market equilibrium; Cobweb model.
Unit 5 : Input-Output Analysis **hours:12**
Input-output analysis; The simple closed and open model; Linkages, concepts and measurement; Dynamic input-output model.

BASIC READING LIST

1. Allen, R.G.D. (1974), Mathematical Analysis for Economists, Macmillan Press, London.
2. Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics (3rd Edition), McGraw Hill, New Delhi.
3. Colell, A. Mas et. al. (1991), Microeconomic Theory, Harvard University Press, Cambridge, Mass.
4. Hands, D.W. (1991), Introductory Mathematical Economics, D.C. Heath.
5. Henderson, J. and R.E. Quandt (1980), Microeconomic Theory : A Mathematical Approach, McGraw Hill, New Delhi.
6. Handy, S.T. (1997), Operations Research, Prentice-Hall of India, New Delhi.
7. Mukherji, B. and V. Pandit (1982), Mathematical Method of Economic Analysis, Allied Publishers, New Delhi.

Proposed Syllabus - Econometrics
Semester-IV
Quantitative Techniques Paper –IV

Unit 1 : Calculus and applications **hours:12**
Differentiation of a Function; Maxima and Minima, Elasticities; Equilibrium of a firm and consumer; Inter-relationships among total, marginal and average cost and revenues; Constrained optimisation problem; Integration of a function, consumer's and producer's surplus.
Unit 2 : Matrices and applications **hours:12**
Various types of matrices, Determinants and properties, Inverse of a matrix, Crammer's rule, applications of matrices and input output analysis.; Simple static model, Linkages, Concept of linear programming — Graphic Method.
Unit 3 : Correlation and Regression **hours:12**
Correlation; Simple, Coefficient of correlation — Karl Pearson and Rank Correlation, Partial and Multiple correlation Analysis, Regression analysis — Estimation of regression line in a bivariate distribution— Least squares method, interpretation of regression coefficients.

Unit 4: Time Series and Index Numbers **hours:12**
Time series analysis — Concept and components — Determination of regular, trend and seasonal indices; Index numbers — Concept, price relative, quantity relative, value relative; Laspeyer's, Paasche's and Fisher, Family budget method; Problems in the construction and limitations of index numbers
Unit 5: Probability and Distribution **hours:12**
Probability: Concept, Rules of probability (Addition and Multiplication); Random variables, Mathematical expectations, Theoretical distribution — Binomial, Poisson and Normal: their properties and uses.

BASIC READING LIST

1. Allen, R.G.D. (1974), Mathematical Analysis for Economists, Macmillan Press, London.
2. Black, J. and J.F. Bradley (1973), Essential Mathematics for Economists, John Wiley and Sons.
3. Chiang, A.C. (1986), Fundamental Methods of Mathematical Economics (3rd Edition), McGraw Hill, New Delhi.
4. Croxton, F.E., D.J. Cowden and S. Klein (1973), Applied General Statistics, Prentice Hall, New Delhi.
5. Gupta, S.C. and V.K. Kapoor (1993), Fundamentals of Applied Statistics, S. Chand and Sons, New Delhi.
6. Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book, London.
7. Gupta, S.C. and V.K. Kapoor (2004), Fundamentals of Mathematical Statistics, S. Chand and Sons, New Delhi.

Proposed Syllabus - Econometrics
Semester-V
Econometric Methods-I Paper –V

Unit 1: Basic Econometrics **hours:12**
Nature of econometrics and economic data, concept of econometrics, steps in empirical economic analysis, econometric model, importance of measurement in economics, the structure of econometric data, cross section, pooled cross section, time series and paired data, simple regression models, two variable linear regression model, assumptions estimations of parameters.

Unit 2: Models and Estimations **hours:12**
Gauss marcoff theorem, OLS estimations, partial and multiple correlations coefficients. The general linear model assumptions, estimation and properties of estimators, BLUEs, and tests of significance of estimators, R square and ANOVA.

Unit3: Problems in OLS Estimators **hours:12**
Nature, test, consequences and remedial steps of problems of heteroscedasticity; Multicollinearity and Auto-correlation; Problems of specification error; Errors of measurement.

Unit 4: Regressions with Qualitative Independent Variables **hours:12**
Dummy variable technique — Testing structural stability of regression models comparing two regressions, interaction effects, seasonal analysis.

Unit 5: Regressions with Qualitative Independent Variables **hours:12**
Piecewise linear regression, use of dummy variables, regression with dummy dependent variables; The LPM, Logit, Probit and Tobit models — Applications.

BASIC READING LIST
Amemiya, T. (1985), Advanced Econometrics, Harvard University Press, Cambridge, Mass.
1. Baltagi, B.H. (1998), Econometrics, Springer, New York.
2. Dongherty, C. (1992), Introduction to Econometrics, Oxford University Press, New York.
3. Goldberger, A.S. (1998), Introductory Econometrics, Harvard University Press, Cambridge, Mass.
4. Gujarati, D.N. (1995), Basic Econometrics (2nd Edition), McGraw Hill, New Delhi.
5. Hill R. C., E.G. William and G.G. Judge (1997), Undergraduate Econometrics, Wiley, New York.
6. Kennedy. P. (1998), A Guide to Econometrics (4th Edition), MIT Press, New York.
7. Kmenta, J. (1997), Elements of Econometrics (Reprint Edition), University of Michigan Press, New York.
8. Koutsoyiannis, A. (1977), Theory of Econometrics (2nd ed.), The Macmillan Press Ltd., London.
9. Krishna, K.L. (Ed.) (1997), Econometric Applications in India, Oxford University Press, New Delhi.

Proposed Syllabus - Econometrics
Semester-V
Econometric Methods -II Paper –VI

Unit 1 : Introduction **hours:12**
Definition and scope of econometrics; The methodology of econometric research; Specification and estimation of an econometric model; Basic concepts of estimation; Desirable properties of estimators; Unbiasedness, consistency, efficiency, and sufficiency.

Unit 2 : Simple Regression Analysis and Theoretical Distribution **hours:12**
Statistical vs. deterministic relationships; Correlation and regression; Coefficient of determination;Estimation of an equation; Theoretical frequency distribution and application of binomial, poisson and normal; Testing of hypothesis; Type-I and Type-II errors; Standard errors, Tests based on Z, t and x2 (Chi-square) statistics.

Unit 3 : Estimation Theory **hours:12**
Ordinary least squares (OLS) method — Assumptions; Gauss-Markov Theorem; Testing of regression coefficient; Test for regression as a whole, Coefficient of determination, F-test.

Unit 4 : Lag Models **hours:12**
Lags in econometric models — Concepts, Koyck model; Partial adjustment and adaptive expectation models;

Unit 5 : Summary Variables **hours:12**
Summary variables; Qualitative data; Seasonal analysis; Use of dummy variables for pooled data; Proxy variable - Concept and its uses.

BASIC READING LIST

1. Greene, W. (1997), Econometric Analysis, Prentice Hall. New York.
2. Griffith, W.F., R.H. Hill and G.G. Judge (1993), Learning and Practicing Econometrics, John Wiley, New York.
3. Gujrati, D. (1995), Basic Econometrics, (3rd Edition), McGraw Hill, New Delhi.
4. Johnston, J. (1985), Econometric Methods, McGraw Hill, New York.
5. Johnston J. and J. D. Nardo (1997), Econometric Methods, McGraw Hill, New York.
6. Kmenta, J. (1997), Elements of Econometrics, Michigan Press, New York.
7. Koutsoyiannis. A. (1977), Theory of Econometrics, (2nd Edition), The Macmillan Press Ltd., Hampshire.
8. Maddala, G.S. (1993), Econometrics — An Introduction, McGraw-Hill, New York.

Proposed Syllabus - Econometrics
Semester-VI Paper –VII (Optional-1)
Computer and Its Applications Paper –VII

Unit 1 : Basics of Computers **hours:12**
Computer fundamentals; Organization and components of a computer; Computer hardware CPU; Memory; Disk drives; Input and output devices; Keyboard; Mouse and VDU; Computer peripherals like printer, scanner, digitizer, etc.; Computer software — Operating system, application software and packages.

Unit 2 : Use of Computer for Office Automation **hours:12**
Text editors and word processor software packages; Operative familiarization with any one package like MS-word; Concept and use of spread sheet; Operation and use of MS-excel; Basics of Database; Table; Records and fields; Data entry and query processing; Operative principles of MS-access; Document formation and presentation through MS-power point.

Unit 3 : Data Analysis and Trend Forecasting **hours:12**
Basics of statistical functions and analysis — Mean, median, mode, standard deviation; Distribution function and density function; Statistical package handling and command description for SPSS; Regression and auto-regression; Correlation and auto-correlation; Covariance and Auto covariance.

Unit 4 : Applications **hours:12**
Text and mail communication using computers; E-mail; Chat; Voice mail; Document transfer and delivery; Internet; World Wide Web (WWW) and use for business and commercial activities like e-business and e-commerce; Electronic stock market and exchanges; B2B and B2C Concepts.

Unit V: Introduction to SPSS **hours:12**
Creation of data files, assigning names and labels to variables, sort cases, import/export of files, Computing variable, Data Analysis: Descriptive statistics, Comparing means, Simple Correlation analysis, ANOVA, Simple Regression Analysis, Preparation of graphs and diagrams

Reference Books:

1. Kerns (1993), Essentials of Microsoft windows, Word and Excell, Prentice Hall of India, New Delhi.
2. Rajaraman, V. (1996), Fundamentals of Computers, Prentice Hall (Ind.) New Delhi.
3. Schied, F. (1983), Theory and Problems of Computers and Programming, Schaum's Outline Series, McGraw Hill, New Delhi.

Proposed Syllabus - Econometrics
Semester-VI Paper –VII (Optional-2)
Advanced Optimization Techniques

Unit 1: hours:12
Sequencing Problems: Introduction, sequencing problem, terminology, notation and assumption, problems with n jobs and two machines, optimal sequence algorithm, problems with n jobs and three machines, problems with n jobs and m machines.

Unit 2: hours:12
Network scheduling by PERT/CPM, basic concepts, activities, notes, network, critical path, constraints and networks, construction of the network, time calculations and networks, critical path calculations, critical path method.

Unit 3: hours:12
Introduction, two person zero sum games, the maximin minimax principles, games without sadle points, mixed strategies, graphical solution of 2 x N and M x 2 Games. Dominance property, the modified dominance property, reducing game property to LPP.

Unit 4: hours:12
Queuing theory – Basic characteristics of queuing models – Arrival and service distribution – steady state solution of M/M/1 and M/M/C models with associated distribution of queue length and waiting time

Unit 5: hours:12
Simulation – Introduction, elements of simulation model, event type simulation, generation of random phenomena, Monte Carlo technique, generation of uniform (0, 1) random observations.

Books for Study
1. Operations Research, S. Kalavathi, Vikas publishing house Pvt Ltd.
2. Hamdy A. Taha (1987): Operations Research – An Introduction, 4/e, Prentice Hall of India,Private Ltd, New Delhi.
3. Hillier F S and Libermann G J (2002): Introduction to Operations Research, 7th Edition, McGraw Hill
4. Kanti Swarup, P.K. Gupta and Man Mohan (2004): Operations Research, Sultan Chand and Sons, New Delhi.
5. Gross D, Shortle J.F. , Thompson J.M. and Harris C.M. (2011): Fundamentals of Queuing Theory, John Wiley & Sons

Proposed Syllabus - Econometrics
Semester-VI Paper –VIII
Economics of Insurance (Cluster – 1, paper-1)

Unit 1: Element of Risk and Risk Management Hours:12
Fundamental of Risk and Uncertainty – Classification of Risk – Risk Pooling and Risk Transfer - Concept of Risk Management – Essentials and Elements of Risk Management – Risk Assessment and Risk Control.

Unit 2: Risk and Insurance Hours:12
Definition of Insurance – Role and Functions of Insurance – General and Specific Principles of Insurance Contract – Insurance and Economic Development – Insurance as Financial Intermediaries and Investment Institutions – Classification of Insurance - The Concept of Re-insurance.

Unit 3: Life and Health Insurance Hours:12
Fundamental Principles of Life and Health Insurances – Functions of Life and Health Insurances – Plans of Life and Health Insurance – The Process of Underwriting Life and Health Insurance-Group Insurance

Unit 4: General and Other Types of Insurance Hours:12
Definition of General Insurance – Marine, Motor Vehicular, Fire and other types of Insurances – Physical and Moral Hazards in General Insurance – The General Insurance Corporation (GIC Re) and General Insurance Companies, NOUN – Growth of General Insurance business in India.

Unit 5: Regulation of Insurance Hours:12
Organization and Growth of LIC - Monopoly of LIC - Need for Insurance Regulation in India - Functions and Duties of Insurance Regulation and Development Authority (IRDA) of India — Entry of Private and Foreign Insurance Companies – Implications – Prospects of Insurance Companies.

Reference Books:
1. Misra, M. N. and V. K. Puri, (2008), Insurance Principles and Practice, New Delhi: S. Chand.
2. Periasamy, P. (2007), Principles and Practice of Insurance, Mumbai: Himalaya Publishing House.
3. Palande, P. S., Shah, R. S. and Lunawal, M. L. (1983), Insurance in India, Changing Policies and Emerging Opportunities, New Delhi: Response Books, A Division of Sage Publications.
4. Bhole, L. M. (1990), The Indian Financial System, New Delhi: Tata McGraw Hill.
5. Black, K. Jr. and H. D. (2000), Life and Health Insurance, New Jersey: Prentice Hall.
6. Bailey, R. (1999), Underwriting and Life and Insurance, Atlanta: LOMA.
7. Bickelhaupt. D. L. (1992), General Insurance, Burr Bridge: Irwin Inc.
8. Hedad, G. L. AND Horn I. I. (1991), Essentials of Risk Management, Vol. I Insurance Institute of America.

Proposed Syllabus – Econometrics
Semester-VI Paper –VIII
Econometric Tools in Business (Cluster – 1, paper-2)

Unit 1: Basic concepts Introduction **Hours: 12**

Stationary Stochastic Process – Non-stationary Stochastic Process; Unit root Stochastic Process, Integrated Stochastic Process, tests of Stationarity.

Unit 2: Co-integration Integrated Variables **Hours: 12**

Unit root tests - Dickey-Fuller tests; Co-integration and error correction mechanism – Engle–Granger, Johansen and Juselius Co-integration tests – ARDL Co-integration Tests.

Unit 3: Forecasting Nature and uses of Forecasts **Hours: 12**

Forecasting with a single-equation linear regression model - Forecasting with a multi-equation econometric model - Evaluation of the forecasting power of a model – Conditional and Unconditional Forecasting – Single and Double exponential smoothing – Box-Jenkins Model. - 15

Unit 4: Linear Time Series Models Univariate Time Series Models **Hours: 12**

Moving Average Models - Auto Regressive Models - Mixed Auto Regressive Moving Average Models – ARIMA models.

Unit 5: Vector Auto-regressions **Hours: 12**

Estimation and Forecasting with VAR, VAR and Causality, Some problems with VAR Modeling,

TEXT AND REFERENCE BOOKS:

1. Gujarathi, D.N, Basic Econometrics, Fourth Edition, Tata McGraw Hill, New Delhi, 2004. 2. Koutsoyiannis, A, Theory of Econometrics, The Macmillan Press Ltd., Hong Kong, Second Edition, 1983.

3. Robert S.Pindyck and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts, McGraw Hill Book Company, 1988

4. Francis Diebold, Elements of Forecasting, South Western College Publishing, 1998.

5. Newbold and Bos, Introductory Business and Economic forecasting (second edition), South Western College Publishing, 1994.

6. William H. Green, Econometric Analysis, Pearson's Education, fifth Edition, 2003

7. Hamilton, J.D, Time Series Analysis, Princeton, N.J., Princeton University Press, 1994.

Proposed Syllabus - Econometrics
Semester-VI Paper –VIII
Applied Econometrics (Cluster – 2, paper-1)

Unit 1: Demand Analysis **Hours: 12**
Demand functions – Restrictions to be satisfied by Demand functions - Single Equation models, Engel Functions and Curves, Specification of Functional forms and Estimation – Linear Expenditure System - Review of Empirical Studies.

