


**GOVERNMENT RAJMOHINI DEVI GIRLS POST
GRADUATE COLLEGE, AMBIKAPUR,
SURGUJA, CHHATTISGARH-497001**

College Code :- 3402

**Programme and course outcomes for all
Programmes offered by the institution**

1.	M.A. Hindi
2.	M.A. History
3.	M.A. Political Science
4.	M.A. Sociology
5.	M.Sc. Botnay
6.	M.Sc. Chemistry
7.	M.Sc. Mathematics
8.	M.Sc. Food & Nutrition
9.	M.Sc. Human Development
10.	P.G. Diploma In Computer Application
11.	B.A. in Environmental Studies, Sociology, Political Science, Home Science, Hindi Literature, Economics, English Literature, History
12.	B.Com General
13.	B.Sc. in Chemistry, Botany, Zoology
14.	B.Sc. in Physics, Chemistry, Mathematics
15.	B.Sc. in Physics, Chemistry, Computer Science
16.	B.SC. (HOME SCIENCE)


PRINCIPAL
Govt. Rajmohini Devi
Girl's P.G. College Ambikapur
Distt.- Surguja (C.G.)



PROGRAMME OUTCOME M.A. (HINDI)

- 01 विद्यार्थी साहित्य की समझ विकसित कर रचनात्मक क्षमता का विकास करेंगे।
- 02 साहित्य की युगीन परिस्थितियों और साहित्यिक प्रवृत्तियों के आधार पर हिन्दी साहित्य के इतिहास के काल विभाजन तथा नामकरण से परिचित होंगे।
- 03 विद्यार्थियों में समीक्षात्मक दृष्टि का विकास होगा।
- 04 विद्यार्थी भाषा विज्ञान के सैद्धांतिक पक्ष से अवगत होंगे।
- 05 विद्यार्थी हिन्दी की आधुनिक काव्य प्रवृत्तियों का परिचय प्राप्त करेंगे
- 06 विद्यार्थी भारतीय एवं पाश्चात्य काव्यशास्त्र से परिचित होंगे।
- 07 हिंदी प्रतियोगी परीक्षा की तैयारी में, देश-विदेश में रोजगार, अनुवाद, पत्रकारिता, हेतु उपयोगी है। हिंदी अपने विविध रूपों में प्रतिष्ठित होने के कारण अपने व्यवहार करने वालों के लिए प्रतिष्ठादायक है।

PROGRAMME SPECIFIC OUTCOME M.A. (HINDI)

- 01 विद्यार्थियों में हिन्दी भाषा और साहित्य के प्रति रचनात्मक दृष्टि का विकास होगा।
- 02 हिन्दी रोजगारपरक होती है।
- 03 विद्यार्थियों में हिन्दी की विविध विधाओं के प्रति आलोचनात्मक दृष्टि का विकास होगा।
- 04 विद्यार्थियों में लोक साहित्य के विकास और संरक्षण की क्षमता का विकसित होगी।
- 05 विद्यार्थियों में शोध की अभिरुचि जागृत होगी।
- 06 विद्यार्थी साहित्य के नवीन विमर्शों से अवगत होंगे।

Course Outcome M.A. Ist sem.

(प्रथम प्रश्न पत्र-हिन्दी साहित्य का इतिहास) पेपर कोड -101

- 01 विद्यार्थियों को हिन्दी साहित्य के इतिहास का विस्तृत ज्ञान प्राप्त होता है।
- 02 आदिकाल, भक्तिकाल, रितिकाल और आधुनिक काल की विविध प्रवृत्तियों से परिचित होते हैं।
- 03 विद्यार्थियों को हिन्दी गद्य के उदभव, विकास और विविध विधाओं का ज्ञान प्राप्त होता है।
- 04 विद्यार्थियों को आधुनिक हिन्दी कविता के विकासक्रम की जानकारी प्राप्त होती है।

Course Outcome M.A. Ist Sem.

(द्वितीय प्रश्न पत्र-प्राचीन एवं मध्यकालीन काव्य) पेपर कोड-102

- 01 विद्यार्थियों को आदिकाल एवं भक्तिकाल की प्रवृत्तियों का ज्ञान प्राप्त होता है।
- 02 विद्यार्थी गौरवशाली मध्यकाल के प्रमुख कवियों की रचनाओं से परिचित होते हैं।
- 03 विद्यार्थियों में मध्यकालीन काव्य के प्रति आलोचनात्मक एवं व्यावहारात्मक दृष्टि का विकास होता है।

Course Outcome M.A. Ist Sem.

(तृतीय प्रश्न पत्र-हिन्दी भाषा एवं भाषा विज्ञान) पेपर कोड-103

- 01 विद्यार्थियों को हिन्दी के विविध रूपों की जानकारी प्राप्त होती है।
- 02 साहित्य के अध्ययन में भाषा विज्ञान की उपयोगिता के प्रति समझ विकसित होती है।
- 03 विद्यार्थी भारतीय आर्य भाषाओं के ऐतिहासिक विकासक्रम से अवगत होते हैं।
- 04 विद्यार्थी भाषा विज्ञान के सैद्धांतिक पक्ष से अवगत होते हैं।
- 05 विद्यार्थी हिन्दी के शब्द भेदों के विकासक्रम से परिचित होते हैं।

Course Outcome M.A. Ist Sem.

(चतुर्थ प्रश्न पत्र-शोध प्रविधि एवं कम्प्यूटर एप्लीकेशन की पृष्ठभूमि) पेपर कोड-221

- 01 विद्यार्थी शोध प्रविधि की मूलभूत अवधारणा से परिचित होते हैं।
- 02 विद्यार्थियों में शोध की अभिरुचि विकसित होती है।
- 03 विद्यार्थियों में कम्प्यूटर एप्लीकेशन की समझ विकसित होती है।
- 04 शोध के सुव्यवस्थित स्वरूप की जानकारी मिलती है।

Course Outcome M.A. Ist Sem.

(पंचम प्रश्न पत्र-पर्यावरण एवं वानिकी विधि) पेपर कोड -ए01

- 01 विद्यार्थी पर्यावरण एवं वन संरक्षण एवं संवर्धन के प्रति जगरूक होंगे।
- 02 विद्यार्थी पर्यावरण एवं जगत के अंतर्संबंधों को समझ सकेंगे।
- 03 विद्यार्थियों में धारणीय विकास के प्रति सचेतनता का विकास हो सकेगा।

Course Outcome M.A. Ist Sem.

(पंचम प्रश्न पत्र-संत कवि कबीरदास) पेपर कोड -ए02

- 01 संत कवि कबीरदास के व्यक्तित्व एवं कृतित्व की विस्तृत जानकारी प्राप्त होती है।
- 02 विद्यार्थी कबीरदास के साहित्य की व्यापक प्रासंगिकता से अवगत होते हैं
- 03 विद्यार्थियों में कबीर के साहित्य के प्रति आलोचनात्मक दृष्टि विकसित हो सकेंगी।
- 04 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होती है।

Course Outcome M.A.Ist Sem.

(पंचम प्रश्न पत्र—महाकवि सूरदास) पेपर कोड —ए03

- 01 विद्यार्थियों को महाकवि सूरदास के व्यक्तित्व एवं कृतित्व की विस्तृत जानकारी प्राप्त होती है।
- 02 विद्यार्थी अन्य भक्तिकालीन कवियों के साथ सूरदास का तुलनात्मक अध्ययन करने की योग्यता प्राप्त करते हैं।
- 03 विद्यार्थी सूर साहित्य की व्यापक प्रासंगिकता से अवगत होते हैं।
- 04 विद्यार्थियों में सूर साहित्य के प्रति आलोचनात्मक दृष्टि विकसित हो सकेगी।
- 05 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होती है।

Course Outcome M.A.Ist Sem.

(पंचम प्रश्न पत्र—महाकवि तुलसी दास) पेपर कोड —ए04

- 01 विद्यार्थियों को महाकवि तुलसीदास के व्यक्तित्व एवं कृतित्व की विस्तृत जानकारी प्राप्त होती है।
- 02 विद्यार्थी अन्य भक्तिकालीन कवियों के साथ तुलसीदास का तुलनात्मक अध्ययन करने की योग्यता प्राप्त करते हैं।
- 03 विद्यार्थी तुलसी साहित्य की व्यापक प्रासंगिकता से अवगत होते हैं।
- 04 विद्यार्थियों में तुलसी साहित्य के प्रति आलोचनात्मक दृष्टि विकसित हो सकेगी।
- 05 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होती है।

Course Outcome M.A.Ist Sem.

(पंचम प्रश्न पत्र—महाकवि तुलसी दास) पेपर कोड —ए05

- 01 विद्यार्थी जयशंकर प्रसाद के व्यक्तित्व एवं कृतित्व की विस्तृत जानकारी प्राप्त कर सकेंगे।
- 02 छायावाद एवं उसकी विशेषताओं को समझ सकेंगे।
- 03 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होती है।

Course Outcome M.A.Ist Sem.

(पंचम प्रश्न पत्र—आचार्य रामचंद्र शुक्ल) पेपर कोड —ए06

- 01 विद्यार्थी तत्कालीन सामाजिक, सांस्कृतिक, राजनैतिक, आर्थिक परिस्थितियों से रचनाओं के माध्यम से अवगत हो सकेंगे।

Course Outcome M.A.IInd Sem.

(प्रथम प्रश्न पत्र—आधुनिक काव्य) पेपर कोड—201

- 01 विद्यार्थी आधुनिक हिन्दी काव्य की प्रमुख प्रवृत्तियों से परिचित हो सकेंगे।
- 02 विद्यार्थियों को आधुनिक काल के प्रबंध और मुक्तक काव्य के तात्त्विक स्वरूप की जानकारी प्राप्त होगी।
- 03 विद्यार्थी आधुनिक युग के उक्त काव्य प्रकारों के विकासक्रम से परिचित हो सकेंगे।
- 04 विद्यार्थियों को आधुनिक काव्य प्रकारों के तात्त्विक स्वरूप एवं विकासक्रम के परिप्रेक्ष्य में रचनाओं के आस्वादन, अध्ययन और मूल्यांकन की दृष्टि मिलेगी।

Course Outcome M.A.IInd Sem.

(द्वितीय प्रश्न पत्र—कथा साहित्य) पेपर कोड—202

- 01 विद्यार्थी गद्य विद्याओं के तात्त्विक स्वरूप से परिचित हो सकेंगे।
- 02 विद्यार्थियों को प्रमुख गद्य विद्याओं के विकासक्रम की जानकारी हो सकेगी।
- 03 विद्यार्थियों में विद्या विशेष के तात्त्विक स्वरूप एवं ऐतिहासिक विकास के परिप्रेक्ष्य में रचना विशेष का महत्व समझने एवं मूल्यांकन की क्षमता का विकास हो सकेगा।
- 04 रचना के आस्वादन एवं समीक्षण की क्षमता का विकास हो सकेगा।

Course Outcome M.A.IInd Sem.

(तृतीय प्रश्न पत्र—भारतीय काव्य शास्त्र) पेपर कोड—203

- 01 विद्यार्थियों को भारतीय साहित्यशास्त्र की मूलभूत अवधारणाओं का ज्ञान हो सकेगा।
- 02 विद्यार्थी भारतीय काव्यशास्त्र के विकासक्रम को समझ सकेंगे।
- 03 विद्यार्थी भारतीय साहित्यशास्त्र के प्रमुख सिद्धांतों एवं रचनाओं से परिचित हो सकेंगे।
- 04 विद्यार्थियों को भारतीय काव्यशास्त्र के सिद्धांतों में साम्य, वैषम्य एवं उसके कारणों का ज्ञान हो सकेगा।

Course Outcome M.A.IInd Sem.

(चतुर्थ प्रश्न पत्र—सामाजिक अधिगम एवं कौशल विकास) HND-S o1

- 01 विद्यार्थी क्षेत्र आधारित कार्य के लिए प्रेरित होते हैं।
- 02 विद्यार्थियों में कौशल विकास के प्रति जागरूकता पैदा होती है।
- 03 विद्यार्थियों में पर्यावरण की चेतना विकसित होती है।
- 04 विद्यार्थियों में सामाजिक उत्तरदायित्वों के प्रति जागरूक आती है।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—भारतीय राजनैतिक व्यवस्था एवं संवैधानिकता) पेपर कोड—बी 01

- 01 विद्यार्थियों में भारत की राजनैतिक व्यवस्था को समझने की दृष्टि का विकास हो सकेगा ।
 02 विद्यार्थी संविधान में प्रदत्त अधिकारों से अवगत हो सकेंगे ।
 03 विद्यार्थियों में अपने कर्तव्यों को समझ कर एक जिम्मेदार नागरिक होने का बोध जागृत हो सकेगा ।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—आदिकाव्य) पेपर कोड—बी 02

- 01 विद्यार्थी हिंदी साहित्य की आदिकालीन सामाजिक—सांस्कृतिक पृष्ठभूमि से अवगत हो सकेंगे ।
 02 तत्कालिक प्रमुख कवियों एवं कृतियों से परिचित हो सकेंगे ।
 03 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होगी ।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—संतकाव्य) पेपर कोड—बी 03

- 01 विद्यार्थी तत्कालिक सामाजिक—सांस्कृतिक पृष्ठभूमि से अवगत हो सकेंगे ।
 02 संतकाव्य की प्रवृत्तियों एवं अन्य कवियों की कृतियों से अवगत हो सकेंगे ।
 03 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होगी ।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—रीतिकाव्य) पेपर कोड—बी 04

- 01 रीतिकाव्य की प्रवृत्तियों एवं अन्य कवियों की कृतियों से अवगत हो सकेंगे ।
 02 विद्यार्थी तत्कालिक सामाजिक—सांस्कृतिक पृष्ठभूमि से अवगत हो सकेंगे ।
 03 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होगी ।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—छायावादी काव्य) पेपर कोड—बी 05

- 01 विद्यार्थी छायावादी काव्य आंदोलन से परिचित होंगे हैं ।
 02 विद्यार्थी छायावाद की प्रमुख प्रवृत्तियों को समझ सकेंगे ।
 03 विद्यार्थी छायावाद के प्रमुख कवि और उनकी प्रमुख कृतियों से परिचित हो सकेंगे ।
 04 तत्कालीन कवियों की पाठ्य कृतियों को पढ़कर विद्यार्थियों में कृतियों के प्रति आलोचनात्मक दृष्टि का विकास हो सकेगा ।

Course Outcome M.A.IInd Sem.

(पंचम प्रश्न पत्र—स्वातंत्रयोत्तर हिंदी काव्य) पेपर कोड—बी 06

- 01 विद्यार्थी नई कविता से परिचित होंगे ।
 02 स्वातंत्रयोत्तर हिंदी काव्य प्रवृत्तियों, कवियों एवं कृतियों से परिचित हो सकेंगे ।
 03 विद्यार्थी तत्कालिक सामाजिक—सांस्कृतिक पृष्ठभूमि से अवगत हो सकेंगे ।
 04 विद्यार्थियों में पाठ्यकृतियों के संदर्भ में समीक्षात्मक क्षमता विकसित होगी ।

Course Outcome M.A.IIIrd Sem.

(प्रथम प्रश्न पत्र—हिन्दी निबंध एवं अन्य गद्य विद्याएं) पेपर कोड—301

- 01 विद्यार्थी हिन्दी गद्य साहित्य के विकासक्रम को समझ सकेंगे ।
 02 विद्यार्थी हिन्दी गद्य की प्रमुख विद्याओं के तात्त्विक स्वरूप से परिचित हो सकेंगे ।
 03 गद्य विद्याओं को पढ़कर विद्यार्थियों में उसके मूल्यांकन करने की क्षमता का विकास हो सकेगा ।
 04 विद्यार्थियों में रचना के आस्वादन एवं सभी की क्षमता का विकास हो सकेगा ।

Course Outcome M.A.IIIrd Sem.

(द्वितीय प्रश्न पत्र—छायावादोत्तर हिन्दी काव्य) पेपर कोड—302

- 01 विद्यार्थी छायावादोत्तर हिन्दी काव्य की प्रमुख प्रवृत्तियों से परिचित हो सकेंगे ।
 02 विद्यार्थी छायावादोत्तर हिन्दी काव्य के विकासक्रम को समझ सकेंगे ।
 03 विद्यार्थी छायावादोत्तर काव्य की प्रमुख कृतियों से परिचित हो सकेंगे ।
 04 विद्यार्थियों में छायावादोत्तर हिन्दी काव्य के तत्कालीन स्वरूप एवं विकासक्रम के परिप्रेक्ष्य में रचनाओं के आस्वादन अध्ययन और मूल्यांकन की दृष्टि का विकास हो सकेगा ।

Course Outcome M.A.IIIrd Sem.

(तृतीय प्रश्न पत्र—पाश्चात्य काव्य शास्त्र) पेपर कोड—303

- 01 विद्यार्थी पाश्चात्य काव्य शास्त्र की मूल अवधारणा से परिचित हो सकेंगे ।
 02 विद्यार्थी पाश्चात्य काव्यशास्त्र के विकासक्रम को समझ सकेंगे ।
 03 विद्यार्थी नई समीक्षा के सिद्धांतों से परिचित हो सकेंगे ।
 04 विद्यार्थियों में आलोचना की विविध प्रणालियों एवं नई अवधारणाओं के प्रति मूल्यांकन दृष्टि का विकास हो सकेगा ।

Course Outcome – M.A.IIIrd Sem.

(चतुर्थ प्रश्न पत्र—बौद्धिक सम्पदा मानवाधिकार एवं पर्यावरण: पृष्ठभूमि) पेपर कोड—एस 02

- 01 विद्यार्थी बौद्धिक सम्पदा की अवधारणा से परिचित हो सकेंगे।
02 विद्यार्थी मानवाधिकार से परिचित हो सकेंगे।
03 विद्यार्थियों में पर्यावरणीय चेतना का विकास हो सकेगा।
04 विद्यार्थी पर्यावरण से जुड़े विविध पहलुओं से परिचित हो सकेंगे।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—जनजातीय अध्ययन) पेपर कोड—सी 01

- 01 विद्यार्थी भारत की विभिन्न जनजातियों से परिचित हो सकेंगे।
02 जनजातीय समाज और उनकी संस्कृति एवं अन्य समाज से अंतर्संबंधों से अवगत हो सकेंगे।
03 विद्यार्थी जनजातीय समाज एवं संस्कृति के महत्व से अवगत हो सकेंगे।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—हिंदी आलोचना) पेपर कोड—सी02

- 01 विद्यार्थियों में साहित्यिक कृतियों की आलोचना की समीक्षा की खमता विकसित हो सकेगी।
02 साहित्यिक कृतियों के तुलनात्मक अध्ययन की क्षमता विकसित हो सकेगी।
03 विद्यार्थियों में तर्कशक्ति विकसित हो सकेगी।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—हिंदी साहित्य और भारतीय संस्कृति) पेपर कोड—सी03

- 01 विद्यार्थी हिंदी साहित्य में भारतीयता की पहचान कर सकेंगे।
02 साहित्य में निहित मानवीय मूल्यों की पहचान कर सकेंगे।
03 साहित्य के माध्यम से भारतीय संस्कृति का विशद ज्ञान प्रपप्त कर सकेंगे।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—दृश्य श्रव्य माध्यम लेखन) पेपर कोड—सी04

- 01 विद्यार्थी दृश्य श्रव्य माध्यमों का विशद ज्ञान प्राप्त कर सकेंगे।
02 अध्ययन उपरांत रोजगार प्राप्ति के अवसर प्राप्त हो सकेंगे।
03 हिंदी-अंग्रेजी भाषा के व्यावहारिक ज्ञान की प्राप्ति हो सकेगी।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—हिंदी नाटक एवं रंगमंच) पेपर कोड—सी05

- 01 विद्यार्थी हिंदी साहित्य की प्रारंभिक गद्य विधा रंगमंच के विकासक्रम से अवगत हो सकेंगे।
02 महत्वपूर्ण नाट्य रचना विशेष के महत्व को समझने एवं मूल्यांकन करने की क्षमता विकसित हो सकेगी।
03 नाट्य रचना के आस्वादन एवं समीक्षा की क्षमता का विकास हो सकेगा।

Course Outcome M.A.IIIrd Sem.

(पंचम प्रश्न पत्र—लोक साहित्य) पेपर कोड—06

- 01 विद्यार्थी लोक जीवन एवं लोक संस्कृति से परिचित हो सकेंगे।
02 विद्यार्थियों में लोक संस्कृति की समझ विकसित हो सकेगी।
03 विद्यार्थियों का लोक जीवन के प्रति जुड़ाव हो सकेगा।
04 विद्यार्थियों में लोक साहित्य के सृजन की रुचि जागृत हो सकेगी।

Course Outcome M.A.IVth Sem.

(प्रथम प्रश्न पत्र—भारतीय साहित्य) पेपर कोड—401

- 01 विद्यार्थी हिन्दी साहित्य के अखिल भारतीय परिप्रेक्ष्य से परिचित हो सकेंगे।
02 विद्यार्थी हिन्दीतर भाषाओं में लिखे साहित्य से परिचित हो सकेंगे।
03 विद्यार्थियों को भारतीय साहित्य में व्यक्त भारतीयता की पहचान करने की क्षमता विकसित हो सकेगी।
04 विद्यार्थियों में साहित्यिक अनुवाद के आस्वादन एवं मूल्यांकन की क्षमता विकसित हो सकेगी।

Course Outcome M.A.IVth Sem.

(द्वितीय प्रश्न पत्र—हिन्दी पत्रकारिता) पेपर कोड—402

- 01 विद्यार्थी हिन्दी पत्रकारिता की मूल अवधारणाओं एवं मूल स्थापनाओं से परिचित हो सकेंगे।
02 विद्यार्थी हिन्दी पत्रकारिता के उद्भव और विकासक्रम को समझ सकेंगे।
03 विद्यार्थियों में हिन्दी में कम्प्यूटर के प्रयोग की विधि की क्षमता का विकास हो सकेगा।
04 विद्यार्थियों में विभिन्न क्षेत्रों में हिन्दी के कार्यसाधक प्रयोग की कुशलता का विकास हो सकेगा।

Course Outcome M.A.IVth Sem.

(तृतीय प्रश्न पत्र—प्रयोजनमूलक हिन्दी) पेपर कोड—403

- 01 विद्यार्थियों में प्रयोजनमूलक हिन्दी के प्रति अभिरुचि का विकास हो सकेगा।

- 02 विद्यार्थी प्रयोजनमूलक हिन्दी के विविध रूपों से परिचित हो सकेंगे।
- 03 विद्यार्थी कार्यालयीन हिन्दी के स्वरूप से परिचित हो सकेंगे।
- 04 मीडिया लेखन के विविध स्वरूपों को जानकर विद्यार्थी मीडिया लेखन के प्रति जागरूक हो सकेंगे।

Course Outcome M. A. IVth Sem.

(चतुर्थ प्रश्न पत्र—लघुशोध प्रबंध) पेपर कोड—421

- 01 विद्यार्थियों में शोध की अभिरुचि का विकास होगा।
- 02 विद्यार्थियों में शोधपरक दृष्टिकोण का विकास हो सकेगा।
- 03 विद्यार्थी विषय—विशेष पर शोध करते हुए उस विषय पर विस्तृत अध्ययन कर सकेंगे।
- 04 लघुशोध प्रबंध के माध्यम से विद्यार्थी आगे के शोध एम.फिल/पी.एच.डी. हेतु तैयार हो सकेंगे।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र—प्रायोगिकी एवं मौखिकी) पेपर कोड डी—01

- 01 विद्यार्थियों में विषय के सैद्धांतिक एवं व्यावहारिक पक्षों की समझ विकसित हो सकेगी।
- 02 भाषा और अभिव्यक्ति कौशल का विकास हो सकेगा।
- 03 भविष्य में विभिन्न पदों हेतु होनेवाले साक्षात्कार के लिए अपेक्षित ज्ञान और समझ का विकास हो सकेगा।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र—भारतीय मूलभाषा पालि) पेपर कोड डी—02

- 01 विद्यार्थी मध्यकालीन भारतीय मूलभाषा पालि के साहित्य एवं तत्कालीन सामाजिक—सांस्कृतिक पृष्ठभूमि से अवगत हो सकेंगे।
- 02 भारतीय आर्यभाषाओं के विकासक्रम को समझ सकेंगे।
- 03 पालि भाषा के व्याकरणिक नियमों से अवगत हो हिंदी भाषा के व्याकरण को समझने की क्षमता का विकास हो सकेगा।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र— अनुवाद विज्ञान) पेपर कोड डी—03

- 01 विद्यार्थियों में अनुवाद के विविध रूप तथा अनुवाद प्रक्रिया को समझने की क्षमता का विकास हो सकेगा।
- 02 विद्यार्थी अनुवाद के सामाजिक—सांस्कृतिक पक्षों से अवगत होंगे।
- 03 विद्यार्थियों में अनुवाद करने की क्षमता विकसित हो सकेगी।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र— कोश विज्ञान) पेपर कोड डी—04

- 01 विद्यार्थी कोश विज्ञान की व्युत्पत्ति एवं इतिहास से अवगत हो सकेंगे।
- 02 विद्यार्थी हिंदी की पारिभाषिक शब्दावली निर्माण, संकेताक्षर, कूटशब्द का ज्ञान प्राप्त कर सकेंगे।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र— पाठालोचन) पेपर कोड डी—05

- 01 विद्यार्थी पाठालोचन की पद्धतियों, शैलियों से अवगत हो सकेंगे।
- 02 विभिन्न ग्रंथों के विवेचन, विश्लेषण की क्षमता का विकास हो सकेगा।
- 03 पाठ की अवधारणा, पाठ निर्धारण की प्रक्रिया, संपादनकला का विकास हो सकेगा।

Course Outcome M.A.IVth Sem.

(पंचम प्रश्न पत्र—भाषा शिक्षण) पेपर कोड—06

- 01 विद्यार्थी भाषा शिक्षण के विविध स्वरूपों से परिचित हो सकेंगे।
- 02 विद्यार्थियों को भाषा शिक्षण के महत्व और उपयोगिता का ज्ञान प्राप्त हो सकेगा।
- 03 विद्यार्थियों में भाषा शिक्षण के प्रति मूल्यांकनपरक दृष्टि विकसित हो सकेगी।



SEMESTER 1

Paper Name :- HISTORICAL METHOD

Outcome

Identify the major historiographical paradigms that have impacted on the writings of History.

- Distinguish between the major arguments of different types of historiographical interventions.
- Identify the important contexts of these historiographical interventions.
- Within each of these historiographies-like Marxism, gender or environmental history the student will be able to identify the debates and shifts amongst historians. They will be able to avoid flattening their rich complexities within rudimentary typologies of schools.
- Learn that the simple recounting of facts is always imbedded in particular historiographical narratives, subject to which they will be introduced in this course

PAPER TWO HISTOGRAPHY OUTCOME

1. Understand the past and present of the disciplines of history and public history by exploring their purpose, practice, and philosophy
2. . Reflect on the purposes, goals, motives, and assumptions historians bring with them to the study of history.
3. Understand the privileges and obligations associated with a career as a professional historian.
4. Understand historical trends in theory and method and be able to identify and explain major trends and issues in historiography.

Paper Name:- MODERN WORLD OUTCOME

- 1 Explain and analyze a key historical event or process in the area and during the period under study
2. Understand the diversity of the human experience as influenced by geographical location, race, ethnicity, cultural traditions, gender and class
3. Analyze historical processes that shape individuals and communities, drawing on detailed knowledge about the history of the area under study
4. Think critically about the varieties of experience found in the historical record of the United States, exploring diversity as a critical component of history
5. Distinguish between primary and secondary sources, and understand how each are used to make historical arguments.

Paper Name:- ANCIENT AND MEDIEVAL HISTORY OF CHHATTISGARH

Outcomes:

- How was Chhattisgarh at the time of Kalchuri dynasty? Informs the students of the glorious history of Chhattisgarh.
- How did Chhattisgarh come under the monopoly of Maratha rule? In formulation related to the relationship between Maratha in Chhattisgarh.
- Students understood about national movement and publicity participation in Chhattisgarh
- Important topics to be told to the students about workers and tribal struggle in Chhattisgarh.
- Provide the Knowledge of the glorious tradition, history and development of Chhattisgarh to the students.

Paper Name :- HISTORY OF CHINA AND JAPAN 1800- 1911

1. Will be able to understand the political historical activities of the Far East Asia.
2. Will be able to understand the victory of Japan over the bigger countries due to his military power.

SEMESTER 2

Paper Name: - CONTEMPORARY WORLD OUTCOME

1. Students gained knowledge about political history of modern world.
2. Students traced and analyzed the main development of contemporary world and explored the important developments of 20th century world.
3. Students acquired the knowledge of the principles, forces, processes and problems of the recent times.
4. Students were able to explain the various political movements and growth of nationalism in different parts of the world.

Paper Name: - MODERN CHHATTISGARH

The Early history of Chhattisgarh.

- They would also be able to know the different dynasties ruled in Chhattisgarh.
- They would learn about the national movements in Chhattisgarh.
- They would have a comprehensive knowledge of the administration changes in Chhattisgarh through nineteenth century.
- It will help to understand the history of Chhattisgarh which became important in the course of history.
- It understands the geographical background that the characteristics of that particular place can be explained to the students.
- Students understood the local culture and art of Chhattisgarh, how it is different from other states, it is unique
- Became aware of the tribal traditions of the life of the tribals

- Studied economic development.
- Took information about archaeological site and information about tourist place

Paper Name: - HISTORY OF CHINA AND JAPAN 1911 - 1950

- To locate these historical transitions in light of other contemporaneous trajectories into a global modernity
- Analyse significant historiographical shifts in Chinese history, especially with reference to the discourses of nationalism, imperialism, and communism
- Investigate the political, economic, social and cultural disruptions caused by the breakdown of the centuries old Chinese institutions and ideas, and the recasting of tradition to meet modernist challenges
- Describe the genesis and trace the unique trajectories of the Chinese Communist Revolution.
- Locate the rise of China in the spheres of Asian and world politics respectively.

SEMESTER 3

Paper Name: - HISTORY OF MODERN INDIA POLITICAL AND ADMINISTRATION 1757-1857

Students will develop a holistic critical understanding of the social, economic, political, military and cultural conditions prevalent in India (1757-1857).

- The course will enable the students to understand the evolution of British policy in India with reference to the key concepts of modern Indian colonial history like Colonialism, Indology, Paramountcy, Orientalism and Utilitarianism.
- While examining the Indian responses to the establishment of British power in India the students will learn more about the central concerns of social reform initiatives, popular protest, military organization and education.

Paper Name: - HISTORY OF MODERN INDIA ECONOMIC SOCIAL AND CULTURAL 1757- 1857

Students will develop a holistic critical understanding of the social, economic, political, military and cultural conditions prevalent in India (1757-1857).

- The course will enable the students to understand the evolution of British policy in India with reference to the key concepts of modern Indian colonial history like Colonialism, Indology, Paramountcy, Orientalism and Utilitarianism.
- While examining the Indian responses to the establishment of British power in India the students will learn more about the central concerns of social reform initiatives, popular protest, military organization and education
- Know the objectives of Utilitarian towards Indian Society
- Know the activities of Christian missionaries during the British Period
- Know how the modern education in India was developed.
- Know the different phases of growth press in India

OPTIONAL Paper Name: - HISTORY OF NATIONAL MOVEMENT 1857-1922

- To developed an understanding of social religious reform movements salving British India.
- Nationalistic approaches of National Moments.
- Causes responsible for partition of India.

OPTIONAL Paper Name: - CULTURAL HISTORY OF INDIA BEGINING TO 1526

- Sources – History as a social science – Influence of Geography on Indian History
- Harappan Culture – Vedic Civilisation
- Importance of 6th Century B.C. in Indian History Buddhism and Jainism.
- Alexender’s invasion and its effects
- Mauryan – Asoka’S Dhamma – Mauryan Administration – Decline and Down fall – cultural conditions in the Mauryan Age.
- Kushans – Kanishka – Cultural Contributions – Satavahanas – Social Economic, political and Religious conditions.
- Imperial Guptas – Samudragupta – Contribution to Culture-Fahien. Harsha and his achievements- Yuan chawing Rajput Heritage.
- India’s Cultural contacts with neighbouring Countries – Central South East and East Asia.
- Pallavas and their Contribution to culture and Arts. Western Chalukyas of Badami – Pulakesin II. Eastern Chalukyas of Vengi.
- Imperial Cholas – Administration – Cultural Contributions.
- Turke – Afgan invasions – Arab Conquest of sind Invasions of Ghazni and Ghori – establishment of sultanate- Alauddin.
- Khilji Mohammad Bin Tugluq - Influence of Islam on Indian Culture Bhakti Movement.
- The Kakatiyas – Socio – economic condition – their cultural contributions.
- Vijayanagar Empire – Krishna devaraya - socio – economic and Cultural conditions.

SEMESTER 4

Paper Name: - MODERN INDIA POLITICAL AND ADMINISTRATIVE 1858-1964’

- To understand and appreciate Indian administration properly.
- To get some knowledge about the Indian constitution.
- To trace the importance of Indian cabinet system in independent India.
- To know the administrative services from the British rule to independent India.
- State the importance and development of local self government

Paper Name: - MODERN INDIA ECONOMIC SOCIAL AMD CULTURE 1858- 1964

The Colonial State

- Consolidation of the British Rule: New Administrative Apparatus;
- Relations with the Native States UNIT-II Economy under the British Rule -I
- Railways, Transport & Communication;
- Commercialization of agriculture: the Making of a Colonial Economy;

- Famine Policy UNIT-III Economy under the British Rule -II
- Indian Capitalist Development: Industry & Finance;
- Changing Nature of External Trade

Monetary Policy, Credit System and Price Movements Socio-cultural Profile of British India

- Socio-legal Intervention by the Raj
- Revivalist & Reform Movements;
- Education a& the Emergence of Middle Class; & Vernacular

Women"s Organizations & Struggle for Women"s Rights

OPTIONAL Paper Name: - HISTORY OF NATIONAL MOVEMENT 1922-1947

- Students will learn about Mahatma Gandhi, the development of nonviolent mass action, and the Indian movement for independence. Students will retain strong mental images of Gandhi and the origins of nonviolent mass action.
- Rationale: Knowledge of nonviolent mass action and of the Indian independence movement is important for any student of modern world history.
- Describes six occasions in which nonviolent mass action changed governments or promoted social reform.

OPTIONAL Paper Name: - CULTURAL HISTORY OF INDIA 1526-1950

- Demonstrate knowledge of the chronology, narrative, major events, personalities and turning points of the history of the United States, Europe, and at least one non-Western area.
- Offer multi-causal explanations of major historical developments based on a contextualized analysis of interrelated political, social, economic, cultural and intellectual processes.
- Correctly extract evidence from primary sources by analyzing and evaluating them in relation to their cultural and historical context (avoiding anachronism, ethnocentrism, and (Ethnomorphism) and use that evidence to build and support an argument.
- Evaluate secondary historical sources by analyzing them in relation to the evidence that supports them, their theoretical frameworks, and other secondary historical literature.
- Write an original research paper that locates and synthesizes relevant primary and secondary sources and has a clear, coherent and plausible argument, logical structure, correct grammar and proper references (footnotes and bibliography).



PROGRAM OUTCOME

The department is dedicated to promote teaching and research in diverse fields of political science including Indian politics, comparative politics, international relation and human rights. Presently the department is offering Master's programmes and PhD research center in Political Science the program outcomes of the programmes are as follows:

- To develop comprehensive understanding of the subject by teaching both conventional and new areas of relevance in the domain of political theory and philosophy, Indian politics, comparative politics, public administration and international politics.
- To develop comprehensive and interdisciplinary knowledge by emphasizing inter-linkages between various political, economic and social issues and challenges.
- To generate socially-informed knowledge and cater to the educational upliftment of marginalized communities through papers like Human Rights, Political Ideas in Modern India and Women and Political in India.
- To develop theoretically rich and empirically grounded knowledge
- To motivate and inform students about the opportunities and future prospects in the field.
- To develop the overall personality of students and prepare them to compete and succeed in their endeavours.
- To provide a progressive, healthy and vibrant environment to its students as well as teachers for the purpose of developing a department known for its academic and intellectual pursuit.
- To inculcate the values of tolerance, progressiveness and fraternity that contributes towards the making of a healthy and prosperous society.
- An M.A Dissertation and its viva –voce was also introduced to train the students in writing research paper and knowledge of research process.

SEMESTER 1

Course title- Debates in political theory

Course code- MAP101

Course type- CCC

Course outcome - This course enables students to develop an understanding of the basic concepts in political theory and engages in critical analysis of the subject. It also gives an opportunity to the students to develop upon contemporary theories and views of scholars creating a deeper understanding and gain knowledge.

Course Title- COMPARATIVE POLITICAL ANALYSIS

Course code- MAP102

Course type- CCC

Course outcome - One of the important aim of this course students will develop a detail understanding of theory and method of comparative politics and of developing countries as

well as advance industrialized countries. They will familiar with different model of political system and the way political dynamics have change and shaped society for time to time.

Course title- India government and politics

Course code- MAP103

Course type- CCC

Course outcome - One of the important aim of this course is to equip students of various disciplines with a basic understanding of the political system in India through the study of constitution and government of this paper .students will develop on understanding of constitution of India and the political system that exists in India. Further the student will have a general understanding about the relation of constitution as a guiding document will the functioning of various governance institutions at central, state and local level.

Course title- Research methodology and computer application basics

Course code- MAPS01

Course type- OSC

Course outcome - This page trains the students to undertake research by familiarizing them with the basic and advance tools and technique of field studies. So after competing it the students will be able to design research project and programmers in diverse area of political science. In course helps to develop various research writing skills. And also help to get acquainted with computer fundamentals and office software package. We will familiar with computer basic knowledge in future.

Course title- Theories of international relations

Course code- MAP A01

Course type- ECC/CB

Course outcome - By doing the course, students will have to develop theoretical might on international relation and global politics. This will help them undertaking academic assignment and research projects related will international issue which are becoming very salient in today's globalized world.

Course title- Interpreting Modern India

Course code- MAP A02

Course type- CCC/CB

Course outcome - After completing this course student will be familiar with India's rich intellectual tradition and its relevance in today's time. This course is give idea of what India is today where it might be heading .The course also focus on various related discourses of the cultural social, political and economic that is the site of intense debate today.

Course title- Contemporary debates in political theory

Course code- MAP A03

Course type- ECC/CB

Course outcome - After completion of paper the students will be able to grasp the various aspects and perspective related to contemporary political philosophy. The students will also be able to reflect the issues and problems that they confront in their duty to day life. The paper will enrich and deepen their understanding of the subject with more rigor and clarity.

SEMESTER 2

Course title- Administration theory: Principles and Approaches

Course code- MAP201

Course type- CCC

Course outcome - After completing this course, the students will have a clear understanding of traditional and emerging theories and principal of public administration. This would also acquaint them with changing management practices in the light of expanding public work and the need for greater collaboration with non-state agencies.

Course title- Theme in Indian political thought

Course code- MAP202

Course type- CCC

Course outcome - One of the important aim of this course is to introduce students to the richness and variety of the tradition of Indian political thought .knowledge gain about the political Ideas of in Indian thinkers covering both ancient and modern political thinkers form renaissance to modernity.

Course title- Western political thought

Course code- MAP203

Course type- CCC

Course outcome - This course will let to know the students about the importance of political philosophy in shaping and influencing the state and society at large, students are expected to appreciate the idea and thoughts which are rich and insightful.

Course title- Social outreach and skill development

Course code- MAP221

Course type- PRJ/FST/EST

Course outcome - This course helps the student to understand the concept and place of research in concerned subject. Student will get familiar with various tools of research its gets acquainted with various resources for research. Through this course student will able to do project work easily .This course design a survey to collect political science data. And perform content analysis on a document.

Course title- Ethics and Politics

Course code- MAP B01

Course type- ECC/CB

Course outcome - This course help the student to know about ethics, the ethics is inseparable from all domains of life from the issues of hunger and poverty to matters of violence and war to the problems of family decency to political virtues to the ethics of professional behaviour.

Course title- Critical traditions in political theory

Course code- MAP B02

Course type- ECC/CB

Course outcome - This paper trains the student in the subject and relate the world outside class room. It provide the necessary and main stream bedrock of political theory, ancient and modern. The paper would bring out the best of the student to comprehend the day to day society critically.

Course title- Social movement and revolutions

Course code- MAP B03

Course type- ECC/CB

Course outcome -This course gives the details to students about the ideology practice and social bases of different movement emphasizing the conceptual, historical and empirical distinction between revolution and social movement .Knowledge gain of student about controversies regarding Indian tradition and about social movement in colonial and independent India.

SEMESTER 3

Course title- Democracy and political institution in India

Course code- MAP301

Course type- CCC

Course outcome - One of the important aims of this course is to equal students of various discipline with a basic understanding of democratic system in India .Through the study of constitution and government at different levels.

Course title- Parties, election and political process in India

Course code- MAP302

Course type- CCC

Course outcome - Through this course students will develop a comprehensive understanding of political parties system and their function in India. It also helps to know electoral process in India

Course title- Indian political thought

Course code- MAP303

Course type- CCC

Course outcome - Through this course students will be able to know the importance of Indian political thought in shaping and influencing the state and society at large. This course aims to familiarize students with the theory and practice concerning ancient and modern political thoughts in India.

Course title- Intellectual property rights, human rights and environment basic.

Course code- MAP S02

Course type- O3C

Course outcome - This course is convenient for student to understand the concept and place of research in concerned subject. It get acquainted with various resources for research and become familiar with various tools of research.

Course title- Tribal studies

Course code- MAP C01

Course type- ECC/CB

Course outcome - First primary outcome of the course is to allow the students to gain understanding of an appreciation of Indian tribal people, their sovereign status, along with their cultural, spiritual, aesthetic, literacy philosophical, social political and economic condition on research work and student become familiar with various tools of research in tribal community.

Course title- Democracy of human rights in India

Course code- MAP C02

Course type- ECC/CB

Course outcome -This course enables students to develop a theoretical understanding of the concept of human right. Insofar as human rights are a crucial sub set of this discourse. They require a specific yet comprehensive treatment.

Course title- Administrative theory

Course code- MAP C03

Course type- ECC/CB

Course outcome - This course will help the student to have a clear understanding of traditional and emerging theories and principal of administration theory. The focus of this course is on the theories that have shaped the emergence of modern system of governance and their related structure and process. These include western and non western tradition so that the student will get more knowledge and idea about administration theories.

SEMESTER 4

Course title- Principle of international politics

Course code- MAP401

Course type- CCC

Course outcome - The aim of this course is to give students a through introduction to the literature on international politics, both theoretical and policy oriented. It give idea about main international relations theories and the value implicit in each of their different ways of looking at the world this course gives them the tools necessary to understand the day to day event reported in the media and basic structure of the contemporary international system.

Course title - India and the world

Course code- MAP402

Course type- CCC

Course outcome - The course provides a comprehensive understanding of contemporary issues in global politics by doing this course student will be able to learn the dynamic of larger issues in global politics like state, human right, nuclear security, human security and environment and the way the global institution are responding to their different social and economic concerns. This course tells also about the foreign policy and domestic determinates.

Course title- Political history of Chhattisgarh

Course code- MAP403

Course type- CCC

Course outcome - This paper is about the political history and role in freedom struggle of C.G. This course gives idea about historical geographical and culture back ground of C.G and also about the role of C.G. in India's freedom struggle and give knowledge about present political system in C.G.

Course title- Dissertation

Course code- MAP 421

Course type- SSC/PRJ

Course outcome - This paper trains the student to undertake research work as a dissertation on a political issue and political incidents analysis as a major research project work.

Course title- foreign policy of major power

Course code- MAP D01

Course type- ECC/CB

Course outcome - Upon successful completion, students will have the knowledge and skill to a sound group of key elements of international relation and foreign policy of major power and develop capacity to presently strong arguments in world politics and their concept and theories it also give idea about foreign economic policy and world power countries namely, us, Russia, china, Germany and Japan.

Course title- Development process and politics in India

Course code- MAP D02

Course type- ECC/CB

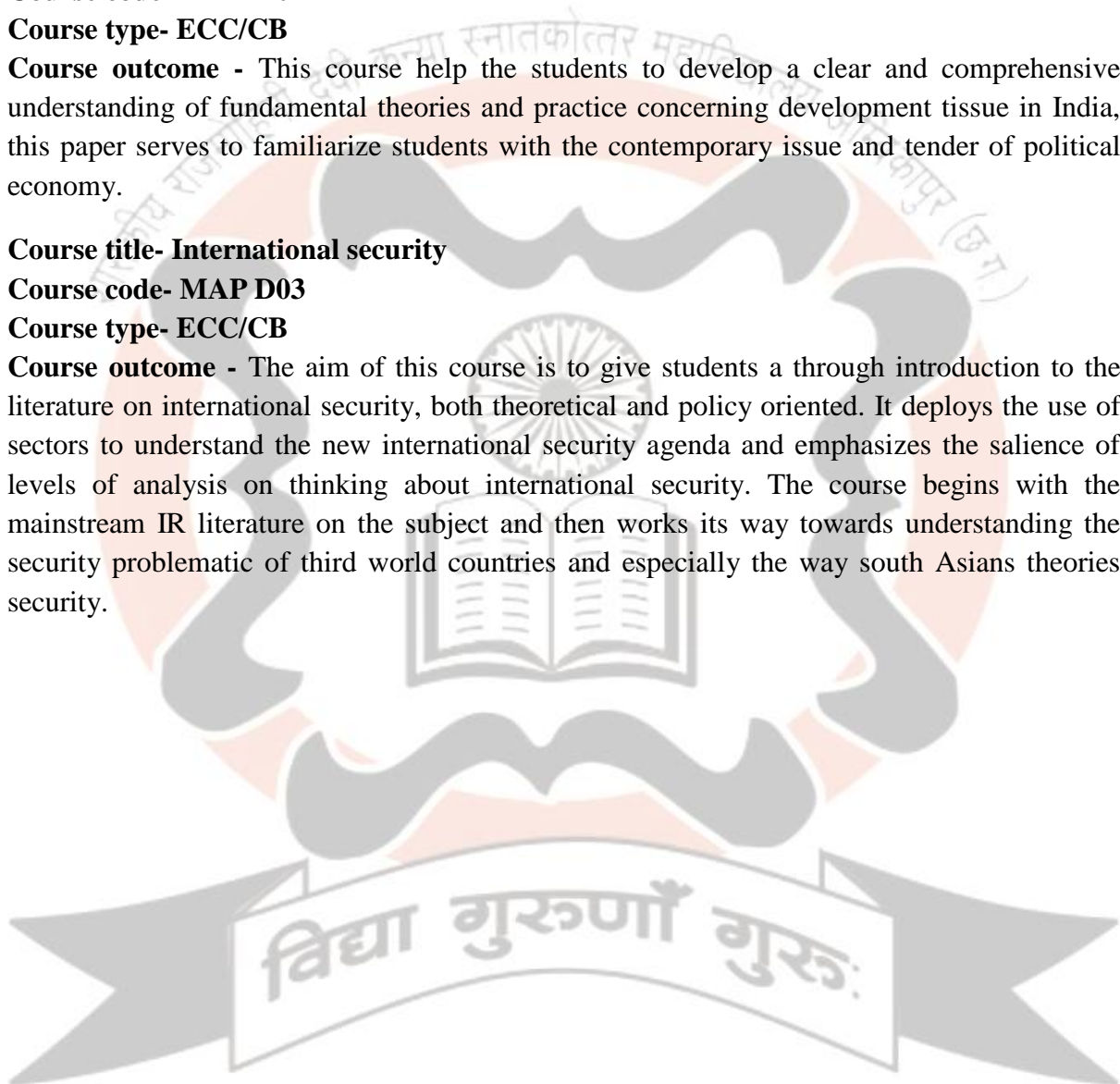
Course outcome - This course help the students to develop a clear and comprehensive understanding of fundamental theories and practice concerning development tissue in India, this paper serves to familiarize students with the contemporary issue and tender of political economy.

Course title- International security

Course code- MAP D03

Course type- ECC/CB

Course outcome - The aim of this course is to give students a through introduction to the literature on international security, both theoretical and policy oriented. It deploys the use of sectors to understand the new international security agenda and emphasizes the salience of levels of analysis on thinking about international security. The course begins with the mainstream IR literature on the subject and then works its way towards understanding the security problematic of third world countries and especially the way south Asians theories security.





Vision

The vision of the sociology department is to provide proficiency both in depth understanding of principles and concept of sociology, theoretical and empirical sociology the department aims to enhance the student's knowledge in basic and applied sociology. To inculcate for a research career in academia and society by introducing advanced ideas and techniques that are applicable while emphasizing the underlying concept of sociology.

Mission

- To impart quality education in sociology such that they aim to become social scientists in reputed research organizations. To make the students effectively disseminate their knowledge in sociology to coming generation.
- Develop the capacity and know-how to apply principles of sociology to solve the problems,
- Apply the social knowledge for sustainable development useful for society. Assume responsibility and always practice. To function effectively as individual as well as in a team.

Program Outcomes (POS)

PO1:- Disciplinary and inter-disciplinary knowledge for capacity building . Students will acquire improved knowledge of the laws governing society through classroom teaching and fieldwork .the will develop a sense of interdisciplinary approach to identity and social institutions.

PO2:- Skills of effective and efficient communication. Students will be able to improve and enhance their communication skill such as reading, writing, listening, and speaking. This will help them to express their ideas clearly and effectively and subsequently empower them to become agents of social change and hence.

PO3:- Sense of inquiry and problem – solving skill. Students will demonstrate the core competencies of their discipline through analytical reasoning, problems solving and research related skill, cooperation, team work, scientific reasoning and thinking that would make them emerge as entrepreneurs or administrative personnel.

PO4:- Skill to impact society – student will develop leadership, team spirit and other skills which will help them to identify. Approach and analyze the existing societal problems with an eye to look beyond gender, age, caste, creed or matianity. and work for the ernancipation and empowerment of humanity

PO5:- Energy, ethics and environment – they will be able to involve themselves in framing policies and development scientific temper to harness energy and work on alternate resources. They will be aware of the environmental issues and imbibe the spirit of ethical values in establishing a self – sustained environment for a healthy society

PO6:- Self – directed and lifelong learning – through digital literacy students will engage in self – paced and curious learning with limitless knowledge acquisition and hence develop motivation for a sustained lifelong learning capability students will accumulate knowledge by continuous learning and leverage the past knowledge seamlessly to solve the problems in the future.

PO7:- National and international priorities preference and perspectives -

Students will be able to prioritize national and global issue with an aim to build a nation and an integrated world through contributions that imbibe the spirit of multicultural competency,

creative thinking, critical analysis, political awareness and the much- needed international politics.

Program educational objects (PEOs)

PEO-1 Professional skill development -

To provide professional training and skill development to students in social sciences related disciplines and nurture them to become responsible persons in the society.

PEO-2 Core competency development -

To augment their core competencies and knowledge levels in social science, humanities and inter disciplinary areas by importing education of high standards and advanced technological tools.

PEO-3 Innovative curriculum of global relevance –

To upgrade the curriculum periodically based on scientific advancement,. Research and societal relevance, so as to cater to the shifting global issues.

PEO-4 Environmental sensitivity and sustainability to infuse environmental sensitivity in student through academic activities and hence equip them with technical skill and scientific knowledge required to protect and safe guard the environment for a sustainable future.

PEO-5 Ethical principles and holistic development to promote ethical values and focus on the holistic development of student to become proficient skilled, competent and socially responsible people.

PEO-6 Accessibility and academic excellence- To provide an accessible learning environment of excellence and equal opportunity to students, enabling them to develop their creativity, critical thinking and leadership and employability skills.

Program Specific Outcomes (PSOs)

PSO1 Acquire scientific temper leading to critical thinking and research motivation in sociology and its allied areas.

PSO2 Gain knowledge and the skills to measure urban-rural linkage and issues. And understand the underlying principles governing the dynamics of their institution and structure.

PSO3 Appreciate the role of family, marriage, kinship institution and status of woman.

PSO4 Structure and function of society.

PSO5 Comparative study of society, and their institution.

SEMESTER 1

Course Title: - classical sociological tradition

Course code: - MAS 101

Course type: - CCC

Out Comes:-To give a basic understanding of sociology. To know the meaning and subject matter of sociology. To understand the natures of scientific study.To know the nature and scope the sociology.

Course Title: - Social anthropology

Course code: - MAS 102

Course type: - CCC

Out Comes:-Elaborate on meaning, nature and scope of social anthropology. Explain anthropology thinkers, evolutionary and functional thinkers. Understand tribal economy, law and justices.

Course Title: - SOCIAL CHANGE IN INDIA

Course code: - MAS 103

Course type: - CCC

Out Comes:-The mandate of the course is to introduce the society and culture of India. This paper is expected to bring familiarity in a student about India society. It will present is comprehensive, integrated and empirically based profile of Indian society. Explain the meaning and types of social change.

Course Title: - Research methodology & computer application basics

Course code: - MAS S01

Course type: - OSC

Out Comes:- Student understands the importance of research in social science. Achievers skills in various research writing. Gets acquainted with computer fundamentals and office software packages.

Course Title: - Urban Sociology

Course code: - MAS A05

Course type: - ECC/CB

Out Comes:- Explain unemployment type and remedies. Analysis the urban ecology and its theories. Understand relation between rural-urban continuums.

SEMESTER 2

Course Title: - Classical Sociological Thinkers

Course code: - MAS 201

Course type: - CCC

Out Comes:- Appreciation of the classical concepts and theories to develop awareness of the limits of current knowledge.

Course Title: - Quantitive Research Techniques in Sociology

Course code: - MAS 202

Course type: - CCC

Out Comes:- Students understand the differences between quantitative and qualitative research. Student learns the basic techniques of quantitative research.

Course Title: - Theoretical Perspectives in Sociology

Course code: - MAS 203

Course type: - CCC

Out Comes:- To give basic understandings of sociology.To know the meaning and subject matter of sociology. To understand the nature of scientific study.

Course Title: - Outreach and Skill Developments

Course code: - MAS S02

Course type: - OSC

Out Comes:- Social the aim of the project work or field works is to introduce students with the research methodology in the subject and to prepare them for pursuing research in theoretical, Experimental or computational areas of the subject.

Course Title: - Indian Rural Society

Course code: - MAS B05

Course type: - ECC/CB

Out Comes:- Describe nature and scope of rural society .Develop on understanding of rural system concepts of village, characteristics or rural social society .Describe rural reconstruction and planning.

SEMESTER 3

Course Title: - Classical sociological theories

Course code: - MAS 301

Course type: - CCC

Out Comes:- To give a basic understanding of sociology .To knows the meaning and subject matter of sociology. To understand the nature of scientific study.

Course Title: - Perspectives on Indian society

Course code: - MAS 302

Course type: - CCC

Out Comes:- The mandate of the course is to introduce the society and culture of India. This paper focuses on the vana, karm, dharm, and ashraan and cost system.

Course Title: - Criminology-I

Course code: - MAS 303

Course type: - CCC

Out Comes:- To give a basic understanding of the criminology. To know the victim logical perspectives and victim responsibility in crime.

Course Title: - Intellectual property human rights and environment: basic

Course code: - MAS S03

Course type: - CCC

Out Comes:- Understands the concepts and place of research in concerned subject. Gets acquainted with various resources of research

Course Title: - Tribal studies

Course code: - MAS C01

Course type: - ECC/CB

Out Comes:-

Introduce them with the concepts of tribe. Develop an understanding about classification of tribal people. Learn about tribal movements.

SEMESTER 4

Course Title: - Modern Sociological Theory

Course code: - MAS 401

Course type: - CCC

Out Comes:- To give a basic understanding of more modern sociological theories. To study the Origen and development of modernism and postmodernism.

Course Title: - Comparative Sociology

Course code: - MAS 402

Course type: - CCC

Out Comes:- To know the historical and social contexts of emerges of sociology in the west. To understand the nature of theoretical of methodological approaches in sociology. To study the current debets and contextualization and indianization.

Course Title: - Criminology –II

Course code: - MAS 403

Course type: - CCC

Out Comes:- To give a basic understanding of the criminology To know the victim logical perspectives and victim responsibility in crime. Rootes of correction to prevent crime

Course Title: - Dissertation

Course code: - MAS S04

Course type: - PRJ/SSC

Out Comes:- The course in an introductory course on how research is actually done. Field work is an applied parts of social research methods. The paper aims to against students with empirical filed data collection, analysis, and writing analytical and standard dissertation or research report in sociology.

Course Title: - Urban society in India

Course code: - MAS DO3

Course type: - ECC/CB

Out Comes:- Understanding the urban community meaning and characteristics. Explain migration and urbanization emigration trends factors in India. Analyze the urban ecology and its theories.



VISION

The vision of this Botany Department is to transform rural girl students into competent and empowered graduates and post graduates in botany by imparting quality education, practical skills, moral values and self confidence.

MISSION

- To create women entrepreneurs to confront the challenges.
- To impart quality education in botany such that they aim to become scientists in reputed research organization.
- To apply conventional tools to understand plant process and human resources development.
- To develop the capacity of students.
- To provide an academic environment.
- Apply the knowledge of botany for sustainable development useful for society.
- To function effectively as individual as well as a team.
- We focus on the patterns and process that enable predictive understanding of plants and their environment at local, regional and global scales.
- Our focus on fundamental research and teaching on plants as well as our study on population, communities and ecosystem of which they are the component.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

<u>PEO 1</u>	Professional skill development to become responsible person in the society.
<u>PEO 2</u>	Address the socio-economic challenges related to plant science.
<u>PEO 3</u>	Have awareness on conservation and sustainable use of plants.
<u>PEO 4</u>	Take up and shape a successful career in botany.
<u>PEO 5</u>	Inculcate through knowledge about various plants from primitive to highly evolved.
<u>PEO 6</u>	To promote ethical values and focus on the holistic development of students to become proficient, skilled, competent and socially responsible people.

PROGRAMME OUTCOMES (PO's)

<u>PO 1</u>	Knowledge and understanding- <ol style="list-style-type: none">1. The range of plant diversity in terms of structure, function, and environmental relationships.2. The evaluation of plant diversity.3. Plant classification and Flora of C.G.4. The role of plants in the functioning of global ecosystem.5. A selection of more specialized optimal topics.6. Statistics as applied to biological data.
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<u>PO 2</u>	<p>Intellectual skills-</p> <ol style="list-style-type: none"> 1. Able to think logically and organize tasks into a structural form. 2. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one topic to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing field. 5. Construct and test hypothesis.
<u>PO 3</u>	<p>Practical skills-</p> <p>Students learn to carry out practical work in the field and in the field. They gain introductory experience in applying each of the following skills and gain greater proficiency in selection of them depending on their choice of optimal modules.</p> <ol style="list-style-type: none"> 1. Interpreting plant morphology and Anatomy. 2. Plant identification. 3. Vegetation Analysis techniques. 4. A range of physiochemical analysis of plant materials in the context of field and lab data obtained. 5. Plant Pathology to be added sharing of field and lab data obtained.
<u>PO 4</u>	<p>Transferable Skills-</p> <ol style="list-style-type: none"> 1. Use of Internet. 2. Communication of scientific ideas in writing and verbally. 3. Ability to work as a part of team. 4. Ability to use library resources. 5. Career Planning.
<u>PO 5</u>	<p>Scientific Knowledge-</p> <ol style="list-style-type: none"> 1. Apply the knowledge of basic science, life science and fundamental process of plants to study and analyze any plant form.
<u>PO 6</u>	Identify the Taxonomic position of plants.
<u>PO 7</u>	<p>Design/Development of solution-</p> <ol style="list-style-type: none"> 1. Design solutions from medicinal plant for health problems, disorders and diseases of human beings.
<u>PO 8</u>	<p>Environment and sustainability-</p> <ol style="list-style-type: none"> 1. Understand the impact of the plant diversity in social and environmental context and demonstrate the knowledge the knowledge and need for sustainable development.
<u>PO 9</u>	<p>Ethics-</p> <ol style="list-style-type: none"> 1. Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.
<u>PO 10</u>	Individual and team work
<u>PO 11</u>	<p>Lifelong learning-</p> <ol style="list-style-type: none"> 1. Recognize the need for and have the preparation and ability to engage in independent and lifelong learning. Students will accumulate knowledge by continuous learning and leverage the past knowledge seamlessly to solve the problems in the future.

Programme Specific Outcomes (M.Sc. Botany)

PSO1 To give students exposure to recent developments and advance topic of subject.

PSO2 Apply research methodologies and able to use instruments in Botany.

PSO3 Able to collect data, analyze and prepare necessary documentation of botanical importance.

PSO4 Identify characters of plants and classify them.

COURSE OUTCOME

SEMESTER 1

Paper -1 (Cell and Molecular Biology)

COURSE CODE: - MBT 101

Course Type- CCC

CO1 Students will be able to understand basic concept of instrumentation, cell and molecular biology.

CO2 This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany/plant science.

Paper -2 (Genetics and Cytogenetics)

COURSE CODE: - MBT 102

Course Type- CCC

CO1 Students will be able to understand basic concept of genetics and cytogenetics.

PO2 This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

Paper -3 (Plant Physiology and Biochemistry)

COURSE CODE: - MBT 103

Course Type- CCC

CO1 Students will be able to understand basic concept of plant physiology and biochemistry.

CO2 This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

Paper – 4 (Research Methodology and Computer Application)

COURSE CODE: - MBT 104

Course Type- CCC

CO1 Students will be able to understand basic concept of research.

CO2 Gets acquainted with various resources for research, computer fundamentals, office software packages and become familiar with tools of research.

CO3 Gets conversant with sampling techniques, methods of research and techniques of analysis of data.

CO4 Achieves skills in various research writings.

Paper – 5 (Constitutionalism & Indian political system)

COURSE CODE: - MBT A01

Course Type- ECC/CB

CO1 Students will be able to understand basic concept of Constitution.

CO2 This course is aimed towards generating fundamental knowledge, concepts and dimensions of Indian political system.

Paper – 5 (Recombinant DNA technology)

COURSE CODE: - MBT A02

Course Type- ECC/CB

CO1 Students will be able to understand basic concept of recombinant DNA technology.

CO2 This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

CO3 Students will be able to understand basic concept of electrophoresis and column chromatography technique.

PRACTICAL: - LABORATORY WORK

Paper -1 (Cell and Molecular Biology)

COURSE CODE: - MBT 111

CO1 Student will be able to used microscope, and others laboratory instruments.

CO2 Student will be able to used insolation and purification of proteins, cell or ganelles and nucleic acids.

Paper -2 (Genetics and Cytogenetics)

COURSE CODE: - MBT 112

CO1 Student will be able to prepared mitotic and meiotic cell division slide and chromosome identification.

CO2 Student will be able to analyze genetical problems.

Paper -3 (plant physiology and biochemistry)

COURSE CODE: - MBT 113

CO1 Student will be able to quantification of proteins.

CO2 Student will be able to understand extraction, detection of deferent plants products by using techniques.

SEMESTER 2

Paper -1 (Developmental Biology)

COURSE CODE: - MBT 201

Course Type- CCC

CO1 Students will be able to understand basic concept of developmental biology in plants includes vascular system, flower development and embryology. This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

Paper -2 (Pathogens and Pests of Crop Plants)

COURSE CODE: - MBT 202

Course Type- CCC

CO Students will be able to understand basic concept of pathogens and pests in crop plants.

CO2 Students will be able to understand basic concept of plant pathogen interactions. This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

Paper -3 (Plant Biotechnology and Resource Utilization)

COURSE CODE: - MBT 203

Course Type- CCC

CO1 Students will be able to understand various concept of plant tissue culture.

CO2 Students will be able to understand various concepts of gene transfer technology in plants. This course is aimed towards generating fundamental knowledge, concepts and dimensions of botany.

CO3 Students will be able to know the importance of economically important plants.

Paper – 4 (SOCIAL OUTREACH AND SKILL DEVELOPMENT)

COURSE CODE: - MBT 221

Course Type- PRJ/FST/EST

CO1 Student will get exposure about social interaction and problems associated with the concerned locality.

CO2 The Students are able to prepare project reports based on their social outreach programmes and will develop the skill accordingly.

Paper – 5 (Environmental and forest Laws)

COURSE CODE: - MBT B01

Course Type- ECC/CB

CO1 Students will be made aware about the environmental, forest and pollution laws.

CO2 Students will be trained about human rights and laws for the betterment of humanity.

Paper – 5 (Elective paper – Systematics, Evolution and environmental science)

COURSE CODE: - MBT B02

Course Type- ECC/CB

CO1 Students will be able to understand basic concept of plant taxonomy, evolution and environment. Project Work – Skill development & Social outreach.

CO2 Students will be able to study enhance practical skills and engage in society through this skill development and social outreach course.

PRACTICAL: - LABORATORY WORK

Paper -1(Developmental Biology)

COURSE CODE: - MBT 211

CO1 The Students will be trained to study the morphology and anatomy of the plants.

CO2 The Students will be exposed to learn the techniques of pollen and explant's invitro culture.

Paper -2 (Pathogens and Pests of Crop Plants)

COURSE CODE: - MBT 212

CO1 The Students will trained to methods of sterilization, media preparation and inoculation.

CO2 The Students will be exposed to learn symptoms, Pathogenesis and control of plant diseases.

Paper -3 (Plant Biotechnology and Resource Utilization)

COURSE CODE: - MBT 213

CO1 The Students will learn the preparation of tissue culture media, sterilization and aseptic culture techniques.

CO2 The Students will be trained to learn the extraction form wild and GM plants along with exposure to several analytical instruments.

SEMESTER 3

Paper – 1 (Algae, Environment and Human Welfare)

COURSE CODE: - MBT 301

Course Type- CCC

CO1 Students will be able to understand characteristics, classification and economic importance of algae.

CO2 Students will be trained about the industrial applications of different valuable products of algal origins.

Paper – 2 (Principle of Ecology)

COURSE CODE: - MBT 302

Course Type- CCC

CO1 Students will be able to understand basic concept of ecology.

CO2 Students will be able to understand various type of environmental pollution.

Paper – 3 (Advances in Archegoniatae)

COURSE CODE: - MBT 303

Course Type- CCC

CO1 Students will be able to understand some advanced concept of bryophyte and some advanced concept of pteridophytes.

CO2 Students will be able to understand some advanced concept of gymnosperms.

Paper – 4 (other supportive course – Intellectual property, Human Rights and Environment: Basics)

COURSE CODE: - MBT S02

Course Type- OSC

CO1 Students will be able to understand basic concept of intellectual property right includes copyright and patents.

CO2 Students will be able to understand concept of human right and environment.

Paper – 5 (Tribal Studies)

COURSE CODE: - MBT C01

Course Type- ECC/CB

CO1 Students will explore various tribal resources of research along with analytical tools and techniques essential for tribal studies.

CO2 Students will be motivated to learn about tribal development programmes and welfare concept prevalent in the tribal society.

Paper – 5 (Microbes and Microbial Technology)

COURSE CODE: - MBT C02

Course Type- ECC/CB

CO1 Students will be able to understand diversity of microbes and microbial techniques for human welfare.

CO2 Students will get in depth knowledge about microbial culture, preservation and their varied dimensions of applications as per microbial technology.

Paper – 5 (Evolutionary Biology)

COURSE CODE: - MBT C03

Course Type- ECC/CB

CO1 Students will be able to understand advanced evolutionary concepts.

CO2 Students will get idea about biological diversity, conservation strategies and molecular evolution.

Paper – 5 (Bioinformatics, Computational Biology and Biostatistics)

COURSE CODE: - MBT C04

Course Type- ECC/CB

CO1 Students will be trained about Bioinformatics, Computational Biology and Biostatistics through software.

CO2 Students will learn about different applications of statistical tools and techniques.

Paper – 5 (Genomics and Proteomics)

COURSE CODE: - MBT C05

Course Type- ECC/CB

CO1 Students will gain detailed knowledge about different aspects of genomics and proteomics.

CO2 Students will be trained about several online software to study the applications of genomics and proteomics.