Unit 2: Consumption Function **Hours: 12**
Theories of Consumption Function – Alternative specifications – Absolute Income Hypothesis, Relative Income Hypothesis, Life Cycle Hypothesis, Permanent Income Hypothesis – Problems of Estimating the Consumption Function – Review of some empirical studies.

Unit 3: Production Functions **Hours: 12**
Single Equation Estimation of production functions - Cobb-Douglas, CES, Trans-log – Specifications and Estimation issues – Review of Empirical studies – Functional forms and Estimation of Cost Functions - Estimation of Factor demand Equations - Empirical Studies.

Unit 4: Macro Econometric Models **Hours: 12**
Nature of Simultaneous Macro Econometric Models – Klein-Goldberger Model for USA - Brookings Model – Macro Econometric models for India – Agarwal, K. Krishna Murthy and N.V. A. Narasimhan Models.

Unit 5: Other Applications of Single and Simultaneous Equation Models **Hours: 12**
Models of Money Demand and Supply – Estimation of Demand for Money Function – Application in Industrial Organization, Labour Economics and Health Systems – Review of Empirical Studies.

Reference Books:
1. Intriligator, M. D. (1978) Econometric Models, Techniques and Applications, North-Holland.
2. ICSSR Survey of Economics – Vol.7 (Econometrics) Allied Publishers
3. Deaton A. and John Muellbauer, Economics and Consumer Behaviour –Cambridge University Press, 1987
4. Killingsworth Mark R.- Labour Supply, Cambridge University Press 1985
5. Meghnad J.Desai 1973 – Macro-economic models for India: A Survey – Sankhya series-B 85 – PP 169-205

Proposed Syllabus - Econometrics
Semester-VI Paper –VIII
Advanced Econometrics (Cluster – 2, paper-2)

Unit 1: Multicollinearity and Heteroscadasticity **Hours: 12**
Multicollinearity: Source and Consequences, Tests for Multicollinearity and solutions for Multicollinearity. Heteroscadasticity: Sources and Consequences, Tests for Heteroscadasticity, Generalized Least Squares Method of Estimation.

Unit 2: Autocorrelation **Hours: 12**
Sources of Autocorrelation - first order Autoregressive scheme - Consequences of Autocorrelation - Tests for Autocorrelation – Durbin-Watson test - Methods of estimation of Autocorrelation coefficient -Estimation from d- statistic and Cochran-Orcutt iterative method.

Unit 3: Qualitative and Limited Dependent Variables Models **Hours: 12**
Binary Choice Models: Linear Probability Model, Probit Model and Logit Models – Censored and Truncated regression models.

Unit 4: Simultaneous Equation Models: Estimation Methods **Hours: 12**
Two stage Least Squares, Limited Information Maximum Likelihood, K-class Estimators, Three Stage Least Squares and Full Information Maximum Likelihood Methods – Numerical Problems.

Unit 5: Panel Data Regression Models and Time Series Econometrics **Hours: 12**
Panel Data – Estimation of Panel Data Regression Models - Fixed and Random Effects – Estimation – Introduction to Time Series Econometrics - Stationary and Non-Stationary Stochastic Process – Integrated Stochastic Process – Unit roots – Co-integration – Test for co-integration, Co-integration and error correction mechanism.

Reference Books:
1. Maddala, G.S: Econometrics, McGraw-Hill Book Co., New York, 3rd Rd.
2. Johnston,J: Econometric Methods, McGraw-Hill Book Co., New York.
3. Gujarathi, D.N: Basic Econometrics, Fourth Edition, New Delhi.
4. Maddala, G.S: Limited-Dependent and Qualitative Variables in Econometrics, Cambridge University Press.

OFFICE MANAGEMENT

Course Structure of Subject Office Management And Secretarial Practices

Year	Semester	Paper	Title of the Couse	Hours	Credits	Marks	
						Internal	External
I st Year	I	1	Office Management and Methods	5	4	30	70
	II	2	E-Governance	5	4	30	70
II nd Year	III	3	Computing Basics and Applications	5	4	30	70
	IV	4	Secretarial Practice and Basic Phonography – 1	5	4	30	70
III rd Year	V	5	Public Relations	5	4	30	70
		6	Secretarial Practice and Basic Phonography – 2	5	4	30	70
	VI	7	Electives (any one) VII-(A) Organizational Behaviour (or) VII-(B) Public Systems Management	5	4	30	70
		8	Cluster Elective (any one cluster, i.e., set of three papers) Elective VIII-A-1 Administration and Public Policy Elective-VIII-A-2 Public Personnel Administration Elective-VIII-A-3 Administrative Law (or) Elective-VIII-B-1 Stress & Time Management Elective-VIII-B-2 Negotiations & Conflict Management Elective-VIII-B-3 Logistics Management (or) Elective-VIII-C-1 Management of Resources Elective-VIII-B-2 Financial Management Elective-VIII-B-3 Management of NGOs	5 5 5	4 4 4	30 30 30	70 70 70

*Recommended Combination: Political Science, Economics, Office Management And Secretarial Practice under CBCS

Office Management and Secretarial Practices-
Syllabus

B.A FIRST YEAR
SEMESTER-I PAPER-1 :OFFICE MANAGEMENT
SEMESTERII-PAPER -2:E-GOVERNANCE

B.A SECOND YEAR
SEMESTER III-PAPER-3: COMPUTING BASICS AND APPLICATIONS
SEMESTER III-PAPER-4: SECRETARIAL PRACTICE AND BASIC PHONOGRAPHY-I

B.A THIRD YEAR
SEMESTER V-PAPER-5:PUBLIC RELATIONS
SEMESTER V-PAPER-6:SECRETARIAL PRACTICE AND BASIC PHONOGRAPHY-2

SEMESTER VI-CHOOSE ONE OF THE ELECTIVES
PAPER 7-A:ORGANIZATIONAL BEHAVIOUR
PAPER-7-B:PUBLIC SYSTEMS MANAGEMENT
SEMESTER VI- CHOOSE ONE OF THE CLUSTERS
PAPER-8-A1:ADMINISTRATION AND PUBLIC POLICY
PAPER-8-A2:PUBLIC PERSONNEL ADMINISTRATION
PAPER-8-A3:ADMINISTRATIVE LAW

PAPER-8-B1:STRESS AND TIME MANAGEMENT
PAPER-8-B2:NEGOTIATIONS AND CONFLICT MANAGEMENT
PAPER-8-B3:LOGISTICS MANAGEMENT

PAPER-8-C1:MANAGEMENT OF RESOURCES
PAPER-8-C2:FINANCIAL MANAGEMENT
PAPER-8-C3:MANAGEMENT OF NGOs

I B.A
Semester –I ; Paper-I

OFFICE MANAGEMENT

Objectives:

To familiarize students with the activities in a modern office. Smooth functioning of any organization depends upon the way various activities are organized, the facilities provided to the staff working in office, the working environment, tools and equipments used in office.

Unit I

Office and office Management – meaning of office, functions of office-primary and administrative functions, importance of office. Relation of office with other departments of business Organization. Concept of paperless office, virtual office, back and front office, open and private office. Definition and elements of office management, duties of an Office Manager.

Unit II

Filing and Indexing – Meaning and importance of filing, essential of good filing system. Centralized and decentralized filing system. Meaning, need and types of indexing used in the business organization.

Unit III

Office forms– Meaning and types of forms used in business organization, advantages, forms controls, objectives, form designing, principles of forms designing and specimens off or ms used in office. Office Record Management – Meaning, importance of record keeping management, principles of record management and types of records kept in a business organization.

Unit IV

Office Machines and equipments – Importance, objectives of office machines. Office Safety and Security – Meaning, importance of office Safety, safety hazards and steps to improve office safety. Security hazards and steps to improve office security.

Unit V

Measurement of Office Work – Importance, purpose, difficulty in measuring office work .Different ways of measurement, setting of work standards, benefits of work standards. Techniques of setting standards. Office Manuals – Meaning, need, types of office manual sand steps in preparing of office manuals.

Suggested Readings

1. **Karyalaya Nirvahana(Tel),Telugu Akademi**
2. **Arora S.P, Office Organisation and Management,Vikas, New Delhi – 1982**
3. **Aswathappa K.& Shridhara Bhat K. , Production and Operation Management, Himalaya Publishing House, New Delhi-2002**
4. **Thukaram Rao,M.E., Office Organisation and Management, Atlantic Pubs,2000**
5. **Chhabra, T.N., Modern Business Organization, New Delhi, Dhanpat Rai& Sons.**
6. **.Duggal, Balraj, Office Management and Commercial Correspondence, KitabMahal, New Delhi.**

I B.A
Semester –II : Paper-II
E-GOVERNANCE

UNIT I :E-governance-A Conceptual Framework

Concept, Models, Roles, and Significance, ICT-Components and Applications, Information Systems

UNIT II :Role of ICT in Administration

E-governance in Government Departments/Institutions/Agencies; Transforming Administrative Culture

UNIT III:Role of ICT in Local Governance

Rural Development, Urban Development
E-learning, E-Commerce, E-Health

UNIT IV:Measures for Effective Implementation of E-governance

Challenges, Measures for having effective e-governance

Select References:

1. Giorgio Petroni and Fanie Cloete, New Technologies in Public Administration, 2005
2. Harekrishna Misra, Governance of Rural Information and Communication Technologies Opportunities and Challenges, 2009
3. A.K. Baranwal, Electronic Information Management System and p-Government: A Paradigm Shift from E-Government, 2010
4. M.A. Shareef et. al., E-Government Service Maturity and Development: Cultural, Organisational and Technological Perspectives, 2012
5. E.H. Klijn and Joop Koppenjan, Governance Networks in Public Sector, 2016
6. **Bhatnagar Subhash, E. Government from Vision to Implementation, SAGE publication, New Delhi, 2004.**
7. **Government of India, National e-governance Plan, India.gov.in.**
8. **Information and communication Technology (ICT) Policy of Govt. of Andhra Pradesh -ICT Policy 2010-15 -**
9. Bidisha Chaudhuri**,** E-Governance in India…, **Import, 2014.**
10. **D N Gupta, E Governance: A Comprehensive Framework,New Century Pubs, Verlag, 2008.**
11. **Pankaj Sharma E-Governance,A.P.H.Pubs,New Delhi 2012.**
12. **S Pankaj, Electronic Governance, 2013.**
13. **Pardhasaradhi,Y. E-Governance and Indian Society, Kanishka, New Delhi,2009**
14. **Sinha,R.P.E. Governance in India: Initiatives and Issues, Concept, New Delhi,2006**

II B.A
Semester –III : Paper-III
COMPUTING BASICS AND APPLICATION-I
Theory: 50 Practical: 40 Viva-Voce: 10 (Internal Assessment in Theory component only)

Unit-I :World of Computers:

Characteristics of Computers, Evolution and Generation of Computers, Hardware and Software Components, Operating System: types, functions and characteristics. Examples: Windows etc., Networking basics and Internet Concepts.

Unit II:Advanced Concepts of Networks and Internet:

Keywords: URL, IP address, Hyperlinks, Web pages, Home page, web sites, WWW, Dial-up ,Broadband, Dedicated, ISP, Browser, DSL, DNS, Gateways, Chat rooms, Downloading and Uploading, Wi-Fi. Working with Microsoft Internet Explorer: Opening a web page, opening multiple browser windows, opening multiple tabs in a single browser windows and their management, working offline, deleting temporary files, exploring Internet Options, Net Etiquettes, Searching the Web: Meaning of Search Engines and Keywords,

Unit III :Database Management System (DBMS):

Meaning and need of a database, Advantages, Limitations of databases, Applications of Database, Meaning and need of DBMS, Database Components: Tables, Rows, Columns, Attributes, Queries, Record, Primary Key, Foreign Key, Relationship between tables.

Unit IV: E-Typewriting:

Meaning and uses of Touch Method (The student is required to achieve proficiency in e-typewriting with touch method of typewriting,) Method of speed calculation (The minimum accurate speed to be attained is 30 words per minute).

Unit V :Word Processing:

Meaning of Word Processor, Need and Uses of Word Processing, Advantages and Limitations of Word Processing, Software used for Word Processing, Why MS-Word and which version? Starting Word: MS Word interface, opening a blank document, hiding and showing toolbars, templates. Working in Word: selecting text, editing text, finding and replacing text, formatting text, checking and correcting spellings, Justification and Alignment, Bullets and Numbering, Tabs, Paragraph formatting, Indent, Page Formatting, Header and Footer & Word Count. Working with a Document: Page Setup of a document, viewing a document, switching between documents, saving a document, print preview, printing document. Finishing Touch to a document: Inserting date and time, Special effects such as Bold, Scripts, etc., Inserting and deleting a comment, Inserting Clip Arts.

Note: The relevant short cut keys of MS Word to be discussed.

Suggested Readings

- Absolute Beginner's Guide to Computer Basics, Michael Miller.
- Fundamental of Computers, AkashSaxena, Kratika Gupta.
- Fundamentals of Information Technology, Alexis and Mathew.
- Computer Fundamentals, P.K. Sinha.
- Principles of Typewriting, D.P. Bhatia and S.S. Sangal.
- Microsoft Word 2010 Step by Step(Microsoft) by Joyce Cox and JoanLambert.
- MS Word 2000 Thumb Rules and Details, Snigdha Banerjee.
- Word 2010 All-in-One For Dummies, Doug Lowe and Ryan C. Williams.

GUIDELINES FOR THE CONDUCT OF PRACTICAL EXAMINATION

Computing Basics & Its Applications –I

Practical

Time: 35 Minutes (Excluding Vica Voce) Maximum Marks: 50

Ques No.	Description of Question	No. of Words	Marks	Time Allowed
1	E-Typewriting	300	20	5 Minutes
2	A Question on MS-Word comprising of simple formatting of passage/letter e.g. bold, italics, etc. Generate mail merge for the letter so created to send it to multiple recipients at the same time.	150	20	30 Minutes
	Total		40	35 Minutes
	Viva-Voce		10	
	Total Marks		50	

NOTE:

1. There will be no Internal Assessment in the Practical component of this paper.
2. 10 Minutes time may be given to the examiners for adjustment of computers before the practical.
3. The examinees will have to produce hard copies of above questions for evaluation.

II B.A

Semester –IV : Paper-IV

SECRETARIAL PRACTICE AND BASIC PHONOGRAPHY-I

Objectives:

The main objective is to familiarize the students with the activities of modern office, role of a Private Secretary in an office besides gaining essential skills in handling of various office operations. As it is very important for an Executive Assistant to write rapidly and accurately, the knowledge of art of writing spoken sounds with the help of principles of Sir Isaac Pitman would help the students to take notes and carry out office work speedily.

Unit –I :Secretary:

Meaning of Secretary, Types/Kinds of Secretaries, importance of Secretary, qualifications and qualities of Secretary, duties of Secretary, changing profile of the Secretary.

Organizational Structure:

Definition, meaning and process, level and functions (Operational Functions- Office, Production, Financial, Marketing, Personnel etc. and Managerial Functions- Planning, Organizing, Staffing, Directing, Coordinating, Controlling. Delegation and Decentralization of Authority.

Unit –II :Meetings:

Meaning and purpose of meetings, types of meetings, preparation for meetings: Notice, Agenda, Quorum, Role of Chairman, Minutes of meetings, duties of Secretary before, during and after a meeting, additional terms used in meetings.

Unit-III: Handling of Mail:

Meaning of Mail, Need for establishing inward and outward mail routines, Nature of Mail – E mail and Physical Mail, Types of Mail – Inward Mail, Outward Mail and Inter-departmental Mail, Handling of Inward and Outward Mail, Mechanizing of Mail Services, Services provided by Courier Companies.

Part- B - Basic Phonography

Unit –IV Phonography:

Meaning and importance. **Consonants:** Definition, types of Consonants, Classification of Consonants, Consonants and consonant strokes, pairs of Consonants, number, size and directions of consonants, joining of strokes.