Paper – 5 (Immunology)

COURSE CODE: - MBT C06

Course Type- ECC/CB

CO1 Students will study the fundamentals and overview of immunology.

CO2 Students will get detailed information about immune system, antigen recognition and hypersensitivity reactions.

PRACTICAL: - LABORATORY WORK

Paper – 1 (Algae, Environment and Human Welfare)

COURSE CODE: - MBT 311

CO1 The Students will be trained to study of diversity of algae.

CO2 The Students will be exposed to learn the techniques of pure culture of algae.

Paper – 2 (Principle of Ecology)

COURSE CODE: - MBT 312

CO1 The Students will be trained to study of ecological concepts.

CO2 The Students will be exposed to learn the techniques of environmental study.

Paper – 3 (Advances in Archegoniatae)

COURSE CODE: - MBT 313

CO1 The Students will be trained to prepare slides for the study of Bryophytes, Pteridophytes and Gymnosperms.

CO2 The Students will be exposed to learn the techniques for the study of evolution and systemics of archegoniatae.

SEMESTER 4

Paper -1 (In Vitro Technology and Industrial applications)

COURSE CODE: -MBT 401

Course Type-CCC

CO1 Students will be able to understand micropropagation of various plants.

CO2 Students will be able to understand problems in plant tissue culture system.

CO3 Students will be able to understand use of bioreactor for secondary metabolite production.

Paper -2 (Reproductive Biology of Flowering plants)

COURSE CODE: -MBT 402

Course Type-CCC

CO1 Students will be able to understand plant embryology of flowering plants.

CO2 Students will learn the overview of flower development, breeding system and seed biology.

Paper – 3 (Molecular interactions of plants with symbionts, pathogens and pests)

COURSE CODE: -MBT 403

Course Type-CCC

CO1 Students will be able to understand molecular interaction of plants with symbionts, pathogens and pests.

CO2 Students will understand the symbiotic interactions in the environment.

Paper – 4 (DISSERTATION)

COURSE CODE: -MBT 421

Course Type-SSC/PRJ

CO1 Student will get exposure about problems and solutions associated with the life of concerned locality.

CO2 The Students are able to prepare research dissertation reports based on their research topics.

CO3 Through dissertation work students will be able to enhance scientific temper, research skill, critical think and analyze.

Paper – 5 (Advanced Genetics and Plant breeding)

COURSE CODE: -MBT D01

Course Type- ECC/CB

CO1 Students will be able to understand concept of genetics and variations in plants.

CO2 Students will be able to learn about crop improvement for human welfare.

Paper – 5 (Agriculture ecology- principle and application)

COURSE CODE: -MBT D02

Course Type- ECC/CB

CO1 Students will be able to understand principles and application of agricultural ecology.

CO2 Students will be able to understand crop production in different ecological conditions.

Paper – 5 (Advanced Plant systematics)

COURSE CODE: -MBT D03

Course Type- ECC/CB

CO1 Students will be able to understand principles of botanical nomenclature and plant classification.

CO2 Students will be able to understand the concept of molecular evolution and relationship between plant groups.

Paper – 5 (Contemporary concepts and methods in cell biology)

COURSE CODE: -MBT D04

Course Type- ECC/CB

CO1 Students will be able to understand origin and structure of cells.

CO2 Students will be able to understand the concept of organization of tissues and organisms.

Paper – 5 (Plant Physiology and biochemistry)

COURSE CODE: -MBT D05

Course Type- ECC/CB

CO1 Students will be able to understand principles of physiological activities of different types of plants.

CO2 Students will be able to understand the concept of molecular defenses and sensitivity against biotic and abiotic stress.

PRACTICAL: - LABORATORY WORK

Paper -1 (In Vitro Technology and Industrial applications)

COURSE CODE: -MBT 411

CO1 The Students will be trained to micropropagation of valuable plants.

CO2 The Students will be exposed to learn the techniques of Gene transfer and synthetic seeds formation.

Paper -2 (Reproductive Biology of Flowering plants)

COURSE CODE: -MBT 412

CO1 The Students will be trained to study of pollination and hybridization in plants.

CO2 The Students will be exposed to learn the techniques of reproduction in plants.

Paper – 3 (Molecular interactions of plants with symbionts, pathogens and pests)

COURSE CODE: -MBT 403

CO1 The Students will be trained to identify the pathogen and symptoms of plant diseases.

CO2 The Students will be exposed to learn the techniques for the study of plantpathogen interactions.



COURSE OUTCOME

SEMESTER 1

Paper -1 (Inorganic Chemistry-I)

COURSE CODE: - MSC 101

COURSE TYPE: -CCC

CO1 Students will be able to understand basic concept of Chemical bonding, Metal ligand reaction and metal carbonyl complex in inorganic chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of coordination complexes.

Paper -2 (Organic Chemistry-I)

COURSE CODE: - MSC 102

COURSE TYPE: -CCC

CO1 Students will be able to understand basic concept of organic chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of basic organic chemistry.

Paper -3 (Analytical Chemistry)

COURSE CODE: - MSC 103

COURSE TYPE: -CCC

CO1 Students will be able to understand basic concept of analytical chemistry.

CO2 This course is aimed developing fundamental knowledge, concepts and dimensions of analytical chemistry

Paper – 4 (Research Methodology and Computer Application)

COURSE CODE: - MSC S01

COURSE TYPE: -OSC

CO1 Students will be able to understand basic concept and principles of research.

CO2 Gets acquainted with various resources for research, computer fundamentals, office software packages and become familiar with tools of research.

CO3 Gets conversant with various techniques, methods of research and techniques of analysis of data.

CO4 Achieves skills in various research writings.

Paper – 5 (Constitutionalism and Indian Political System)

COURSE CODE: - MSC A01

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of constitutionalism and Indian political system.

CO2 This interdisciplinary course is aimed towards generating fundamental knowledge, concepts and dimensions of Indian political system.

Paper – 5 (Group Theory Spectroscopy and Diffraction method)

COURSE CODE: - MSC A02

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of Group Theory Spectroscopy and Diffraction method.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of Group Theory Spectroscopy and Diffraction method and its utilization in spectroscopy.

Paper – 5 (Computer programming in chemistry)

COURSE CODE: - MSC A03

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of computer programming in chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of computer programming in chemistry and its utilization in theoretical studies in chemistry.

Paper – 5 (Medicinal chemistry)

COURSE CODE: - MSC A04

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of medicinal chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of medicinal chemistry and its utilization in pharma industries.

PRACTICAL

Inorganic and analytical chemistry-1 lab

COURSE CODE: - MSC 111

COURSE TYPE: -CCC

CO1 Student will be able to perform qualitative analysis for inorganic mixtures, complexometric titration, synthesis of inorganic complex, volumetric and gravimetric analysis, various chromatographic techniques and also able to perform experiment based on potentiometer, pH meter, conductivity meter, nephelometer, flame photometer, colorimeter, spectrophotometer.

CO2 Student will be able to estimate biomolecules using spectrophotometer.

SEMESTER 2

Paper -1 (Inorganic Chemistry-II)

COURSE CODE: - MSC 201

COURSE TYPE: -CCC

CO1 Students will be able to understand basic concept of electronic spectra, magnetic properties, metal clusters, Lanthanides, actinides, nanotechnology, bioinorganic chemistry and coordination chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of inorganic chemistry.

Paper -1 (organic Chemistry-II)

COURSE CODE: - MSC 202

COURSE TYPE: -CCC

CO1 Students will be able to understand basic concept of addition of electrophile and nucleophile to C-C and C- heteroatom bonds, NGP, Molecular rearrangement, aromaticity of non-benzenoids, selected organic reagent and organometallic compounds.

CO2 Students will be able to understand basic concept of organic reaction and reagent. This course is aimed towards developing fundamental knowledge, concepts and dimensions of organic chemistry.

Paper -3 (Physical Chemistry)

COURSE CODE: - MSC 203

COURSE TYPE: -CCC

CO1 Students will be able to understand various concept and theories of spectroscopy, thermodynamics, radio chemistry and application in chemistry.

CO2 Students will be able to understand various concepts and principles spectroscopy. This course is aimed towards developing fundamental knowledge, concepts and dimensions of physical chemistry.

Paper – 4 (SOCIAL OUTREACH AND SKILL DEVELOPMENT)

COURSE CODE: - MSC S02

COURSE TYPE: -PRJ/SSC

CO1 Student will get exposure about social interaction and problems associated with the concerned locality and local analytical labs.

CO2 The Students are able to prepare project reports based on their social outreach and skill development course and trainings and will develop the skill accordingly.

Paper – 5 (Elective paper – Environmental and Forest Laws)

COURSE CODE: - MSC B01

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of environmental issues and importance of forest and wild life.

CO2 This interdisciplinary course is aimed towards developing fundamental knowledge, concepts and dimensions of Environmental and Forest Laws.

Paper – 5

(Elective paper – Polymer Chemistry)

COURSE CODE: - MSC B02

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of polymer chemistry and its application.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of Polymer Chemistry.

Paper – 5 (Elective paper – Organic Synthesis-I)

COURSE CODE: - MSC B03

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of organic synthesis and its application in various field.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of synthesis of organic compounds in the lab.

Paper – 5 (Elective paper – Applied chemistry)

COURSE CODE: - MSC B04

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of water analysis, polymer chemistry, pollution, fertilizers, petroleum and their application in various field.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of water analysis, polymer chemistry, pollution, fertilizers, petroleum chemistry.

PRACTICAL LABORATORY WORK-

(Physical and organic chemistry lab)

COURSE CODE: - MSC 211

COURSE TYPE: -CCC

CO1 The Students will be trained to perform experiments based on Surface tension, partition coefficient, refractometry, chemical kinetics, conductivity meter, PH meter/ potentiometer, colorimeter, spectrophotometer.

CO2 The Students will be trained to perform experiments based on binary mixture separation for organic compounds, synthesis and estimation of organic compounds.

SEMESTER 3

Paper – 1 (Application of spectroscopy-Inorganic chemistry)

COURSE CODE: - MSC 301

COURSE TYPE: -CCC

CO1 Students will be able to understand principle and application of Spectroscopy in characterization of inorganic compounds.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of spectroscopy.

Paper – 2 (Application of spectroscopy-Inorganic chemistry)

COURSE CODE: - MSC 302

COURSE TYPE: -CCC

CO1 Students will be able to understand principle and application of Spectroscopy in characterization of organic compounds.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of spectroscopy for organic molecules.

Paper – 3 (Photochemistry and Pericyclic reaction)

COURSE CODE: - MSC 303

COURSE TYPE: -CCC

CO1 Students will be able to understand principle and application of photochemistry and pericyclic reaction in organic reaction.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of photochemistry and pericyclic reaction for organic molecules.

Paper – 4 (Intellectual property rights, human rights & environment basics)

COURSE CODE: - MSC S03

COURSE TYPE: -OSC

CO1 Students will be able to understand basic concept of Intellectual property rights, human rights & environment basics.

CO2 This interdisciplinary course is aimed towards developing fundamental knowledge, concepts and dimensions of Intellectual property rights, human rights & environment basics.

Paper – 5 (Elective paper – Tribal Studies)

COURSE CODE: - MSC C01

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand the life and culture of Tribal.

CO2 This interdisciplinary course is aimed towards developing fundamental knowledge, concepts and dimensions of the life and culture of Tribal.

Paper – 5

(Elective paper – Green Chemistry)

COURSE CODE: - MSC C02

COURSE TYPE: - ECC/CB

CO1 Students will be able to understand basic concept of Green Chemistry and their uses and application in synthesis.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of green chemistry.

Paper – 5 (Elective paper – Organic Synthesis- II)

COURSE CODE: - MSC C03

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic concept of organic synthesis and its application in various field.

CO2 This course is aimed towards developing fundamental knowledge, concepts and methodologies for the synthesis of organic compounds in the lab.

Paper – 5

(Elective paper – HETEROCYCLIC CHEMISTRY)

COURSE CODE: - MSC C04

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand basic Knowledge of Nomenclature, Preparations, Characteristics and Structure of Heterocyclic compounds.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimension of Heterocyclic compounds.

PRACTICAL LABORATORY WORK-

(Organic chemistry lab)

COURSE CODE: - MSC 311

COURSE TYPE: -CCC

CO1 The Students will be trained to perform experiments based on purification techniques used for organic compounds, extraction of natural products, organic synthesis and binary mixture separation for organic compounds.

CO2 This laboratory course is aimed towards developing lab skills for synthesis, isolation and separation for organic compounds.

SEMESTER 4

Paper -1(BIOINORGANIC CHEMISTRY)

COURSE CODE: -MSC 401

COURSE TYPE: -CCC

CO1 Students will be able to understand the fundamental concepts of bioinorganic chemistry.

CO2 Students will be able to understand about Trace metal ions, Enzymes and medicinal bioinorganic chemistry.

CO3 This course is aimed towards developing fundamental knowledge, concepts and dimension of bioinorganic chemistry.

Paper -2 (ENVIRONMENTAL CHEMISTRY)

COURSE CODE: -MSC 402

COURSE TYPE: -CCC

CO1 Students will be able to understand about Earth, Biosphere and Pollution and its Control.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimension of environmental chemistry.

Paper – 3 (SOLID STATE CHEMISTRY)

COURSE CODE: -MSC 403

COURSE TYPE: -CCC

CO1 Students will be able to understand about Solid States and their structure and application.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimension of solid-state chemistry.

Paper – 4 (DISSERTATION)

COURSE CODE: -MSC S04

COURSE TYPE: -CCC

CO1 Student will get exposure about problems and solutions associated with the chemistry.

CO2 The Students are able to prepare research dissertation reports based on their research topics.

CO3 Through dissertation work students will be able to enhance scientific temper, research skill, critical think and characterization techniques.

Paper – 5 (Elective paper – Photo inorganic Chemistry)

COURSE CODE: - MSC D01

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand about Photo inorganic chemistry.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of Photo inorganic chemistry.

Paper – 5 (Elective paper – Material Science)

COURSE CODE: - MSC D02

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand about material science and their application.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of material science.

Paper – 5 (Elective paper – Chemistry of natural product)

COURSE CODE: - MSC D03

COURSE TYPE: -ECC/CB

CO1 Students will be able to understand about chemistry of natural product and their application.

CO2 This course is aimed towards developing fundamental knowledge, concepts and dimensions of chemistry of natural product.

PRACTICAL LABORATORY WORK-

(General chemistry lab)

COURSE CODE: -MSC 411

CO1 Student will be able to perform spectrophotometric titration, various chromatographic techniques and also able to perform experiment based on potentiometer, pH meter, polarography, refractometer, flame photometer, colorimeter, spectrophotometer.

CO2 Student will be able to estimate organic molecules using spectrophotometer and other techniques.



PROGRAM OUTCOME

- There is a greater chance of self employment and variety of career opportunities like analyst, teaching, banking sector etc.
- Students can pursue research in mathematics and also in interdisciplinary subjects.
- There is an opportunity to fulfill academic hunger.

COURSE OUTCOME

SEMESTER 1

Paper I – Advanced Abstract Algebra-I

- In Abstract Algebra, a composition series provides a way to breakup and algebraic structures that is group or a module into simple pieces.
- Modules are very closely related to the Representation theory of groups and are used widely in algebraic geometry and algebraic topology.
- Field theory widely used in Algebra, number theory and many cryptographic Protocols.

Paper II – Real Analysis -I

- Riemann Stieltjes Integral serves as an instructive and useful procedure of the living integral for the students and also they used it for discrete and continuous probability.
- Power series are useful tools that can be used to expand other functions solve equation and applied in all areas of engineering.
- In the mathematical field of analysis, uniform convergence of convergence is a mode of functions stronger than point wise convergence.

Paper III – Topology -I

- This paper gives the basic idea of topology and it serves as a foundation for future for future study in Analysis, geometry, fuzzy topology, algebraic topology etc.
- Continuity of function is of core concept of topology. Topology finds applications in Physics, Economics, Networking, Computer Science and many other branches of knowledge.

PaperIV- Research Methodology & Computer Application: Basic

- Upon completion course, the student will be able to.
- Discuss different methodologies and techniques used in research work
- Explain basic computer skill necessary for the conduct research.
- Assess the basic function and working of analytical instrument in research.
- Propose the required numerical skills necessary carry in research.

Paper V - Complex Analysis-I

After completing the course students will be able to

- Carry out computations with the complex exponential, logarithm and root functions and know their definition.
- Calculate the image of circle and lines under mobius transformation.
- Find the harmonic conjugate to harmonic function.
- Express analytical function in terms of power series and Laurent's series Taylor series.
- Calculate Complex line integrals and some infinite real integral using Cauchy's Residue theorem (contour integral).
- Find the number of zeros and poles within a given curve using argument principle, Rouché's theorem.
- Work with multivalued function.

Paper VI – Advanced Discrete mathematics-I

- Boolean algebra is used to analyse and simplify the digital circuits. Boolean algebra also used to the design of switching circuits.
- Lattice theory is the use of Boolean algebra's in modelling and simplified switching circuits.
- The study of computability theory in computer science is closely related to the study of computability in mathematical logics.
- Descriptive complexity theory relates logics to computational complexity.

SEMESTER 2

Paper-1 Advanced Abstract Algebra-II

- Noetherian and Artinian modules and rings are generalized finiteness conditions. Noetherian conditions prevents chains from piling up too much and artinian condition prevent them from infinitely shrinking.
- Smith normal form is useful in topology to compute the homology of a simplicial complex and also used in control them to compute transmission and blocking zeros of a transfer function matrix.
- In the field of abstract algebra, structure theorem for finitely generated modulus over PID is generalization of Fundamental Theorem of finitely generated abelian groups. It provides simple framework to understand various Canonical form results for square matrices over fields.

Paper II- Real Analysis-II

- Lebesgue spaces are used in the theoretical discussion of problems in Physics ,Statistics ,Finance, Engineering and other disciplines.
- L^p space used to derived from the fact that they offer a partial but useful generalization of the fundamental L^2 space of square integrable function.
- Function of bounded variation are used to define generalization solution of nonlinear problems involving functional ,ordinary and partial differential equation in mathematics ,Physics and engineering.

Paper III – Topology -II

- The topic dealt in this paper serve as a foundation to facilitate students for research work in various branches of science.

Paper IV- Social outreach and Skill development

Students able to knowledge about social outreach and project.

Paper V - Complex analysis-II

- The students should learn the basic techniques of contemporary Complex Analysis in various applications such as harmonic analysis differential equations as well as in the applied disciplines.
- formation of entire function with the help of weierstrass theorem , Rhungi and Mittag Leffler's theorem .
- analytic continuation along a path and curve.
- understand Green's theorem ,which help to solve differential equations.
- able to find the order and rank of entire function exponent of convergence.
- learn the range of analytic function.

Paper V – Advanced Discrete Mathematics-II

- Graph theory used in modeling transport networks activity networks and theory of games.
- Graphs can be used to model many types of relations and process in physical, biological, social and information system.
- Graphs are used to represent networks of communication, data organization, computational device, the flow of computation etc.
- In computer science, finite state machine are widely used in modeling of application behavior, design of hardware digital system , software engineering , compilers , network protocols and the study of computational and languages.

SEMESTER 3

Paper I - Integration theory and Functional analysis-I

- Raydon Nikodym theorem can be used to prove the existence of conditional expectation for probability measures.
- Borel set are used in descriptive set theory.
- Baire measures are convenient framework for integration on locally compact hausdorff space.

Paper II - PDE, Mechanics & Gravitation-I

Student will be able to

- its widely used in formulating many fundamental law of Physics and Chemistry .
- gain the vast knowledge by using the application of Calculus of variation in biological and medical field.

- develop the skill while doing using the various problem by using integral equation in all engineering sciences.
- demonstrate their understanding of how physical phenomenon Are modeled by differential equation.
- be familiar with the Modelling assumption and derivation that lead to p d e .
- Be competent is solving linear PDE using classical solution method.
- find the fourier and Laplace transformation its application.
- solve bondary value problem using fourier and laplacetransform.

Paper III - Operations research-I

- Operations research utilised in allocation and distribution in project and production and facility planning, in marketing, in finance sector etc.
- Network analysis used in construction projects based on the knowledge and experience of the past project for predicting accurately the time required for various activities during execution of project.
- Application of dual simplex method is that it works even when values are zero, easily implemented to solve any type of transportation problem.
- Assignment problem does the allocation in such a way that cost or time involved in process is minimum and profit or sale is maximum.

Paper IV-Intellectual Property, Human Right Environment: Basic

On completion of this course, the student will be able to:

1. Identify key actors and norms in the fields of intellectual property (IP) and human rights, and appreciate the nature and significance of the relationship between intellectual property (IP) and human rights.
2. Identify and understand the tensions arising between IP and human rights and how those tensions are being addressed at domestic, regional and international levels.
3. Critically assess how IP rights may interact with and impact on civil, political, economic and social rights and further issues pertaining to indigenous peoples and the protection of traditional knowledge and traditional cultural expressions from a human rights perspective.
4. Be aware of current developments in the field and be able to contribute in an informed manner to ongoing debate.

PaperV- Numerical Analysis-I

This course is an introduction to a broad range of numerical methods for solving mathematical problems that arise in Science and Engineering. The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods, along with a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods. This will help you choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy. The problems cover (i) systems of linear equations, linear least squares problems, and eigenvalue calculation; (ii) interpolation, approximation, and integration of functions; (iii)

initial values problems governed by ordinary differential equations; (iv) nonlinear scalar equations.

Paper VI – Fuzzy Sets and their applications-I

This paper gives an introductory idea of fuzzy sets and basic properties of fuzzy sets. This property has been introduced so that a student can fuzzify all the concepts of a crisp set. This paper acts as a tool for serving all types of research concerned with fuzzy sets.

SEMESTER 4

Paper I -Integration theory and Functional analysis-II

- Hilbert space are used and functional analysis in quantum mechanics. Hilbert space support generalization of simple geometric concept like projection and change of basis from their usual finite-dimensional setting.
- Banach space allow us to transfer variable between the domain and codomain.
- Inner product space can be used to define Fourier coefficient for the series and that gives us a wide range of applications in boundary value problem(mainly heat and wave equation).

Paper II –PDE, Mechanics & Gravitation-II

- have a deep understanding of Newton's Law.
- to solve statistical mechanics problems.
- familiar with experimental techniques used in elementary practical physics.
- to understand the discipline specific knowledge in classical mechanics that is concept and Newton's law and application oscillation, Lagrange's equivalent.
- to solve problem in Applied Physics .
- understand the Lagrange's and Hamiltonian approach in classical mechanics.
- get familiarized with Poisson and Lagrange's brackets and Hamilton Jacobi equations.
- kinematics and dynamics of rigid body in detail and ideas regarding Euler's equations.
- To apply calculus of variation to diverse problems in physics including isoperimetric problems, use of Lagrange multiplier in solving physics problems.

Paper III - Operations research-II

- Dynamic programming used in computer network, routing, graph problems, computer vision, artificial intelligence, machine learning etc.
- Valuable applications of queuing theory are traffic flow (vehicles, aircraft, people Communications, scheduling and facility design etc.). Queuing theory applicable to Healthcare settings where system have excess capacity to accommodate random variation.
- Nonlinear programming is the field of mathematical Optimization that deals with problem that is not linear.

Game Theory is applied for determining different strategies in the business world

Paper IV-Dissertation

Students will be able to

- Read mathematics independently and solve advanced mathematical problems.
- Demonstrate mastery of subject material, as evidenced by quality of performance in coursework, and on written and oral examinations in mathematics.
- Communicate mathematical ideas, results, context, and background effectively and professionally in written and oral form.
- Produce and defend an original contribution to knowledge, as evidenced by the writing and defence of a thesis involving significant original research

Paper IV- Numerical Analysis-II

This course is an introduction to a broad range of numerical methods for solving mathematical problems that arise in Science and Engineering. The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods, along with a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods. This will help you choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy. The problems cover (i) systems of linear equations, linear least squares problems, and eigenvalue calculation; (ii) interpolation, approximation, and integration of functions; (iii) initial value problems governed by ordinary differential equations; (iv) nonlinear scalar equations.

Paper V – Fuzzy Sets and their applications-II

- In this paper students study the most successful application areas of fuzzy system called fuzzy control which finds extensive use in neural network.
- Decision making in fuzzy environment helps in how decisions are made involving single decision maker or multi decision makers. Students also learn fuzzy measure theory, probability theory, evidence theory which are used to characterize the various forms of uncertainty. Students after attaining knowledge of fuzzy sets can apply their knowledge in research work in the field of medicine, economics, science and engineering, neural network and so on.

विद्या गुरुणां गुरुः



COURSE OUTCOME

SEMESTER 1

PHYSIOLOGY

- TO UNDER STAND THE STRUCTURE & FUNCTION IN VARIOUS ORGANS & SYSTEMS & DISEASES RELATD TO VARIOUS SYSTEMS

FOOD MICROBIOLOGY

- TO UNDERSTAND THE RELEVANT ISSUES & TOPICS OF FOOD MICROBIOLOGY

PROBLEMS IN HUMAN NUTRITION

- TO UNDERSTAND RELEVANT ISSUES & TOPICS RELATED TO NUTRITIONAL PROBLEMS

RESEARCH METHODOLOGY & COMPUTER APPLICATION

- TO GIVE BASIC KNOWLEDGE OF FUNDAMENTAL OF COMPUTER
- TO STUDY SAMPLING TECHNIQUES, METHODS OF RESEARCHES & TECHNIQUES & ANALYSIS OF DATA

CONSTITUTIONALISM & INDIAN POLITICAL SYSTEM

- TO UNDERSTAND THE CONCEPT OF CONSTITUTIONALISM & BECOME FAMILIAR WITH UNION EXECUTIVE.

PUBLIC NUTRITION

- TO UNDERSTAND NATIONAL HEALTH CARE DELIVERY SYSTEM.
- TO UNDERSTAND THE COURSES & CONSEQUENCES OF NUTRITIONAL PROBLEM IN THE COMMUNITY,

SEMESTER 2

FOOD SCIENCE, FOOD CHEMISTRY & FOOD PROCESSING

- TO UNDERSTAND STRUCTURE & COMPOSITION OF VARIOUS FOOD STUFFS.
- TO IMPACT BASIC & APPLIED ASPECTS OF FOOD PROCESSING & TECHNOLOGY

THERAPEUTIC NUTRITION

- TO UNDERSTAND NUTRITIONAL ASSESSMENT TECHNIQUE
- TO UNDERSTAND NUTRITIONAL MANAGEMENT IN DIFFERENT DISEASES.

SOCIAL OUTREACH

- TO PREPARE PROJECT WORK & DO FIELD WORK IN INDUSTRIES , SOCIETIES.

SEMESTER 3

ADVANCED NUTRITION

- TO STUDY THE ADVANCES IN NUTRITION AT ADVANCED LEVEL.

NUTRITIONAL BIOCHEMISTRY

- TO IDENTIFY DIFFERENT COMPOUNDS & UNDERSTAND METABOLISM OF VARIOUS NUTRIENTS.

METHODS OF INVESTIGATION

- TO STUDY THE VARIOUS TECHNIQUES OF INVESTIGATION CHROMATOGRAPHY, ELECTROPHORESIS ETC,

INTELLECTUAL PROPERTY & HUMAN RIGHTS

- TO STUDY ABOUT HUMAN RIGHTS & INTELLECTUAL PROPERTY RIGHTS

NUTRITION FOR HEALTH OF WOMEN & CHILDREN

- TO UNDERSTAND THE IMPORTANCE OF NUTRITION & HEALTH OF WOMEN & CHILDREN & RELATED ISSUES.

SEMESTER 4

NUTRITION FOR HEALTH & FITNESS

- TO DEVELOP THE ABILITY TO EVALUATE FITNESS & WELL BEING.
- TO STUDY THE NUTRITION & HEALTH CARE OF GERIATRICS.

INSTITUTIONAL MANAGEMENT

- TO STUDY ABOUT ACCOUNT KEEPING , COST CONTROL, FOOD SERVICE MANAGEMENT.

STATISTICS & COMPUTER APPLICATION

- TO UNDERSTAND THE STATISTICS & RESEARCH METHODOLOGY

DISSERTATION & CURRENT TRENDS IN NUTRITION

- TO DO COMMUNITY WORK , SURVEY & INNOVATIVE RESEARCHES IN THE FIELD OF FOOD,NUTRITION & HEALTH.

FOOD SCIENCE LAB WORK RELATED RESEARCHES



SUBJECT NAME: - JAVA

- CO1 Understand the concepts related to Java Technology
- CO2 Explore and understand use of Java Server Programming
- CO3 Object oriented programming concepts using Java.
- CO4 Knowledge of input, its processing and getting suitable output.
- CO5 Understand, design, implement and evaluate classes and applets.
- CO6 Knowledge and implementation of AWT package.

SUBJECT NAME: - OBJECT ORIENTED PROGRAMMING C++ AND VISUAL C++

- CO1 Students should be able to write, compile and debug programs in C++ language.
- CO2 Students should be able to use different data types in a computer program.
- CO3 Students should be able to design programs involving decision structures, loops and functions.
- CO4 Students should be able to explain the difference between call by value and call by reference
- CO5 Students should be able to understand the dynamics of memory by the use of pointers.
- CO6 Students should be able to use different data structures and create/update basic data files.

SUBJECT NAME: - DATABASE MANAGEMENT SYSTEMS

- CO1 Master concepts of stored procedure and triggers and its use.
- CO2 Learn about using PL/SQL for data management
- CO3 Understand concepts and implementations of transaction management and crash recovery

SUBJECT NAME: - PROGRAMMING IN VISUAL BASIC

On completion of this course the students will be able to

- CO1 Explain the concept of windows programming
- CO2 Write pseudo code for windows program.
- CO3 Develop program using Visual Basic
- CO4 Develop program using VC++
- CO5 Develop real time application using VB and VC++.

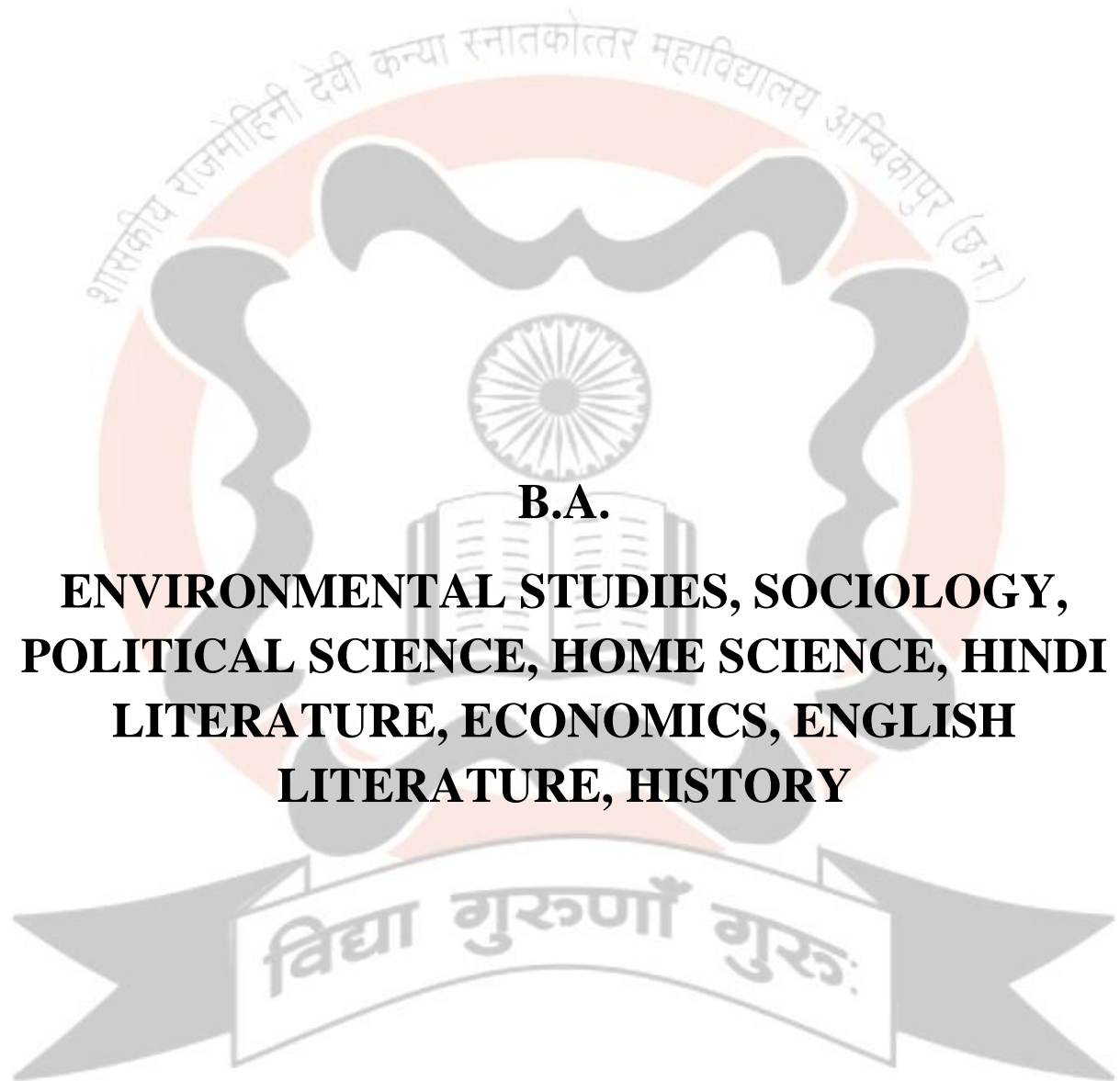
SUBJECT NAME: - PROGRAMMING IN C LANGUAGE

- CO1 Students should be able to write, compile and debug programs in C language.
- CO2 Students should be able to use different data types in a computer program.
- CO3 Students should be able to design programs involving decision structures, loops and functions.
- CO4 Students should be able to explain the difference between call by value and call by reference
- CO5 Students should be able to understand the dynamics of memory by the use of pointers.
- CO6 Students should be able to use different data structures and create/update basic data files.

SUBJECT NAME: - FUNDAMENTAL OF IT AND OS

- CO1 An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- CO2 An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- CO3 An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.





B.A.

**ENVIRONMENTAL STUDIES, SOCIOLOGY,
POLITICAL SCIENCE, HOME SCIENCE, HINDI
LITERATURE, ECONOMICS, ENGLISH
LITERATURE, HISTORY**

COMPULSORY PAPER FOR B.A./B.Sc./ B.Com/ BHSC Part –III

ENVIRONMENTAL STUDIES

COURSE OUTCOME

- To acquire awareness of the environment as a whole and its related problems.
- To know ecology and environment of India and world.
- Effect of pollution on environment.
- Conservation of Flora and Fauna.

Program Outcomes

Student completing the requirements for B.A degree in political science will be able to :

1. Write clearly and with purpose on issue of National and International and domestic politics and public policy:
2. Participate as a civically engaged member of society:
3. Analyze political and policy problem and formulate policy options:
4. Use of electronic and traditional library resource to research key local, state, national international policy issues and present results:
5. Demonstrate competency with basic tools underling modern social research including competency in statistics and qualities analysis
6. Demonstrate critical thinking including the ability to form an argument, detect fallacies, and martial evidence, about key issues of public policy and politics;
7. Discuss the major theory and concept of political science and its subfields; and
8. Deliver thoughtful and well articulated presentation of research finding,

(FOUNDATION COURSE – ENGLISH LANGUAGE)

Course Out come

After completing the Course the students will able to demonstrate:

CO-01 basic grammatical skill in tens, voice narration conditional sentences, conjunctions, Gerund and participles and its application in different walks of life .

CO-02 good convince and reading, writing and communication ability in logical and convincing manner

CO-03 Understanding of different scientific, medical and technological issues related to day today life an awareness towards healthy physical, mental and social set up.

CO-04 Compatible knowledge and understanding in the field of modern communicative devices, its applications and its healthy and unhealthy repercussions.

CO-05 Comprehensive composition skill on different issues, practical and ethical .

CO-06 effective listening, reading, uniting and communications on different occasion and situation occasion and situations.

CO-07 sensuous comprehension of different personal social and national issues with convincing suggestions.

CO-08 attitude as a balanced human basic, anticipation their duties and responsibility towards society and nation.

B.A./B.Sc./ B.Com/ BHSCPart –I

Paper –II (Foundation Course – English Language)

Learning Out come

This course will give to the students:-

CO-01 a solid foundational grounding in correct grammatical usage of the English language.

CO-02 a large working vocabulary related with socio- cultural and political areas of human life.

CO-03 an adequate familiarity with and understanding of the various aspects of Indian history, culture and democratic functioning.

CO-04 Skills of short composition in English.

CO-05 a sense of civic responsibility toward the Indian nation.

CO -06 an inclination toward further and deeper readings into the vastness of Indian history and cultural- civilization aspects.

B.A./B.Sc./ B.Com/ BHSC Part –II

Paper –II (Foundation Course – English Language)

Learning Out come

This course will give to the students:-

CO-01 a solid foundational grounding in correct grammatical usage of the English language.

CO-02 a large working vocabulary related with the rich intellectual history of India, particularly of her achievements in the field of scientific thoughts and discoveries.

CO-03 an adequate familiarity with the ancient and pre- independence phases of the Indian scientific history focussed on the great scientists and their achievements.

CO-04 Skill of short composition in English.

CO-05 a sense of national pride of belonging to the Indian nation with great scientific heritage.

CO-06 an inclination towards gaining more and deeper Knowledge about science as practised and researched by Indian minds .

विद्या गुरुणां गुरुः

PROGRAMME OUTCOME B.A. HINDI

- 01 विद्यार्थी हिन्दी भाषा के उद्भव, विकास एवं उसकी विविध बोलियों का ज्ञान प्राप्त करते हैं।
- 02 विद्यार्थियों को हिन्दी व्याकरण एवं शुद्ध वर्तनी का ज्ञान होता है।
- 03 विद्यार्थियों हिन्दी साहित्य के इतिहास, विकास एवं लेखन परंपरा ज्ञान कराना।
- 04 विद्यार्थियों में हिन्दी साहित्य के प्रति भावात्मक अभिरूचि का विकास होता है।
- 05 विद्यार्थी साहित्य की विविध विधाओं से परिचित होते हैं।

PROGRAMME SPECIFIC OUTCOME

आधार पाठ्यक्रम – स्नातक

भाग एक– हिंदी भाषा, पेपर कोड – 0101

भाग दो– हिंदी भाषा, पेपर कोड – 0171

भाग तीन– हिंदी भाषा, पेपर कोड – 0231

- 01 हिन्दी भाषा एवं व्याकरण का बोध प्राप्त होगा है।
- 02 विद्यार्थियों को हिन्दी साहित्य के इतिहास का ज्ञान प्राप्त होगा।
- 03 हिन्दी भाषा और साहित्य की विविध प्रवृत्तियों एवं स्वरूपों का ज्ञान प्राप्त हो सकेगा।
- 04 भाषा ज्ञान के माध्यम से सांस्कृतिक एवं भावात्मक एकता के सूत्र विकसित हो सकेंगे।

आधार पाठ्यक्रम

Course Outcome B.A.Ist

(प्रथम प्रश्न पत्र–प्राचीन हिन्दी काव्य) पेपर कोड– 0103

- 01 विद्यार्थी प्राचीन एवं मध्यकालीन काव्य का ज्ञान प्राप्त कर सकेंगे।
- 02 हिन्दी साहित्य के (स्वर्णकाल) भक्तिकाल के प्रमुख कवियों एवं उनकी काव्य प्रवृत्तियों से परिचय प्राप्त कर सकेंगे।
- 03 विद्यार्थी साहित्यिक अभिरूचि का विकास कर सृजनात्मक लेखन हेतु प्रेरित होंगे।

Course Outcome B.A.Ist

(द्वितीय प्रश्न पत्र– हिन्दी कथा साहित्य) पेपर कोड– 0104

- 01 विद्यार्थी कथा साहित्य की विविध प्रवृत्तियों से परिचित होते हैं।
- 02 विद्यार्थियों में प्रमुख उपन्यासों एवं कहानियों के पाठ के माध्यम से कथा साहित्य के प्रति अभिरूचि का विकास होता है।
- 03 विद्यार्थियों में भाषा के रचनात्मक पहलू की समझ का विकास होता है।
- 04 विद्यार्थी हिन्दी कहानी और उपन्यास के विकासक्रम से परिचित होते हैं।

Course Outcome B.A.IInd

(अर्वाचीन हिन्दी काव्य)–प्रथम प्रश्न पत्र, पेपर कोड– 0173

- 01 विद्यार्थी हिन्दी कविता के आधुनिक काल की विविध प्रवृत्तियों का ज्ञान प्राप्त करते हैं।
- 02 विद्यार्थी हिन्दी साहित्य के आधुनिक काल के प्रमुख काव्य आन्दोलनों से परिचित होते हैं।
- 03 विद्यार्थी को हिन्दी के कार्यालयिन एवं व्यवहारिक स्वरूप से परिचित होते हैं।
- 04 विद्यार्थियों में सृजनात्मक क्षमता का विकास होता है।

Course Outcome B.A.IInd

(द्वितीय प्रश्न पत्र–हिन्दी निबंध तथा अन्य गद्य विधाएं) पेपर कोड– 0174

- 01 विद्यार्थी हिन्दी निबंध एवं अन्य गद्य विधाओं से परिचित होते हैं।
- 02 नाटककार, एकांकीकार तथा उनकी रचनाओं से परिचित होते हैं।
- 03 विद्यार्थी नाटक एवं एकांकियों के माध्यम से सामाजिक समस्याओं का ज्ञान प्राप्त कर उनके समाधान हेतु प्रेरित होते।
- 04 विद्यार्थियों में लेखकों के लेखन शैली के प्रति आलोचनात्मक दृष्टि का विकास होता है।

Course Outcome B.A.IIIrd

(प्रथम प्रश्न पत्र–छत्तीसगढ़ी भाषा एवं साहित्य)– पेपर कोड– 0233

- 01 विद्यार्थियों में छत्तीसगढ़ी भाषा एवं साहित्य के प्रति अभिरूचि का विकास होता है।
- 02 विद्यार्थी छत्तीसगढ़ी भाषा एवं व्याकरण का ज्ञान प्राप्त कर, छत्तीसगढ़ी में साहित्य सृजन के लिए प्रेरित होंगे।
- 03 छत्तीसगढ़ी भाषा के प्रमुख रचनाकारों से परिचित होते हैं।
- 04 छत्तीसगढ़ी भाषा की कविता एवं गद्य की विविध विधाओं परिचित होते हैं।
- 05 विद्यार्थियों में छत्तीसगढ़ी साहित्य के प्रति आलोचनात्मक दृष्टि का विकास होता है।

Course Outcome B.A.IIIrd

(द्वितीय प्रश्न पत्र—हिन्दी भाषा एवं साहित्य का विकास तथा काव्यांग विवेचन) पेपर कोड— 0234

- 01 विद्यार्थियों में हिन्दी भाषा के लेखन, पठन और वाचनकला का विकास होता है। हिन्दी भाषा के विविध रूपों से परिचित होते हैं।
- 02 विद्यार्थियों को हिन्दी साहित्य के सभी कालखण्डों (आदिकाल, भक्तिकाल, रीतिकाल एवं आधुनिक काल) की पृष्ठभूमि, परंपरा, प्रवृत्ति एवं रचनाकारों तथा उनकी प्रमुख रचनाओं का ज्ञान प्राप्त होता है।
- 03 विद्यार्थियों में हिन्दी साहित्य के इतिहास लेखन की परंपरा और उसके प्रति आलोचनात्मक दृष्टि का विकास होता है।



(B.A. English Literature)

Programme Learning Outcomes

The programme learning outcomes relating to B.A. programme in English B Literature:

- demonstrate a set of basic skills in literary communication and explication of literary practices and process with clarity
- demonstrate a coherent and systematic knowledge of the field of English literature and Bhasha literatures in English showing an understanding of current theoretical and literary developments in relation to the specific field of English studies.
- display an ability to read and understand various literary genres and stylistic variations and write critically
- cultivate ability to look at and evaluate literary texts as a field of study and as part of the wider network of local and global culture
- demonstrate a critical aptitude and reflexive thinking to systematically analyze the existing scholarship and expand critical questions and the knowledge base in the field of English studies using digital resources.
- display knowledge to cultivate a better understanding of values both literary values that aid us in literary judgment and also values of life at all stages. apply appropriate methodologies for the development of the creative and analytical faculties of students, their overall development of writing, including imaginative writing.
- recognize employability options in English studies programme as part of skill development and as career avenues open to graduates in today's global world such as professional writing, translation, teaching English at different levels, mass media, journalism, aviation communication and personality development
- channelize the interests of the students and analytical reasoning in a better way and make more meaningful choices regarding career after completion of graduate programme
- to enable students to develop an awareness of the linguistic- cultural richness of India as an important outcome of English literary studies in India

B.A. I Year English Literature

Paper –I (Literature in English :1550-1750)

Course outcome

After completing the Course the students will be able to demonstrate:

CO 01- a Comprehensive knowledge of the literary works in English produced by British writers this knowledge will include the various literary forms fictional as well as non-fictional employed by the British writers and Historical and Literary topics as well.

CO 02- a critical understanding of the poets like Shakespeare, Milton and John Donne, John Dryden and Alexander Pope, playwrights like Shakespeare, non-fictional writers like Bacon, Addison, and Steele and the novelists like Swift

CO 03- a capacity to compare and contrast the different literary qualities of the writers with the critically rank them in evaluative terms.

CO 04- a critical inclination to read literature as a socio-cultural document.

CO 05- a research tendency to go for innovative studies English Literature in the postcolonial light of the latest research insights.

CO 06- a socio- political sense of responsibility to stand up against colonizing human tendencies.

CO 07- a visible literary- critical bent towards understanding life through literature and vice versa .

Paper-II Literature In English-1550-1750

UNIT-1 ANNOTATIONS.

UNIT-2 POETRY

- Shakespeare- sonnet No. 1 From Fairest Creatures, Sonnet No. 154 The little Love God.
- Milton- How Soon Hath Time the subtle of Youth...
- John Donne- Sweetest Love I Don't go, This is my Play's Last Scene.

UNIT-3 POETRY

- John Dryden- Portrait of shadwell.
- Alexander- Pope- From An Essay on Criticism (True case in writing...) and the world's Victor Stood subdned by sound.

UNIT-4 PROSE

- Bacon Of Studies, Of Health, Of Friendship
- Addison-Sir Roger at Home
- Steele Of the Club.

UNIT-5 DRAMA

Shake spear- The Merchant of Venice

UNIT-6 Fiction- Swift- The Battle of the Books.

UNIT-7 Historical and Literary Topics

- The Renaissance.
- Humanism.
- Reformation.
- The Restoration.
- The Earlier Drama
- Petrarchism and the Sonnet Cycle.
- The Influence of Seneca an Classical Dramatic Theory
- The Elizabethan and Jacobean stage.
- Restoration Drama
- The Rise of Periodcal Essay

syllabus for B.A. Part-I and B.A. Part- II

B.A. II Year English Literature Paper –I (Modern English Literature).

UNIT-I Annotations

UNIT-II (Poetry)

- W.B. Yeats-' A Prayer for my Daughter, The Second Coming
- T.S. Eliot- Love Song of J. Alfred Prufrock'

UNIT-III (Poetry)

Dylan Thomas- Lament A Refusal to Mourn the Death Larkin- Toads, At Grass.

UNIT-IV (Prose)

Bertrand Russell- On the Value of Scepticism Qscar Wilde Happy Prince.

UNIT-V (Drama)

G.B. Shaw- Pygmalion.

UNIT-VI (Fiction and short- stories)

- Rudyard Kipling- Kim Short Stories
- Katherine mansfield- A Cup of Tea

UNIT-VII

- Elegy,
- Sonnet,
- Ode
- Morality & Miracle Play,
- Interlude

Course outcome

After completing the Course the students will be able to demonstrate:

CO 01- a Comprehensive knowledge of the literary works in English produced by British writers this knowledge will include the various literary forms fictional and non-fictional employed by the British writers and literary terms as well.

CO 02- a critical understanding of the poets like Sassoon, Owen, Auden and Ted Hughes, playwrights like John Galsworthy and J.M. Synge, non-fictional writers like Robert Lynd and the novelists like William Golding

CO 03- a capacity to compare and contrast the different literary qualities of the writers with the critically rank them in evaluative terms.

CO 04- a critical inclination to read literature as a socio-cultural document.

CO 05- a research tendency to go for innovative studies of English Literature in the postcolonial light of the latest research insights.

CO 06- a socio-political sense of responsibility to stand up against colonizing human tendencies.

CO 07- a visible literary-critical bent towards understanding life through literature and vice versa .

B.A. III Year English Literature

Paper –I (A) Indian Writing in English

UNIT-I Annotation and short answer questions

UNIT-II (Poetry)

Toru Dutt - Our Casurina Tree

Tagore - Songs 1 & 103

from Gitanjali Sarojini Naidu -

The Ecstasy; The

UNIT-III Kamla Das - The Old Playhouse

Gauri Deshpandey or The female of the species

Jayant Mahapatra - Dawn at Purl

K.N. Daruwala or Death by Burial'

Shiv K. Kumar Indian Women

Lotus'

UNIT-IV Prose-

Nirad C. Choudhary - My Birth Place

Dr. S. Radhakrishnan - The call of the suffering

H. Belloc- A conversation with A Reader

UNIT-V (Drama)

Girish Karnad	-	Hayavadana or
Tendulkar	-	Silence The court is in session

UNIT-VI Fiction

R.K.Narayan	-	Guide
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UNIT- VII 1. Lyric, 2. Subjective Poetry 3. Couplet 4. Fable 5. Hymn 6. Allegory 7. Autobiography.

B.A. III Year English Literature

PAPER-I (B) - American Literature Course outcome

After completing the Course the students will able to demonstrate:

CO 01- a Comprehensive knowledge of the literary works in English produced by American writers. This knowledge will include the various literary forms fictional as well as non-fictional employed by the American writers in English.

CO 02- a critical understanding of the poets like Sylvia Whitman, Carl Sandberg, Dickinson and Cummings, playwrights like O'Neil and Miller, non fictional writers like Emerson and Thoreau , the novelists like Faulkner and Hemmingway

CO 03- a capacity to compare and contrast the different literary qualities of the writers with the critically rank them in evaluative terms.

CO 04- a critical inclination to read literature as a socio-cultural document.

CO 05- a research tendency to go for innovative studies of American writing in English in the postcolonial light of the latest research insights.

CO 06- a socio- political sense of responsibility to stand up against colonizing human tendencies.

CO 07- a visible literary- critical bent towards understanding life through literately and vice versa .

B.A. III Year English Literature

PAPER-I (B) - American Literature

UNIT-I Annotation and short answer questions

UNIT-II (Poetry)

Wait whitman - O Captain ! My Captain , when the

Lilacs Last in the Dooryard Bloomed.

Carl Sandberg - ' Who Am I ? ; ' I am the people, The Mob'

UNIT-III Emily Dickinson - 'Hope is the thing with Feather' I
f=Felt a Funeral in My Brain'

E.E. Cummings - ' The Cambridge Ladies'
As Freedom is a Breakfast food'

UNIT-IV Prose-

William Faulkner - Nobel Award Acceptance Speech

W. Carlos Williams - In the

American Grain Walt Whitman - Preface

to " Leaves of Grass '

H. Belloc- A conversation with A Reader

UNIT-V (Drama)

Miller - All My Sons or

Eugene O' Neill	-	The Hairy Ape
UNIT-VI Fiction		
E. Hemingway	-	A Farewell to Arms Or
W. Faulkner	-	The Sound and the Fury
UNIT- VII 1. Naturalism, 2. Realism 3 Art for Art's sake 4. Poetic- Drama,		
5. Symbolism	6. American Renaissance	7. Existentialism.

B.A. III Year English Literature

Paper –II (20th Century Literature In English)

Course outcome

After completing the Course the students will able to demonstrate:

CO 01- a Comprehensive knowledge of the literary works in English produced by British writers this knowledge will include the various literary forms fictional and non- fictional employed by the British writers and historical terms as well.

CO 02- a critical understanding of the poets like Sassoon, Owen, Auden and Brooke , playwrights like Shaw and Beckett, non fictional writers like Virginia Woolf and Greene and the novelists like Conrad and Chinua Achebe.

CO 03- a capacity to compare and contrast the different literary qualities of the writers with the critically rank them in evaluative terms.

CO 04- a critical inclination to read literature as a socio-cultural document.

CO 05- a research tendency to go for innovative studies of English Literature in the postcolonial light of the latest research insights.

CO 06- a socio- political sense of responsibility to stand up against colonizing human tendencies.

CO 07- a visible literary- critical bent towards understanding life through literately and vice versa .

B.A. III Year English Literature

Paper –II (20th Century Literature In English)

The Paper will be taught as an optional paper to paper- II (A) which is a paper on American Literature. The Principle focus will be to probe the students a general background and cultural history of this period and also to make them aware of the Literary trends of the twentieth century. The Paper Will comprise six units sand in all six questions are to be attempted, one from each unit.

UNIT-I The following historical and literary topics will be included in this unit, Students are required to write short notes of not more than three hundred words on any two of the following topics.

- The Two world wars.
- The Russian Revolution.
- The Great Depression
- The Vietnam war.
- Freudian Thought.
- Existentialism.
- Absurdism.
- Modernism and Post Modernism.
- New Development in fiction and Drama.

UNIT-II Ten Objective type questions on the life History and major poetical work of the following poets of the twentieth century will be asked in this unit (10 Marks)

- i) W.B. Yeats (1865-1939)
- ii) Siegfried Sasson (1886- 1967)

- iii) Rupert Brooke (1887-1918) iv) T.S. Eliot (1888-1965)
 v) wilfred Owen (1893- 1918) vi) W.H. Auden (1907- 1937)
 vii) Louis Maceneice (1907-1963).
 viii) Stephen spender (19096-)
 ix) Dylan Thomas (1914- 1953)
 x) Philip Larkin (1922- 1985)

UNIT-IV Prose-

Joseph Conrad
 Chinua Achebe

- 'Heart of Darkness' or
 - 'Things Fall Apart'

UNIT-V

(Non Fictional Prose)

Virginal Woolf
 Graham Greene

'The Death of the Moth'
 'The Lost Childhood'



B.A. ECONOMICS

Vision

"Be the very pinnacle of academic and research excellence in Economics"

Mission

- Achieve academic excellence in Economics through innovative teaching and learning processes.
- To prepare the student to be professionally competent to face the challenges in the industry.
- Promote inter-disciplinary research among the faculty and the students to create state of art research facilities.
- Motivate the students to acquire entrepreneurial skills to become global leaders.

Programme Education Objective (PEO)

PEO 1. Utilizing strong technical aptitude and domain knowledge to Develop Economic Environment

PEO 2. Applying research and entrepreneurial skills augmented with a rich set of communication, teamwork and leadership skills to excel in their profession.

PEO 3. Showing continuous improvement in their professional career through life-long learning, appreciating human values and ethics..

Graduate Attributes for BA Economics

GA 1. An ability to apply Knowledge of Economics

GA 2. An ability to design and conduct experiments, as well as analyze and interpret data

GA 3. An ability to design an Economic system with realistic constraint such as economic environmental, social, ethical, health and safety

GA 4. An ability to identify, formulate and solve economic problem GA 5. An ability to function on multidisciplinary teams.

GA 6. An ability to communicate effectively

GA7. An understanding of professional and ethical responsibility

GA 8. The broad education necessary to understand the impact of Economic solution in a global economic, environmental and social context

GA 9. An ability to engage in life long learning

GA 10. A knowledge of contemporary issues in technologies related to economic activities of country

GA 11. An ability to use the modern techniques tools necessary for economic research and development

GA 12. AN ability to develop economic environment in society

Programme outcome for BA Economic (PO)

Programme Outcomes:

The Bachelor of Arts programme in Economics has been designed with the objective to develop in-depth knowledge of students in frontier areas of economic theory and methods, so that they are able to use the knowledge to study real world economic problems.

The course has a strong focus on theoretical and quantitative skills and train students in the collection and analysis of the data using their software skills. The programme offers specialised optional courses, which allow student to pursue their studies in their area of interest. The students are required to submit report and present their findings of field-study. Besides, to hone the student's writing and analytical skills they are required to submit a term paper on current economic problem. Thus, the Bachelor in Economics programme seek to

PO 01- Prepare students to develop critical thinking to carry out investigation about various socio-economic issues objectively while bridging the gap between theory and practice.

PO 02- Equip the student with skills to analyse problems, formulate an hypothesis, evaluate and validate results and draw reasonable conclusions thereof.

PO 03- Prepare students for pursuing research or careers that provide employment through entrepreneurship and innovative methods. Because today's unemployment problem can also be solved by developing the micro and small entrepreneurship

PO 04- Prepare students to develop own thinking /opinion regarding current national or international policies and issues

PO 05- Create awareness to become a rational and an enlightened citizen so that they can take the responsibility to spread the governments' initiatives/schemes to the rural areas for the upliftment of the poor or vulnerable section of the society for inclusive growth

Programme Learning Outcome:

At the end of the programme, the students will have adequate competency in the frontier areas of economic theory and methods. The students will acquire additional specialisation through optional courses. They will be able to use common software for analysis of economic data. Besides, students will be able to execute in-depth analysis of economic issues based on their understanding of economic theory, which will not only widen their opportunities for employment, but also help them to pursue their doctoral studies. Keeping the programme objectives in view, the specific learning outcomes of Bachelor in Economics are:

PL 01- Understanding the basic assumptions in various economic theories and enhance capabilities of developing ideas based on them.

PL 02- Prepare and motivate students for research studies in Economics especially by developing questionnaire, collecting primary data through field surveys.

PL 03- Provide knowledge of a wide range of econometric techniques using excel or other statistical software.

PL 04- Motivate students to extract or utilize different websites for secondary data collection, generating concepts for various facets of economic studies and gather latest informations provided by various Universities, UGC, or ICSSR.

PL 05- Motivate students in preparing for various competitive examinations, B.Ed etc, by developing or gaining value addition day by day by giving assignments, by following a routine or developing discipline / concentration etc.

A. Part-1 (Economics)

Subject: Micro Economics, Paper-I

COURSE OUTCOME

CO 01. To understand how market works, identify the various determinants of firms demand for factor services, monopoly and oligopoly in factor market and market equilibrium.

CO 02. To introduce the student to the basic micro economic concepts like demand, supply, production, cost and revenue and the theories explaining their determination.

CO 03. To enable the student to apply the theories in analyzing real world micro issues.

CO 04. To get a basic understanding about micro economics.

CO 05. To provide basic understanding on micro economic concepts, relating to markets, factor pricing, distribution and economies of uncertainty.

B. A. Part-1 (Economics)

Subject: Indian Economy, Paper-II

COURSE OUTCOME

CO 1. To enable the students to have an understanding of the various issues of the Indian Economy.

CO 2. To enable the students to comprehend and critically appraise current issues and problems of Indian economy.

CO 3. The focus of this course is on the development of Indian Economy since Independence.

CO 4. To understand the importance of planning undertaken by the government of India.

CO5. To provide a detailed treatment of issues in agricultural economics.

CO 6. To familiarize students with policy issues those are relevant to Indian Agricultural Economics.

CO 7. To enable them analyse the agricultural issues using the economic concepts

B.A. Part-II (Economics)

Subject: Macro Economics, Paper-I

COURSE OUTCOME

CO 01. To give an insight to the students about the basic concepts used in Macro economics.

CO 02. To enable the students to understand the theoretical framework and the working of an economy as a whole.

CO 03. To suggest the policy alternatives used in controlling the economy.

CO 04. To explain the process of calculating national income, identify its components, demonstrate green accounting and social accounting.

CO 05. To enable the students to.

CO 06. It also provides an ins

CO 07. This paper gives an insight to the students about the basic concepts used in macro economics and policy alternatives.

CO 08. To enable the students to understand the theoretical framework and the working of an economy as a whole.

CO 09. To illustrate the meaning of inflation, deflation and stagflation, identify different kind of inflation, causes and effects of inflation on the different sectors of the economy.

CO 10. To understand the basic concepts of international trade.

CO 11. To enable the students to have a basic understanding of the emerging trend, issues and policies per in the field of international economic system..

B.A. Part-II (Economics)

Subject: Money, Banking and Public Finance, Paper-11

COURSE OUTCOME

CO 01. To enable the students to know the evolution and role of money in the economy.

CO 02. It also provides an insight into the innovative role of banks in the changing economic set up.

- CO 03.** It provides basic understanding about the nature and significance of money.
- CO 04.** It gives a narration about the banking structure and its functioning of an economy.
- CO 05.** To provide basic information to students on the scope, significance and functions of government.
- CO 06.** A general understanding about fiscal policy and its various instruments.
- CO 07.** To give u awareness about budgeting with special reference to India.

B. A. Part-III (Economics)

Subject : Development and Environmental Economics, Paper-1

COURSE OUTCOME

- CO 01.** To enable the students to understand the basic concepts of Development and Growth.
- CO 02** It also intends to provide the theoretical framework for growth and development discourses under different schools of economic thought and a better insights and knowledge on issues and challenges on economic development.
- CO 03.** To understand the significance for life enrichment and career orientation.
- CO 04.**The course also teaches the basic principles of strategic human resource management and the various aspects of Human Resource Planning.
- CO 05.**The main objective is to provide a basic understanding of economic concepts and theories.
- To understand the market structures and is various features.

B.A. Part-III (Economics)

Subject: Statistical Methods, Paper-II,

COURSE OUTCOME

- CO 0 1.** The course also aims to create an enthusiasm among students about different schools of Economic thought and various aspects of social science research, methodology, concepts, tools and various issues.
- CO 02.** To get a closer understanding of the subject Social Sciences with all its prominent branches.
- CO 03.** The course intends to familiarize the students with the broad contours of Social Sciences,Economics and its methodologies, tools and analysis procedures.
- CO 04.** To introduce the basic methods and methodology used in Economics.
- CO 05.** To provide a broad understanding about the contributions made by the economists over the decades.
- CO 06.** To enrich the students awareness about Research Techniques.

B. A. HISTORY

PROGRAMME OUTCOME [P.O]

- History is a true teacher of man which shows proper path to the future.
- History makes us aware of various aspects of human nature and provides gradual development of civilization.
- The study of history is important to every nation and its citizen to remain alive, prosperous and dynamic.
- Through the study of history, one gets to know the circumstances of the rise and fall of a nation.
- Study of history makes us understand past mistakes of our ancestor and gives a stern warning not to repeat them.
- Study of history is considered to be a region of human civilization.
- History provides a clear picture of all known things of ethics, religious life, economic life, cultural life, political system, governance etc. of any erstwhile society.
- Study of history as a provident fund is necessary otherwise a nation has no future.
- The necessity, concept, purpose, importance and usefulness of history is very broad and far reaching.

PROGRAMME SPECIFIC OUTCOME [P.S.O]

- Analyze relationship between past and present.
- To develop practical skills helpful in the study and activities related to historical events.
- Understand present existing social, political, religious and economic conditions of the people.
- To develop interest in the study of history and activities related to history
- Understand background of our religion, administration.
- Critical analysis – student will produce their own historical analysis of documents and develop the ability to think critically and historically when discussing the past.
- Student will demonstrate in written work and class discussions and the ability to recognize and articulate the diversity of human experience, including ethnicity, race language as well as political, economic, social and cultural structures are time and space.
- Application - Student will employ full range of techniques and methods used to gain historical method to make comparison across time space and culture.
- Student will understand and evaluate historical ideas, arguments and point of view.
- Knowledge – An understanding of the major trends of historical knowledge.
- Construct and communicate historical arguments in both oral and written form.

BA PART ONE

HISTORY OF INDIA (UPTO 1206 A.D.) PAPER 1

Course Outcomes

- Political History of ancient India. The life-story of the Indian people in their formative stage, struggling to find happiness both here & hereafter.
- Reconstruction of that past history through a selection of significant facts.

OUTCOME

- Understand the salient features of Indus valley civilization
- Evaluate the features of Buddhism and Jainism
- Visualize the administration of Mauryas and the art and architecture of Mauryas
- Identify the administration of Guptas and their contribution to Nalanda University
- Examine the Arab conquest of Sindu and the battle of Tarain.

PAPER 2 WORLD HISTORY 1453 -1890 AD OUTCOME

- Describe the Geographical discoveries and the Renaissance movement in Europe.
- Assess the causes and effects of Reformation and Counter-Reformation movements.
- Narrate the enlightened despotism in Europe, especially in France ,Prussia and Austria.
- Learn the causes and results of Thirty years war. V- Discuss the reforms of Peter the Great and Catherine II of Russia.

BA PART TWO

PAPER 1 INDIAN HISTORY [MEDIEVAL HISTORY] 1206 -1761 AD

- Study Indian society that subjected to a variety of impacts under which the Indian people had to learn to adopt themselves to an ever changing environment.
- Study of Social organization in India which is often remarked as the caste system. Ancient Indian Polity: -
- All forms of Human organization that of the state.
- Understand the foundation of the Delhi sultanate and the Sultanate administration.
- Recognise the Socio, economic and religious conditions under Vijayanagar Empire.
- Identify the condition of India under the Mughal Empire.
- Explain the Administration and art and architecture of Mughal.
- Analyse the rise of the Marathas and the contribution of Shivaji.

PAPER TWO [WORLD HISTORY] 1890 -1964

- Identify what is meant by the French Revolution.
- Trace short-term and long-term repercussions of revolutionary regimes and Empire-building by France.
- Explain features of revolutionary actions and reactionary politics of threatened monarchical regimes.
- Delineate diverse patterns of industrialization in Europe and assess the social impact of capitalist industrialisation.
- Analyse patterns of resistance to industrial capital and the emerging political assertions by new social classes.

BA PART 3

PAPER 1 HISTORY OF INDIA (MODERN INDIA) 1761 – 1950

- Study the Indian art tradition which one of the oldest living art traditions in the world.
- The art of country with its history social & economical perspective.
- Excavation of the sites of the old towns like Harappa Mohenjo-Daro & Taxila information of the other ancient monuments.

OUTCOME

- Outline key developments of the 18th century in the Indian subcontinent
- Explain the establishment of Company rule and important features of the early colonial regime
- Explain the peculiarities of evolving colonial institutions and their impact.
- Discuss the social churning on questions of tradition, reform etc, and during first

century of British Colonial rule.

- Assess the issues of landed elite, and those of struggling peasants, tribals and artisans during the Company Raj.

PAPER 2 WORLD HISTORY 1871-1945

OUTCOME

- Identify how different regional, religious and linguistic identities developed in the late 19th and early 20th centuries.
- Outline the social and economic facets of colonial India and their influence on different trends of politics.
- Explain the various forms of anti-colonial struggles in colonial India.
- Analyse the complex developments leading to communal violence and Partition.
- Discuss the negotiations for independence, the key debates on the Constitution and need for socio-economic restructuring soon after Independence.

Course Outcome

The main focus in the History Course at UNDERGRADUATE LEVEL is on the stages the growth of human civilizations and the evolution of social systems and on cultural and scientific development. The main aims outlined for history teaching are:

CO1. To promote an understanding of the processes of change and development through which human societies have evolved to their present stage of development.

CO2. To promote an understanding of the common routes of human civilizations and an appreciation of the basic unity of mankind.

The outcomes of this Course are as follows: Students who complete the History POST GRADUATE LEVEL might come up the following knowledge and skills:

CO 1 Learn a basic narrative of historical events in a specific region of the world in a specific time frame

CO 2 Distinguish between primary and secondary sources

CO3. Understand and evaluate different historical ideas, various arguments, and points of view.

CO4 . Evaluate competing interpretations and multiple narratives of the past. CO 5. Gather and assess primary historical evidence.

CO 6. Compile a composite bibliography.

CO7. Present clear and compelling arguments, based on critical analysis of diverse historical sources.

CO 8. Articulate factual and contextual knowledge of specific places and times, to make careful comparisons (across time, space, and culture) and to discern how each generation (including theirs) uses the past for present purposes.