Vowels: Definition, long and short vowels, Vowel signs and their places, Position of outlines according to vowels, Intervening Vowels, Grammalogues and Punctuation signs.

Alternative Forms of Strokes: Upward and Downward 'R', Upward and downward 'H', Diphthongs and Tri phones, Phraseography, Abbreviated 'W' and Tick 'The'.

Unit –V 15 :Circles and Loops: Circle 'S' & 'Z', use of small circles with straight and curved strokes, exceptions to the use of Circle 'S'/'Z', Large Circles 'SW', 'SS or 'SZ', use of large circles with straight and curved strokes, Use of large circles in Phraseography, Loops 'ST' and' STR', use of small and big loops with straight and curved strokes, medial use of loops, exceptions to the use of loops.

Initial and Final Hooks: **Initial Hooks** 'R' and 'L, use of initial hooks with straight and curved strokes, alternative forms for 'Fr', 'Vr' etc., use of circles and loops preceding initial hooks.

Small Final Hooks 'N', 'F/V', use of final hooks with straight and curved strokes, medial use of small final hooks, use of small final hooks in Phraseography, Exceptions to the use of small final hooks, circles and looks to final hooks.

Large Final Hook 'Shun Hook', use of Shun Hook with straight and curved strokes, medial use of Shun Hook, Use of Shun Hook after Circle 'S' and 'NS', Use of Shun Hook in Phraseography

Suggested Readings

- Office Management, B.R. Duggal, KitabMahal, New Delhi.
- Principles of Office Management, Dr. R.C. Bhatia, Lotus Press, Darya Ganj, New

Delhi-110002

Office Organization and Management, S.P. Arora, Vikas Publishing House.

Administrative Office Management by R.K. Chopra, Himalaya Publishing House.

Office Management and Commercial Correspondence, B.R. Duggal, KitabMahal.

Pitman Shorthand Instructor, New Era Edition (Old Course Book), A.H.Wheeler Publications.

Pitman Shorthand, New Course Book, A.H. Wheeler Publications.

Shorthand Made Easy for Beginners, O.P. Kuthiala, Pitman S.S. Publications

III B.A
Semester –V ; Paper-V

PUBLIC RELATIONS

UNIT-I

- Public Relations: Evolution, Meaning-Essentials and Principles of Public Relations.
- Major Areas of PR Activity: Public Relations, Advertising Publications, Media & Co- ordination,
- Ministry of Information and Broadcasting: organization, functions

UNIT-II

- Media and Publicity: Publicity Media, Types of Publicity,
- Corporate Public Relations: Process, elements and management of corporate Public Relations.
- Aids to Public Relations: Photography Exhibitions, trade fair, Radio, Television and special events in Public Relations.
- Advertising in Public Relations: Role, features and states of advertising in India

UNIT-III

- Employee Relations-Stake holder Relations
- Community Relations.

UNIT-IV:

- Professional code : Meaning , Principles and Code of Ethics (International, IPRA)
- International Public Relations
- Public Relations and Social Responsibility.

References Books:

1 **Mehta, D.S, Handbook of Public Relations in India, Allied Publishers Ltd, New Delhi. (1998)**
2 Sharma, Diwaker Public Relations: An Emerging Specialized Profession, Deep & Deep , New Delhi , 2004
3. Balan, K.R. Applied Public Relations and Communication, Sultan Chand & Co., New Delhi, 2002
4. Singh, U.K. & Narayan, B., Public Relations Management, Anmol Publications ,New Delhi , 1999
5.Saileshsen Gupta, Management of Public Relations and Communication(2nd Edition),2006
6.Diwaker Sharma, Public Relations:An Emerging Specialised Profession,2004
7. The Art of Public Relations,2005
8.Iqbal Sachdeva, Public Relations: Principles and Practices, Oxford Higher Education,2009

III B.A
Semester –V : Paper-VI

SECRETARIAL PRACTICE AND BASIC PHONOGRAPHY-II

Objectives:

The aim of the course is to impart knowledge about various operations of an office. The knowledge of latest office equipments is essential for a Secretary. Office Stationery is very important aspect in an organization. As it is very important for an Executive Assistant to write rapidly and accurately, the knowledge of art of writing spoken sounds with the help of principles of Sir Isaac Pitman would help the

Students to take notes and carry out office work speedily.

PART-A - Secretarial Practice-II

Unit –I :Office Automation:

Meaning of Mechanization, factors for selection of office machines, advantages and disadvantages of mechanization, Types of Machines – Communication Equipment, Copying Machines, Accounting, Tabulating and Computing Machines and Miscellaneous Machines.

Stationery: Need and importance of stationery, purchase of stationery, storage of

Stationery, issue and control of stationery.

Unit –II :Behavioral Skills:

Personality development, importance of good human relations,

Understanding organizational culture, management of time and stress, importance of ethics and values.

Unit –III :Appointments and Travel Arrangements:

Scheduling appointments, duties of Secretary before, during and after appointment. Preparation of itinerary, role and selection of travel agency, reservations.

Part-B - Basic Phonography -II

Unit –IV :The Aspirate:

Tick 'H', Dot 'H', Additional Rules for Upward and Downward 'R', and Downward 'L', Upward and Downward 'SH', Compound Consonants.

Halving Principle: Halving of strokes for 'T' or 'D', Half length 'H', Exceptions to the use of Halving Principle, Halving and Thickening of Strokes 'M', 'N', 'L' ,'R', signs for 'RT' and 'LT , joining of strokes of unequal length, Use of Halving Principle for Past Tense**,** use of Halving Principle in Phraseography.

Unit –V :Doubling Principle:

Doubling of straight and curved strokes, Doubling of Strokes 'MP/MB', alternative forms of 'MPR/MBR', Stroke 'NG', alternative forms of 'NG-KR and 'NG-GR'', Doubling of Stroke 'L', Exceptions to the use of Doubling Principle, use of Doubling Principle in Phraseography.

Di phones: Use of Di phones, Medial Semi-Circle, Left Semi-Circle, Right **Semi**circle.

Prefixes, Suffixes & Terminations. **Contractions:** omission of consonants.

Figures: Numerals in Shorthand, round numbers, monetary units.

Suggested Readings

- Office Organisation and Management, S.P. Arora, Vikas Publishing House.
- Administrative Office Management by R.K. Chopra, Himalaya Publishing House.
- Office Management and Commercial Correspondence, B.R. Duggal, KitabMahal.
- Office Management, B.R. Duggal, KitabMahal Distributors, 28 NetajiSubhashMarg,

New Delhi-110002.

- Principles of Office Management, Dr. R.C. Bhatia, Lotus Press, 4263/3, Ansari Road.Darya Ganj, New Delhi-110002
- Secretarial Services by Evelyn Anstin, Macdonald &Evavs.
- Personality Development by R.K. Mishra, Rupa Publications
- Pitman Shorthand Instructor, New Era Edition (Old Course Book), A.H.Wheeler Publications.
- Pitman Shorthand, New Course Book, A.H. Wheeler Publications.
- Shorthand Made Easy for Beginners, O.P. Kuthiala, Pitman S.S. Publications
- Phono Phrase Book, O.P. Kuthiala, Pitman S.S. Publications, New Delhi.
- Modern Phrase Book, N.V. Krishna Murty.
- Way to High Speed Writing, O.P. Kuthiala.
- Principles of Modern Phraseography, Edgar E. Thorpe.
- Personality Development by S.K.P. Selvam, APH Publication Corporation

ELECTIVES (Any one)

III B.A

Semester –VI : Paper-VII-A

ORGANISATIONAL BEHAVIOUR(Elective-I)

The objective of the course is to provide a foundation for understanding individual, group and organizational behavior, which is essential for better management of human resources in an organization.

Unit -I:

Overview of the concept and relevance of organizational behavior: meaning, features, approaches, model, challenges and opportunities.

Unit -II Foundation of individual behavior:

Biography, ability, personality (determinants and models), perception (definition, components, factors affecting, perception in decision making).

Unit III : Individual behavior

Attitude : types - Job satisfaction, involvement, commitment, effects of employee attitude, changing attitudes. Learning : Nature, theories classical conditioning, operant conditioning, cognitive learning, social learning.

Unit IV :Motivation:

Concept and theories (Maslow, Mc- Gregor, Herzberg, ERG).

Group dynamics: Nature, theories, types of group. Team work: Nature, effectiveness, potential problems.

Unit V:Communication:

Definition, interpersonal communication, process of communication,

networks, formal & informal communication, rum our & grapevine, barriers to effective communication, building effective communication, recent trends in communication.

Suggested Readings :

1. Luthans, Fred (2002) Organization Behavior (9thed), McGraw Hill, India.
2. Mishra M.N. (2001) Organizational Behavior, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Newstrom W. John, Davis Keith (1996) Organization Behavior, McGraw Hill, India.
4. Robbins S.P. (1999) Organizational Behavior, concepts, controversies and applications, Prentice-Hall, New Delhi.
5. Sharma R.A. (1982) Organization Theory and Behavior, Tata McGraw-Hill, India.
6. Andre, R. (2009) Organizational Behavior, Pearson, India.
7. Chadha, N.K. (2010) Perspectives in Organizational Behavior.
8. Rao, V.S.P. (2009) Organizational Behavior, Excel Books, India.

ELECTIVES (Any one)

III B.A
Semester –VI : Paper-VII-B

PUBLIC SYSTEMS MANAGEMENT (ELECTIVE-1I)

UNIT I: Public Systems Management: Conceptual Framework and Contextual Setting

Public Systems Management- Concept, Nature, Scope and Characteristics, Public Systems Management: Constitutional Context, Political Context and Socio-economic Context

UNIT II: Towards Understanding Governance

Concept of Governance, Role of Bureaucracy, Role of Political Executive, Role of Legislature, Role of Judiciary, Role of Non -State Actors and Institutions

UNIT III:Public Systems Management Techniques

Key Management Tools (Strategic management, Work Measurement, Decision Making Techniques), Management Information System, Total Quality Management

UNIT IV:Public Systems Management: Emerging Perspectives

Accountability and Responsiveness, Transparency and Right to Information, Performance of Public Systems

Select References:

1. Arora, Ramesh K. (Ed), 2004, Public Administration: Fresh Perspectives, Aalekh Publishers, Jaipur
2. Bhattacharya, Mohit, 2001, New Horizons of Public Administration, Jawahar Publishers, New Delhi
3. Chakraborty, Bidyut and Mohit Bhattacharya (Eds), 2003, Public Administration, A Reader, Oxford University Press, New Delhi
4. Dhameja, Alka (Ed), 2003, Contemporary Debates in Public Administration, Prentice Hall of India Pvt Ltd, New Delhi
5. Hye, Hasnat Abdul (Ed), 2001, Governance South Asian Perspectives, Manohar Publishers, New Delhi
6. Sadler P, 2003, Strategic Management, Kogan Page, London

7. Sahni, Pardeep and Uma Medury (Eds), 2003, Governance for Development: Issues and Strategies, Prentice Hall of India Invate Limiated, New Delhi

8. Srivastava, P, 2004, Management Information System: A New Framework, Shree Niwas Publications, Jaipur

9. Stephen P. Osborne (Ed), 2002, Public Management: Critical Perspectives, Vol. I, Routledge, London

10. Tandon Rajesh and Ranjita Mohanty (Eds), Civil Society and Governance: Issues and Problems, Sage, New Delhi

11. Vayunandan E and Dolly Mathew (Eds), 2003, Good Governance: Initiatives in India, Prentice Hall of India Limited, New Delhi

Cluster Electives

III B.A

Semester –VI : Paper-VIII-A1

ADMINISTRATION AND PUBLIC POLICY

Duration: 3 hours **Marks: 100 Objective Type Questions**

To provide basic understanding of Administration and public policy in India

Unit I:Public administration as a Discipline:

Meaning, scope and significance of the subject, public and private administration, brief evolution and major approaches, and comparative approaches to public administration.

Unit II:Administrative Theories:

the classical theory, scientific management, the human relation theory, and rational decision-making.

Unit III:Development Administration:

Elements of development administration. Time and space dimensions in the study of development administration, politics of development administration.

Unit IV:Understanding Public Policy:

concept and theories, relevance of policy making in public administration and process of policy formulation and implementation and

evaluation.

Unit V:Contemporary Developments:

new public administration, new public management, good governance and development, corporate governance, feminist and ecological Perspective on public policy and administration. Democratization, decentralization and social protection: administration functional and fiscal decentralization, in rural and urban context, social welfare administration and social protection for weaker sections.

Suggested Readings:

- Awasthi, A.andMaheshwari, S. (2003) Public Administration. Agra:LaxmiNarain Agarwal, pp. 3-12.
- Henry, N. (2003) Public Administration and Public Affairs. New Delhi: Prentice Hall, pp. 1-52.
- Bhattacharya, M. and Chakrabarty, B. (2005) 'Introduction: Public Administration: Theory and Practice', in Bhattacharya, M. and Chakrabarty, B. (eds.) Public Administration: A Reader. Delhi: Oxford University Press, pp.1-50.
- Henry, N. (2003) Public Administration and Public Affairs. New Delhi: Prentice Hall, pp. 53-74.

- Mouzelis, N.P. (2005) 'The Ideal Type of Bureaucracy', in Bhattacharya, M. and Chakrabarty, B. (eds.) Public Administration: A Reader. Delhi: Oxford University Press, pp. 88-100.
- Hyderbrand, W. (1980) 'A Marxist Critique of Organization Theory', in Evan, W (ed.) Frontiers in Organization & Management. New York: Praeger, pp. 123-150.
- Hyderbrand, W. (1977) 'Organizational Contradictions in Public Bureaucracies: Towards a Marxian Theory of Organizations', in Benson, J. K. (ed.) Organizational Analysis: Critique and Innovation. Beverly Hills: Sage, pp. 85-109.
- Bhattacharya, M. (1999) Restructuring Public Administration: Essays in Rehabilitation. New Delhi: Jawahar, pp. 29-70, 85-98.
- Bhattacharya, M. (2001) New Horizons in Public Administration. New Delhi: Jawahar, pp. 248-272, 301-323.
- Dye, T.R. (1975) Understanding Public Policy. New Jersey: Prentice Hall, pp. 1-38, 265-299.
- Dror, Y. (1983) Public Policy Making Reexamined. Oxford: Transaction Publication, pp.129-216.
- Wiedner, E. (ed.) (1970) Development Administration in Asia. Durham: Duke University Press.

Cluster Electives

III B.A
Semester –VI : Paper-VIII-A2
PUBLIC PERSONNEL ADMINISTRATION

UNIT-I

Public Personnel Administration – Nature – Scope – Importance, Structure of Civil Services in India – All India Services – Central Services, State Services, Position Classification.

UNIT-II

Civil Services – Recruitment, Training, Second Administrative Reforms Commission, Accountability – Permanent Executives.

UNIT-III

Higher Civil Services – Ethical Values, Discipline – Morale and Motivation, Employees Welfare – Retirement Benefits.

UNIT-IV

Employer – Employee Relations, Civil Services Unionism – Right to Strike.

UNIT – V

Promotion – Principles and Importance, Emerging Problems in Personnel Administration.

Suggested Readings

1. Arthur Procter. 2012. Principles of Public Personnel Administration. General Books.
2. Ashok Kumar. 2013. Encyclopaedia of Public and Personnel Administration (5 Vol.). Neha Publishers and Distributors, New Delhi.
3. Glenn O'Stahl. 1983. Public Personnel Administration. Harper and Row Publishers, New York.
4. Jha. 2012. Public Personnel Administration. Pearson Education India, New Delhi.
5. Lloyd G. Nigro, Felix A. Nigro, J. Edward Kellough. 2012 (7th Edition). The New Personnel Administration.Wadworth Cengage Learning.
6. Government of India,Refurbishing of Personnel Administration – Scaling New Heights, Tenth Report, Second Administrative Reforms Commission.
7. S.A. Palekar. 2005. Public Personnel Administration. ABD Publishers, New Delhi.
8. S.L.Goel and Shalini Rajneesh. (2008). Public Personnel Administration: Theory and Practise. Deep & Deep Publications Pvt. Ltd, New Delhi.