CO 9. Students should understand academic honesty, a concept presented to them in all history classes.

CO10. Students should understand the basic skills that historians use in research. CO11.

Students should understand the basic skills that historians use in writing. CO12. Students should understand the basic tools of historical analysis.

CO13. Students should understand the value of diversity.

CO14. Students should develop a secular outlook towards society.

CO15. Students should believe in the equality of man irrespective of caste, creed, religion and colour.

CO.16 . Students should learn to believe in the ideas of religious toleration

B. A. POLITICAL SCIENCE

Vision

The department of Political science conducts continuous evaluation of girl students regularly due to which the intellectual understanding of the girl students, of writing ability and question in relation to nature etc. Information received. The girls who excelled in this with this the department ensures its level of success. So that the examination results of the girl students can be improved.

On the implementation of Semester system, Seminars and project work, social learning research work is done by the students on the prescribed time period. Having experience in research work.

Mission

Programmes Specific outcome

The Department is running two programmes namely M.A and PhD political science in the research center. Programme have been designed in a manner so as provide a holistic approach to the study of political science. The core of the discipline is maintained with courses on political philosophy both western and Indian and key concepts of politics. These course provide a solid grounding to the learners on the history of ideas and the larger issues of epistemology in social science. They also try to integrate the concepts with the practices and government and to understand their relevance in totality. The second set of paper on Indian politics including study of constitution, institutions, processes and political economy entail a detailed study and analysis of morphology and anatomy of politics in India. While familiarizing the students with legal framework of government institution, the courses tent to engage them with the undercurrents of political practice and developments process. By learning the evolution of concepts and theories of Indian politics the students are able to critically reflect on the contemporary development the courses on comparative politics and international relations provide an overview of political developments at the global level. Comparative analysis not only helps in understanding the patterns of institutionalism, democratization and development in various polities. But also provide a framework for explaining variations. In addition specialized course like . Human rights peace and conflict studies and state politics introduce the students to certain new dimensions of politics. By doing these courses students develop a solid footing over the vast field of knowledge in the discipline that also in a way encourage them to undertake future research in these unconventional areas of political science. Through them they also tend to develop an interdisciplinary focus without deviation from the core of the discipline.

Research methodology is taught both in M.A and PhD political science in the research center. While providing an epistemological and philosophical grounding on the subject the course familiarizes the students with specialized techniques of qualitative and quantitative research in social sciences. The field work component of the course further trains the students to undertake field research and write research reports. Advance paper in political theory. Global politics and women and politics further enhance the knowledge of students in these areas and also help them identify their areas of research.

B.A I Year Political Science

Course Outcomes

Course Title:- Political Theory

Course Code:- 46

Paper First

Course Outcome:- By doing this course student will have develop theoretical insight on political concept. This will have undertaking demonstrative knowledge of the leading theory, literature, and approach in the political science and develop the student with the knowledge related to political theory and concept and other new trends under this subject also have knowledge of the events and changes related to the new political process. Apart from this student are also aware of the concept of right, justice freedom, Equality and Sovereignty and law.

Course Title:- Indian Government and Politics

Course Code:- 47

Paper:- II

Course Outcome:- upon completion of this paper student will develop a comprehensive understanding of Indian political institution and their function in India additional ,they will also be familiarized with the evolution and working of political party and the political parties in India and pressure group has taken shape under diverse social setting. This course on the state politics in India will develop an understanding in the student about the historical and emerging trends in political process in the Indian state. The student will understand the federal process in India.

B.A II^{Year} Political Science

Course Title:- Political Thought

Paper:- I

Course Code:- 61

Course Outcome:- This purpose of this course expressed in the title itself. As many western political thinkers provide various thought that is important in new scenario.

Course Title:- Comparative Government and Politics

Paper:- II

Course Code:- 62

Course Outcome:- After completing the course student will develop a detailed understanding of theory and methods of comparative politics. They will be familiar with different models of political system and they way political dynamics have changed and shaped society from time to time. Discuss the theory and apply the other countries institution , political behavior and political ideas as America, Britain, china and Switzerland countries their institute and government function and political process.

B.A III Year Political Science

Course Title:- International Politics and foreign policy India

Paper:- I

Course Code:- 103

Course Outcome:- This course enables student to development an understanding of the international politics identify names and geography location of most contemporary state. Describe the role of individual and cultural value and perception, and the important of empirical evidence in analyzing international problems. An understanding of the

fundamentals of foreign policy making in India . An understanding of the foreign policy challenges faced by India.

Course Title:- Public Administration

Course Code:- 104

Paper:- II

Course Outcome:- After completing this course, the students will have a clear understanding of traditional and emerging theories and principle of public administration . This would also acquaint them with changing management practices in the light of expanding public works and need for greater collaboration with non-state agencies.



B. A. SOCIOLOGY

GRADUATE ATTRIBUTES IN SOCIOLOGY

- GOOD Knowledge and understanding of major concept theoretical principle and subfield like political.
- Sociology rural urban sociology and tribal sociology understand.
- Ability to modern thought of social thinkers.
- Ability to employ critical thinking and efficient problem solving skills in all the basic problem of sociology.
- Capability for asking relevant question relating to the issues and problems in the field of sociology and planning executing and reporting the results of a theoretical investigation.
- Capable of working effectively in diverse team in both classrooms library and fieldbased situation.
- Capable of identifying appropriate resources required for a project and manage a project thought to completion while observing responsible and ethical social conduct.
- Capable of using computer for simulation studies in sociology and computation and appropriate software for numerical statistical analysis of data.
- The graduate should be capable of demonstrating ability to think and analyse rationally with modern and scientific outlook and identify ethical issues related to ones work avoid unethical behavior such as fabrication falsification or misrepresentation of data or committing plagiarism.
- The B.A.(Sociology) programme is a three years course . The syllabus and schemes of examination are detailed herewith

Academic programs

B.A. Part -I

PAPER	PAPER CODE	COURSE PAPER	MAX. MARKS	MIN.MARKS
Paper 1 st		Introduction To Sociology	75 Marks	25 Mark
Paper 2 nd		Contemporary Indian Society	75 Marks	25 Mark

B.A. Part -II

PAPER	PAPER CODE	COURSE PAPER	MAX. MARKS	MIN.MARKS
Paper 1 st		Sociology Of Tribal Society	75 Marks	25 Mark
Paper 2 nd		Crime And Society	75 Marks	25 Mark

B.A. Part -III

PAPER	PAPER CODE	COURSE PAPER	MAX. MARKS	MIN.MARKS
Paper 1 st		Foundation of Sociological Thought	75 Marks	25 Mark
Paper 2 nd		Methods of Social Research	75 Marks	25 Mark

B.A. Part-I. Course Out Comes

OBJECTIVE

- To give a basic understanding of sociology.
- To know the meaning and subject matter of sociology.
- To understand the nature or scientific study.
- To know the nature and scope of sociology.

B.A. Part-II. Course Out Comes

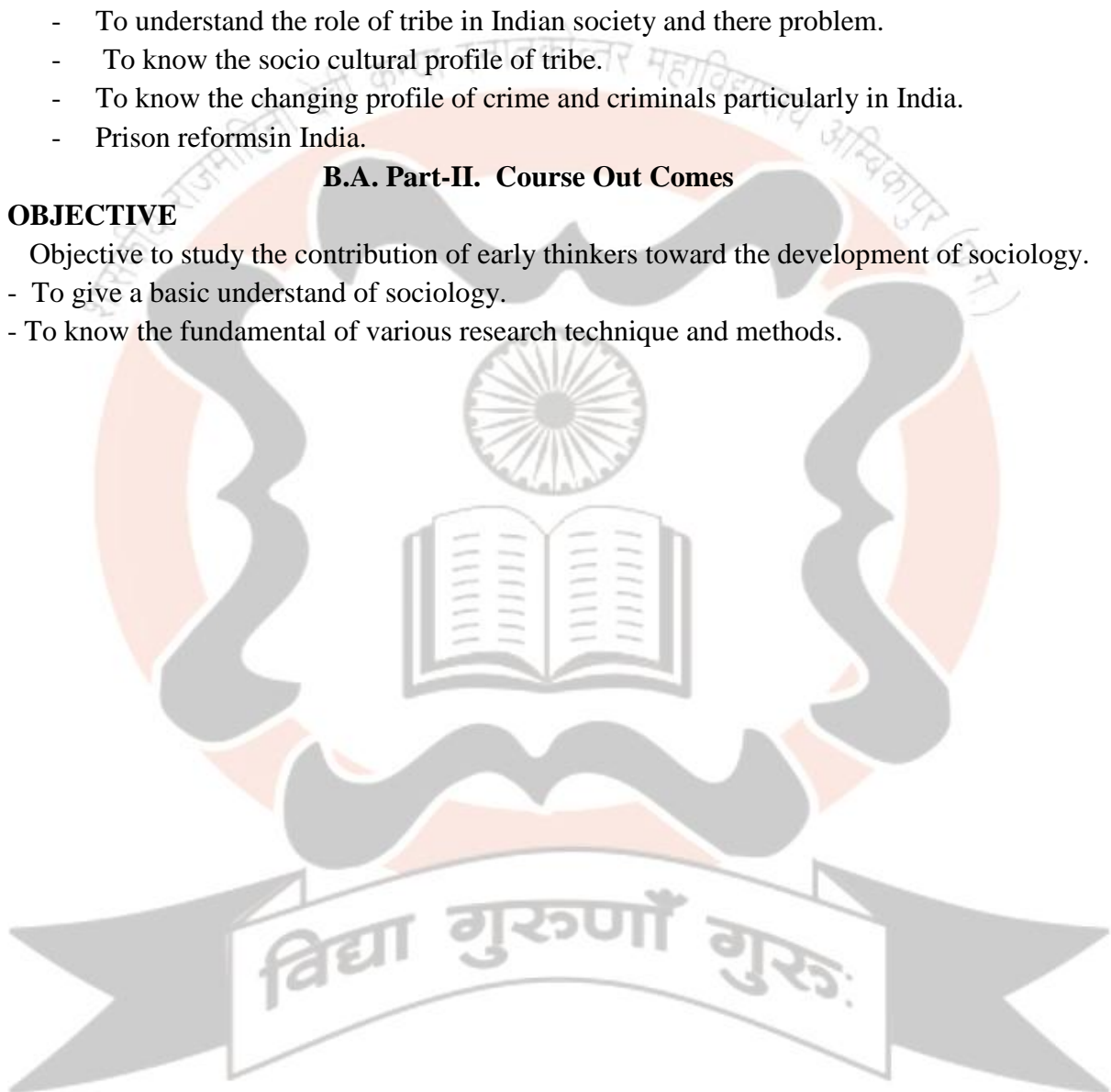
OBJECTIVE

- To understand the role of tribe in Indian society and there problem.
- To know the socio cultural profile of tribe.
- To know the changing profile of crime and criminals particularly in India.
- Prison reformsin India.

B.A. Part-II. Course Out Comes

OBJECTIVE

- Objective to study the contribution of early thinkers toward the development of sociology.
- To give a basic understand of sociology.
 - To know the fundamental of various research technique and methods.





B. COM. PROGRAM OUTCOME

- After completion of three years for bachelors in commerce program students would gain a thorough grounding in the fundamentals of commerce and finance.
- Learners will gain thorough systematic and subject skills within various disciplines of commerce, business, accounting, economics, finance, auditing and marketing.
- The commerce and finance focused curriculum offers a number of specializations and practical exposures which would equip the students to face the modern-day challenges in commerce and business.
- The all-inclusive outlook of the course offer a number of values based and job oriented courses ensures that students are trained into up-to-date.
- Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
- Learners will acquire the skills like effective communication, decision making, problem solving in Day to day business affairs

COURSE OUTCOME

B.COM. PART-I

GROUP – I; PAPER – I: - FINANCIAL ACCOUNTING

- Demonstrate an appropriate mastery of knowledge, skill and tools of financial accounting.
- On successful completion of this course the students are enabled with the knowledge in the practical applications of accounting.
- To impart the knowledge of various accounting concepts

GROUP – I; PAPER – II: -BUSINESS COMMUNICATION

- To understand the concept, process and importance of communication
- To develop awareness regarding new trends in business communication.
- To develop effective business communication skills among the students.

GROUP – II; PAPER – I: - BUSINESS MATHEMATICS

- To Develop Abstract, logical & critical thinking ability to reflect critically upon their work.
- To prepare for competitive examinations
- To understand the concept of Simple interest, compound interest and the concept of EMI.
- To understand the concept and application of profit and loss in business

GROUP – II; PAPER – II: – BUSINESS REGULATORY FRAMEWORK

- To provide a brief idea about the framework of Indian business laws.
- To develop the awareness among the students regarding these laws affecting business, trade and commerce
- To acquaint students with the basic concepts, terms & provisions of Mercantile and Business Laws.

GROUP – III; PAPER – I: – BUSINESS ENVIRONMENT

- On successful completion of this subject the students should have Knowledge on the meaning conveyed by the word 'Business' , understand the various forms of business , types of business and impact of various aspects on business environment
- To make the students aware about the Business Environment.
- To make students understand about the internal and external factors that affects the business.

GROUP – III; PAPER – II: – BUSINESS ECONOMICS

- To expose Students of Commerce to basic micro economic concepts and inculcate an analytical approach to the subject matter.
- To stimulate the student interest by showing the relevance and use of various economic theories.

B.COM. PART-II

GROUP – I; PAPER – I: CORPORATE ACCOUNTING

- To enable the students to develop awareness about Corporate Accounting in conformity with the provisions of Companies Act and Accounting as per Indian Accounting Standards.
- To make aware the students about the conceptual aspect of corporate accounting.

GROUP – I; - PAPER – II: COMPANY LAW

- To provide basic knowledge of the provisions of companies act 1956 along with relevant case law.
- To update the knowledge of provisions of the Companies Act of 2013.
- To acquaint the students with the duties and responsibilities of Key Managerial Personnel.

GROUP – II; PAPER – I: COST ACCOUNTING

- To expose the students to the basic concepts on the tools used in cost accounting.
- To familiarize students with various methods and techniques of costing.

GROUP – II; - PAPER – II: PRINCIPLES OF MANAGEMENT

- To familiarize the students with the basics of principles of management.
- To provide an understanding about various functions of management.

GROUP – III; - PAPER – I: BUSINESS STATISTICS

- To gain understanding of statistical techniques as are applicable in business.
- To impact the basis in Statistics to help students acquire new skills on the application of statistical tools and techniques in Business decision-making.

GROUP – III; PAPER – II: FUNDAMENTALS OF ENTREPRENEURSHIP

- To provide exposure to the students to the entrepreneurial culture and industrial growth so as to preparing them to set up and manage their own small units.
- To motivate students to make their mind set for taking up entrepreneurship as career
- On successful completion of this course, the student should be well versed in Concept relating to entrepreneur, Knowledge in the finance institution, project report incentives and subsidies.

B.COM. PART-III

GROUP-I; - PAPER – I: - INCOME TAX

- To enable the students to know the basics of Income tax and its applications.
- This course aims to provide an in-depth knowledge on the provisions of Income Tax.
- To familiarize the students with recent amendments in Income-tax.

GROUP-I; - PAPER – II: AUDITING

- To impart the knowledge about the principle and methods of auditing and their applications.
- On successful completion of this course, the student should be well versed in the fundamental concepts of Auditing.

GROUP-II; - PAPER – I: - INDIRECT TAX

- Aims at imparting basic knowledge about major indirect taxes levied by central and state government.
- To understand the basic concepts and to acquire knowledge about computation of indirect taxes.
- Enable the student to understand the Principles of Indirect Taxes Calculation of Tax, Tax Authorities, Procedures

GROUP-II; - PAPER – II: MANAGEMENT ACCOUNTING

- To develop the understanding of accounting tools and information and their uses in Decision making.
- To introduce students to the various tools and techniques of management Accounting.
- To enlighten students on Financial Statement Analysis with the emphasis on the preparation of fund flow and cash flow statement.

OPTIONAL GROUP B (MARKETING AREA)

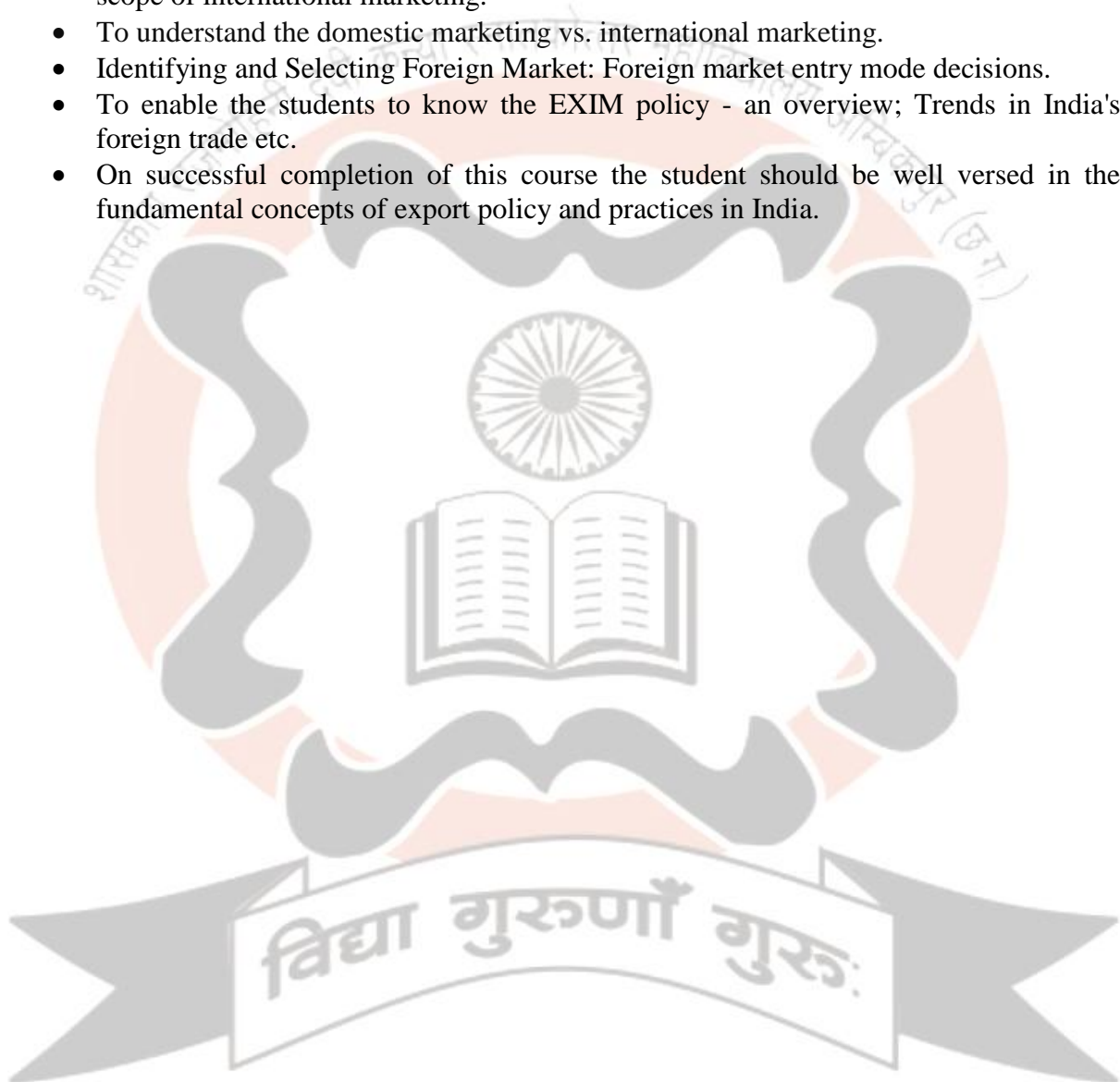
PAPER – I: PRINCIPLES OF MARKETING

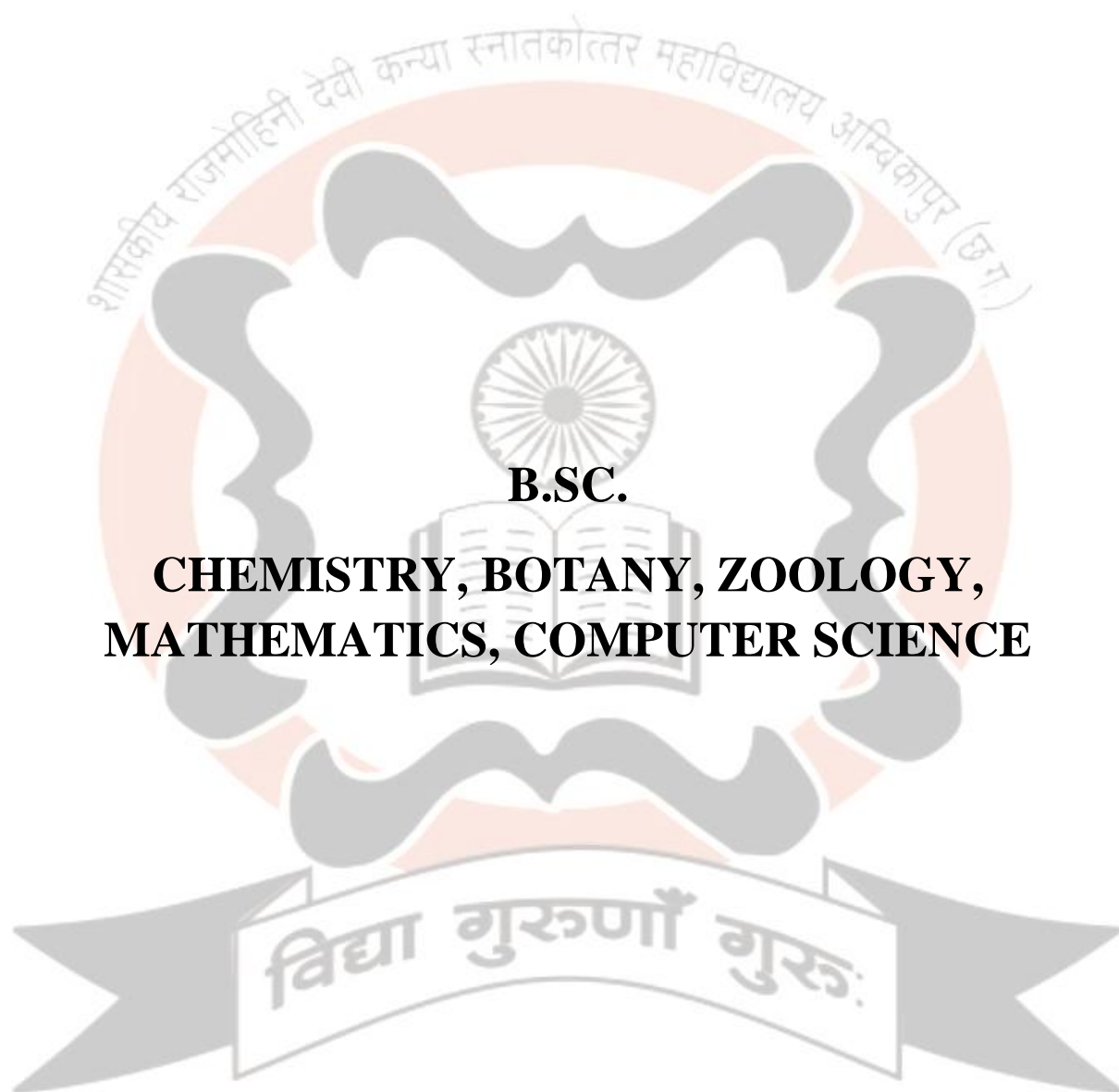
- To enable the students to know the importance of marketing as a business function and in the economy.
- To make the Students aware of the marketing concepts: traditional and modern; selling vs. marketing etc.
- To understand the consumer Behaviour and market Segmentation.
- To develop the understanding of recent development in marketing; social marketing, online marketing, direct marketing, services marketing, and green marketing etc.

OPTIONAL GROUP B (MARKETING AREA)

PAPER – II: INTERNATIONAL MARKETING

- To make the Students aware of the international marketing: nature, definition, and scope of international marketing.
- To understand the domestic marketing vs. international marketing.
- Identifying and Selecting Foreign Market: Foreign market entry mode decisions.
- To enable the students to know the EXIM policy - an overview; Trends in India's foreign trade etc.
- On successful completion of this course the student should be well versed in the fundamental concepts of export policy and practices in India.





B.SC. MATHEMATICS

- (1) It provides a base for higher studies and refines the brain of students in comparison to other students as study of mathematics helps to increase the act of logical thinking.
- (2) Students can apply their knowledge in other branches of study as mathematics find application in every field of knowledge.
- (3) Students of science have greater chance of employment e.g. in finance and investment. Teaching, keep up mathematical knowledge in the changing environment of technology.
- (4) Study of mathematics enhances personal development. One learns to develop skills and time management.

COURSE OUTCOME

B.Sc. Part One

Calculus:

- By learning the topics taught in this paper student learns how to tackle problems of successive differentiation in other branches of science. Topics like curvature and curve tracing find applications in a number of research fields. Vector calculus too is very useful in building the concepts of Physics.
- In integral calculus student learns to find length, area, volume and surface of revolution of standard curves. A student can apply his knowledge of calculus in physics, chemistry statistics and can also create mathematical models in order to arrive into an optimal solution.
- To Identify and solve the first order and first degree linear differential equations
- To find orthogonal trajectories.
- To solve exact and differential equation of second order simultaneous equations

Algebra:

Student will be able to

- Apply De Morgan's theorem on functions properties of direct inverse and hyperbolic function.
- To find the logarithm of complex quantities.
- To expand trigonometric function.
- To solve the problem of roots and coefficient of polynomial of the variables.
- To solve the cubic equations.
- To transform different kinds of polynomials.
- To define mapping relations congruence modulo.
- To find gcd of problems based on congruence modulo.
- To define group, subgroup and properties.
- To find order and generator of group.
- To use of cosset decomposition in the langrage's theorem.
- To understand zoomorphism and isomorphism.
- To construct normal, quotient group.
- To find kernel of Homomorphism

B.Sc. Part Two

Advanced Calculus:

- The topics taught in this paper serve as pivot for other branches of science. For example partial differentiation, Laplace's transformations are few topics in which student must have a good knowledge to understand the concepts of Physics, Chemistry etc.
- Topics taught in this paper like envelope, evolutes, Beta function, Gamma function have been introduced to handle the topics in Physics.

Differential Equation:

Students will learn

- To solve the differential equation by power series frobeniens method.
- To solve Bessel's, Legendre's equation.

- Familiar with generating function recurrence relation.
- To solve orthogonality Sturm-Liouville problem.
- To find Laplace transform.
- To find inverse Laplace transform.
- To apply shifting theorem to solve problems.
- To solve differential equation with the help of Laplace transform.
- To solve differential equations of first order.
- To solve equation with Lagrange's and Charpit's method.
- To solve D. E. of second and higher orders.
- To classify D. E. reducible to equation with constant Coefficient.
- To define proximity, maximal's, external.
- To solve boundary value problem with the help of Euler's Lagrange's equation.
- To find the external.

B.Sc. Final

Analysis

Students will learn

- To perform basic mathematical operation on complex number
- To define continuity and differentiability..
- To define analyticity, find CR equations.
- To find harmonic function.
- To formation of analytic function with the help of Milne Thomson method.
- To identify different type of Elementary function.
- To decide when and where are given function is analytic.
- To understand the metric space properties and able to verify whether a given function is metric.
- To explain the geometric meaning of metric.
- To distinguish between open and closed balls.
- To define convergence for sequence in a metric space.
- Continuity of a function between two metric spaces.
- To understand contraction principle, dense, subsets, separable space.
- To understand FIP, continuous function, compact set.

Abstract Algebra

Students will learn

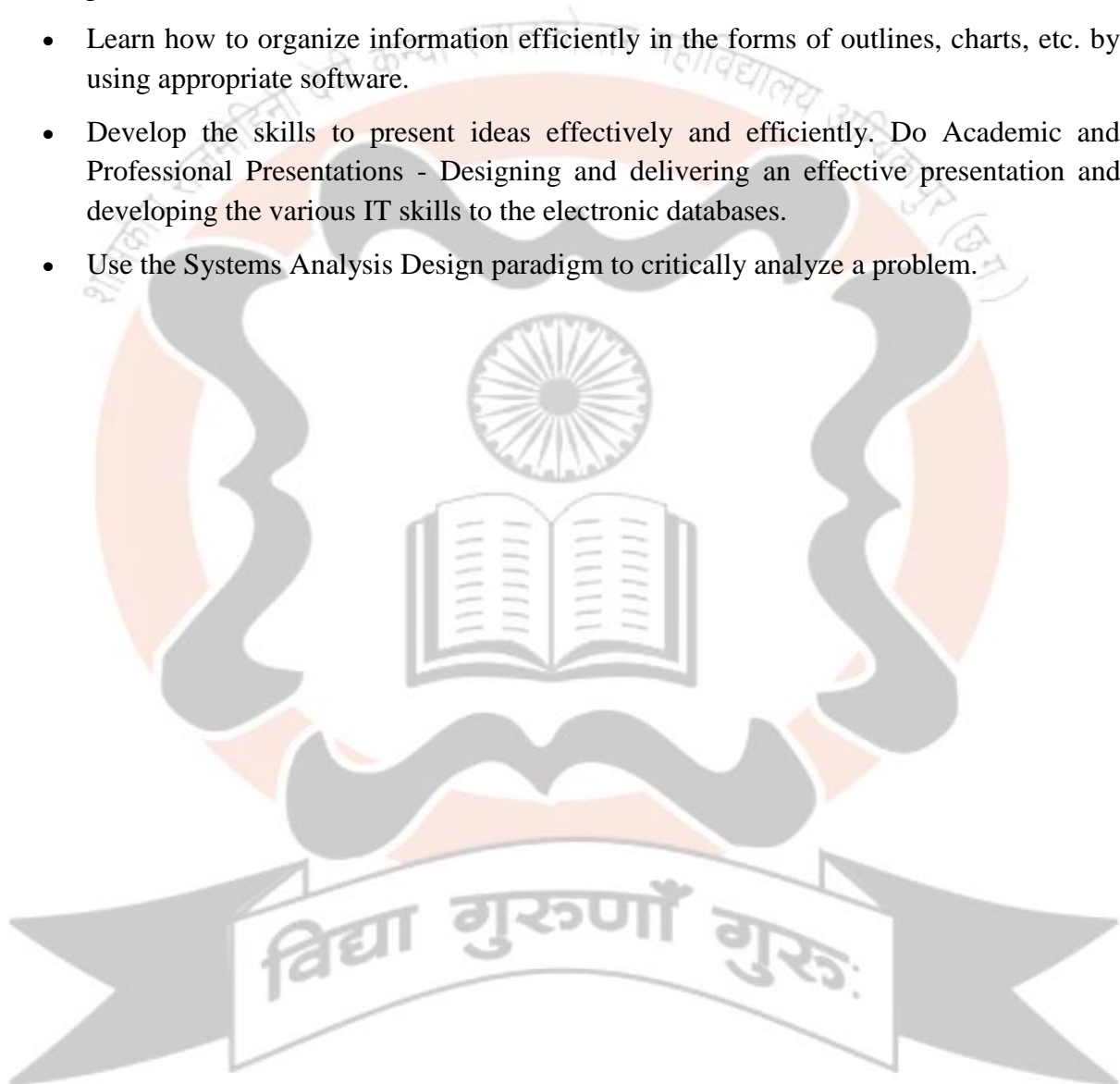
- To explain linear transformation and their representation as matrices.
- To find the rank and mobility.
- To find the basis.
- To evaluate Eigen values at Eigen vector of LT
- To formation of inner product spaces
- To distinguish the orthogonal set
- To orthogonalize the finite dimensional vector spaces..
- To precise and accurate mathematical definition of object in ring theory.
- To use definition to identify and construct examples.
- To analyze and demonstrate example of Ideals and quotient rings.
- To use rings like polynomial and modular rings.
- Use concept of homomorphism, isomorphism for rings.
- analyze finite and infinite dimensional vector space subspace over field ,including properties structures of vs.
- Compute Eigen values and eigenvectors and applied the basic diagonalization.
- Compute inner product including Gram Schmidt process.

B.SC. COMPUTER SCIENCE

PROGRAM OUTCOME

After Completing the Bachelors of Computer Science (B.Sc. Computer Science) Students are able to:

- Improve their computer literacy, their basic understanding of operative systems and a working knowledge of software commonly used in academic and professional environments.
- Develop criteria to organize and present different type of works in academic and professional environments.
- Learn how to organize information efficiently in the forms of outlines, charts, etc. by using appropriate software.
- Develop the skills to present ideas effectively and efficiently. Do Academic and Professional Presentations - Designing and delivering an effective presentation and developing the various IT skills to the electronic databases.
- Use the Systems Analysis Design paradigm to critically analyze a problem.



B.SC. BOTANY

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. I

Paper – I :Bacteria, Viruses, Fungi, Lichens and Algae.

On completion of the course students will be able to –

- Understand the diversity of Bacteria, viruses, Algae and Fungi.
- General structure, ultra structure, multiplication, economic importance and life cycle of bacteria, virus, fungi Algae and lichen.
- Understand the life cycle pattern of Algae and Fungi.
- Understand the useful and harmful activities of bacteria, algae, fungi and lichens.
- Understand the pathogenic and non-pathogenic bacteria.
- Understand the biodiversity of fungi.
- Understand the microbial biotechnology, mushroom biotechnology and bio-fertilizers (Rhizobium, Agrobacterium).

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. I

Paper – II :Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany.

On completion of the course students will be able to –

- Understand the morphological biodiversity of bryophytes, pteridophytes and gymnosperms.
- Understand the Anatomical structure of bryophytes, pteridophytes and gymnosperms.
- Understand the economic and ecological importance of bryophytes, pteridophytes and gymnosperms.
- Know the importance of Angolla as biofertilizer.
- Understand the biodiversity of fossil gymnosperms.
- Understand the types of fossil and fossilization.
- Understand the uses of some fossils in daily life like coal, petroleum etc.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. II

Paper – I : Plant taxonomy, economic botany, plant anatomy and embryology.