9. S.W. Hays and R.C. Kearney. 2003. Public Personal Administration: Problems and Prospects. Prentice Hall, Englewood Cliffs, NJ.
10. Suneel Parnami & K.K.Dhariwal. 2007. Training, Civil Services & Personnel Administration. Rawat Publications, New Delhi.
11. Varma, S.P. & Sharma, S.K. (1985). Managing Public Personnel Systems II, AP, New Delhi.
12. Avasthi & Maheswari (2010). Public Administration, Lakshmi Narayana Agarwal, Agra.
13. Sharan, P. (1981). Modern Public Administration, Meenakshi Prakashan, New Delhi.
14. Singh Hoshiar and Singh Mahender (1989). Public Administration in India :Theory and Practice, Sterling, New Delhi.

Cluster Electives

III B.A
Semester –VI : Paper-VIII-A3
ADMINISTRATIVE LAW

UNIT I:

- **Administrative Law : Meaning , Nature and Scope**
- **Growth of Administrative Law : Reasons**
- **Rule of Law: Concept of Rule of Law-Rule of Law under Indian Constitution.**

UNIT II:

- **Principles of Natural Justice & their Judicial interpretation**
- **Administrative discretion and Judicial control.**
- **Administrative Tribunals: Meaning, Reasons and Features ;Difference between Court and Tribunal, Limitations**

UNIT III:

- **Delegated Legislation : Meaning & Need of delegated Legislation-Types,**
- **Parliamentary control over delegated legislation**
- **Procedural & Judicial Control- Judicial Review: Principles and modes (writs).**

UNIT IV:

- **Fundamental Rights**
- **Fundamental Duties.**

References Books:

1. Kagzi, M.C.J. Indian Administrative Law, (97th edition), (Delhi Metropolitan) ,2014

2. Kesri, U.P.D. Lectures on Administrative Law (Central Law Publications) latest edition.

3. Chhabra, S. Administrative Tribunals, New Delhi 2007.

4. Pandey, J. N., Constitutional Law ,Central law Agency Allahabad, 2005.

5. Takwani,C.K., Lectures on Administrative law(5th edition), Eastern Book Co, Lucknow, 2014

6. Massey, I.P, Administrative Law(8th edition),Eastern Book Company,New Delhi,2012

7.Basu,D.D and S.P.Sen Gupta, Administrative Law(7th edition),2015

8. Kesari,U.P.D., Administrative Law(8th edition),2014

Cluster Electives

III B.A
Semester –VI : Paper-VIII-B1
STRESS AND TIME MANAGEMENT

UNIT I:Understanding Stress Management

Stress: Nature and Symptoms

Sources of Stress: Environmental, Social, Physiological and Psychological

Workplace Stress: Major Causes

Stress and Health: Effects of Stress on Health

UNIT II:Understanding Time Management

Time Management: Concept

Waste of Time: Distractions at Workplace

Time Wasters and Time Savers

Effects of Poor Time Management on Job Performance

UNIT III:Stress and Time Management: Towards Sustainable Development

- Effective Methods and Approaches to Manage Stress

  i) Methods: Yoga, Meditation, Relaxation Techniques

  ii) Approaches: Action-oriented, Emotions-oriented, Acceptance-oriented and Adaptation- oriented

UNIT IV:Effective Methods and Approaches to Manage Time

i) Creating an effective environment

ii) Setting priorities and goals
(ABC analysis, Pareto analysis, the Eisenhower Method, Domino Reactions Method, POSEC Method, Implementation of Goals, Task list Organisation, Software Applications, Time Management Systems)

iii) Elimination of non-priorities

Select References:

1. **D.N. Pestonjee, 1998, Stress and Coping: The Indian Experience, Sage Publication, India.**
2. **Dr.Sudhir Dikshit, 2011, Time Management (Hindi) Manjul Publishing House, Bhopal.**
3. Neiten, W. & Lloyd, M.A, 2007, Psychology applied to Modern life. Thomson Detmar Learning
4. **P.K.Jha, 2008, Time Management: The Art of Stress Free Productivity, Global India Publications Pvt. Ltd., India.**
5. Ramesk K. Arora, 2015, Time Management for Happiness and Success, Paragon International Publishers, New Delhi
6. **Rita Emmett, 2009, Manage Your Time to Reduce Your Stress: A Handbook for the Overworked, Overscheduled and Overwhelmed, Walker Publishing Company, INC., New York.**
7. **Tom Marcoux, 2014, Power Time Management: More Time, Less Stress, and Zero Procrastination Your Breakthrough for More Success, Happiness and Time Off, Tom Marcoux Media, LLC.**

Cluster Electives

III B.A
Semester –VI : Paper-VIII-B2
NEGOTIATIONS AND CONFLICT MANAGEMENT

UNIT I:Understanding Negotiations and Conflict Management

Conflict Management

- Nature and Causes of Organisational Conflicts
- Conflicts in an Organisation**:** Types and Levels of Conflicts
- Criteria for Conflict Management
- Conflict Management Strategies

UNIT II: Negotiation

- Bargaining strategies in negotiation
- Negotiation process: Stages
- Techniques of Negotiations: Third-party Negotiations

UNIT III: Negotiations and Conflict Management

- Styles of Handling Inter-personal Conflicts and Managing Conflict Management Process: Case Studies
- The Arbitration and Conciliation (Amendment) Act , 2015

Reading List

Government Report

Government of India, The Gazette of India Extraordinary PART II- Section 1, New Delhi, Friday, January1, 2016 www.indiacode.nic.in/acts-in-pdf/2016/201603.pdf.

Books

1. C.K.W. DeDreu & E.Van de Vliert (Eds.), 1997, Using Conflict in Organizations, Sage, London.

2. D.G. Pruitt & P.J. Carnevale, 1993, Negotiation and Social Conflict, Open University Press, England.
3. Deepak Malhotra, 2016, Negotiating the Impossible: How to Break Deadlocks and Resolve Ugly Conflicts (without Money or Muscle).Berrett-Koehler Publishers, Oakland CA

4. Deepak Malhotra and Max H. Bazerman, 2008, Negotiation Genius: How to Overcome Obstacles and Achieve Brilliant Results at the Bargaining Table and Beyond, Bantam Dell, Random House Inc., New York.

5. I William Zartman, 2007, Negotiation and Conflict Management: Essays on Theory and Practice (Security and Conflict Management), Routledge, New York.

6. L.D. Brown, 1983, Managing Conflict at Organizational Interfaces, Reading, Addison-Wesley, M.A.
7. M.Afzalur.Rahim, 2001, Managing Conflict in Organizations (3rd Ed.), Quorum Books, Westport, CT.
8. Shay & Margaret McConnon, 2008, Conflict Management in the Workplace: How to Manage Disagreements and Develop Trust and Understanding, How to Books Ltd., U.K.
9. Wendel.L. French & Cecil.H. Bell Jr, 1999, Organization Development : Behavioral Science Interventions for Organization Improvement(6th Ed.) Englewood Cliffs, Prentice-Hall, N.J.
10. William W.Wilmot and Joyce L. Hocker, 2005, Interpersonal Conflict, Mc Graw-Hill Higher Education.

Cluster Electives

III B.A
Semester –VI : Paper-VIII-B3

LOGISTICS MANAGEMENT

UNIT I:Introduction to Logistics Management

Logistics –Concept, Principles and Forms,. Logistics Management: Conceptual Framework, Scope and Importance, Logistics Management Cycle

UNIT II: **Logistics Management: Components**

Procurement of Material and Inventory Control (Economic Order Quantity, ABC and VED Analysis), Material Handling and Packaging, Transportation, Warehousing, Storage and Security, Logistics Information System

UNIT III:Logistics Management: Emerging Trends

Green Logistics, Effective Logistics Management: Challenges (Human Resource Management, Financial Management, Inventory/ Materials. Outsourcing, Customer Satisfaction etc)

Reading List

1. Ailawadi, Satish C,and Rakesh P. Singh,2011, Logistics Management(Second Edition),Prentice Hall india, New Delhi.
2. Agarwal,D.K.,2012, Text book of Logistics and Supply Chain Management (Reprint),Macmillan, Delhi.
3. Bhattacharya,S.K.,2010,Logistics Management-Definition, Dimensions and Functional Applications(Reprint),Sultan Chand and Sons,Delhi.
4. Ismail,Reji,2013, Logistics Management, Excel books India, Delhi.
5. Raghuram ,G and N. Rangaraj,Logistics and Supply Chain Management-Cases and Concepts, Macmillan India, Delhi.
6. Sople, Vinod,V., 2013, Logistics Management(Third edition),Dorling Kindersley India, New Delhi.

Cluster Electives

III B.A
Semester –VI : Paper-VIII-C1
MANAGEMENT OF RESOURCES

UNIT-I: Human Resource Management

1. Meaning, Nature, Scope and Significance of Human Resource Management

2. Human Resource Strategy and Planning.

UNIT - II:

3. Recruitment, Selection, Appointment and Promotion.

4. Pay - Components, Principles of Pay & Pay Commissions

UNIT - III Capacity Building

5. Performance Appraisal - Rewards and Incentives Management.

6. Human Resource Development- Concept of HRD; Training - Objectives, Types, Evaluation.

UNIT - IV

7. Employee Capacity Building Strategies and Quality Management

8. Human Resource Management ,Effectiveness and Human Resource Audit,

9. Issues in HRM - Downsizing, Outsourcing, Consultancies

Reference Books:

1. **Vanarula Nirvahana(Tel),Telugu Akademi**
2. **Avasthi and Maheswari: Public Administration, (30th Edition), Lakshmi Narayan Agarwal, Agra ,2010.**
3. **K. Aswathappa, Human Resource and Personnel Management, McGraw-Hill, New Delhi, 2002.**
4. **L.M.Prasad: Principles and Practice of Management, Sultan Chand and Sons, New Delhi, 2005.**
5. **Gangadhar Rao: Human Resource Management, EXCEI Books ,New Delhi ,2009.**

Cluster Electives

III B.A
Semester –VI : Paper-VIII-C2
FINANCIAL MANAGEMEMENT

UNIT I:Introduction to Public Finance and Administration

Public Finance –Meaning and Forms, Financial Administration- Nature, Scope, Importance and Principles, Fiscal Federalism- Principles, Centre-state-local body Financial Relations, Finance Commission

UNIT II:Budgeting and Budgetary Systems-I

Public Expenditure- Meaning and Classification, Fiscal Policy and Monetary Policy –Meaning, Objectives and Instruments

UNIT III: Government Budgeting

Government Budget- Concept, Features, Types, Principles and Functions, Government Budgeting in India- Preparation, Enactment and Execution, Delegation of Financial Powers and Control over Expenditure, Role of Ministry of Finance

UNIT IV:Resource Mobilisation

Public Resource Mobilisation(Taxation, Public Debt and Borrowings, Deficit Financing, GST), Tax Administration In India- Types of Taxes in India(Centre, State and Local) Methods of Taxation, Role of Central Board of Direct Taxes and Central Board of Excise and Customs .

UNIT V:Accounts and Audit

Accounting System in India- Classification of Government Accounts, Accounting System in India, Scheme of Departmentalisation of Accounts, Concept and Types of Audit, Functions and Role of Comptroller and Auditor General of India

UNIT VI:Financial Control

Financial Control of Parliament over Executive- Nature of Financial Control and Instruments of Parliamentary Control, Financial Committees, Role as Instruments of Parliamentary Control over Expenditure(Public Accounts Committee, Estimates Committee, Committee on Public Undertakings)

Reading list

1. Laxmikanth K.L., 2011, Public Administration, Tata McGraw Hill Education, 2011
2. Goel S.L., 2002, Public Financial Administration, Deep and Deep Publishers, New Delhi

3. Handa K.L., 2002, Expenditure Control and Zero Based Budgeting, Indian Institute of Finance, New Delhi

4. Hajela A.N., 2010, Public Finance (4th Ed), Ane Books, New Delhi

5. Mahajan, Sanjeev Kumar and Anupama Puri Mahajan, 2014, Financial Administration in India, PHI Learning Pvt Ltd, Delhi

6. Thavaraj, M.J.K., 2003, Financial Administration of India (7th Ed) Sultan Chand and Sons, Delhi.

7. Second Administrative Reform Commission, (Fourteenth Report), Strengthening Financial Management System, GoI, New Delhi

8. Pooja Paswan, 2015, Financial Administration of India, Rajat Publications, Delhi

Cluster Electives

III B.A

Semester –VI : Paper-VIII-C3

MANAGEMENT OF NON-GOVERNMENTAL ORGANIZATIONS

Unit-I : Introduction to NGO Management-legal Process of Forming an NGO- Management Functions of NGO

Unit II : Development of Voluntarism- Stages-International and National Scenarios

Unit III : Human Resources Management-Leadership Styles- Interpersonal Skills-Social Networking-Roles in NGO Teams-Responsibility Chart-Work Ethics

Unit IV : Financial Planning and Management-Social marketing-Funding Opportunities-Preparation of Proposal-Components-Common Pitfalls-LOGFRAME Approach-Accounting AND Auditing

Unit-V : Project Development and management-key Competencies-Factors for Successful Project-Work Breakdown Structure-Activity Sequencing-GANTT Chart

References :

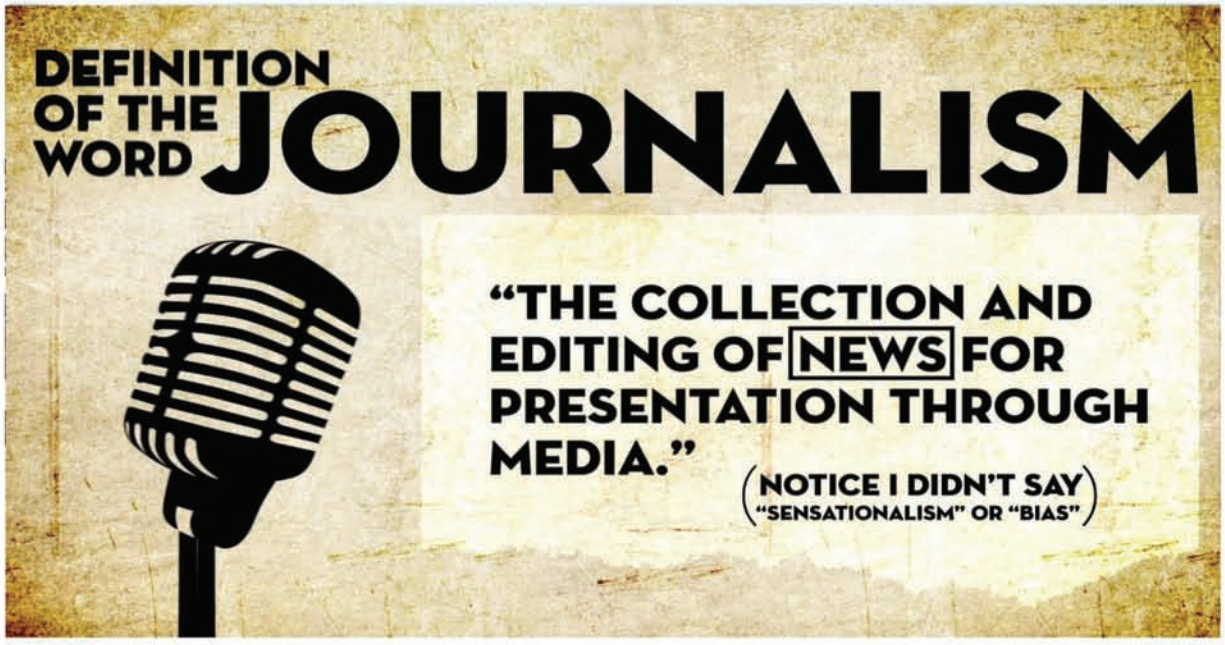
1. **Bawa, Noorjahan (ed.) Non-Government Organisations in Development: Theory and Practice, Kanishka , New Delhi,1997**
2. **Government of India ,An Action Plan to bring about Collaborative Relationship between Voluntary Organizations and Government. CAPART, (New Delhi: Government of India, 1994**
3. **----- Report of the Steering Committee on Voluntary Sector for the Tenth five year Plan (2002-07), Planning Commission, New Delhi, 2002**
4. **Gangrade, K.D. and NGOs: Retrospect and Prospect, in Randhir B.,Sooryawoorthy, R. Jain, NGOs in Development Perspective (New Delhi: latest ed.).**
5. **Prasad, Kamta (ed.) NGOs and socio-Economic Development Opportunities (New Delhi: Deep and Deep Publications Pvt. Ltd, latest ed.).**
6. **Jain, Nabhi Kumar, Handbook for NGOs: An Encyclopaedia for Non-Governmental Organisations and Voluntary Agencies , Nabhi Publications, New Delh, 2003**
7. **Jain, R.B., NGOs in Development Perspective, Vivek Prakashan, New Delhi, 1995**
8. **Anitha Abraham,Formation and Management of NGOs, Universal law Pubs,2011**
9. **Chandra,s.,mNon Governmental Organisations:Structure,Relevance and Functions,Kanishka, New Delhi,2001**

10. **Kumar R and S.L.Goel., Administration and Management of NGOs: Text and Case Studies, Deep&Deep, New Delhi,2005**

11. David Lewis, Non-Governmental, management and Development, 3rd Edition

12. Anthony J. Bebbington, Samuel Hickkey and Diana Mitlin (Eds), Can NGOS Make a Difference? : The Challenge of of Development Alternatives, Zed Books (December 1, 2007)
13. B.R.Nanda, NGO Management (With case studies), Surendra Publications
14. John Cammack, Building Financial management Capacity for NGOs and Community Organisations, ISBN:9781853398247

JOURNALISM


DEFINITION OF THE WORD JOURNALISM
"THE COLLECTION AND EDITING OF NEWS FOR PRESENTATION THROUGH MEDIA."
(NOTICE I DIDN'T SAY "SENSATIONALISM" OR "BIAS")

Course Structure of **Journalism and Mass Communication**

Year	Sem	Paper	Title of the Course	Hours	Credits	Marks	
						Internal	External
Ist Year	I	1	History of Journalism in India	5	4	25	75
	II	2	Advertising	5	4	25	75
			Practical - Advertising	3	2	0	50
II nd Year	III	3	Reporting and writing for print media	5	4	25	75
	IV	4	Communication and Culture	5	4	25	75
			Practical - Reporting	3	2	0	50
III rd Year	V	5	Public Relations and corporate communication	5	4	25	75
		6	Media laws and ethics	5	4	25	75
	VI	7	General electives (select one) Science communication Or Human rights and media	5	4	25	75
			Practical Public Relations and corporate communication practical Seminar	3 2	2 2		50 50
	VI	8	**Cluster** A 1 : Radio Journalism 2 : TV Journalism 3 : Media issues (or)	 5 5 5	 4 4 4	 25 25 25	 75 75 75
			B 1 : Photo Journalism 2 : Magazine Journalism 3:Editing and newspaper production (or)	 5 5 5	 4 4 4	 25 25 25	 75 75 75

			C 1 : Globalization and ICTs 2: Internet and Social Media 3: Web journalism	5 5 5	4 4 4	25 25 25	75 75 75
		P4	**Optional Addition:** **Practical** Assignment in respective subjects Internship Viva Voce	 3 3	 2 2		 100 100 100
			Total				

Syllabus of **Journalism and Mass Communication**

I. B.A.

Semester- I (Paper- I)

HISTORY OF INDIAN JOURNALISM

Unit 1: Early Journalism in India - Hick's Gazette –Origin of Vernacular Press in India – Indian Press and Social Reforms – Contribution of Raja Ram Mohan Ray.

Unit 2: - Indian Press and Freedom Movement - Contribution of Mahatma Gandhi, Bala Gangadhar Tilak, Anne Besent – Dr.B.R.Ambedkar

Unit 3: Contribution of national eminent newspapers - Amrit Bazaar Patrika, Hitvad, Times of India, The Statesman, The Hindu, Free Press Journal, Indian Express, Leader.

Unit 4: The origin and growth of Telugu newspapers –Vrutathini, Dina Vruthamani - Telugu Press and Social Reforms - KandukuriVeeresalingam – Freedom Movement – Kasinadhuni NageswaraRao, Konda Venkatappaiah Panthulu,Mutnuri Krishna Rao, PattabhiSeetharamaiah.

Unit 5: Krishna Patrika, Andhra Patrika, Andhra Prabha - Telugu Press after 1970s - Changing trends in Telugu Journalism - Eenadu, Udayam, Andhra Jyothi, Visalandra, Prajasakhti – Vartha - Sakshi

Reference Books:

1. RangaswamyParthasarathy, (Reprint 2011)Journalism in India, Sterling publishers private limited
2. S.C.Bhatt, (2010), Indian press since 1955, Publication division
3. J.Natarajan,(2000)History of Indian Journalism, Publication division
4. Bangore, (1973)Brown jabulu-Telugu Journalism Charitra, Bangoreprachurana.
5. Potturi VenkateswaraRao, Telugu Patrikalu :, Press academy

I. B.A.
Semester- II (Paper- II)
Advertising

Unit1
Evolution of advertising – types of advertisements – Commercial advertisings – CSR Advertising – Public Service Advertising - Recent trends in Indian Advertising.
Unit2
Various phases of advertising - Planning and campaigns – Media selection – newspapers – Magazines – Radio - Television - Direct mail - Outdoor advertising - Hoarding - Bus panels-spectacular- Bulletins– advertising agency system -market research.
Unit3
Outdoor advertising in India -Commercial advertisings over - All India Radio -Doordarshan - Recent trends in Indian Advertising - Legal and ethical aspects of advertising - Advertising policy

Unit 4
Advertising copy – Visualization – Illustrations – Layout – Headlines – Text – Color – Graphics – Psychological factors in advertising – Trademarks – Slogans – Evaluation of effectiveness
Unit 5
Advertising – problems of measurements – Opinion ratings – Concurrent methods – Recall test – Recognition test – Audience evolution for various media – Advertising code
Reference Books:

1. Chunawala S A (1999). Foundations of advertising: theory and practice. New Delhi. Himalaya publishing House
2. Dunn S. Watson (1961). Advertising: Its role in modern marketing. New York: Holt,
3. Rinehart and Winston Mohan, Manendra (1981). Advertising management: concepts and cases. New Delhi: McGraw Hill
4. Wilmshurst, John. (1985) Fundamentals of advertising. London: Heinemann.
5. Wright, John S. and Mertes, J. (1976). Advertising's role in society. St. Paul, Minn: West
6. Wells Burnett Moriarty (2003). Advertising: principles and practice. Singapore: Pearson

I. B.A.
Semester- II (Paper- II)
Advertising Practical

In the final exam, the candidates will be asked to appear for an exam where the external examiner will conduct the practical exam by giving a practice-oriented question. The answer paper will be evaluated by internal /external examiner.

II.B.A

Semester –III (Paper- 3)
Reporting and Writing for Print Media

UNIT 1: News Definition- News Value- Source of News –Structure of News–5W and 1H - Inverted pyramid pattern - Different types of News

Unit 2: Report writing skills for news stories, - Introduction to lead and Intro, super lead, Kinds of leads,

Unit 3: Kinds of reporting: Press Conference, Interviewing techniques, Human interest stories. Reporting Special events: Disasters and accidents, crime, Sports, Public Speech Reporting, Investigative reporting, Mofussil reporting, Citizen Reporting, Advocacy Reporting.

Unit 4: Features – News features – historical features - photo features –profiles – syndicate features. Reviews – definitions – scope –types of reviews – books –films – performing arts – contemporary trends in reviews.

Unit 5: Editorial writing – Types of editorials –Column writing – writing creative middles – language as a tool of writing

Suggested reading

- Anna McKane (2006). *News Writing*: London, Sage.
- Curtis Macdougall (1953): *Interpretative reporting.* New York George Allen & Unwin Ltd.
- L. S. Burns (2002). *Understanding Journalism.* London. Sage
- Susan Pape and Sue Featherstone (2005). Newspaper Journalism: A Practical Introduction, London: Sage.
- Bonnie, M, Anderson (2004). News Flash Journalism: New York, Jossey-Bass.
- Ian Hargreaves (2005). *Journalism A very short introduction*: London, Sage.
- Barbie Zeliezer and Stuart Allan (2004). *Journalism after September 11*: London, Routledge.
- Rangaswamy Parthasarathy (1984). *Basic Journalism*: New Delhi, Sterling.
- George, T J S (1981). *Editing- Principles and Practices*. Indian Institute of Mass Communication, New Delhi
- Frank Barton (1989): *The Newsroom: A manual of journalism.* New Delhi: Sterling Publishers
- Rangaswamy Parthasarathy (1984). *Basic Journalism*: New Delhi, Sterling.
- L. S. Burns (2002). *Understanding Journalism.* London. Sage
- Anna McKane (2006). *News Writing*: London, Sage.
- Ian Hargreaves (2005). *Journalism: A very short introduction*: London, Sage.
- Bowles A. Dorothy and Borden L. Diane (2000). *Creative Editing*, Belmont: Wadsworth, Thomson Learning Inc.
- Ahuja, B. N. and Chhabra, S. S. (2004).*Editing*, Delhi: Surjeet Publications.
- Mencher, Melvin (2003). *News Reporting and Writing,* New York: McGraw- Hill
- Shrivastava, K. M. (2003). *News Reporting and Editing*, New Delhi: Sterling Publishers Pvt. Ltd.

II.B.A
Semester- IV (Paper- IV)
Communication and Culture

Unit 1. Communication: Meaning-Definition and scope-Process and functions ofCommunication- barriers of communication.

Unit 2. Types of Communication: Intra- personal, interpersonal, group communication and Mass Communication; Verbal and Non- verbal communication, Flow of communication.
Unit 3. Basic Models of Communication: Shannon Weaver Model, Harold Lass well Model- Advance Models of Communication: Two step flow of Communication – Rogers and Shoemakers Model – Gate keeping Models.
Unit 4. Cultural rules and relationships- assertiveness v/s. Peace keeping-recognition of performance-the role of social contacts in intercultural business-ethical considerations in intercultural engagements

Unit 5. Information, decisions and solutions- sources of business information-information and knowledge management-problem solving- conflict resolution- Intercultural negotiation -factors in negotiation-the phases in negotiation.

Reference books

1. Holt, Rinehart and Winston Stanley J Baran and Dennis K Davis. (2006): Mass Communication Theory: Foundations,
2. Uma Narula. (1976). Mass Communication: Theory and Practice, New Delhi: Har Anan
3. Denis Mcquail and Windhal. (1986). Communication Models, London: Longman.
4. John Fiske (2002). Introduction to communication studies. London:Routledge
5. Peter Hartley (1999). Interpersonal Communication. London: sage.
6. Denis Mcquail (2005). Mass communication theory, New Delhi:sage.
7. Defluer and Ball Rockeach. (1989) Theories of Mass Communication, New York:
8. Larry A Samovar and Richard E Porter (2003). Intercultural communication. London : Wadsworth Company
9. Linda Beamer and iris Varner (2009). Intercultural communication in the global work place. London: Tata McGraw Hill
10. Joann Keyton (2006). Communication and organization culture. London; Sage

II.B.A
Semester –IV (Paper- 4)
Reporting Practical's

In the final exam, the candidates will be asked to appear for an exam where the internal/external examiner will conduct the practical exam by giving a practice-oriented question. The answer paper will be evaluated by internal /external examiner.

III.B.A

Semester –V (Paper-5)

Public Relations and Corporate Communication

Unit-1

Definitions – nature – scope- Evolution of PR in India – publicity – propaganda - Dynamic role of PR in public affairs – PR management– structure – PR policy – Four steps of PR - Methods of PR – Press relations – House journals- Periodicals – Books and other publications

Unit- 2

PR for central government –State government – Local bodies – Private Organizations – Employees relations Professional organizations of PR PRSI, PASA, IPRA, BPRA – A brief survey of PR in India – techniques – evaluation – recent trends.

Unit 3

Corporate Communication-Types - Marketing communications-Organizational communications- Definition-Tools of corporate communication-Visual identity systems-Integrated marketing communications-Coordinating teams- Communication planning system-The communication agenda to build reputation.

Unit 4

Communication to Reputation- Brand, image, - The value of a good reputation- The influence of psychology, economics, strategic management, sociology, organizational science - Linking corporate communication to reputation- Defining identity- Corporate Identity

Unit 5

Communicating with the corporate Brand-The drivers of corporate branding-Strategy drivers-Organizational drivers- Employee drivers- Value drivers-Generating value from the corporate brand-Organizational associations-Typologies of corporate brands.

Reference books:

1. Cutllip& Centre. (2005). Effective public relations, New Delhi: Pearson.
2. JV Vilanilam (2011). Public Relations in India. New Delhi: Sage.
3. Alison Thaker. (2004). The Public Relations Handbook. London: Routledge.
4. J V Vilanilanm. (2005). Mass Communication in India. New Delhi; Sage.
5. Cees B.M. van Riel and Charles J Fombrun . Essentials of Corporate Communication: Implementing practicals for effective reputation management. Routledge. 2007
6. J Jaiswany (2011). Corporate Communication, New Delhi: Oxford University.

III.B.A

Semester –V (Paper-6)
Media Laws and Ethics

Unit 1

Indian Constitution : The significance of the constitution and Preamble - Fundamental Rights and Directive Principle of State Policy- Nature of Judiciary.

Unit 2

Article 19 (1) (A): Meaning, scope and importance of Article 19 (1) (A)- New Dimensions of Freedom of Speech and Expression - Important cases on Freedom of Speech and Expression-- Judgments of landmark cases - Freedom of Press and Right to Information.

Unit 3

Press Commissions: First press commission- Second press commission - Indian Working Journalist Movement and Wage Boards - Press council:History of Press Council of India- Composition of Press Council- Functions of Press Council.

Unit 4

Advertising policy of print media - Contempt of Court – Defamation - The Official Secrets Act, 1923- Books and Registration of Newspaper Act, 1956 Working Journalists Act, 1955

Unit – 5

Media and Ethics - Media Issues in India - accuracy-fairness-completeness- Journalism and objectivity- the influence of news values- objectivity in practice- redefining objectivity - use of language – Code of Conduct in Various Media – Ethical issues in Media – Social Responsibility of the Media Person.

Reference Books:

1. Reports of **Information** and Broadcasting Ministry: First press commission Report, Vol I & II.
2. Second press Commission Report Vol I & II.
3. VanitaKohli (2006) The Indian media Business: New Delhi. Sage.
4. B.N. Pandey, Indian Constitution: Central Law Publications
5. D. D. Basu, Introduction to Indian Constitution
6. D. D, Basu, (1996) Law of the Press Third Edition, Prentice Hall of India Private Limited, New Delhi

III.B.A
7 General Elective
Paper

Semester –V (Paper-7)
Science Communication

Unit 1
Science communication – Definition – Nature – Scope and need – History of science communication – Key elements

Unit 2

Introduction to science writing – Science writing in media – Introduction and skills – Expanding fields for science writing – Science news – Writing science news – How to write a story.

Unit 3
Science communication and development – Science and technology in the ancient world- In ancient and medieval India – Diffusion of science and technology in British India – Progress in science and technology in post 1947 India communication and communication in modern India

Unit 4
Introduction to science writing – Science writing in media – Introduction and skills – Expanding fields for science writing – Science news – Writing science news – How to write a story

Unit 5
Health Communication-Overview- Issues and Trends- Opportunities and Disparities Health Communication- Sources-Barriers -Attributes -Community Outreach- Developing Effective Television Ads- Contemporary Approaches- Emerging Communication Techniques- Tele health and Telemedicine.