On completion of the course students will be able to –

- Understand the classification and nomenclature of plants.
- Preservation methods of plant material and herbarium techniques.
- Important botanical gardens and herbarium.
- Systematic position of some important local plants (Angiosperms).
- Economic importance of fibre yielding plants, medicinal plants, food plants, beverages, rubber, flowering plants and bio-diesel plants of C.G.
- Anatomy and anatomical analmalous structure in seed growth.
- Embryology of flowering plants.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. II

Paper – Ecology and plant physiology.

On completion of the course students will be able to –

- Introduction and scope of ecology.
- Enviromental factors.
- Soil formation and profile.
- Morphological and anatomical adaptation.
- Characters of plant population and community.
- Plant succession and evolution of plants.
- Concept of Ecosystem.

- Biogeochemical cycles.
- Plant water relationship.
- Mineral nutrition and absorption.
- Mechanism of photosynthesis and respiration and related cycles.
- Plant hormones and its activity in plant growth.
- Flowering mechanism, photoperiodism and vernalization.
- Seed structure, type and germination.
- Plant movement.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. III

Paper – I Analytical Technology, Plant Pathology, Experimental embryology, Elementary biostatistics, Environmental Pollution and conservation.

- To understand structure, principles and applications of analytical instrumentation.
- Techniques and uses of plant Tissues culture.
- To understand Principles of plant pathology and disease management of some local crop and vegetable diseases.
- Pollution, causal organisms, B.O.D./C.O.D. biomagnification, eutrophication.
- Biogeographical Zones of India.
- Biodiversity and its conservation.
- CBD, MAB, national parks, hot spots, Red data book, IUCN Threat categories invasive/endemic species and sustainable development.
- To understand elementary biostatistics. Standard deviation and standard error.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

B.Sc. III

Paper – II Genetics, Molecular Biology, Biotechnology and Biochemistry.

- Able to know about plant cell structure, cell organelles, cell division and inheritance.
- Able to know about Nucleus and nucleic acid, mutation and behaviour of living organisms, transcription and translation in prokaryotes.
- Recombinant DNA Technology. Application of Biotechnology, GM Plants, Monoclonal antibodies, use of DNA finger printing.
- Protein structure and synthesis.
- CBH - st and synthesis.
- Fat - st. and synthesis and breakdown
- Enzymes - Nomenclature, classification components and enzymatic activity.

NEW CURRICULUM

B.Sc.-I (BOTANY) PAPER-I : BACTERIA, VIRUSES, FUNGI, LICHENS AND ALGAE

UNIT-I

VIRUSES: General characteristics, types of viruses based on structure and genetic material. Multiplication of viruses (General account), Lytic and Lysogenic cycle. Economic importance. Structure and multiplication of Bacteriophages. General account of Viroids, Virusoids, Prions, and Cyanophages. Mycorrhiza-Types and Significance.

UNIT –II

BACTERIA: General characteristics and classification (on the basis of morphology), fine structure of bacterial cell, Gram positive and Gram negative bacteria, mode of nutrition and reproduction vegetative, asexual and recombination (Conjugation, transformation and transduction), Economic importance. Microbial Biotechnology, Rhizobium, Azotobactor, Anabena.

UNIT-III

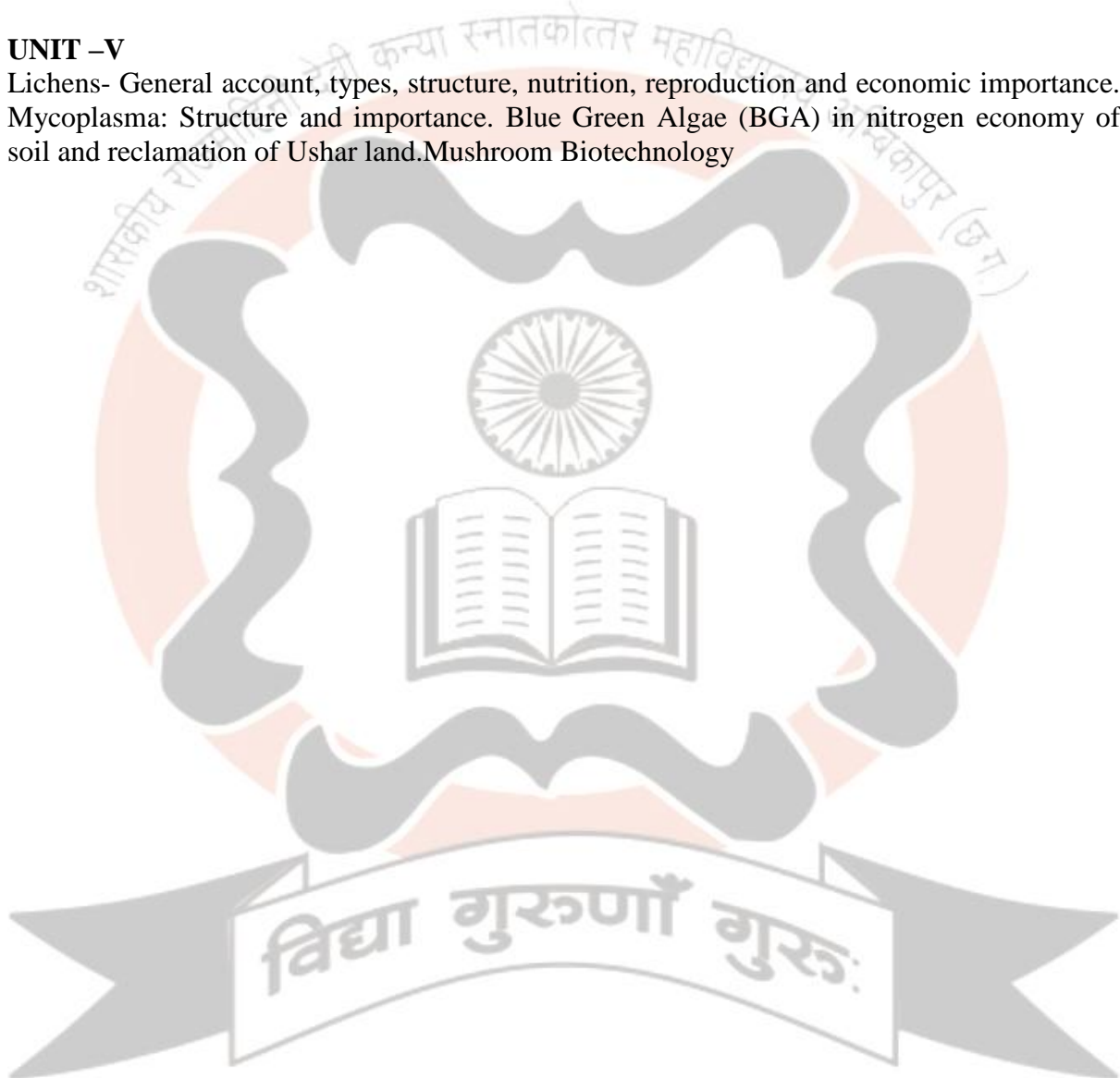
FUNGI: General account of habit and habitat, structure (range of thallus organization), cell wall composition, nutrition and reproduction in fungi. Heterothallism and Parasexuality. Outlines of classification of fungi. Economic importance of fungi. Life cycles of Saprolegnia, Albugo, Aspergillus, Peziza, Agaricus, Ustilago, Puccinia, Alternaria and Cercospora. VAM Fungi

UNIT-IV

ALGAE: Algae: General characters, range of thallus organization, Gaidukov phenomenon, reproduction, life cycle patterns and economic importance. Classification, Systematic position, occurrence, structure and life cycle of following genera : Nostoc, Gloeocapsa, Volvox, Oedogonium, Vaucheria, Chara, Ectocarpus, Polysiphonia.

UNIT -V

Lichens- General account, types, structure, nutrition, reproduction and economic importance. Mycoplasma: Structure and importance. Blue Green Algae (BGA) in nitrogen economy of soil and reclamation of Ushar land. Mushroom Biotechnology



B.Sc.-I (BOTANY) PAPER –II
(BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY)

UNIT –I

BRYOPHYTA: General characteristics, affinities, range of thallus organization, general classification and economic & ecological importance, Systematic position, occurrence, morphology anatomy and reproductive structure in Riccia, Marchantia, Peltia, Anthoceros, Funaria. Vegetative reproduction in Bryophytes, Evolution of sporophytes.

UNIT-II

PTERIDOPHYTES: General characteristics, affinities, economic importance and classification, Heterospory and seed habit, stellar system in Pteridophytes, Aposory and apogamy, Telome theory, Azolla as Biofertilizer.

UNIT-III

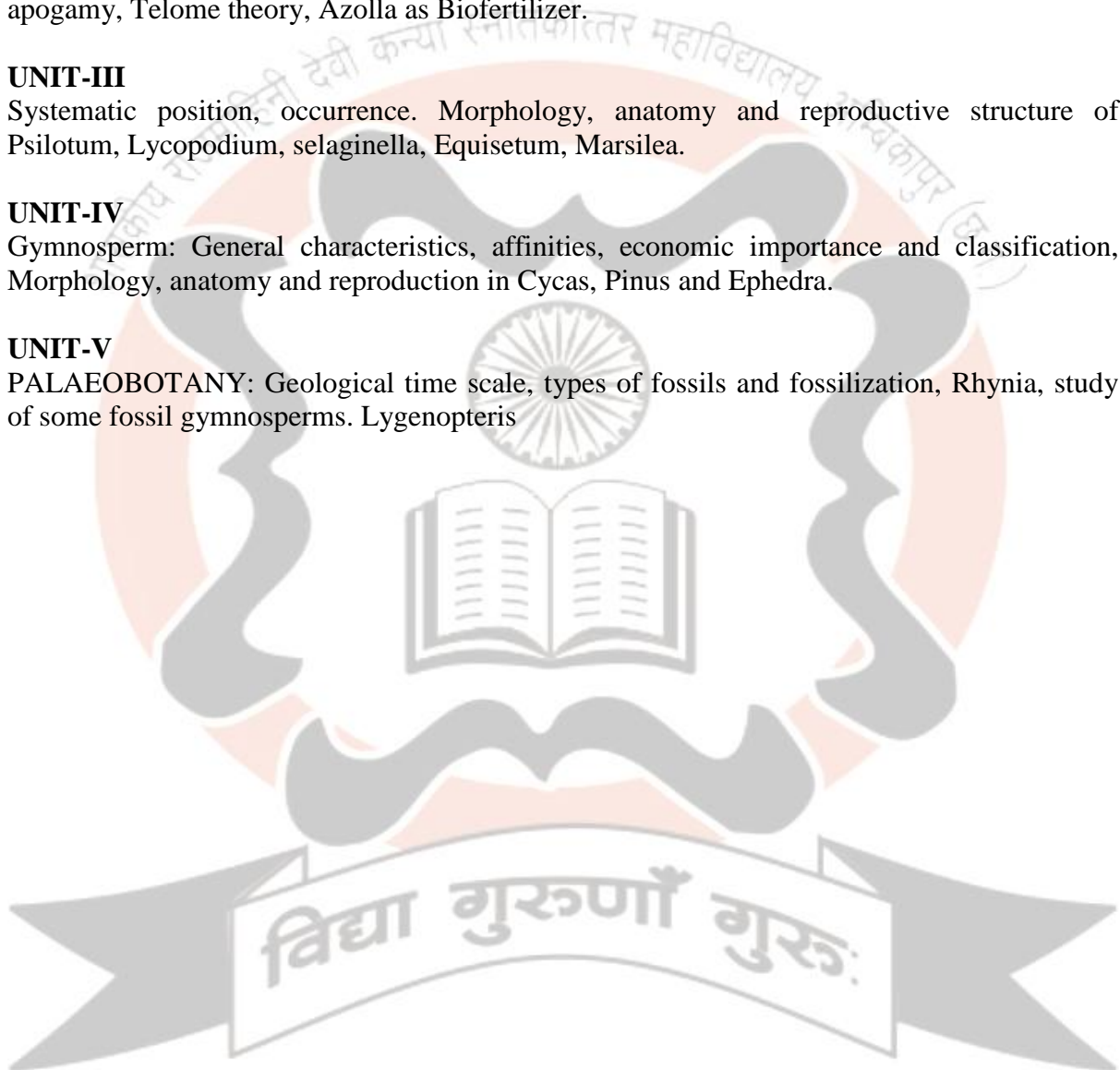
Systematic position, occurrence. Morphology, anatomy and reproductive structure of Psilotum, Lycopodium, Selaginella, Equisetum, Marsilea.

UNIT-IV

Gymnosperm: General characteristics, affinities, economic importance and classification, Morphology, anatomy and reproduction in Cycas, Pinus and Ephedra.

UNIT-V

PALAEOBOTANY: Geological time scale, types of fossils and fossilization, Rhynia, study of some fossil gymnosperms. Lyginopteris



B.Sc. I (BOTANY) PRACTICAL

Study of external (Morphological) and internal (microscopic/anatomical) features of representative genera given in the theory.

- Algae: Gloeocapsa, Scytonema, Gloeotrichia, Volvox, Oedogonium, Vaucheria, Chara, Ectocarpus, Sargassum, Batrachospermum
- Gram staining
- Fungi: Albugo, Aspergillus, Peziza, Agaricus, Puccinia, Alternaria and Cercospora
- Bryophyta: Riccia, Marchantia, Pellia, Anthoceros, Sphagnum, Funaria
- Pteridophyta: Lycopodium, Selaginella, Equisetum, Marsilea.
- Gymnosperm: Cycas, Pinus, Ephedra.

B.Sc.–II (BOTANY)

PAPER-I: (PLANT TAXONOMY, ECONOMIC BOTANY, PLANT ANATOMY AND EMBRYOLOGY)

UNIT-I

Bentham and Hooker system of classification. Binomial Nomenclature, International Code of Nomenclature for Algae, Fungi, and plants (IUCN), Typification, numerical Taxonomy and chemotaxonomy. Preservation of Plant material and Herbarium techniques. Important botanical gardens and herbaria of India, Kew Botanical garden, England.

UNIT-II

Systematic position, distinguishing characters and economic importance of the following families, Ranunculaceae, Magnoliaceae, Brassicaceae, Rosaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Malvaceae, Convolvulaceae, Orchidaceae, Acanthaceae, verbenaceae, Lamiaceae, Asteraceae, Fabaceae, Euphorbiaceae, Poaceae and Liliaceae.

UNIT-III

Economic Botany: Botanical name, family, part used and uses of the following economically important plants, fiber yielding plants; Cotton, jute, sun, hemp, coir. Timber yielding plants: Sal,

Teak, Shisham and Pine. Medicinal plants: Kalmegh, Ashwagandha, Ghritkumari, Giloy, Brahmi, sarpagandha, ---of medicinal plants of C.G. Food plants: Pearl millet, Buck of wheat, Sorghum, Soyabean, gram, Ground nut, Sugarcane and Potato. Fruit plants: Pear, Peach, Litchi.

Spices: Cinnamon, Turmeric, Ginger, Asafoetida and Cumin.

Beverages : Tea, Coffee Rubber

Cultivation of important flowers: Chrysanthemum, Dahelia, Biodiesel plants Jatropha, Pongamia

Ethnobotany in context of Chhattisgarh.

UNIT-IV

Plant Anatomy: Root and shoot apical meristems theories of root and shoot apex organization,

permanent tissues, anatomy of root, stem and leaf of dicot and monocot, secondary growth in root and stem, Anatomical anomalies in the primary structure of stems (Nyctanthes, Boerhaavia,

Casuarina), Anomalous secondary growth in Dracaena, Bignonia, Laptadenia.

UNIT-V

Embryology: Flower as a reproductive organ, anther, microsporogenesis, types of ovules, megasporogenesis, development of male and female gametophyte, pollination, mechanisms, self

incompatibility, fertilization, endosperm, embryo, polyembryony, apomixis and parthenocarpy.

B.Sc.-II (BOTANY) PAPER-II (ECOLOGY AND PLANT PHYSIOLOGY)

UNIT-I

Introduction and scope of ecology, environmental and ecological factors, Soil formation and soil

profile, Liebig's law of minimum, Shelford's law of tolerance, morphological and anatomical adaptations in hydrophytes, xerophytes and epiphytes.

UNIT-II

Population and community characteristics, Raunkiaer's life forms, population interactions (e.g.

Symbiosis, Amensalism etc.), succession, ecotone and edge effect, ecological niches, ecotypes,

keystone species

Concept of ecosystem, trophic levels, flow of energy in ecosystem, food chain and food web, concept of ecological pyramids

Biochemical cycles: carbon cycle, nitrogen cycle and phosphorus cycle

UNIT-III

Plant water relations: Diffusion, permeability, osmosis, imbibitions, plasmolysis, osmotic potential and water potential, Types of soil water, water holding capacity, wilting, Absorption of

water, theories of Ascent of sap, Mineral nutrition and absorption, Deficiency symptoms, Transpiration, stomatal movement, significance of transpiration, Factors affecting transpiration, guttation.

UNIT-IV

Photosynthesis: Photosynthetic apparatus and pigments, light reaction mechanism of ATP synthesis. C₃, C₄ CAM pathway of carbon reduction, photorespiration, factors affecting photosynthesis.

Respiration: Aerobic and anaerobic respiration, Glycolysis, Krebs' cycle, factors affecting respiration, R.Q.

UNIT-V

Plant growth hormones: Auxin, Gibberellin, Cytokinin, Ethylene and Abscisic acid. Physiology

of flowering, Florigen concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

Books Recommended:

- Koromondy, EJ. Concepts of Ecology, Prentice Hall, USA
- Singh, JS Singh SP and Gupta SR. Ecology and Environmental Science and Conservation, S.
- Chand Publishing, New Delhi
- Sharma, PD. Ecology and Environment, Rastogi Publications, Meerut
- Hopkins, WG and Huner, PA. Introduction to Plant Physiology, John Wiley and Sons.

- Pandey SN and Sinha BK, Plant Physiology, Vikas Publishing, New Delhi
- Taiz, L and Zeiger. E. Plant Physiology, 5th edition, Sinauer Associates Inc. M.A, USA
- Srivastava, HS Plant Physiology and Biotechnology, Rastogi Publications, Meerut

B.Sc. II (BOTANY)

Practical

1. Taxonomy: Detailed description and identification of locally available plants of the families as prescribed in the theory paper.
2. Economic Botany: Identification and comment on the plants and plant products belonging to different economic use categories
3. Preparation of Herbarium of local wild plants.
4. Quantitative vegetation analysis of a grassland ecosystem.
5. Anatomical characteristics of hydrophytes and xerophytes.
6. Demonstration of root pressure.
7. Demonstration of transpiration.
8. Demonstration of evolution of O₂ in photosynthesis, factors affecting of photosynthesis.
9. Comparison of R.Q. of different respiratory substrates.
10. Demonstration of fermentation.
11. Determination of BOD of a water body.
12. Demonstration of mitosis.

B.SC.-III (BOTANY) PAPER –I

(ANALYTICAL TECHNOLOGY PLANT PATHOLOGY, EXPERIMENTAL EMBRYOLOGY, ELEMENTARY BIOSTATISTICS, ENVIRONMENTAL POLLUTION AND CONSERVATION)

UNIT-I

Structure, Principle and applications of analytical instrumentation.

Chromatography technique, Oven, Incubator, Autoclave, Centrifuge, Spectrophotometer

UNIT-II

Plant Tissue culture techniques, growth media, totipotency, protoplast culture, somatic hybrids and cybrids, micropropagation, somaclonal variations, haploid culture.

Analytical techniques: Microscopy-Light microscope, Electron microscope

UNIT-III

General principles of plant pathology, general symptoms of fungal, bacterial and viral diseases, mode of infection, diseases resistance and control measures, plant quarantine. A study of epidemiology and etiology of following plant diseases.

Rust diseases of wheat, Tikka diseases of ground nut, Red rot of sugar can, Bacterial blight of rice, Yellow vein mosaic of b hindi, Little leaf of brinjal.

UNIT-IV

Introduction to pollution, green house gases, Ozone depletion, Dissolve oxygen, B.O.D., C.O.D.

Bio magnification, Eutrophication, Acid precipitation, Phytoremediation, Plant indicators, Biogeographical Zones of India, Concept of biodiversity, CBD, MAB, National parks and biodiversity Hot spots, Conservation strategies, Red Data Book, IUCN threat categories, invasive species, endemic species, concept of sustainable development.

UNIT-V

ELEMENTARY BIOSTATISTICS:

Introduction and application of Biostatics, measure of central tendency-Mean, Median, Mode, measures of dispersal-Standard deviation, standard error.



**B.Sc.-III (BOTANY) PAPER –II
(GENETICS, MOLECULAR BIOLOGY, BIOTECHNOLOGY AND
BIOCHEMISTRY)**

UNIT-I

Cell and cell organelles, organization and morphology of chromosomes, giant chromosomes, cell division, Mendel's laws, gene interactions, linkage and crossing over, chromosomal aberration, polyploidy, sex linked inheritance, sex determination, cytoplasmic inheritance, gene concept: cistron, muton, recon.

UNIT-II

Nucleic acids, structure and forms of DNA and RNA, DNA/RNA as genetic material, replication of DNA, biochemical and molecular basis of mutation, genetic code and its properties, mechanism of transcription and translation in prokaryotes, regulation of gene expression, Operon model.

UNIT-III

Recombinant DNA, Enzymes in recombinant DNA technology, cloning vectors (Plasmid, Bacteriophages, Cosmids, Phagemids), gene cloning, PCR, Application of Biotechnology; G.M.Plants, Monoclonal antibodies, DNA finger printing

UNIT-IV

Protein: Chemical composition, primary, secondary and tertiary structure of Proteins.
Carbohydrate: general account of monosaccharides, disaccharids and Polysaccharides
Fat: Structure and properties of fats and fatty acids, synthesis and breakdown.

UNIT-V

ENZYMES: Nomenclature and classification, components of enzyme, theories of enzyme action, enzyme kinetics (Michaelis-Menten constant), allosteric enzymes, isozymes, Abzymes. Ribozymes, factors affecting enzyme activity.

B.Sc.-III (Botany)

Practical

1. Study of host parasite relationship of plant diseases listed above.
2. Demonstration of preparation of Czapek's Dox medium and Potato dextrose agar medium, sterilization of culture medium and pouring.
3. Inoculation in culture tubes and petriplates.
4. Gram Staining.
5. Microscopic examination of Curd.
6. Study of plant diseases as listed in the theory paper.
7. Biochemical test of carbohydrate and protein.
8. Instrumentation techniques.

B.SC. CHEMISTRY VISION

The vision of the Chemistry Department is to provide in proficiency both in depth understanding of principles and concept of Chemistry, theoretical and experimental Chemistry. The Department aims to enhance the students' knowledge in basic and applied Chemistry. To inculcate aptitude for a research career in academia or industry by introducing advanced ideas and techniques that are applicable while emphasizing the underlying concepts of Chemistry.

MISSION

- To impart quality education in Chemistry such that they aim to become Scientists in reputed Research Organisations. To make the students effectively disseminate their knowledge in Chemistry to coming generations..
- Develop the capacity and know-how to apply principles/laws of Chemistry to solve the problems. The ability to do and interpret the data obtained in experiments. To become a center of excellence and extend research facilities.
- Apply the Chemistry knowledge for sustainable development useful for society. Assume responsibility and always practice ethical principles. To function effectively as individual as well as in a team.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Professional Skill Development To provide professional training and skill development to students in Chemical sciences, related disciplines and nurture them to become responsible persons in the society.
PEO 2	Core Competency Development To augment their core-competencies and knowledge levels in science, humanities and inter-disciplinary areas by imparting education of high standards and advanced technological tools.
PEO 3	Innovative Curriculum of Global Relevance To upgrade the curriculum periodically based on scientific advancements, innovations and societal relevance, so as to cater to the shifting global demands.
PEO 4	Environmental Sensitivity and Sustainability To infuse environmental sensitivity in students through academic activities and hence equip them with technical skills and scientific knowledge required to protect and safeguard the environment for a sustainable future.
PEO 5	Ethical Principles and Holistic Development To promote ethical values and focus on the holistic development of students to become proficient, skilled, competent and socially responsible people.
PEO 6	Accessibility and Academic Excellence To provide an accessible learning environment of excellence and equal opportunity to students, enabling them to develop their creativity, critical thinking, and leadership and employability skills.

PROGRAMME OUTCOMES

PO-1: B.Sc. Chemistry curriculum is so designed to provide the students a comprehensive understanding about the fundamentals of chemistry covering all the principles and perspectives.

PO-2: The branches of Chemistry such as Organic Chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry expose the diversified aspects of chemistry where the students experience a broader outlook of the subject.

PO-3: The syllabi of the B.Sc. Chemistry course are discretely classified to give stepwise advancement of the subject knowledge right through the three years of the term.

PO-4: The practical exercises done in the laboratories impart the students the knowledge about various chemical reagents and reactions. Thereby, hone their skills of handling the corrosive, poisonous, explosive and carcinogenic chemicals making themselves employable in any kind of chemical industries. They are also trained about the adverse effects of the obnoxious chemicals and the first aid treatment.

PROGRAMME SPECIFIC OUTCOMES

PSO-1: The students will understand the existence of matter in the universe as solids, liquids, and gases which are composed of molecules, atoms and sub atomic particles.

PSO-2: Students will learn to estimate inorganic salt mixtures and organic compounds both qualitatively and quantitatively using the classical methods of analysis in practical classes.

PSO-3: Students will grasp the mechanisms of different types of reactions both organic and inorganic and will try to predict the products of unknown reactions.

PSO-4: Students will learn to synthesize the chemical compounds by maneuvering the addition of reagents under optimum reaction conditions.

Graduate attributes in Chemistry

Skills that are transferable to a variety of pursuits in life, including not only the specific knowledge and skills that will equip students for a future in chemistry, and an awareness of the ethical, social and cultural dimensions of the study of chemistry, but also the ability to solve problems, to communicate effectively in writing and in speech, to manage their time effectively and to work successfully independently and in teams.

Bachelor of Science Chemistry graduates will be able to demonstrate:

An in-depth knowledge of the basic principles of Chemistry, and the ability to acquire new knowledge.

Awareness of the contribution of research to the development of the discipline of Chemistry, the limits of current knowledge and that all knowledge is contestable.

Understanding of the place of Chemistry as an enabling science and its relationship to other scientific and social disciplines. Awareness and understanding of the ethical, social and regulatory implications and obligations of Chemistry.

An ability to work successfully both independently and as part of a group of peers, and with support and technical staff within the department.

Personal skills in written and oral communication; time management, critical thinking and analysis, problem solving and decision making, gathering and presenting information, imagination, openness, curiosity and creativity.

Skills important for research in Chemistry, including not only the practical skills required for effective and safe activity in the laboratory environment, but also familiarity with electronic information systems, databases and appropriate computer applications.

A Chemistry degree also contributes to the development of University of Otago Graduate Attributes.

Qualification descriptors for a UG programs in Chemistry

The qualification descriptors for a B.Sc. (CS), B.Sc. (PCM), B.Sc. (PEM), B.Sc. (PMC) program may include the following.

The graduates should be able to:

- **Demonstrate**

- (i) a fundamental/systematic or coherent understanding of the academic field of Chemistry, its different learning areas like AstroChemistry, Material science, Nuclear and Particle Chemistry, Condensed matter Chemistry, Atomic and Molecular Chemistry, Mathematical Chemistry, Analytical dynamics, Space science and applications, and its linkages with related disciplinary areas/subjects like Chemistry,

Mathematics, Life sciences, Environmental sciences, Atmospheric Chemistry, Computer science, Information Technology;

(ii) procedural knowledge that creates different types of professionals related to different areas of study in Chemistry outlined above, including research and development, teaching and government and public service;

(iii) skills in areas related to specialization area relating the subfields and current developments in the academic field of Chemistry.

- Use knowledge, understanding and skills required for identifying problems and issues relating to Chemistry, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources from various Chemistry laboratories of the world, and their application, analysis and evaluation using methodologies as appropriate to Chemistry for formulating new theories and concepts.
- Communicate the results of studies undertaken accurately in a range of different contexts using the main concepts, constructs and techniques of Chemistry. Develop communication abilities to present these results in technical as well as popular science meetings organized in various universities and other private organizations.
- Ability to meet one's own learning needs, drawing on a range of current research and development work and professional materials, and interaction with other physicists around the world.
- Apply one's knowledge of Chemistry and theoretical and laboratory skills to new/unfamiliar contexts to identify and analyse problems and issues and solve complex problems in Chemistry and related areas with well-defined solutions.

Demonstrate Chemistry-related technological skills that are relevant to Chemistry-related job trades and employment opportunities.

The Program Learning Outcomes relating to B.Sc. Course in Chemistry

- Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries.
- The students will be able to learn about fundamental basic concept of organic, inorganic and physical chemistry. Just like periodic table and elements, atoms, reaction mechanism, reagents, types of reactions, thermodynamics, Spectroscopy.
- Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
- Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
- Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
- Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.
- Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
- Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.
- Students will be able to function as a member of an interdisciplinary problem solving team.

NEW CURRICULUM OF B.Sc. PART I CHEMISTRY

The new curriculum will comprise of Three theory papers of 33, 33 and 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs each duration and the practical work of 180 hrs duration.

PAPER I

INORGANIC CHEMISTRY

UNIT-I

A. ATOMIC STRUCTURE

Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation, significance of Ψ and Ψ^2 , radial & angular wave functions and probability distribution curves, quantum numbers, Atomic orbital and shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements.

B. PERIODIC PROPERTIES

Detailed discussion of the following periodic properties of the elements, with reference to s and p-block. Trends in periodic table and applications in predicting and explaining the chemical behavior.

- Atomic and ionic radii,
- Ionization enthalpy,
- Electron gain enthalpy,
- Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales.
- Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.

UNIT-II

CHEMICAL BONDING I

Ionic bond: Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Ionic character in covalent compounds: Bond moment and dipole moment, Percentage ionic character from dipole moment and electronegativity difference, Metallic bond-free electron, Valence bond & band theories.

UNIT-III

CHEMICAL BONDING II

Covalent bond: Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons: H₂O, NH₃, PCl₃, PCl₅, SF₆, H₃O⁺, SF₄, ClF₃, and ICl₂⁻ Molecular orbital theory. Bond order and bond strength, Molecular orbital diagrams of diatomic and simple polyatomic molecules N₂, O₂, F₂, CO, NO.

UNIT-IV

A. s-BLOCK ELEMENTS

General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals

B. p-BLOCK ELEMENTS

General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus. Boranes, borazines, fullerenes, graphene and silicates, interhalogens and pseudohalogens.

UNIT-V

A CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure, bonding in xenon compounds

B. THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS (H₂S SCHEME)

Basic principles involved in the analysis of cations and anions and solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after Group II.

PAPER: II

ORGANIC CHEMISTRY

UNIT-I BASICS OF ORGANIC CHEMISTRY

Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment. Electrophiles and Nucleophiles; Nucleophilicity and basicity; Homolytic and Heterolytic cleavage, Generation, shape and relative stability of Carbocations, Carbanions, Free radicals, Carbenes and Nitrenes. Introduction to types of organic reactions: Addition, Elimination and Substitution reactions.

UNIT-II INTRODUCTION TO STEREOCHEMISTRY

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration: Fischer, Newmann and Sawhorse Projection formulae and their interconversions; Erythrose and threose, D/L, d/l system of nomenclature, Cahn-Ingold-Prelog system of nomenclature (C.I.P rules), R/S nomenclature. Geometrical isomerism: cis-trans, syn-anti and E/Z notations.

UNIT-III CONFORMATIONAL ANALYSIS OF ALKANES

Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars. Relative stability and Energy diagrams. Types of cycloalkanes and their relative stability, Baeyer strain theory: Theory of strainless rings, Chair, Boat and Twist boat conformation of cyclohexane with energy diagrams; Relative stability of mono-substituted cycloalkanes and disubstituted cyclohexane.

UNIT-IV CHEMISTRY OF ALIPHATIC HYDROCARBONS

A. Carbon-Carbon sigma (σ) bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions: Halogenation-relative reactivity and selectivity.

B. Carbon-Carbon Pi (π) bonds:

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

Reactions of alkenes: Electrophilic additions and mechanisms (Markownikoff/ Anti - Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation). 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

UNIT-V AROMATIC HYDROCARBONS

Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.

PAPER - III PHYSICAL CHEMISTRY

UNIT-I MATHEMATICAL CONCEPTS FOR CHEMIST

Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; Permutation and combination and probability theory, Significant figures and their applications.

UNIT-II GASEOUS STATE CHEMISTRY

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Joule Thompson effect, Liquification of Gases.

Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor (Z), and its variation with pressure and temperature for different gases. Causes of deviation from ideal behaviour. van der Waals equation of state, its derivation and application in explaining real gas behaviour, calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.

UNIT-III A. LIQUID STATE CHEMISTRY

Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.

B. COLLOIDS and SURFACE CHEMISTRY

Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotrophy, Application of colloids.

Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich). Nature of adsorbed state. Qualitative discussion of BET.

UNIT-IV SOLID STATE CHEMISTRY

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Crystal defects.

UNIT-V A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions. Temperature

dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

B. CATALYSIS

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of catalyst, Enzyme catalysed reactions, Micellar catalysed reactions, Industrial applications of Catalysis.

PAPER – IV

LABORATORY COURSE

INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using H₂S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:

Cations : NH₄⁺, Pb²⁺, Bi³⁺, Cu²⁺, Cd²⁺, Fe³⁺, Al³⁺, Co²⁺, Ni²⁺, Mn²⁺, Zn²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Na⁺ Anions : CO₃²⁻, S²⁻, SO₄²⁻, S₂O₃²⁻, NO₂⁻, CH₃COO⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, SO₄²⁻

(Spot tests may be carried out wherever feasible)

B. Acid-Base Titrations

- Standardization of sodium hydroxide by oxalic acid solution.
- Determination of strength of HCl solution using sodium hydroxide as intermediate.
- Estimation of carbonate and hydroxide present together in mixture.
- Estimation of carbonate and bicarbonate present together in a mixture.
- Estimation of free alkali present in different soaps/detergents

C. Redox Titrations

- Standardization of KMnO₄ by oxalic acid solution.
- Estimation of Fe(II) using standardized KMnO₄ solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of Fe(II) with K₂Cr₂O₇ using internal (diphenylamine, anthranilic acid) and external indicator.