Reference Books

1. J V Vilanilam (1993): Science Communication and Development. Sage Publications, New Delhi
2. D.W.Burkett (1973): Writing Science News for the Mass Media, Gulf Publishing Company, Texas, USA
3. Richard K Thomas (2006): Health Communication. Springer. USA
4. Brian Brown, Paul Crawford and Ronal carter (2006). Evidence-based health communication McGraw Hill. London

Semester –V (Paper-7)

Human Rights and Media

Unit I: Human rights – Concept – Meaning – Evolution – Kinds of human rights – Civil and political rights – Economic, social and cultural rights – Human rights under UN Charter – Commission on Human rights – UN high commissioner for human rights – International coverants on human rights

Unit II: Universal declaration of human rights – International bill of human rights – Preamble- Enumeration of rights in the declaration - Civil and political rights – Economic rights and social rights – India and the universal declaration

Unit III : International conventions on inhuman acts – Genocide – Apartheid- Torture and other cruel , inhuman or degrading treatment or punishment – Slavery- Slave trade – Forced or compulsory labour- Traffic in person and prostitution – Elimination of racial discrimination – Death penalty

Unit IV: Vulnerable groups and human rights – women, rights of the child – Child labour – Rights of the migrant workers – Refugees- Stateless persons – Disabled persons – Indigenous people – Older people – Human rights commissions in India – NHRC – SHRC – Human rights courts in districts

Unit V: Human rights and media – Newspapers – TV and Films – Agenda setting – Framing of issues – Newsworthiness - Assessment of reports – Reporting and writing of human rights report

Suggested Reading

1.GopalaBhargava (2001). *Human rights concern of the Future*. New Delhi: Gyan books.
2.H.OAggarwal (*2000) International Law & Human rights*. Allahabad: Central Law Publications.
3. NJ Wheeler and Timothy Dunne (1999).*Human Rights in Global politics.* London: Oxford University Press.

Practical

In the final exam, the candidates will be asked to appear for an exam where the external examiner will conduct the practical exam by giving a practice-oriented question. The answer paper will be evaluated by internal /external examiner.

Paper 8
CLUSTER ELECTIVE A
1. Radio Journalism

Unit I: Radio as a medium- Radio as a medium of mass communication in today's context - Characteristics of radio - Limitations of radio

Unit II: Different modes of transmission & stations - Three Modes of transmission: AM, SW and FM - Different types of radio stations

Unit III: Radio journalism- Meaning & Definition -Qualities of an anchor/presenter - Importance of pronunciation & voice modulation

Unit IV: Radio Formats - Meaning & Importance- Radio news - Radio talks - Radio features

Unit V: Practical training in radio production- Preparation of audio brief - Write news for radio - Write a feature for radio -Write questions for a radio talk- Research and drafting of questions for interview.

Suggested Reading

- P. C. Chatterji (1987). *Broadcasting in India.* New Delhi: Sage Publications
- U. L. Barua (1983) *This is All India Radio- a handbook of radio broadcasting in India.* New Delhi: Publications Division
- Mehra Masani (1976) *Broadcasting and the people*. New Delhi: National Book Trust
- H. R. Luthra (1986). *Indian Broadcasting.* Publications Division, Ministry of Information and Broadcasting, Govt. of India
- G. C. Awasthi (1965). *Broadcasting in India*. New Delhi: Allied Publishers
- Vanita Kohli-Khandekar (2010). *The Indian media business*. New Delhi: Sage Publications
- Sharafat Yar Khan (1993) *Fundamentals of broadcasting- A Broadcaster's Companion.* New Delhi: Ideal Impressions (P) Ltd.
- Vyas R.V. (2002). Educational radio in India, *Turkish online journal of education July 2002 Vol. 3 Number 3*
- Singh M. (1999). Role of radio is more vital today, *Communicator: July- September 1999 pg 53-56*
- http//www.allindiaradio.org

Paper 8
CLUSTER ELECTIVE A
2. Television Journalism

UNIT I: Television as medium of mass communication – Video revolution Origin and growth – Characteristics –– Doordarsan origin and Growth in India – SITE - of Stages in TV programme production – Audience

UNIT II: Types of TV Programmes - TV News – Principle Code - News telecast technique – Programmes for special audience – Women – Youth – Children – Farmers – Students – Panel Discussion – Interview – Advertisements - Broadcast Ethics

UNIT III: Types of Private TV Channels - Comparison with other media - Educational TV - University TV - Commercial TV - Satellite TV - Cable TV - Digitalization – DTH TV – HD TV

UNIT IV: Script writing far Television - Types of scripts - Sources for Writing - Language – Grammar – Script far news – Script for commercials features, Script for interviews and plays. **UNIT V:** Studio operations: Sound and acoustics – Microphones –Lighting – Floor planning – Duties of the TV crew - Shooting – Indoor – Outdoor – Location survey – Documentaries – Dramas – Variety programmes – Role of producer and News presenter –– Tapes and recording – different formats – dubbing - Cameras – Lenses – Basic shots – Movements – Video editing

Suggested Reading

Vasuki Belavadi. (2008*). Video Production*, New Delhi: Oxford University Press.

Stuart Hyde (1998). *Radio and Television Announcing*, New Delhi: Kanishka Publishers.

Chatterji P. C. (1991). *Broadcasting in India*, New Delhi: Sage Publications.

Saksena Gopal (2000). *Television in India: Changes and Challenges*, New Delhi: Visas Publications.

Chapman, Jane and Marie *Kinsey* (eds.) (*2009*). *Broadcast Journalism: A Critical Introduction*, London New York: Routledge.

Paper 8
CLUSTER ELECTIVE A
3. Media Issues

Unit I: Indian Press- Types of ownership pattern – Advantages and disadvantages- Newspaper registration process– Registrar of Newspapers of India- Structure and duties- newspaper circulation– Readerships surveys – Audit bureau of circulation-Advertising policy of Government of India- Indian newspaper society- origin and present status.

Unit II: Press commissions – Recommendations first press commission - second press commission-recommendations- Wage policy - Wage boards-Indian working journalists' movement- Indian press-expansion of newspapers-circulation strategies- import of newsprint-
Foreign direct investment in print media.

Unit III: Autonomy of radio and television in India-Committees of Information and Broadcasting ministry-Chanda-Verghese- Varadhan committees- PrasarBharthi-Liberalization of airways.

Unit IV: Privatization of radio-FM radio in India-growth of FM radio-business trends-content in FM radio-broadcasting news and issues in FM radio- Community radio in India-guidelines –content-present status of community radio/campus radio-the future of community radio.

Unit V: Television – Private TV – Uplinking and down linking policy of government of India.-Cable TV- DTH- Internet protocol television (IPTV)-TV ads. Regulations- Digital television-TRP ratings-Television regulatory authority of India.

Suggested Reading

Herbert Lee: *Newspaper Organization and Management.* New Delhi: Surjeet publications
P.C.Chatterji (1988).*Broadcasting in India.* New Delhi. Sage Publications
MehraMasani (1986); *Broadcasting and the people.* New Delhi. National Book Trust.
Reports of Information and Broadcasting Ministry.
First press commission Report , Vol I & II.
Second press Commission Report Vol I & II.
VanitaKohli (2010) *The Indian media Business*: New Delhi: Sage
Ravidra Kumar (2014). *Three scores and fifteen*. New Delhi: Indian Newspaper Society Publication

Paper 8
CLUSTER ELECTIVE B
1. Photo Journalism

Unit I: Photo Journalism - History of photojournalism- Photographer vs Photojournalist. Understanding visuals- Human interest visuals- Photography for different media- Newspaper, magazine, internet-Importance of visuals in journalism- Timeliness, unbiased and narrating the story.

Unit II: Techniques of Photojournalism- Types of cameras- Digital versus Analogue, SLR versus Point and Shoot cameras- Different types of lenses- tripod, flash- Aesthetics of photojournalism- Composition- Camera angles-Types of image formats- Raw, JPEG, TIFF. Understanding Lights- Mobile phone for photo journalism.

Unit III: Types of Photojournalism- Sports photojournalism- Travel photojournalism- Food, Still Life- Science- Medical- spot news-War photojournalism - Wildlife photojournalism.

Unit IV: Photo feature and Editing- The online photo editors- Manipulating the images- Applying effects- Technical skills for photo journalism.

Unit V: Ethical and Legal Issues- Staging versus truthfulness- Treating subjects with respect- Privacy, Stereotyping- Public interest visuals- Photography and digital technology- Photojournalism as a profession and business- Photo Agencies- Their role in media- Photo freelancing as a profession-Photojournalist as a writer.

Suggested Reading

1. Parrish, Fred S., (2001). Photojournalism: An Introduction, Wadsworth Publishing.
2. Brill, Betsy. (2001). Photo Journalism: The Professionals' Approach, Focal Press.
3. Hoy, Frank P., (1993) Photojournalism: The Visual Approach, Prentice Hall Books.
4. McCartney, Susan. (2001). Mastering the Basics of Photography, Allworth Press
5. Drew, Helen. (2005). The Fundamentals of Photography, AVA Publishing.

Paper-8
CLUSTER ELECTIVE B
2. Magazine Journalism

Unit I: Definition and types of magazines – News- Special interest- General, lifestyle, glamour, gossip.

Unit II: Brief history of the magazine-International Magazines- Magazines in India- Their boom- Glorious years of the new magazine.

Unit III: Magazine formats and their difference from other media- magazine formats within a genre -Unique features of magazines.

Unit IV : Overview of English and Telugu language magazines today- Vernacular magazines- specialized magazines such as literary, interior, fashion, food, travel magazines

Unit V: Editing for a magazine - Niche' journalism- Financial, Cultural, Women, Sports, health, Entertainment, Travel, Developmental magazines

Suggested Reading

- Davis, Anthony; Magazine Journalism Today; (1988); Heinemann
- Baird, Click; Magazine and Production; 4th edition
- Anderson, Douglas; Contemporary Sports Reporting; (1985); Nelson-Hall
- Melkote, Srinivas; Communication for development in the third world; (1991); Sage
- Ed. Glasser, Theodore; The idea of Public, Journalism;(1999); Guilford Press
- Bathla, Sonia; Women, Democracy and the Media; (1998); Sage Publication
- Joseph, Ammu and Abraham; Whose News
- Venkateswaran, R.J; How to Excel in Business Journalism; (1994); Sterling

Paper-8
CLUSTER ELECTIVE B
3. Editing and Newspaper production

Unit I: Editing – definition – principles– Hierarchy of editing department – Qualities – Duties and responsibilities of news editor/copy editor/sub editor – news flow management – leader writers – editorial board

Unit II: Using correct grammar and punctuation – Consistent style and correct words, numerals, abbreviations, capitalization, time, dateline, checking facts, reliability of different source, editing stories

Unit III: Leads and Headlines arrangement – Types of headlines – Purpose – Characteristics – Guidelines – Placement – alignment – Typography – Type size – Width – Style – Weights

Unit IV: Design and layout – Design principles – Contrast – Proportion – Unity – Design element – Body type – Borders – Open space – Art – Color – Layout style - newspaper layout – Basic guidelines – Inside pages – Pagination layout.

Unit V: Editing pictures – Photo shop – Selecting pictures – Selecting the best shot – Preparing images for publication – Scanning – Selecting a file format – Cropping and scaling photographs – Editing information graphic – Types – Guidelines – Evolution Printing Technology.

Suggested Reading

1. Bruce Westley: News Editing. New Delhi: IBH Publishers.
2. Frank Barton (1989): The newsroom: A manual of journalism. New Delhi: Sterling Publishers.
3. R. Parthasarathy: Basic Journalism. New Delhi: McMillan

Paper-8
CLUSTER ELECTIVE C
1.Globalization and ICTs

Unit I : Globalization- Definition, Context and Challenge- Globalization and International Politics- Globalization and International Institutions- UN, World Bank, IMF, GATT and WTO, NGOs, MNCs

Unit II: Globalization networks and their impact- Globalization, ICT and Development- Technical Origin, Innovations and Productivity, Socio-economic impacts, Political impacts, ICT and E-commerce

Unit III: Diffusion of ICT- the Digital Divide- Indian Economy, Employment and ICT- ICT markets and labor markets- Software and Hardware industries- Indian IT industry

Unit IV: State, ICT and Development- ICT and Good Governance- Governance Virtual to real- Bridging the Digital Divide- ICT Options for India- Policy issues- ICT in rural India- the Kerala Experience

Unit V: ICT enabled partnerships in rural India, E-Governance through partnerships, ICT and service delivery- E seva- Case studies, Cyber laws and its implications

Suggested Reading

1. Sumit Roy. (2005). Globalization*, ICT and Developing Nation, New Delhi:* Sage.
2. R. K. Bagga, et al. (2005). *The State, IT and Development,* New Delhi: Sage.
3. James N. Rosenau and JP Singh. 2006). *Information Technologies and Global Politics,*NewYork: StateUniversity of New York Press.
4. David Held et al. (2005). *Debating Globalization*, New York: Polity Press.
5. Peter N. Stearns. (2010). *Globalization in World History*, London: Routledge.

Paper-8
CLUSTER ELECTIVE C
2. Internet and Social Media

Unit I: Humanity in the Age of the Internet- The Internet before the Internet- "Pulling" the Internet into Existence- Human Nature and the Internet
Unit II: What the internet did – Privacy- Fidelity- Volume- Velocity- Range- Persistence- Searchability

Unit III: Introduction to Networks – the Internet –Working on Internet –Addressing Skills-Domains and Sub Domains- Main features of Internet-WWW-e-mail-Tools for Web Search.
Unit IV: Websites-Blogs-Micro Blogs-social Networks-YouTube-Twitter-linked in-Pod Casting-Photo sharing – Social Book Markings-Online communities.
Unit V: Digitalization-Web Design –Electronic publication –e-News Papers-Screen- Typography Navigation-printer friendly web pages – Advertising on Internet-Viral Marketing-Law relating to Cyber Media.

Suggested Reading

1. Marshall. T.Poe. (2012). A history of communications: Cambridge University Press
2. Deborah Chambers (2012). Social media and personal relationships,Palgrave MacMillan

Paper-8
CLUSTER ELECTIVE C
3. Web journalism

Unit I: Web journalism-characteristics- Audience demands- History of web journalism – Need for web journalism- Growth of web journalism- Web journalism in India- Origin and growth

Unit II: Web writing- Characteristics- Forms of writing- Lateral writing- Web journalism vs print journalism- Objectivity vs subjectivity- Code of ethics in web journalism

Unit III: On-line journalism- Gate keeping- Accuracy and verification- source transparency as a new ethic- Bloggers vs journalists- Watchdogs in web journalism

Unit IV: User-generated content-citizens initiatives- Polling and the web- Interactive dialogue through emails- case studies

Unit V: Citizen Journalism and the public sphere- Freedom of expression-Ethical issues and case studies

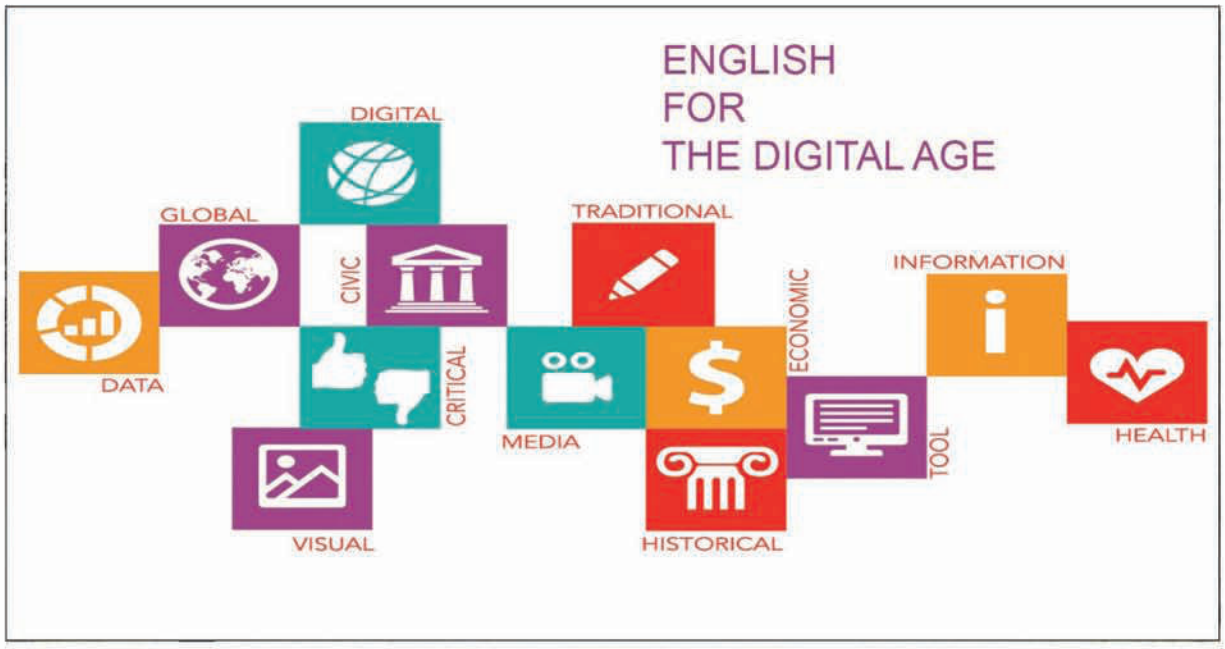
Suggested Reading

1. Arun Sandhu. (2000). *Internet Journalism: Yesterday, Today and Tomorrow*, Pune: Pune University.
2. Cecilla Friend and Jane B Singer. (2009). *Online Journalism Ethics*, New Delhi: PHI.
3. NaliniRajan. (ed) (2008). *Practicing Journalism*, New Delhi: Sage Publications.
4. J G Stovall. (2006). *Writing for the Mass Media*, New Delhi: Pearson.
5. David Berry. (2009). *Journalism, Ethics and Society*, London: Ashgate.