D. Iodo / Iodimetric Titrations

- Estimation of Cu(II) and K₂Cr₂O₇ using sodium thiosulphate solution iodimetrically.
- Estimation of (a) arsenite and (b) antimony iodimetrically.
- Estimation of available chlorine in bleaching powder iodometrically.
- Estimation of Copper and Iron in mixture by standard solution of K₂Cr₂O₇ using sodium thiosulphate solution as titrants.

ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer. 80o–82o (Naphthalene), 113.5o–114o (Acetanilide), 132.5o–133o (Urea), 100o (Distilled Water.)
3. Purification of organic compounds by crystallization using different solvents.
 - Phthalic acid from hot water (using fluted filter paper and stemless funnel).
 - Acetanilide from boiling water.
 - Naphthalene from ethanol.
 - Benzoic acid from water.
4. Determination of the melting points of organic compounds.
Naphthalene 80o–82o, Benzoic acid 121.5o–122o, Urea 132.5o–133o Succinic acid 184.5o– 185o, Cinnamic acid 132.5o–133o, Salicylic acid 157.5o–158o, Acetanilide 113.5o–114o, m-Dinitrobenzene 90o, p-Dichlorobenzene 52o, Aspirin 135o.
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
 - Urea – Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1).

6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method).
- Ethanol 78o, Cyclohexane 81.4o, Toluene 110.6o, Benzene 80o.
 - Distillation (Demonstration)
 - Simple distillation of ethanol-water mixture using water condenser.
 - Distillation of nitrobenzene and aniline using air condenser.
 - Sublimation
 - Camphor, Naphthalene, Phthalic acid and Succinic acid.
 - Decolorisation and crystallization using charcoal.
 - Decolorisation of brown sugar with animal charcoal using gravity filtrations crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol.
 - Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

PHYSICAL CHEMISTRY

1. Surface tension measurements.
 - Determine the surface tension by (i) drop number (ii) drop weight method.
 - Surface tension composition curve for a binary liquid mixture.
2. Viscosity measurement using Ostwald's viscometer.
 - Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.
 - Study of the variation of viscosity of sucrose solution with the concentration of solute.
 - Viscosity Composition curve for a binary liquid mixture.
3. Chemical Kinetics
 - To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature.
 - To study the effect of acid strength on the hydrolysis of an ester.
 - To compare the strengths of HCl & H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate.
4. Colloids
 - To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.

Note: Experiments may be added/ deleted subject to availability of time and facilities

PRACTICAL EXAMINATION

NEW CURRICULUM OF B.Sc. PART II CHEMISTRY

The new curriculum will comprise of three papers of 33, 33 and 34 marks each and practical work of 50 marks. The Curriculum is to be completed in 180 working days as per UGC norms and conforming to the directives of Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration and practical work of 180 hrs duration.

Paper – I INORGANIC CHEMISTRY

UNIT-I CHEMISTRY OF TRANSITION SERIES ELEMENTS

Transition Elements: Position in periodic table, electronic configuration, General Characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment μ_{so} (spin only) and μ_{eff} and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.

UNIT-II

A. Oxidation and Reduction: Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.

B. COORDINATION COMPOUNDS: Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes.

UNIT-III COORDINATION CHEMISTRY

Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of $10 Dq$ (Δ_o), CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of $10 Dq$ (Δ_o , Δ_t). Octahedral vs. tetrahedral coordination.

UNIT-IV

A. CHEMISTRY OF LANTHANIDE ELEMENTS

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

B. CHEMISTRY OF ACTINIDES

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the later actinides and the later lanthanides

UNIT-V

A. ACIDS BASES : Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases.

B. NON-AQUEOUS SOLVENTS

.Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H₂SO₄ , Ionic liquids.

Paper – II
ORGANIC CHEMISTRY

UNIT-I

CHEMISTRY OF ORGANIC HALIDES

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – SN1, SN2 and S_NI mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution; S_NAr, Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

UNIT-II

ALCOHOLS

A. Alcohols: Nomenclature, preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt-Blanc Reduction for the preparation of alcohols, Dihydric alcohols – methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [Pb(OAc)₄ and HIO₄] and pinacol-pinacolone rearrangement.

B. Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.

PHENOLS

A. Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.

B. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesh reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

UNIT-III

ALDEHYDES AND KETONES

A. Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones.

Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil- Benzilic rearrangement.

B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen reduction, Wolf-Kishner reaction, LiAlH₄ and NaBH₄ reduction. Halogenation of enolizable ketones, An introduction to α,β -unsaturated aldehydes and ketones.

UNIT-IV

A. CARBOXYLIC ACIDS

Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zeilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation.

Di carboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.

B. CARBOXYLIC ACID DERIVATIVES

Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives. Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution.

Mechanism of acid and base catalyzed esterification and hydrolysis.

UNIT-V

ORGANIC COMPOUNDS OF NITROGEN

A. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

B. Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann- Bromamide reaction, Reactions of amines, electrophilic aromatic substitution of aryl amines, Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.

Paper – III

PHYSICAL CHEMISTRY

UNIT-I

A. THERMODYNAMICS-I

Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of q , w , U and H for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thompson expansion, inversion temperature of gases, expansion of ideal gases under isothermal and adiabatic condition

B. THERMO CHEMISTRY

Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions, Adiabatic flame temperature, explosion temperature.

UNIT-II

A. THERMODYNAMICS-II

Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature. Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical signification of entropy, Molecular and statistical interpretation of entropy.

B. Gibbs and Helmholtz free energy, variation of G and A with pressure, volume, temperature, Gibbs-Helmholtz equation, Maxwell relations, Elementary idea of Third law of Thermodynamics, concept of residual entropy, calculation of absolute entropy of molecule.

UNIT III

A CHEMICAL EQUILIBRIUM

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Thermodynamic derivation of relations between the various equilibrium constants K_p , K_c and K_x . Le Chatelier principle (quantitative treatment). Equilibrium between ideal gas and a pure condensed phase.

B IONIC EQUILIBRIA

Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson

equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

UNIT-IV

PHASE EQUILIBRIUM

A. Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Claperon equation and its applications to Solid-Liquid, Liquid-Vapor and solid-Vapor, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system.

Application of phase rule to two component system: Pb-Ag system, desilverization of lead, Zn-Mg system Ferric chloride-water system, congruent and incongruent, melting point and eutectic point.

Three component system: Solid solution liquid pairs.

B. Nernst distribution law, Henry's law, application, solvent extraction

UNIT - V

PHOTOCHEMISTRY

Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry: Grothus-Drapper law, Stark- Einstein law, quantum yield, actinometry, examples of low and high quantum yields, Photochemical equilibrium and the differential rate of photochemical reactions, Quenching, Role of photochemical reaction in biochemical process.

Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes {simple examples}, photostationary states, Chemiluminescence.

Paper –IV

LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

CO₃²⁻, NO₂⁻, S₂⁻, SO₃²⁻, S₂O₃²⁻, CH₃COO⁻, F⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, BO₃³⁻, C₂O₄²⁻, PO₄³⁻, NH₄⁺, K⁺, Pb²⁺, Cu²⁺, Cd²⁺, Bi³⁺, Sn²⁺, Sb³⁺, Fe³⁺, Al³⁺, Cr³⁺, Zn²⁺, Mn²⁺, Co²⁺, Ni²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Mg²⁺.

Mixtures should preferably contain one interfering anion, or insoluble component (BaSO₄, SrSO₄, PbSO₄, CaF₂ or Al₂O₃) or combination of anions e.g. CO₃²⁻ and SO₃²⁻, NO₂⁻ and NO₃⁻, Cl⁻, Br⁻, and I⁻.

Volumetric analysis

- Determination of acetic acid in commercial vinegar using NaOH.
 - Determination of alkali content-antacid tablet using HCl.
 - Estimation of calcium content in chalk as calcium oxalate by permanganometry.
 - Estimation of hardness of water by EDTA.
 - Estimation of ferrous & ferric by dichromate method.
 - Estimation of copper using thiosulphate.
- Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

ORGANIC CHEMISTRY

- Detection of elements (X, N, S).

- Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds:
 - (i) m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye.

PHYSICAL CHEMISTRY

Transition Temperature

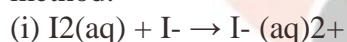
- Determination of the transition temperature of the given substance by thermometric/dialometric method (e.g. $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}/\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$).

Thermochemistry

- Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
- Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
- To determine the solubility of benzoic acid at different temperature and to determine ΔH of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

Phase Equilibrium

- To study the effect of a solute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- To construct the phase diagram of two component system (e.g. diphenylamine–benzophenone) by cooling curve method.
- Distribution of acetic/ benzoic acid between water and cyclohexane.
- Study the equilibrium of at least one of the following reactions by the distribution method:



Determination of molecular weight by Rast Camphor and Landsburger method.

Note: Experiments may be added/ deleted subject to availability of time and facilities.

NEW CURRICULUM OF B.Sc. PART III CHEMISTRY

The new curriculum will comprise of three papers of 33, 33 and 34 marks each and practical work of 50 marks. The Curriculum is to be completed in 180 working days as per UGC norms and conforming to the directives of Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration and practical work of 180 hrs duration.

Paper – I

INORGANIC CHEMISTRY 60 Hrs., Max Marks 33

UNIT-I

METAL-LIGAND BONDING IN TRANSITION METAL COMPLEXES

(A) Limitations of valence bond theory, Limitation of Crystal Field Theory, Application of CFSE, tetragonal distortions from octahedral geometry, Jahn–Teller distortion, square planar geometry. Qualitative aspect of Ligand field and MO Theory.

(B) Thermodynamic and kinetic aspects of metal complexes. A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution

reactions of square planar complexes, Trans- effect, theories of trans effect. Mechanism of substitution reactions of square planar complexes.

UNIT-II

MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES

Types of magnetic behavior, methods of determining magnetic susceptibility, spin only formula, L-S coupling, correlation of μ_{so} (spin only) and μ_{eff} . values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.

Electronic spectra of Transition Metal Complexes.

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectro-chemical series. Orgel-energy level diagram for d1 and d2 states, discussion of the electronic spectrum of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ complex ion.

UNIT-III

ORGANOMETALLIC CHEMISTRY

Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18-electron rule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear carbonyls of 3d series.

Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π -acceptor behavior of CO (MO diagram of CO to be discussed), Zeise's salt: Preparation and structure.

Catalysis by Organometallic Compounds –

Study of the following industrial processes and their mechanism :

1. Alkene hydrogenation (Wilkinson's Catalyst)
2. Polymerization of ethane using Ziegler – Natta Catalyst

UNIT-IV

BIOINORGANIC CHEMISTRY

Essential and trace elements in biological processes, Excess and deficiency of some trace metals, Toxicity of some metal ions (Hg, Pb, Cd and As), metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metals with special reference to Ca^{2+} and Mg^{2+} , nitrogen fixation.

UNIT-V

HARD AND SOFT ACIDS AND BASES (HSAB) Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, Applications of HSAB principle.

INORGANIC POLYMERS

Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones. Silicates, phosphazenes and polyphosphate.

Paper – II

ORGANIC CHEMISTRY

UNIT-I

HETEROCYCLIC COMPOUNDS

Classification and nomenclature, Structure, aromaticity in 5-membered and 6-membered rings containing one heteroatom; Synthesis, reactions and mechanism of substitution reactions of: Furan, Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis, Hantzsch synthesis), Thiophene, Pyridine (Hantzsch synthesis), Indole (Fischer indole synthesis and Madelung synthesis), Quinoline and isoquinoline, (Skraup synthesis, Friedlander's synthesis,

Knorr quinoline synthesis, Doebner- Miller synthesis, Bischler-Napieralski reaction, Pictet-Spengler reaction, Pomeranz-Fritsch reaction).

UNIT II

A. ORGANOMETALLIC REAGENT

Organomagnesium compounds: Grignard reagents formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions.

Organolithium compounds: formation and chemical reactions.

B. ORGANIC SYNTHESIS VIA ENOLATES

Active methylene group, alkylation of diethylmalonate and ethyl acetoacetate, Synthesis of ethyl acetoacetate: The Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. Robinson annulations reaction.

UNIT-III

BIOMOLECULES

A. CARBOHYDRATES

Occurrence, classification and their biological importance. Monosaccharides: relative and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth projections and conformational structures; Interconversions of aldoses and ketoses; Killiani Fischer synthesis and Ruff degradation; Disaccharides – Structural comparison of maltose, lactose and sucrose. Polysaccharides – Elementary treatment of starch and cellulose.

B. AMINO ACIDS, PROTEINS AND NUCLEIC ACIDS

Classification and Nomenclature of amino acids, Configuration and acid base properties of amino acids, Isoelectric Point, Peptide bonds, Protein structure, denaturation/ renaturation, Constituents of nucleic acid, DNA, RNA nucleoside, nucleotides, double helical structure of DNA.

UNIT-IV

SYNTHETIC POLYMERS

A. Addition or chain growth polymerization, Free radical vinyl polymerization, Ziegler-Natta polymerization, Condensation or Step growth polymerization, polyesters, polyamides, phenols- formaldehyde resins, urea-formaldehyde resins, epoxy resins and polyurethanes, natural and synthetic rubbers.

B. SYNTHETIC DYES

Colour and constitution (Electronic Concept). Classification of Dyes. Chemistry of dyes. Chemistry and synthesis of Methyl Orange, Congo Red, Malachite Green, Crystal Violet, phenolphthalein, fluorescein, Alizarine and Indigo.

UNIT-V

A. INFRA-RED SPECTROSCOPY

Basic principle, IR absorption Band their position and intensity, IR spectra of organic compounds.

B. UV-VISIBLE SPECTROSCOPY

Beer Lambert's law, effect of Conjugation, Types of electronic transitions λ_{max} , Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption Visible spectrum and colour.

C. NMR SPECTROSCOPY

Basic principles of Proton Magnetic Resonance, Tetramethyl silane (TMS) as internal standard, chemical shift and factors influencing it; Spin – Spin coupling and coupling constant (J); Anisotropic effects in alkene, alkyne, aldehydes and aromatics, Interpretation of NMR spectra of simple organic compounds. ^{13}C MR spectroscopy: Principle and applications.

Paper – III
PHYSICAL CHEMISTRY

UNIT-I

QUANTUM MECHANICS-I

Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect. Operator: Hamiltonian operator, angular momentum operator, Laplacian operator, postulate of quantum mechanics, eigen values, eigen function, Schrodinger time independent wave equation, physical significance of ψ & ψ^2 , application of Schrodinger wave equation to particle in a one dimensional box, hydrogen atom (separation into three equations) radial and angular wave functions.

UNIT-II

A. QUANTUM MECHANICS-II

Quantum Mechanical approach of Molecular orbital theory, basic ideas-criteria for forming M.O. and A.O., LCAO approximation, formation of H_2^+ ion, calculation of energy levels from wave functions, bonding and antibonding wave functions, Concept of σ , σ^* , π , π^* orbitals and their characteristics, Hybrid orbitals- sp, sp^2, sp^3 Calculation of coefficients of A.O.'s used in these hybrid orbitals.

Introduction to valence bond model of H_2 , comparison of M.O. and V.B. models. Huckel theory, application of Huckel theory to ethene, propene, etc.

UNIT III

SPECTROSCOPY

Introduction: Characterization of Electromagnetic radiation, regions of the spectrum, representation of spectra, width and intensity of spectral transition, Rotational Spectrum of Diatomic molecules. Energy levels of a rigid rotor, selection rules, determination of bond length, qualitative description of non-rigid rotator, isotopic effect.

Vibrational Spectroscopy: Fundamental vibration and their symmetry vibrating diatomic molecules, Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, determination of force constant, anharmonic oscillator

Raman spectrum: Concept of polarizability, quantum theory of Raman spectra, stokes and antistokes lines, pure rotational and pure vibrational Raman spectra. Applications of Raman Spectra.

Electronic Spectroscopy: Basic principles, Electronic Spectra of diatomic molecule, Franck- Condon principle, types of electronic transition, application of electronic spectra.

UNIT-IV

ELECTROCHEMISTRY-I

A. Electrolytic conductance: Specific and equivalent conductance, measurement of equivalent conductance, effect of dilution on conductance, Kohlrausch law, application of Kohlrausch law in determination of dissociation constant of weak electrolyte, solubility of sparingly soluble electrolyte, absolute velocity of ions, ionic product of water, conductometric titrations.

B. Theories of strong electrolyte: limitations of Ostwald's dilution law, weak and strong electrolytes, Elementary ideas of Debye-Huckel-Onsager's equation for strong electrolytes , relaxation and electrophoretic effects.

C. Migration of ions: Transport number, Determination by Hittorf method and moving boundary method, ionic strength.

UNIT-V

ELECTROCHEMISTRY-II

A. Electrochemical cell and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells, EMF of the cell and effect of temperature on EMF of the cell, Nernst equation Calculation of ΔG , ΔH and ΔS for cell reactions.

- B.** Single electrode potential : standard hydrogen electrode, calomel electrode, quinhydrone electrode, redox electrodes, electrochemical series
- C.** Concentration cell with and without transport, liquid - junction potential, application of concentration cells in determining of valency of ions , solubility product and activity coefficient
- D.** Corrosion-types , theories and prevention

B.Sc. Part- III PRACTICAL INORGANIC CHEMISTRY

Gravimetric analysis:

- Estimation of nickel (II) using Dimethylglyoxime (DMG).
 - Estimation of copper as CuSCN
 - Estimation of iron as Fe_2O_3 by precipitating iron as $\text{Fe}(\text{OH})_3$.
 - Estimation of Al (III) by precipitating with oxine and weighing as $\text{Al}(\text{oxine})_3$ (aluminium oxinate).
 - Estimation of Barium as BaSO_4
- Inorganic Preparations:
- Tetraamminecopper (II) sulphate, $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4 \cdot \text{H}_2\text{O}$
 - Cis and trans $\text{K}[\text{Cr}(\text{C}_2\text{O}_4)_2 \cdot (\text{H}_2\text{O})_2]$ Potassium dioxalato diaquachromate(III)
 - Tetraamminecarbonatocobalt (III) ion
 - Potassium tris(oxalate)ferrate(III)/ Sodium tris(oxalate)ferrate(III)
 - Cu(I) thiourea complex, Bis (2,4-pentanedionate) zinc hydrate; Double salts (Chrome alum/ Mohr's salt)

ORGANIC CHEMISTRY

1. Preparation of organic Compounds
 - Acetylation of one of the following compounds: amines (aniline, o-, m-, p- toluidines and o-, m-, p-anisidine) and phenols (β -naphthol, vanillin, salicylic acid)
 - Benzoylation of one of the following amines (aniline, o-, m-, p- toluidines and o-, m-, panisidine) and one of the following phenols (β -naphthol, resorcinol, p cresol) by Schotten-Baumann reaction.
 - Bromination of any one of the following: a. Acetanilide by conventional methods b. Acetanilide using green approach (Bromate-bromide method)
 - Nitration of any one of the following: a. Acetanilide/nitrobenzene by conventional method b. Salicylic acid by green approach (using ceric ammonium nitrate).
 - Reduction of p-nitrobenzaldehyde by sodium borohydride.
 - Hydrolysis of amides and esters.
 - Semicarbazone of any one of the following compounds: acetone, ethyl methyl ketone, cyclohexanone, benzaldehyde.
 - Benzylisothiuronium salt of one each of water soluble and water insoluble acids (benzoic acid, oxalic acid, phenyl acetic acid and phthalic acid).
 - Aldol condensation using either conventional or green method.
 - Benzil-Benzilic acid rearrangement.
 - Preparation of sodium polyacrylate.
 - Preparation of urea formaldehyde.
 - Preparation of methyl orange.

The above derivatives should be prepared using 0.5-1g of the organic compound. The solid samples must be collected and may be used for recrystallization, melting point and TLC.

2. Qualitative Analysis Analysis of an organic mixture containing two solid components using water, NaHCO_3 , NaOH for separation and preparation of suitable derivatives.
3. Extraction of caffeine from tea leaves.
4. Analysis of Carbohydrate: aldoses and ketoses, reducing and non-reducing sugars.
5. Identification of simple organic compounds by IR spectroscopy and NMR spectroscopy. (Spectra to be provided).

6. Estimation of glycine by Sorenson's formalin method.
7. Study of the titration curve of glycine.
8. Estimation of proteins by Lowry's method.
9. Study of the action of salivary amylase on starch at optimum conditions.
10. Effect of temperature on the action of salivary amylase.

PHYSICAL CHEMISTRY

Conductometry

- Determination of cell constant
- Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
- Perform the following conductometric titrations:
 - i. Strong acid vs. strong base
 - ii. Weak acid vs. strong base
 - iii. Mixture of strong acid and weak acid vs. strong base
 - iv. Strong acid vs. weak base
- To determine the strength of the given acid conductometrically using standard alkali solution.
- To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically
- To study the saponification of ethyl acetate conductometrically.

Potentiometry/pH metry

Perform the following potention/pH metric titrations:

- i. Strong acid vs. strong base
- ii. Weak acid vs. strong base
- iii. Dibasic acid vs. strong base
- iv. Potassium dichromate vs. Mohr's salt
- v. Determination of pKa of monobasic acid UV/ Visible spectroscopy
 - Verify Lambert-Beer's law and determine the concentration of CuSO₄/KMnO₄/K₂Cr₂O₇ in a solution of unknown concentration
 - Determine the concentrations of KMnO₄ and K₂Cr₂O₇ in a mixture.
 - Study the kinetics of iodination of propanone in acidic medium.
 - Determine the amount of iron present in a sample using 1,10-phenanthroline.
 - Determine the dissociation constant of an indicator (phenolphthalein).
 - Study the kinetics of interaction of crystal violet/ phenolphthalein with sodium hydroxide.
 - Study of pH-dependence of the UV-Vis spectrum (200-500 nm) of potassium dichromate.
 - Spectral characteristics study (UV) of given compounds (acetone, acetaldehyde, acetic acid, etc.) in water.
 - Absorption spectra of KMnO₄ and K₂Cr₂O₇ (in 0.1 M H₂SO₄) and determine λ_{max} values.

Note: Experiments may be added/deleted subject to availability of time and facilities

COURSE OUTCOMES BSc CHEMISTRY

BSc- I

Paper- I Inorganic Chemistry

- Students able to know ATOMIC STRUCTURE Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation.
- Students able to know Periodic Properties Detailed discussion of the periodic properties of the elements, with reference to s and p-block.
- Students able to know **Ionic bond:** Ionic Solids - Ionic structures, radius ratio & co-

ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation.

- Students able to know **Covalent bond**: Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR).
- Students able to know **s-BLOCK ELEMENTS** - General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals.
- **P-BLOCK ELEMENTS** General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of P Block element.
- **NOBLE GASES** Chemical properties of the noble gases, chemistry of xenon, structure, bonding in xenon compounds, **THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS (H₂S SCHEME)**

Paper- II Organic Chemistry

- Students able to know **BASICS OF ORGANIC CHEMISTRY** Hybridization, Shapes of molecules, Influence of hybridization on bond properties.
- **STEREOCHEMISTRY** Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds etc.
- **CONFORMATIONAL ANALYSIS OF ALKANES** Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars. Relative stability and Energy diagrams.
- **Carbon-Carbon sigma (σ) bonds** Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions.
- **Carbon-Carbon Pi (π) bonds**: Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.
 - Students able to know **AROMATIC HYDROCARBONS**.

Paper- III Physical Chemistry

- Students able to know mathematical concepts for chemistry **Basic Mathematical Concepts**: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima.
- **Gaseous state chemistry** kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter.
- students able to know **liquid state chemistry** Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.
- Students able to know **COLLOIDS and SURFACE CHEMISTRY** Application of colloids.
- **SOLID STATE CHEMISTRY** Bragg's law, a simple account of rotating crystal method and powder pattern method. Crystal defects etc.
- **CHEMICAL KINETICS** Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order.
- About **CATALYSIS** and their application.

Course Outcome B.Sc. PART II

Paper- I Inorganic Chemistry

- **CHEMISTRY OF TRANSITION SERIES ELEMENTS and their Applications.**
- **Oxidation and Reduction**: Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.
- **COORDINATION COMPOUNDS**: Werner's theory and its experimental

verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers.

- **COORDINATION CHEMISTRY** Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory.
- **CHEMISTRY OF LANTHANIDE ELEMENTS** Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation and application and ACTINIODS.
- **ACIDS BASES** : Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases.
- **NON-AQUEOUS SOLVENTS**.

Paper- II Organic Chemistry

- **ORGANIC HALIDES**, S_N1 , S_N2 and elimination reactions.
- **Alcohols**: Nomenclature, preparation, properties and relative reactivity of 1° , 2° , 3° alcohols.
- **Structure and bonding in phenols**, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.
- **Nomenclature, structure and reactivity of carbonyl group**. General methods of preparation of aldehydes and ketones.
- **Use of acetate as protecting group**, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones,
- **CARBOXYLIC ACIDS** Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength.
- **CARBOXYLIC ACID DERIVATIVES**
- **ORGANIC COMPOUNDS OF NITROGEN** Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

Paper- III Physical Chemistry

- **THERMODYNAMICS-I** Intensive and extensive variables; state and path functions; isolated, closed and open systems; law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of q , w , U and H for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thompson.
- **Thermo chemistry**, Laws of Thermo chemistry, Heats of reactions, standard states; enthalpy
- **THERMODYNAMICS-II** Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle.
- **Gibbs and Helmholtz free energy**, variation of G and A with pressure, volume, temperature.
- **CHEMICAL EQUILIBRIUM** Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases.
- **IONIC EQUILIBRIA** Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis- calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions.
- **Phase rule**, Phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Claperon equation and its applications.
- **PHOTOCHEMISTRY** Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes.

COURSE OUTCOMES OF B.Sc. PART III

Paper- I Inorganic Chemistry

- **METAL-LIGAND BONDING IN TRANSITION METAL COMPLEXES** Limitations of valence bond theory, Limitation of Crystal Field Theory, Application of CFSE.
- **MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES** Types of magnetic behavior, methods of determining magnetic susceptibility, spin only formula, L-S coupling.
- **ORGANOMETALLIC CHEMISTRY** Definition and classification of organometallic compounds on the basis of bond type. Concept of hapticity of organic ligands. Metal carbonyls: 18-electron rule, electron count of mononuclear, polynuclear Zeise's salt.
- **BIOINORGANIC CHEMISTRY** Essential and trace elements in biological processes, Excess and deficiency of some trace metals, Toxicity of some metal ions (Hg, Pb, Cd and As), metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metals with special reference to Ca^{2+} and Mg^{2+} , nitrogen fixation.
- **HARD AND SOFT ACIDS AND BASES (HSAB) and** Types of inorganic polymers,.

Paper- II Organic Chemistry

- **HETEROCYCLIC COMPOUNDS** Classification and nomenclature, Structure, aromaticity in 5-membered and 6-membered rings containing one heteroatom.
- **ORGANOMETALLIC REAGENT** Organomagnesium compounds: Grignard reagents formation, structure and chemical reactions.
- **ORGANIC SYNTHESIS VIA ENOLATES** Keto-enol tautomerism of ethyl acetoacetate. Robinson annulations reaction etc.
- **CARBOHYDRATES** Occurrence, classification and structure their biological importance.
- **AMINO ACIDS, PROTEINS AND NUCLEIC ACIDS** Classification and Nomenclature of amino acids, Configuration and acid base properties of amino acids, Isoelectric Point etc.
- **SYNTHETIC POLYMERS and Application,**
- **SYNTHETIC of DYES and Application**
- **INFRA-RED SPECTROSCOPY**
Basic principle, IR absorption Band their position and intensity, IR spectra of organic compounds.
- **UV-VISIBLE SPECTROSCOPY NMR SPECTROSCOPY and Application.**

Paper- III Physical Chemistry

- **QUANTUM MECHANICS-I** Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect. Operator: Hamiltonian operator, angular momentum operator, physical significance of ψ & ψ^2 etc.
- **QUANTUM MECHANICS-II** Quantum Mechanical approach of Molecular orbital theory, basic ideas-criteria for forming M.O. and A.O., LCAO approximation, formation of H_2^+ ion, calculation of energy levels from wave functions, wave functions.
- **SPECTROSCOPY Introduction:** Characterization of Electromagnetic radiation, regions of the spectrum, representation of spectra, width and intensity of spectral transition, Rotational Spectrum of Diatomic molecules.
- **Vibrational Spectroscopy and Application.**
- **Raman spectrum and Application.**
- **ELECTROCHEMISTRY-I** Elementary ideas of Debye-Huckel-Onsager's equation for strong electrolytes, relaxation and electrophoretic effects.

- ELECTROCHEMISTRY-II Electrochemical cell and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells, EMF of the cell and effect of temperature on EMF of the cell, Nernst equation Calculation of ΔG , ΔH and ΔS for cell reactions.
- Corrosion-types , theories and prevention.



B.SC. ZOOLOGY

B Sc Under graduate

Zoology Program Outcomes, Program Specific Outcomes and Course Outcomes

Zoology Program Outcomes:

Program Outcomes-

PO-1. After studying this program, student will be more equipped to learn and know about different biological system. Drawing upon this knowledge. PO-2. They will be able to give specific examples of the physiological adaptations, development, reproduction and behaviour of different forms of life.

PO-3. Student will be able to explain how organisms function at the level of the gene, genome, cell, tissue and organ-system.

Course Outcomes-B.Sc.-I(Paper –I) Cell Biology and Non-Chordata Unit-I.

CO-1. To understand the structural organization and function of Intracellular Organelles.

CO-2. To study the structure, Composition and functions of DNA and RNA. CO-3. Students will understand the structures, Positions and functions of Plasma membrane, Endoplasmic reticulum, Mitochondria and Golgi complex.

Unit-II.

CO-1. Students will acquire knowledge about Chromosomes and cell divisions.

CO-2. They will also know about cancer cell.

CO-3. Students will understand the elementary idea about Immunity.

Unit-III.

CO-1. Students will have learning about the basic taxonomy and systematic and classification of Protozoa, Porifera, Coelenterata.

CO-2. To study the Sexual and asexual reproduction in unicellular Paramecium.

CO-3. Students will acquire knowledge of structure and life cycle of Sycon and Obelia.

CO-1. Students will have learning about the basic taxonomy and systematic and classification of Platyhelminthes, Nematelminthes, Annelida and Arthropoda up to Order.

CO-2. Students will understand the life cycle and pathogenesis of Parasite Fasciola and Ascaris.

CO-3. They will also know about Pheretima and Palaemon.

Unit-V.

CO-1. Students will have learning about the basic taxonomy, systematics and classification of Phylum Mollusca and Echinodermata up to Order.

CO-2. They will learn details of external feature, digestive system, respiratory system and reproductive system in Pila.

CO-3. To study the various system of Starfish.

Course Outcomes-B.Sc.-I (Paper –II) Chordata and Embryology Unit-I

CO-1. To study the classification, structural peculiarities of Hemichordata, protochordata and their evolutionary Importance.

CO-2. Students will be able to analyse the Comparative knowledge to Petromyzon and Myxine.

CO-3. Students will be able to understand the principles of taxonomy, systematics and classification of Chordata.

Unit-II

CO-1. Students will be able to gain a comprehensive knowledge of Poisonous and non poisonous snakes.

CO-2. Students will understand about snake venom and poison apparatus.

CO-3. Students will be able to analyse the process of metamorphosis of amphibians.

Unit-III.

CO-1. Students will be able to gain a comprehensive knowledge about Migration, Flight adaptation and Perching mechanism in Bird.

CO-2. Students will be able to evaluation of Prototheria, Metatheria, Eutheria and their affinities.

CO-3.Students will understand adaptation of aquatic Mammals.

CO-1.Understand the concepts of embryology.

CO-2.Gains comprehensive knowledge about gametogenesis, cleavage mechanisms, gastrulation,parthenogenesis and role of hormones in metamorphosis and regeneration.

Unit-V

CO-1.Students will understand the concepts of Embryonic induction and Differentiation.

CO-2.To understand the formation of three germinal layers in Frog. CO-3.Students will be able to analysis the concept of regeneration.

Course out Come-B.Sc.-II (Paper –I) Anatomy and Physiology Unit-I

CO-1.Students will have understood the structure of different Integument and its derivatives.

CO-2.They will also understand the Comparative anatomy of various organ systems of vertebrates.

CO-3.Understands about structure composition of Scales hair and feathers .

Unit-II

CO-1.Student will understand the various type of Endoskeleton. CO-2.Course provides students comprehensive understanding about Circulatory system and Urinogenital system.

CO-3.students gain evolutionary knowledge about Heart and Aortic arches.

Unit-III

CO-1.Course provides students comprehensive understanding about neurobiology, neurophysiology, molecular neurobiology.

CO-2.Comparative animal physiology is a comprehensive subject that gives in depth knowledge of various physiological processes Ear and Eye.

CO-3.Describing structural and functional knowledge of gonad and ducts.

Unit-IV

CO-1.After going through this course on Animal Physiology(Vertebrates)', the students have a good

Understanding of how vertebrate animals work.

CO-2.The students will be able to explore an original query of blood Coagulation.

CO-3.Students will be able to understand the Cardiac cycle of heart.

Unit-V

CO-1.After successfully completing this course, the students will be able to Understand Synaptic transmission to Nerve impulse.

CO -2.Students gain knowledge of physiology of Muscle contraction.

CO-3.After successfully completing this course, the students will be able to understand regulation of processes of Excretion.

Course out Come-B.Sc.-II(Paper –II) Vertebrate Endocrinology, Reproductive biology, Behavior, Evolution and Applied Zoology Unit-I

CO-1.They will learn detail of endocrinology with classification of hormones, their biosynthesis.

CO-2.Learn basic principles of Hormone.

CO-3.Understand the basic organization of the Endocrine disorder of Pituitary,Thyroid,Adrenal and Pancreas.

Unit-II

CO-1.Students of this class will be able to understand the importance of hormones in the Gametogenesis.

CO -2.After successfully completing this course, the students will be able to understand to Mechanism of parturition.

CO-3.Gain knowledge about the Reproductive cycle in vertebrates.