Practical

1. **Production.** The student shall submit an assignment (newspaper/ small magazine/ news photo album/ radio capsule/ TV capsule/ create an e-paper) that is given by the examiner in respective clusters.
2. **Internship.** The student may be sent for an internship of minimum of 6 weeks to a media organization for hands-on-experience, and submit a report on return from internship to the department for evaluation by an examiner.
3. **Viva voce:** The student needs to attend to a Viva voce exam to be conducted by internal/external examiner after the end of third year.

ENGLISH FOR THE DIGITAL AGE



CURRICULUM FOR SUBJECT English for Digital Age
UNDER CBCS PATTERN

Anchor Subject/Dept: **English**
Proposed Combination: **B.A. (History, English for Digital Age, Political Science)**

Importance of the New Course - English for Digital Age

RATIONALE

English for Digital Age is a multi-disciplinary and job-oriented programme that bridges humanities and technology by providing job opportunities in the IT and ITES sectors. The use of Technology in Language oriented operations has been increasing day by day in IT and ITES sectors. The course is designed to develop the learners' abilities of using English effectively in online and web based environments. The course will focus on clear communication for situations where the learners will be using technical language and need technical writing and speaking skills. The course will provide the learners with the language skills and also technical skills required in the present digital age. The course aims at improving the proficiency in oral and written communication in English in a multicultural environment. The digital technologies affect the way we read, study and understand texts.

By the end of the course the learners will be able to use their language skills effectively: speaking, listening, reading and writing and they can also integrate these skills with technology for online jobs.

CAREER PROSPECTS AND JOB OPPORTUNITIES

- Jobs in IT and ITES firms
- Online Translators
- Printing and Publishing
- Content Generators
- Editors in Print and Electronic Media

SYLLABUS

ENGLISH FOR DIGITAL AGE
First Year
Semester-1 Paper-I: Functional English

Objectives:

The Module ***Functional English*** lays strong foundation to the learners in primary language skills and prepares them for the subsequent professional modules. The learners who equip themselves with these skills they find themselves coping with the demands of the professional environment. The module reinforces the language skills of the learners with various advanced level activities.

Year	Semester	Module	Unit	Topics	Total No. of Hours
First Year	**First Semester**	**Paper-I** **Functional English**	**Unit-1: Remedial Grammar**	**REMEDIAL GRAMMAR:** Articles, Prepositions, Tenses, Transformation of Sentences, Question Tags and Common Errors	**60**
			Unit-2: Speaking Skills	**Speaking Skills:** Pronunciation, Intonation, Contextual Speaking, Formal and Informal Levels of Speaking, Giving Directions, Seeking Information, Giving Instructions,	
			Unit-3: Listening Skills	**Listening Skills** :Listening for Various Purposes, Telephonic Sills, Listening to Speeches	
			Unit-4: Writing Skills	**Writing Skills:** Basics of Writing Skills, Paragraph, Essay, Note Taking, Note Making, Information Transformation and Summarizing	
			Unit-5: Reading Skills	**Reading Skills**: Skimming, Scanning, Comprehension, Reading between the Lines	

Reference Books

1. Raymond Murphy, *English Grammar in Use*, Cambridge University Press, New Delhi.
2. F.T.Wood, *Remedial English Grammar for Foreign Students*, Macmillan, Chennai
3. John Seely, *Oxford Guide to Effective Writing and Speaking*, OUP, UK, 2013

SYLLABUS

ENGLISH FOR DIGITAL AGE

First Year

Semester-2

Paper-II: Computer Skills for Language Development

Objectives: ***Basic Computer Skills*** is an interdisciplinary module which aims at creating an understanding among the learners about the functioning of computers, hardware, various operating systems, applications, word processing and also webskills. The module also focuses on the advantages of using computers for language-oriented jobs.

Job Opportunities:

- Content Generators
- Editors
- Bloggers
- BPO Executives
- Front Office Executives

Year	Semester	Module	Unit	Topics	Total No. of Hours
First Year	Second Semester	Paper-II: Computer Skills for Language Development	**Unit-1: Fundamentals of Computers & Hardware**	**FUNDAMENTALS OF COMPUTERS & HARDWARE:** History, Generation, Classification, Computer System, Hardware, Cache, Peripherals, Input, Output and Memory Devices, CPU, File Management	60
			Unit-2: Mobile Learning	**COMPUTER-BASED & MOBILE LEARNING :** Learning Management Systems, Educational Applications, Online Learning Resources	
			Unit-3: Operating Systems	**OPERATING SYSTEMS** : Functions of OS, Types of OS	
			Unit-4: MS Office	**MS Office:** Microsoft Word, Microsoft Excel, Power Point and other Applications	
			Unit-5: Reading Skills	**Reading Skills**: Skimming, Scanning, Comprehension, Reading between the Lines	

Reference Books

1. Anita Goel. *Computer Fundamentals*, Pearson India, New Delhi
2. Raymond Murphy, *English Grammar in Use*, Cambridge University Press, New Delhi.
3. James Paul Gee. *Language and learning in the Digital Age*, Routledge, New York

SYLLABUS

ENGLISH FOR DIGITAL AGE

Second Year
Semester-3
Paper-III: e-Writing

Objectives

Writing is skill that is required in all the spheres of life. The modules is designed to help the learners to acquire all the knowledge and skills required to become an effective content writer. Content writing offers attractive career opportunities to the learners who have flair, skill and the ability to write. The module prepares the learners to the online writing discourses and makes them potential writers.

Year	Semester	Module	Unit	Topics	Total No. of Hours
Seond Year	Third Semester	Paper-III: e-Writing	**Unit-1: Web Resources & e-Correspondence**	**WEB RESOURCES & E-CORRESPONDENCE:** Educational Websites, Open Source Software & Applications Concept of E-Correspondence, Concept of Email, Features of Email, Advantages and Disadvantages of Email	60
			Unit-2: Netiquette & Social Media	**NETIQUETTE & SOCIAL MEDIA:** Netiquette, Privacy, Language Sensitivity, Social Networking Websites	
			Unit-3: Online Learning	**ONLINE LEARNING** : Online Learning Websites, Multicultural Class Room, Virtual Learning, Collaboration	
			Unit-4: Web Quests, Blogs & Wikis	**WEB QUESTS, BLOGS & WIKIS:** Content Delivery Platforms, Creating Blogs, Maintaining Blog Journals	
			Unit-5: Writing Projects Online	**WRITING PROJECTS ONLINE**: Online Writing Skills, Collecting Data, Compilation of Data, Graphics and Visual Aids, Preparation of Projects online, Online Helps	

Reference Books

1. Diana Booher. *E-Writing: 21st Century Tools for Effective Communication*. Pocket Books, New York
2. John Seely. *Oxford Guide to Effective Writing and Speaking* OUP, UK, 2013
3. *MLA Handbook: Rethinking Documentation for the Digital Age*, Modern Language Association of America, New York 2016

SYLLABUS

ENGLISH FOR DIGITAL AGE
Second Year
Semester-4
Paper-IV: Life Skills for Global Employment

Objectives:

Life Skills are the skills we need to deal effectively with the challenges in everyday life. They are also called life skills, 21st century skills are soft skills. Those who are able to acquire and employ these skills in their life along with their educational qualifications, will have an edge over their peers either in educational and employment opportunities. The module deals with a few important personal and professional skills which will enable the learners to meet the challenges of life and achieve their goals.

Year	Semester	Module	Unit	Topics	Total No. of Hours
Seond Year	**Fourth Semester**	**Paper-IV: Life Skills for Global Employment**	**Unit-1: Personal Skills-1**	**PERSONAL SKILLS-1:** Positive Attitude, Self Awareness & Self Motivation	**60**
			Unit-2: Personal Skills-2	**PERSONAL SKILLS-2:** Emotional Intelligence, SWOC & Stress Management,	
			Unit-3: Professional Skills-1	**PROFESSIONAL SKILLS-1** : Problem Solving, Conflict Management & Presentation Skills	
			Unit-4: Professional Skills-2	**PROFESSIONAL SKILLS-2:** Persuasion, Negotiation & Analytical Skills	
			Unit-5: Team Skills	**TEAM SKILLS**: Team Dynamics, Open-Mindedness & Cultural Sensibility	

Reference Books

1. Shalini Varma, *Soft Skills for the BPO Sector,* Person, New Delhi.
2. Nitin Bhatnagar & Mamta Bhatnagar, *Effective Communication and Soft Skills: Strategies for Success,* Person, New Delhi.
3. Barun K.Mitra. *Personality Development and Soft Skills.* Oxford University Press

SYLLABUS

ENGLISH FOR DIGITAL AGE
Third Year
Semester-5
Paper-V: Editing for Academic & Journalistic Purposes

Objectives:

There is a huge demand for editors in the field of printing and publishing, online content generation, maintaining blogs and websites. The module provides skills in editing and proofreading for academic and journalistic purposes. The strong writing skills that the learners acquire through this module will help them find job opportunities in the following areas:

Job Opportunities

- Editors in Print and Electronic Media
- Editors in Publishing
- Bloggers
- Journalists
- Technical Writers

Year	Semester	Module	Unit	Topics	Total No. of Hours
Third Year	**Fifth Semester**	**Paper-V** **Editing for Academic & Journalistic Purposes**	**Unit-1: Introduction to Editing**	**INTRODUCTION TO EDITING:** What makes a good editor?, Editor as Standard Bearer, Principles of Composition, Form	**60**
			Unit-2: Language & Style	**LANGUAGE & STYLE:** Language Varieties & Styles, Levels of Formality, MLA Handbook, APA Style Guide	
			Unit-3: Journals and Magazines	**JOURNALS** & MAGAZINES: Research Papers, Seminar Papers,	
			Unit-4: Project Works & Thesis	**PROJECT WORKS & THESIS:** Techniques of Conducting Project Work, Data Collection, Documentation and Printing	
			Unit-5: Language of Media	**LANGUAGE OF MEDIA**: Language of Headlines, Language of News Papers, Language of Advertisements	

Reference Books

1. Nick Ceramella. *Cambridge English for the Media.*CUP, New Delhi, 2008
2. John Seely, *Oxford Guide to Effective Writing and Speaking* OUP, UK, 2013

SYLLABUS

ENGLISH FOR DIGITAL AGE
Third Year
Semester-5
Paper-VI: Translation & Subtitling

Objectives:

The TV and cinema subtitling industry is a well-established market requiring professionals with specific skills. The professionals may have to translate scientific and technical documentaries, interviews news reports, cartoons, soap operas and movies from Telugu to English vice versa and write subtitles in the respective language. Subtitling is a type of audiovisual translation that has its own specifications, rules and criteria. The module will equip the learner with necessary skills to work in the fields of film and video, television and multimedia.

Year	Semester	Module	Unit	Topics	Total No. of Hours
Third Year	**Fifth Semester**	**Paper-VI: Translation & Subtitling**	**Unit-1: Techniques of Translation**	**TECHNIQUES OF TRANSLATION:** Translation, an Overview, Methods of Translation, Translation & Culture	**60**
			Unit-2: Dialogue Writing & Narrative Techniques	**DIALOGUE WRITING & NARRATIVE TECHNIQUES:** English for Conversations, Dialogue Writing & Narrative Techniques	
			Unit-3: Online Translation	**ONLINE TRANSLATION**: Translation in Digital Age, Techniques of Online Translation & Online Documentation	
			Unit-4: Subtitling	**SUBTITLING & SOFTWARES:** Subtitling for Movies, Subtitling Softwares: Introduction, Spotting and Timing	
			Unit-5: Reviewing of Films	**FILM REVIEWING** : Types of Films, Films and Language, Reviewing Films	

Reference Books

1. Jeremy Munday. *Introducing Translation Studies:* Theories and Applications, Routledge

2. Jorge Diaz Cintas. *Audiovisual Translation: Subtitling*. Routledge

3. Nitin Bhatnagar & Mamta Bhatnagar, *Effective Communication and Soft Skills: Strategies for Success,* Person, New Delhi.

SYLLABUS
ENGLISH FOR DIGITAL AGE
Third Year
Semester-6
Internship & Project Work

Year	Semester	Module	Unit	Topics	Total No. of Hours
Third Year	**Sixth Semester**	**Internship & Project Work**	**Unit-1: Internship with any Language Oriented Industry**	**INTERNSHIP WITH ANY LANGUAGE ORIENTED INDUSTRY:**	**120**
			Unit-2: Internship with any Language Oriented Industry	**INTERNSHIP WITH ANY LANGUAGE ORIENTED INDUSTRY:**	
			Unit-3: Preparation of Project Work	**PREPARATION OF PROJECT WORK**	
			Unit-5: Preparation of Project Work	**PREPARATION OF PROJECT WORK**	
			Unit-5: Viva-Voce	**VIVA-VOCE**: Presentation on the Internship and the Project Work	

Note: In the place of Internship the colleges may also go for cluster electives as mentioned below: Details of Syllabus and pattern will be prepared separately

1. English for Specific Purposes
2. Business English
3. Legal English
4. English of Sports
5. English for Scientific & Technical Writing
6. English for Academic Writing

FUNCTIONAL TELUGU

B.A. Functional Telugu Under CBCS
With effect from Academic Year – 2017-18

Semester	Part	Subject	Hrs	Credits	IA	ES	Total
		FIRST YEAR					
Semester - I	I	తెలుగు భాష – ప్రాథమిక సూత్రాలు	5	5	25	75	100
Semester – II	II	ఆధునికాంధ్ర సాహిత్యంలో ఉద్యమాలు – ప్రక్రియలు	5	5	25	75	100
		SECOND YEAR					
Semester – III	III	మాధ్యమాల రచన – (ప్రింట్ మీడియా)	5	5	25	75	100
Semester – IV	IV	మాధ్యమాల రచన – (ఎలక్ట్రానిక్ మీడియా)	5	5	25	75	100
		THIRD YEAR					
Semester – V	V	F.I.T.T.(Fundamentals in Telugu Technology)	5	5	25	75	100
	VI	అనువాదం	5	5	25	75	100
		ELECTIVE					
Semester – VI	VII	1. జర్నలిజం	5	5	25	75	100
		2. సంజ్ఞానామ పరిశీలన	5	5	25	75	100
		3. జీవిత చరిత్ర	5	5	25	75	100
		CLUSTER ELECTIVE					
Semester – VI	VIII	1. నిఘంటు నిర్మాణం	5	5	25	75	100
		2.సామెతలు–జాతీయాలు–న్యాయాలు	5	5	25	75	100
		3. ప్రాజెక్ట్ వర్క్	5	5	100	–	100

తెలుగు భాష – ప్రాథమిక సూత్రాలు

1. వర్ణం, పదం, పదాంశం, ఆధునిక సంధి స్వరూపం.
2. వాక్యం – పరిచయం – సామాన్య, సంయుక్త, సంశ్లిష్ట, క్రియాసహిత, క్రియా రహిత, కర్మణి, కర్తరి, ప్రత్యక్ష, పరోక్ష ప్రసంగం.
3. అర్థ విపరిణామం – వర్గీకరణ – ఆదానం – రకాలు.
4. ప్రమాణ భాష – మాండలికం – మాండలిక భేదాలు.
5. జాతీయాలు, లోకోక్తులు, సామెతలు.

ఉపయుక్త గ్రంథాలు:

1.	భాషాశాస్త్ర సిద్ధాంతాలు	–	డా॥ పి.యస్. సుబ్రహ్మణ్యం
2.	తెలుగు భాషా చరిత్ర	–	ఆచార్య భద్రిరాజు కృష్ణమూర్తి
3.	ఆంధ్రభాషా వికాసం	–	ఆచార్య గంటి సోమయాజులు
4.	వ్యవహారిక భాషా స్వరూపం	–	డా॥ బూదరాజు రాధాకృష్ణ
5.	తెలుగు భాషా చరిత్ర	–	డా॥ స్ఫూర్తి శ్రీ
6.	తెలుగు వాక్యం	–	డా॥ చేకూరి రామారావు.
7.	తెలుగు మౌలిక భావనలు	–	డా॥ బి.ఆర్. అంబేద్కర్ ఓపెన్ యూనివర్సిటి
8.	భాష – సమాజం – సంస్కృతి	–	భద్రిరాజు కృష్ణమూర్తి
9.	వాడుకమాటలు – మాటల వాడుక	–	డా॥ బూదరాజు రాధాకృష్ణ.

ఆధునికాంధ్ర సాహిత్యంలో ఉద్యమాలు – ప్రక్రియలు

1. సాహిత్య ఉద్యమాలు

1. సంఘ సంస్కరణోద్యమ సాహిత్యం
2. జాతీయోద్యమ సాహిత్యం
3. భావకవిత్వోద్యమం
4. అభ్యుదయ కవిత్వోద్యమం
5. దిగంబర కవిత్వోద్యమం
6. విప్లవ కవిత్వోద్యమం
7. నవ్య సంప్రదాయోద్యమం
8. స్త్రీవాద కవిత్వోద్యమం
9. దళిత కవిత్వోద్యమం

2. సాహిత్య ప్రక్రియలు

1. కథానిక
2. జీవిత చరిత్ర – స్వీయ చరిత్ర
3. వ్యాసం
4. శతకం
5. ఖండకావ్యం
6. నవల
7. స్మృతి కావ్యం (ఎలిజీ)
8. యాత్రాకావ్యం
9. వచన కవిత
10. చిట్టి కవిత (మినీ కవిత)
11. దీర్ఘ కవిత
12. నానీలు
13. హైకూ
14. గజల్
15. నాటిక
16. పేరడీ
17. అవధానం
18. పాట.

ఆధార గ్రంథాలు:

1. తెలుగు సాహిత్య సమీక్ష 1, 2 – ఆచార్య జి. నాగయ్య
2. ఆధునికాంధ్ర సాహిత్యంలో సంప్రదాయాలు, ప్రయోగాలు – డా.సి.నారాయణ రెడ్డి
3. సాహిత్య చరిత్రలో చర్చనీయాంశాలు – ఆచార్య జి.వి. సుబ్రమణ్యం
4. సామాజిక చారిత్రక నేపథ్యంలో తెలుగు భాషా చరిత్ర – ముదిగంటి సుజాతారెడ్డి
5. తెలుగు సాహిత్య చరిత్ర – ఆచార్య వెలమల సిమ్మన్న
6. పాతికేళ్ళ సామాజిక సంఘటనలు – ఎం.సి.కనకయ్య
7. ఆధునికాంధ్ర సాహిత్యంలో ఉద్యమాలు–వాదాలు–ప్రక్రియలు – డా॥ఎస్.ఎల్.వి.ఉమామహేశ్వరరావు
8. తెలుగులో లఘు కవితా రూపాలు (వ్యాసం) – రావి రంగారావు

మాధ్యమాల రచన - 1

(ముద్రణా మాధ్యమం) (ప్రింట్ మీడియా)

1.

1. ముద్రణా మాధ్యమం, పరిచయం, పరిధి, వికాసం
2. వివిధ పత్రికలు – పరిశీలన, పత్రికా భాష, శైలి, వైవిధ్యం.
3. తెలుగులో ముద్రణ సంస్థలు, అకాడమీలు, మాధ్యమ వ్యవస్థలో ఉపాధి అవకాశాలు.
4. వార్త – లక్షణం, రచన.
5. శీర్షికా రచన, వ్యాస రచన, సంపాదకీయాలు, సమీక్షలు, ఇంటర్వ్యూలు, నివేదికలు, ప్రకటనలు, కరపత్రాల రచన, విరామ చిహ్నాలు, అవగాహన

ఆధార గ్రంథాలు:

1. తెలుగు – మౌలిక భావనలు – డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
2. మాధ్యమాలకు రచన – డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
3. తెలుగు జర్నలిజం – దుర్గం రవీందర్
4. తెలుగు జర్నలిజం – బూదరాజు రాధాకృష్ణ

మాధ్యమాల రచన – 2

(ప్రసార మాధ్యమం) (ఎలక్ట్రానిక్ మీడియా)

1.

1. దృశ్య శ్రవణ మాధ్యమాలు – పరిధి, ప్రాధాన్యత
2. ప్రసార మాధ్యమాల్లో వివిధ కార్యక్రమాలు – వాటి నిర్వహణ, తీరుతెన్నులు.
3. ప్రసార మాధ్యమాల్లో వివిధ రచనలు – పరిశీలన, అవగాహన
4. దృశ్యశ్రవణ మాధ్యమాల్లో భాష, శైలి, సృజనాత్మక రచన, జనాకర్షక రచన, స్క్రిప్ట్ రచన, డ్రాఫ్ట్ రచన, కెమెరా రచన, వార్తా రచన.
5. దృశ్యశ్రవణ మాధ్యమాల్లో వాణిజ్య ప్రకటనలు, ఇంటర్వ్యూలు, ప్రత్యక్ష ప్రసారాలు, డాక్యుమెంటరీలు, సీరియల్స్.
6. తెలుగు, ఇంగ్లీషు కీ బోర్డు పరిచయం.

ఆధార గ్రంధాలు:

1. జర్నలిజం – చరిత్ర, వ్యవస్థ	–	రాపోలు ఆనంద భాస్కర్
2. సమాచారాల చేరవేత మరియు పాత్రికేయత్వం	–	ఆచార్య యస్.జి.డి. చంద్రశేఖర్
3. మంచి జర్నలిస్ట్ కావాలంటే	–	బూదరాజు రాధాకృష్ణ
4. నివేదన పద్ధతులు – భాష	–	(సం) కేతు విశ్వనాథరెడ్డి పమ్మి పవన్ కుమార్

F.I.T.T.
Fundamentals In Telugu Technology
(తెలుగు సాంకేతికత - పరిచయం)

1. తెలుగు టైపింగ్, తెలుగు టైపింగ్‌లో వివిధ లిపులు, గూగుల్ ఐ.యం.ఇ., యూనికోడ్
2. ఈమెయిల్, సోషల్ నెట్‌వర్క్ సర్వీసులు
3. వివిధ తెలుగు బ్లాగ్‌లు, వాటి పరిశీలన
4. ఇంటర్నెట్ యాక్సెస్, వెబ్ బ్రౌసింగ్, కవర్‌పేజీ డిజైనింగ్.
5. వికీపీడియా.

ఆధార గ్రంథాలు:

1. భాషా సాంకేతిక జనతా ఉపకరణాలు - 2003, CALTS హైదరాబాద్.
   సెంట్రల్ యూనివర్శిటీ ఆఫ్ హైదరాబాద్.
2. కంప్యూటర్ శాస్త్రం - కిరణ్ కుమార్
3. ప్రాక్టికల్ కంప్యూటర్ శాస్త్రం - శ్యాం బాబు
4. కంప్యూటర్ నిఘంటువు - ఇల్లా ప్రవీణ్ కుమార్, సువర్ణ. Com, హైదరాబాదు.
5. న్యూస్ ఎడిటింగ్ - నామాల విశ్వేశ్వర రావు.
   ప్రోగెసివ్ కమ్యూనికేషన్స్, హైదరాబాదు.

అనువాదం

1. అనువాద నిర్వచనం, అనువాద పద్ధతులు, అనువాద విధానాలు.

2. అనువాద సమస్యలు, భౌగోళిక, భాషా, సాంస్కృతిక సమస్యలు, పరిష్కారాలు.

3. అనువాదకుని లక్షణాలు

4. తెలుగులో ముఖ్య అనువాద గ్రంథాలు – సమీక్ష.

5. అధికార భాషగా తెలుగు, అధికార భాష ఆవశ్యకత, అధికార భాషా సంఘం.

6. ఆంగ్లం నుంచి తెలుగుకు, తెలుగు నుండి ఆంగ్లానికి అనువాదం చేయడం.

ఆధార గ్రంథాలు.

1.	అనువాద సమస్యలు	–	రాచమల్లు రామచంద్రా రెడ్డి
2.	అనువాద సిద్ధాంతాలు	–	డా॥ ఎస్. అక్కిరెడ్డి
3.	అధికార భాషగా తెలుగు	–	సి. ధర్మారావు
4.	అనువాద పాఠాలు	–	బూదరాజు రాధాకృష్ణ
5.	అనువదించడం ఎలా	–	గోవిందరాజు చక్రధర్

ELECTIVE

1. జర్నలిజం

1. జర్నల్, జర్నలిస్ట్, జర్నలిజం – నిర్వచనం– రకాలు.

2. రిపోర్టర్, ఎడిటర్ – అర్హతలు, లక్షణాలు, విధులు, పాటించాల్సిన నీతి నియమాలు.

3. న్యూస్ ఫీచర్స్, నూతన పదబంధాల సృష్టి, వార్తల్లో నుడికారాలు, లోకోక్తులు, జాతీయాల ప్రయోగం.

4. సమాచార, సాంకేతిక విప్లవం, భాష మీద ఇంటర్నెట్ ప్రభావం, భాషావరోధాలు.

5. వార్తా సేకరణ పద్ధతులు– రిపోర్టింగ్, ఎడిటింగ్.

ఆధార గ్రంథాలు:

1.	జర్నలిజం పరిచయం	–	బూదరాజు రాధాకృష్ణ
2.	తెలుగు జర్నలిజం	–	డా॥ వి. లక్ష్మణ రెడ్డి
3.	తెలుగు జర్నలిజం	–	దుర్గం రవీందర్
4.	తెలుగు జర్నలిజం చరిత్ర – వ్యవస్థ	–	రాపోలు ఆనంద భాస్కర్
5.	సమాచారాల చేరవేత, పాత్రికేయత్వం	–	డా॥ యస్.జి.డి. చంద్రశేఖర్

ELECTIVE

2. సంజ్ఞానామ పరిశీలన

1. ఊళ్ళ పేర్లు – ఇంటి పేర్లు – అధ్యయనం – పద్ధతులు

2. ఊళ్ళపేర్లు – ఇంటిపేర్లు – అర్థాలు – వ్యవహారం

3. పేర్లు – చారిత్రక వికాసం

4. పేర్లు – సమాజం – చరిత్ర

5. పేర్లు – సాహిత్య భూమిక

ఆధార గ్రంథాలు:

1. కడప జిల్లా గ్రామనామాలు – ఆచార్య కేతు విశ్వనాథ రెడ్డి
2. తెలుగువారి ఊళ్ళ పేర్లు – ఇంటి పేర్లు – డా॥ యార్లగడ్డ బాలగంగాధర రావు
3. నెల్లూరు జిల్లా గ్రామ నామాలు– భాషా పరిశీలన – డా॥ ఉగ్రాణం చంద్రశేఖర్ రెడ్డి
4. అనంతపురం జిల్లా గ్రామ నామాలు–భాషా సామాజిక పరిశీలన– డా॥ గోవింద స్వామి నాయుడు
5. కాకతీయుల శాసనాలలో గ్రామనామాలు – డా॥ కొసరాజు వెంకటేశ్వరరావు

ELECTIVE

3. జీవిత చరిత్ర – స్వీయ చరిత్ర

జీవిత చరిత్ర – పరిచయం

స్వీయ చరిత్ర – పరిచయం.

1.	మూడు వాజ్ఞయ శిఖరాలు	–	తిరుమల రామచంద్ర
2.	ఇదండీ నా కథ	–	ఎ.జి.కె. మూర్తి
3.	సత్య శోధన	–	గాంధీజీ

CLUSTER ELECTIVE

1. నిఘంటు నిర్మాణం

1. నిఘంటు నిర్మాణ పద్ధతులు

2. తెలుగులో నిఘంటు నిర్మాణ చరిత్ర, ఇతర భారతీయ భాషల్లో నిఘంటు నిర్మాణం.

3. తెలుగులో వివిధ రకాల నిఘంటువులు

4. నిఘంటువు తయారీ విధానం – పద్ధతులు

5. నిఘంటువు – అనువాదం–కొత్త పద బంధాల సృష్టి

6. శాస్త్ర సాంకేతిక పద నిఘంటువులు – పరిభాషిక పదసృష్టి.

ఉపయుక్త గ్రంథాలు:

1. నిఘంటు చరితము – వెంకట రమణాచార్యులు,

2. పత్రికా భాషా నిఘంటువు – బాలసుబ్రమణియన్.కె (సంపా)

3. తెలుగు నిఘంటువు – ఒక అధ్యయనం– గోవిందరాజులు & ఉషారాణి పి.

4. రత్నమాలిక – ఆచార్య హరి శివకుమార్.

CLUSTER ELECTIVE

2. సామెతలు – జాతీయాలు – న్యాయాలు

1. సామెతలు – పుట్టు పూర్వోత్తరాలు
2. సామెతలు – రకాల (లౌకిక, ఆధ్యాత్మిక, శతక సామెతలు)
3. జాతీయాలు – పుట్టు పూర్వోత్తరాలు, పరిశీలన
4. అనుభవాలు – న్యాయాలు
5. న్యాయాలు

ఆధార గ్రంధాలు

1. మాటల వాడుక – వాడుక మాటలు,
   అనుభవాలు – న్యాయాలు – డా॥ బూదరాజు రాధాకృష్ణ
2. మాటలు – మార్పులు – డా॥ బూదరాజు రాధాకృష్ణ
3. తెలుగు సామెతలు, జాతీయాలు
4. వేమన శతకం
5. సుమతీ శతకం

CLUSTER ELECTIVE

3. ప్రాజెక్ట్ వర్క్

1. అనువాదం

   ఏదైనా ఒక 20 తెలుగు పుటలను ఆంగ్లంలోకి అనువదించడం.

2. ఏవైనా 3 పత్రికలలో వ్యాసాలను కానీ, సమీక్షలను కానీ రాయడం, వార్తలను సేకరించడం, వార్తా పత్రికకు పంపడం.

3. వికీపీడియా

   ఏదైనా ఒక తెలుగు పుస్తకాన్ని డి.టి.పి. చేసి వికీపీడియాలో పెట్టడం.

4. కాలేజ్ మ్యాగజైన్‌ను నిర్వహించడం, మ్యాగజైన్ సమీక్షలు కానీ, గ్రంధ సమీక్షలు కానీ చేయడం.

5. ప్రత్యేక కార్యక్రమాలపై సర్వే, డేటా అనాలసిస్.

   పైన సూచించిన అంశాలలో ఏవేని మూడింటిని విద్యార్థులు పూర్తి చేయాలి.