Unit-III

CO -1.Description of Variation.

CO-2.Understanding the current Evidences of organic evolution. CO-3.Conceptualization and theories of organic evolution.

Unit-IV

CO-1.After successfully completing this course, the students will be able to demonstrate knowledge of key concepts in animal behavior.

CO-2.Learn a wide range of theoretical and practical techniques used to study animal behavior.

CO-3.Thinkingability , flexibly and apply knowledge to new behavior problem.

Unit-V

CO-1.Understands concepts of fisheries, fishing tools and site selection. CO-2.Students will be able to biological and chemical pest control.

CO-3.Gives knowledge of silk worm rearing andMulberry cultivation.

Course out Come-B.Sc.-III (Paper –I) Ecology, Environmental Biology: Toxicology, Microbiology and Medical Zoology

Unit-I

CO-1.Students will understand the various features and aspects of population ecology, community ecology and ecosystem ecology.

CO-2.They will acquire knowledge about environmental biology in details. CO-3.To studies the various pollution and their harmful effect.

Unit-II

PO-1.Student will be learning the various issues related to biodiversity loss and conservation as well as status, conditions and conservation of forest and wild life.

CO-2.After successfully completing this course, the students will be able to Understands concepts of energy flow in ecosystem.

CO-3.Understands laws of limiting factor of environment.

Unit-III

CO-1.The study of this paper students gain knowledge in the basic concept of Toxicology.

CO-2.Imparts knowledge regarding the various Heavy metal toxicity.

CO-3.It provides opportunities for student's research projects, internships in assessing the effects of poisonous animal.

Unit-IV

CO-1.They will also know the various tools and techniques related to industrial microbiology.

CO-2.Understanding of Industrial microbiology and production of penicillin

.CO-3.Student's gains knowledge about microbiology of milk and milk production.

Unit-V

CO-1.They also will acquire knowledge about some parasites for their life cycle, pathology, diagnosis, symptoms and treatment.

CO-2.They will also have knowledge about the basics of parasite, host interaction etc.

CO-3. To study about pathogenic protozoan's and helminthes and their vector and treatment.

Physiology,Biochemistry,Biotechniques Unit-I

CO-1.Students will learn the fundamental genetics like linkage and linkage map.

CO-2.Understanding the chromosome anomalies and associated diseases. CO-3.Knowledge about gene and chromosomal mutation.

Unit-II

CO-1.To studies the mechanism of active transport and its role in mitochondria and Endoplasmic reticulum.

CO-2.Understanding of general idea about pH and buffer.

CO-3.To understands about the amino acid and peptides and its structure and biological function.

Unit-III

CO-1.Students will understand the basic and fundamental biochemistry of carbohydrates, proteins, lipids and nucleic acids.

CO-2.Students will understand the metabolism of carbohydrates, lipids and protein in detail.

CO-3.They will also understand the nature, mechanism of protein and their metabolism.

Unit-IV

CO-1.Student will acquire knowledge about recombinant DNA and gene therapy.

CO-2.To understands the scope and importance of tissue ulture,hybridoma,transgenic animals and gene library.

CO-3.Students gain knowledge about various tools & techniques used in gene cloning.

Unit-V

CO-1.Students will acquire knowledge some instrumentation such as light microscope, compound, phase contrast and electron microscopes.

CO-2.Studentsgain knowledge about various tools & techniques used in biological systems and gives them insight about their use in research.

CO-3.To study principles and Acquired skills the separation methods of centrifugation,chromatography and electrophoresis.



B.SC. PHYSICS

B.Sc. I Year

Paper-I: Mechanics, Oscillations and Properties of matters

Course Outcomes: After completing the course the students will able to :-

- Understand laws of motion and their application to various dynamical situations, motion of inertial frames and concept of Galilean invariance. He / she will learn the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.
- Understand the analogy between translational and rotational dynamics, and application of both motions simultaneously in analyzing rolling with slipping.
- Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions.
- Understand the phenomena of collisions and idea about center of mass and laboratory frames and their correlation.
- Understand the principles of elasticity through the study of Young Modulus and modulus of rigidity.
- Understand simple principles of fluid flow and the equations governing fluid dynamics.
- Apply Kepler's law to describe the motion of planets and satellite in circular orbit, through the study of law of Gravitation.
- Explain the phenomena of simple harmonic motion and the properties of systems executing such motions.
- In the laboratory course, the student shall perform experiments related to mechanics (compound pendulum), rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity) and fluid dynamics (verification of Stokes law, Searle method) etc.

B.Sc. I Year

Paper-II: Electricity, Magnetism and Electromagnetic Theory

Course Outcomes: After completing the course the students will able to :-

- Demonstrate Gauss law, Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.
- Explain and differentiate the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.
- Demonstrate a working understanding of capacitors.
- Describe the magnetic field produced by magnetic dipoles and electric currents.
- Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields.
- Understand the dielectric properties, magnetic properties of materials and the phenomena of electromagnetic induction.
- Describe how magnetism is produced and list examples where its effects are observed.
- Apply Kirchoff's rules to analyze AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.
- Apply various network theorems such as Superposition, Thevenin, Norton, Reciprocity, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.
- In the laboratory course the student will get an opportunity to verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments.

- Should be able to verify of various circuit laws, network theorems elaborated above, using simple electric circuits.

B.Sc. II Year

Paper-I: Thermodynamics, Kinetic Theory and Statistical Physics Course Outcomes:

After completing the course the students will able to:

Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.

- Learn about Maxwell's thermodynamic relations.
- Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.
- Learn about the real gas equations, Van der Waal equation of state, the Joule-Thompson effect.
- In the laboratory course, the students are expected to do some basic experiments in thermal Physics, viz., determinations of Stefan's constant, coefficient of thermal conductivity, temperature coefficient of resistant, variation of thermo-emf of a thermocouple with temperature difference at its two junctions and calibration of a thermocouple.
- Understand the concepts of microstate, macrostate, ensemble, phase space, thermodynamic probability and partition function.
- Understand the combinatoric studies of particles with their distinguishably or indistinguishably nature and conditions which lead to the three different distribution laws e.g. Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Dirac distribution laws of particles and their derivation.
- Comprehend and articulate the connection as well as dichotomy between classical statistical mechanics and quantum statistical mechanics.
- Learn to apply the classical statistical mechanics to derive the law of equipartition of energy and specific heat.
- Understand the Gibbs paradox, equipartition of energy and concept of negative temperature in two level system.
- Learn to derive classical radiation laws of black body radiation. Wiens law, Rayleigh

B.Sc. II Year

Paper-II: Waves, Acoustics and Optics

Course Outcomes: After completing the course the students will able to :-

- Recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.
- Apply basic knowledge of principles and theories about the behaviour of light and the physical environment to conduct experiments.
- Understand the principle of superposition of waves, so thus describe the formation of standing waves.
- Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.
- Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.
- Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms.
- In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt firsthand.

- The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.
- Understand the spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing.

B.Sc. III Year

Paper-I: Relativity, Quantum Mechanics, Atomic Molecular and Nuclear Physics

Course Outcomes: After completing the course the students will able to : -

- Know main aspects of the inadequacies of classical mechanics and understand historical development of quantum mechanics and ability to discuss and interpret experiments that reveal the dual nature of matter.
- Understand the theory of quantum measurements, wave packets and uncertainty principle.
- Understand the central concepts of quantum mechanics: wave functions, momentum and energy operator, the Schrodinger equation, time dependent and time independent cases, probability density and the normalization techniques, skill development on problem solving e.g. one dimensional rigid box, tunneling through potential barrier, step potential, rectangular barrier.
- Understanding the properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.
- Ability to calculate the decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrinos and its properties and role in theory of beta decay.
- Understand fission and fusion well as nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.
- In the laboratory course, the students will get opportunity to perform the following experiments
- Measurement of Planck's constant by more than one method.
- Verification of the photoelectric effect and determination of the work Function of a metal.
- Determination of the charge of electron and e/m of electron.
- Determination of the ionization potential of atoms.
- Determine the wavelength of the emission lines in the spectrum of Hydrogen atom.
- Plan and Execute 2-3 group projects in the field of Atomic, Molecular and Nuclear Physics in collaboration with other institutions, if, possible where advanced facilities are available.

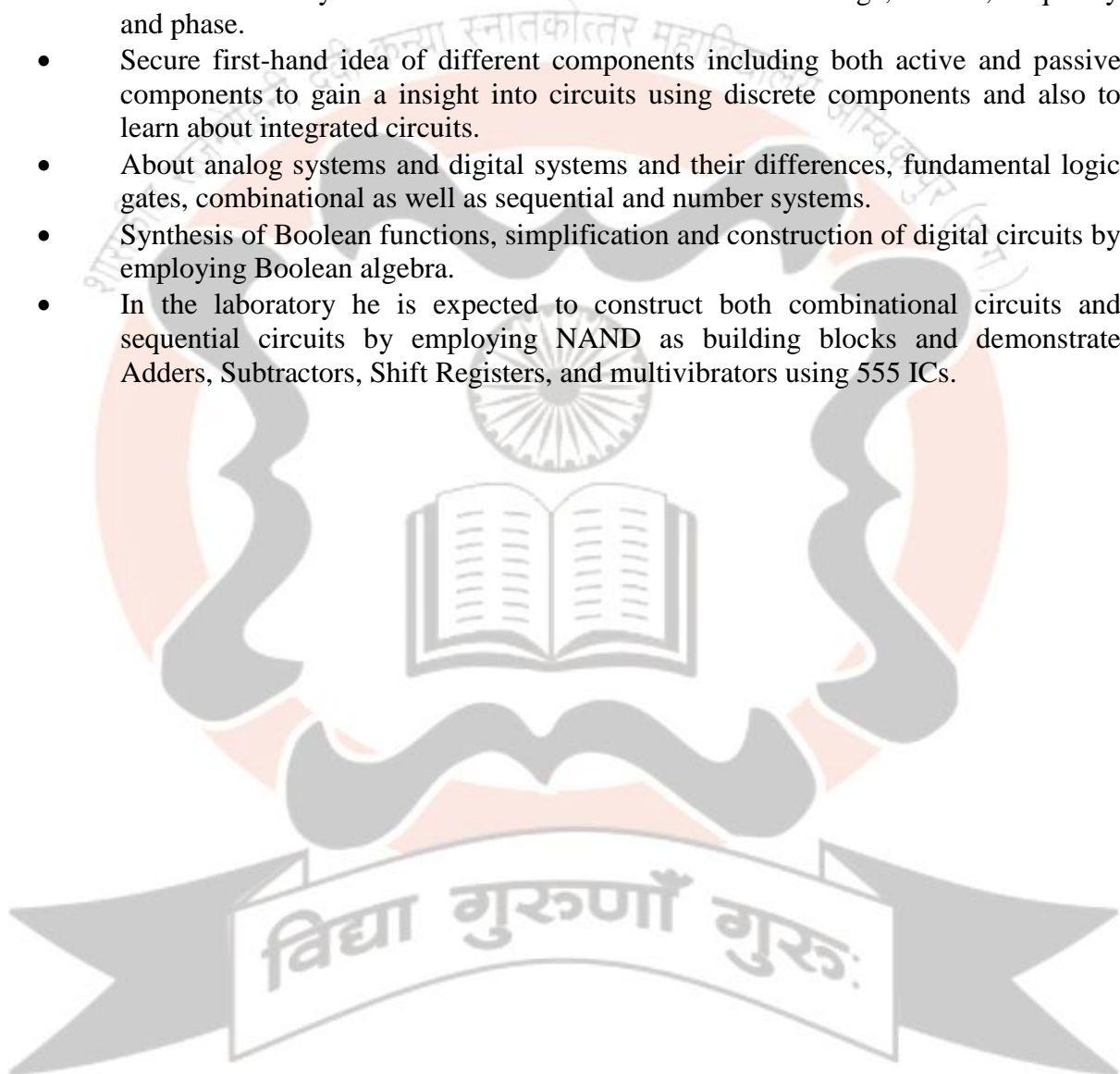
B.Sc. III Year

Paper-II: Solid State Physics, Solid State Devices and Electronics Course Outcomes:

After completing the course the students will able to : -

- A brief idea about crystalline and amorphous substances, about lattice, unit cell, miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystalline materials.
- Knowledge of lattice vibrations, phonons and in depth of knowledge of Einstein and Debye theory of specific heat of solids. At knowledge of different types of magnetism from diamagnetism to ferromagnetism and hysteresis loops and energy loss.
- Secured an understanding about the dielectric and ferroelectric properties of materials.
- Understanding above the band theory of solids and must be able to differentiate insulators, conductors and semiconductors.
- Understand the basic idea about superconductors and their classifications.

- N- and P- type semiconductors, mobility, drift velocity, fabrication of P-N junctions; forward and reverse biased junctions.
- Application of PN junction for different type of rectifiers and voltage regulators.
- NPN and PNP transistors and basic configurations namely common base, common emitter and common collector, and also about current and voltage gain.
- Biasing and equivalent circuits, coupled amplifiers and feedback in amplifiers and oscillators.
- To characterize various devices namely PN junction diodes, LEDs, Zener diode, solar cells, PNP and NPN transistors. Also construct amplifiers and oscillators using discrete components.
- Basic working of an oscilloscope including its different components and to employ the same to study different wave forms and to measure voltage, current, frequency and phase.
- Secure first-hand idea of different components including both active and passive components to gain a insight into circuits using discrete components and also to learn about integrated circuits.
- About analog systems and digital systems and their differences, fundamental logic gates, combinational as well as sequential and number systems.
- Synthesis of Boolean functions, simplification and construction of digital circuits by employing Boolean algebra.
- In the laboratory he is expected to construct both combinational circuits and sequential circuits by employing NAND as building blocks and demonstrate Adders, Subtractors, Shift Registers, and multivibrators using 555 ICs.





HOME SCIENCE

B.Sc. (Home-Science) PART- I

MARKING SCHEME

S.No.	Paper No.	Subject	Theory M. Mark	Practical M. Mark	Total	Theory M. Mark	Practical M.Mark
Group I	(A)	Environmental Studies	75	-	100	33	
	(B)	Field work	25				
			Foundation Course				
	(A)	Hindi Language-I	75		75	26	
	(B)	English Language-II	75		75	26	
Group II	(A)	Basic Nutrition	50	25	75	33	09
	(B)	Introduction to Resource Management	50	25	75		09
Group III	(A)	Introduction to Human Development	50	25	75	33	09
	(B)	Textile and Clothing	50	25	75		09
Group IV	(A)	Community Development	50	25	75	33	09
	(B)	Personal Empowerment and Computer Basics	50	25	75		09
Total			700				

DISTRIBUTION OF MARKS IN VARIOUS PRACTICALS

S.No.	Name of the Practical	Total M.	Sessional	Viva	Practical	Marks
1	BASIC NUTRITION	25	05	05	A. Preparation & Presentation) any one Recipe B. Taste	10 05
2	INTRODUCTION TO RESOURCE MANGEMENT	25	05	05	-	15
3	INTRODUCTION TO HUMAN DEVELOPMENT	25	05	-	A. Preparation of any one article of Baby kit B. Toy or wearing Food of Imm. Chart	10 10
4	TEXTILE & CLOTHING	25	05		A. Drafting B. Stitching C. Weave	05 10 05
5	COMMUNITY DEVELOPMENT	25	10	05	Preparation of Audio-Visual aids	10
6	PERSONAL EMPOWERMENT & COMPUTER BASIC	25	05	05	Computer Practical	15

B.SC.HOME SCIENCE I

GROUP II PAPER - A

BASIC NUTRITION

OBJECTIVE-

- To understand the function of food, the role of various nutrients, their requirements & the effect of deficiency & excess.
- To learn about the structure, composition, nutritional contribution & selection of different food stuffs.
- To make the students familiar with different methods of cooking their advantages & disadvantages, develop an ability to improve nutritional quality of food.

Course outcome-

- The course helps the students to understand the function of food, the role of various nutrients, their requirements & the effect of deficiency & excess.
- In this course student s learn about the structure, composition, nutritional contribution & selection of different food stuffs.
- This enables the students to be familiar with different methods of cooking their advantages & disadvantages, develop an ability to improve nutritional quality of food.

PRACTICAL EXPERIMENT

Through practical's student prepare & present different nutritious recipes& know the nutritive value of different food & recipe

- EXPERIMENT NO. 1. Weight Measures for raw and cooked food.
- EXPERIMENT NO. 2. Using different cooking methods Boiling, Steaming, Baking, Roasting, Frying
- VEGETABLES -
 - a) Simple salads and sprouting
 - b) Curries
- FRUITS –
 - a) Fruits preparations using fresh and dried fruits
- MILK –
 - a) Porridges
 - b) Curds, paneer and their commonly made preparation.
 - c) Milk based simple desserts and puddings – custards , kheer, ice-cream.
- SOUPS-
 - a) Basic ,clear and cream soups
- Peanut chikki, Paushtik ladoo

B.SC.HOME SCIENCE I

GROUP III PAPER – B TEXTILE & CLOTHING

OBJECTIVES

- ❖ To acquaint with proper notion regarding choice of fabrics.
- ❖ To develop skills in clothing construction.
- ❖ To acquaint with different textiles and their performances.

COURSE OUTCOME

- ❖ **This course helps the students to develop skills in clothing construction how to choose fabrics & acquaint with the different textile fiber, types of fibers, yarn making, types of yarn, yarn count, weaving patterns, loom, handloom, parts of loom, finishes , printing, dyeing, stain removal etc.**

PRACTICAL EXPERIMENT

Through practical students learn identification of textile fibres, weaving , printing, dyeing, etc.& basics of drafting , stitching also.

EXPERIMENT NO. 1. Identification of yarn

EXPERIMENT NO. 2. Identification of textile fibers

❖ Visual test/ Microscopic test

❖ Burning test/ Chemical test

EXPERIMENT NO. 3. Weaves and their variations

❖ Plain weave/ Twill weave

❖ Satin & Sateen weave

❖ Honeycomb & Birdseye weave

EXPERIMENT NO. 4. Printing

❖ Block printing/ Screen printing/ Stencil printing

EXPERIMENT NO. 5. Tie & Dye

EXPERIMENT NO. 6. Simple dyeing of different fabrics

EXPERIMENT NO. 7. Finishing of fabric before dyeing & printing

❖ Scouring

❖ Bleaching

❖ Designing

EXPERIMENT NO. 8. Bleaching & whitening

EXPERIMENT NO. 9. Starching

EXPERIMENT NO. 10. Laundering of cotton, silk, wool and synthetic fabric

EXPERIMENT NO. 11. Batik

B.sc. Home science I

GROUP IV

PAPER A COMMUNITY DEVELOPMENT

OBJECTIVES

- To aware the approaches to development
- Develop faith in the capacity of the people , to take responsibility of their own development.
- Understand the existing support structures for development efforts.
- Understand the role of non govt. Organizations in community development.
- Understand the socio economic structure & systems that make up the rural and urban communities.
- Understand the meaning of social change through development plans and programs in the context of the existing socio economic structures and systems.
- Recognize one's own role in the development process.

COURSE OUT COME

This course enables students be aware of approaches to the develop faith in the capacity of people, to take responsibilities for their own development.

This enable students to under stand the role of N.G.O. in community development to understand the socio economic structure & systems that make up the rural & urban communities TO Recognize one's own role in the development process.

PRACTICAL EXPERIMENT: - Through practical's students prepare different audio visual aids, chart, posters, cartoons, pamphlets, puppets etc. In this course student conduct survey regarding socio economic condition of the communities.

PRACTICAL EXPERIMENT – 1. Field Experience in Village(s) / Urban Slum

❖ Practical use of RRA / PRA Method

❖ Reporting on Socio- economic analysis of the rural / urban community

❖ To select, plan, preparation & and use of different – audio visual aids, i.e.

❖ Chart –Educational, Tree Chart, Flow Chart , Suspense Chart.

- ❖ Posters- Cartoons, Pamphlets, Puppets.
- ❖ Conduct of survey based on Unit IV & V of theory Papers,
- ❖ Organizing group demonstration

B.SC.HOME SCIENCE I

GROUP IV PAPER – B

PERSONAL EMPOWERMENT AND COMPUTER BASICS

OBJECTIVES:-

The student will

1. Become aware of the need, competencies and skills to be development for empowerment and be motivated for self improvement / self enhancement
2. Become aware of the role of empowerment of women from the perspectives of personal and national development
3. Become aware of the inter disciplinarily of Home Science education and its potential for personal and professional enhancement
4. Become sensitized to some pertinent contemporary issues that affect the quality of life of individuals, families and community.
5. Know the basics of computers.
6. To be able to use computers for education, information and research

COURSE OUTCOME :- This course motivate students for self improvement & self enhancement & develop empowerment of women and role of H. Sc. Education in empowerment to know the basic of computer & make then to be able to use computers for education in formation & research.

PRACTICAL EXPERIMENT :- Through practical work computer basics, use of M.S. Word & M.S. Excel how to create file, editing, formatting, printing, preparing, worksheet, formula function, chart preparation etc. They learn how to use internet

PRACTICAL EXPERIMENT – 1. Computer Basics

PRACTICAL EXPERIMENT – 2. MS Word – Creating, editing and formatting document word art, mail merge, page set-up, page preview printing a document

PRACTICAL EXPERIMENT – 3. MS – Excel – Work sheet, Generating graphs, chart , print preview, printing worksheets

PRACTICAL EXPERIMENT – 4. Internet

B.SC.HOME SCIENCE I

GROUP II PAPER – B

INTRODUCTION OF RESOURCE MANAGEMENT

- To create an awareness among the students about, management in the family as well as the other systems.
- To recognize the importance of wise use of resources in order to achieve goals.
- The impact of human, activities on environment.
- The action needed for checking environmental threats.

COURSE OUTCOME :- Students Learn and to help them take individual/ household/ community level decision for making the physical environment conducive for family living.

PRACTICAL:-

- Identify and formulate various types of standard that student can have.
- Five goals that a student will have.
- Various type of decision process of decision making.
- To work out minimum and maximum working approach.

B.SC.HOME SCIENCE I

GROUP III PAPER – A

INTRODUCTION OF HUMAN DEVELOPMENT

OBJECTIVES:-

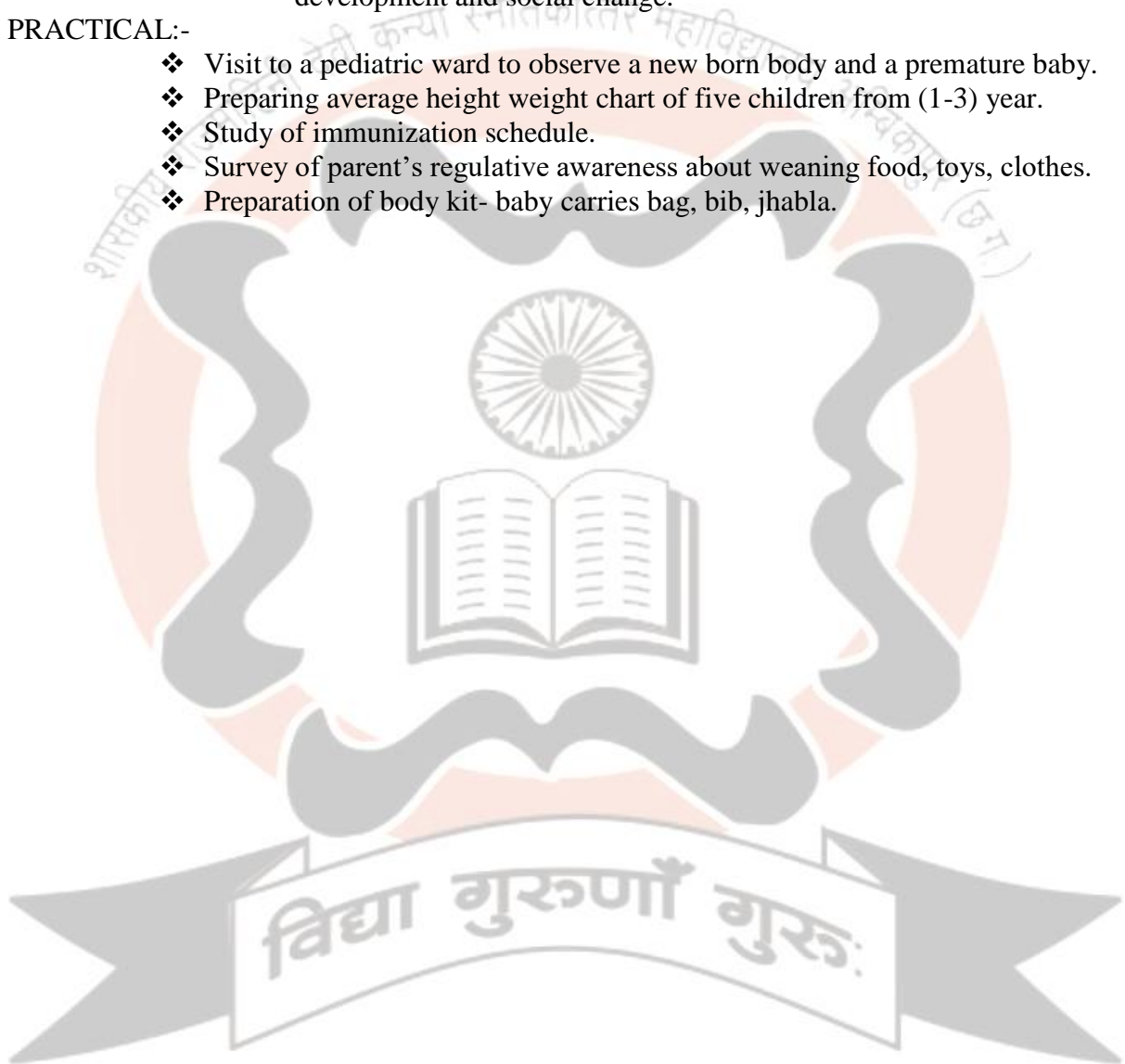
- ❖ To introduce student to the field of Human Development concept dimensions and interrelations.
- ❖ To sensitize student to social and cross- culture contexts in human development.
- ❖ To sensitize student to interventions in the field of human development.
- ❖ Become aware of her changing role and relationship with the family.

COURSE OUTCOME :-

- ❖ Student understands the dynamics of families in distress and crisis.
- ❖ Student understands the factors important for growth and development, different dimensions of development across the life span namely, physical and motor, cognition, language, social-emotional and personality and finally relevant issues in human development and social change.

PRACTICAL:-

- ❖ Visit to a pediatric ward to observe a new born baby and a premature baby.
- ❖ Preparing average height weight chart of five children from (1-3) year.
- ❖ Study of immunization schedule.
- ❖ Survey of parent's regulative awareness about weaning food, toys, clothes.
- ❖ Preparation of body kit- baby carries bag, bib, jhabla.



**B.Sc. (Home Science) PART- II
MARKING SCHEME**

S.No.	Paper No.	Subject	Theory M. Mark	Practical M. Mark	Total	Theory M. Mark	Practical M.Mark
Group I	(A)	Foundation Course Hindi Language-I	75		75	26	
	(B)	English Language-II	75		75	26	
Group II	(A)	Clinical Nutrition & Dietetics	50	25	75	33	09
	(B)	Textiles and Fiber Science	50	25	75		09
Group III	(A)	Human Physiology & Community Nutrition	50	25	75	33	09
	(B)	Communication Process	50	25	75		09
Group IV	(A)	Life Span Development	50	25	75	33	09
	(B)	Consumer Economics	50	25	75		09

DISTRIBUTION OF MARKS IN VARIOUS PRACTICALS

No.	Name of the Practical	Total Marks	Distribution			Marks
			Session	Viva	Practical	
Group – II A	Clinical Nutrition & Dietetics	25	05	05	Planning	08
					Cooking – Presentation	07
Group – II B	Textiles and Fiber Science	25	05	05	Stain Removal	05
					Tie & Dye	05
					Printing	05
Group – III A	Human Physiology & Community Nutrition	25	05	05	Spotting	10
					Blood Practicals	05
Group – III B	Communication Process	25	05	05	Preparation of Audio Visual Aids - 2	15
Group – IV A	Life Span Development	25	05	05	Practical	15
Group – IV B	Consumer Economics	25	05	05	Practical	15

**B.Sc. (HOME-SCIENCE) PART III
MARKING SCHEME**

Group No.	Paper No.	Subject	Theory M. Mark	Practical M. Mark	Theory M. Mark	Practical M. Mark
I	(A)	Foundation Course Hindi Language	75		26	
	(B)	English Language	75		26	
II	(A)	Nutritional Biochemistry	50	25	33	09
	(B)	Food Preservation	50	25		09
III	(A)	Early Childhood Education	50	25	33	09
	(B)	Extension Education	50	25		09
IV	(A)	Foundation of Art and Design	50	25	33	09
	(B)	Apparel Making & Fashion Designing	50	25		09

DISTRIBUTION OF MARKS IN VARIOUS PRACTICAL

S.No.	Name of the Practical	Total Mark	Distribution			
			Sessi.	Viva		Marks
1	Nutritional Biochemistry	25	5	5	Titration, Identification of CHO, Blood	10 05
2	Food Preservation	25	5	5	Preparation Presentation	10 05
3	Early Childhood Education	25	5	5	Preparation Teaching	05 10
4	Extension Education	25	5	5	Practical – (2)	15
5	Foundation of Art & Design	25	5	5	Practical – (2)	15
6	Apparel Making	25	5	-	Stitching or Designing	10

**B.SC.HOME SCIENCE III
GROUP II PAPER - A
NUTRITIONAL BIOCHEMISTRY**

OBJECTIVES :-

1. To study about importance of biochemistry
 2. To learn about chemistry classification sources function metabolism of protein, fat, carbohydrate, energy
 3. To study structure & function of nucleoprotein
 4. to study about enzyme & hormones blood, body liquids & their biological role
- COURSE OUTCOME:-**This course enables students to learn about carbohydrate, protein, fat, enzymes, hormones. Nucleoproteins, blood & urine different metabolic process etc.

PRACTICAL EXPERIMENT – Through practical they learn how to identify different carbohydrate protein.

PRACTICAL EXPERIMENT – 1. Identification of glucose, fructose, maltose, lactose, sucrose, starch

PRACTICAL EXPERIMENT – 2. Colour and precipitation reaction of protein

PRACTICAL EXPERIMENT – 3. Estimation of glucose by benedict's method

PRACTICAL EXPERIMENT – 4. Estimation of haemoglobin

PRACTICAL EXPERIMENT – 5. Estimation of Glycine by Titration

PRACTICAL EXPERIMENT – 6. Estimation of ascorbic acid .

PRACTICAL EXPERIMENT – 7. Visit to pathological lab.

**HOME SCIENCE III
GROUP II PAPER - B
FOOD PRESERVATION**

OBJECTIVE

- To know the importance & principles of food preservation
- To study different methods of food preservation
- To learn how to make Jam, Jelly, pickles, Squashes, Chutney, Ketchups etc.

COURSE OUTCOME :- This course enable student to learn how to preserve different food methods of preservation, principles of preservation theory & practical both Jam, Jelly, Pickles, Candy, Dehydrated bari , Papad, chips are prepared in the practical's

PRACTICAL EXPERIMENT – 1. Preparation of Jam, Jellies, Marmalades

PRACTICAL EXPERIMENT – 2. Preparation of Pickles & chutney

PRACTICAL EXPERIMENT – 3. Dehydration of Vegetables & fruits

PRACTICAL EXPERIMENT – 4. Preparation of papad. Badi. Chips

PRACTICAL EXPERIMENT – 5. Preparation of synthetic syrups & squashes

PRACTICAL EXPERIMENT – 6. Survey of market product and packaging

**B.SC.HOME SCIENCE I
GROUP IV PAPER – B
EXTENSION EDUCATION
OBJECTIVES**

- To know the concept of education extension education process
- To study meaning & purpose of adult/non formal education
- To study five year plans in India
- To study how to enhance food production
- To know the programs & polices for woman & children, poverty alleviation

COURSE OUTCOME :- This course enables students to learn extension education process, home science extension & community development , importance of adult education, planning of schemes at different level poverty alleviation program, 5 year program, food production

program etc. Visits to I.C.D.S. unit conducted advertisement are prepared; audio visual aids are prepared in the practical work.

PRACTICAL EXPERIMENT – 1. Visits to Radio / T.V. stations.

PRACTICAL EXPERIMENT – 2. Script writing for Radio.

PRACTICAL EXPERIMENT – 3. Visit to Extension Education Unit.

PRACTICAL EXPERIMENT – 4. Write slogan about Adult- Education

PRACTICAL EXPERIMENT – 5. Designing an Advertisement for any product with relevant slogan at least two

PRACTICAL EXPERIMENT – 6. Study of program for women as target group and children

B.Sc. (HOME SCIENCE) III

Group -III Paper -A

EARLY CHILDHOOD EDUCATION

OBJECTIVES:-

- To know importance of early childhood care and significance of intervention programmes for early child development.
- To understand major theoretical approaches and implication for early child development.
- To become acquainted with current policies and programs in ECCE.
- To recognize role of play in children's development.
- To understand goals, principle, factors and approaches used in programme planning.
- To recognize the advantages of project method and learn to use integrated approach in the development of daily programme.

COURSE OUTCOME :-

- Students learn about various early childhood care and education facilities through different programmes, for early childhood education.
- Students develop the concept of curriculum for all round development of children.

PRACTICAL:-

- Plan three activities for children : list objectives, analyst tasks to achieve goals, select and organize instructional and learning materials, teacher's role, preparation of evaluation sheets i.e. check list, rating scale.
- Prewriting activities.
- (a) Mathematics

(b) Readiness


(c) Materials for classifying, comparing, serrations, pattering, counting shapes, fractions, list vocabulary related to mathematical concepts.

(d) Material for addition, subtraction, multiplication and divisions.

(e) Graphs.

(f) Experiences for understanding time distance weight, capacity and money.

- Prepare a lesson for early childhood education.
- Plan a project based on lesson of first and second standard, plan activities which children can do at home.
- Visit to nursery school.


PRINCIPAL
Govt. Rajmohini Devi
Girls P.G. College Ambikapur
Distt.- Surguja (C.G.)