शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR, CHHATTISGARH

SYLLABUS

B.A. PART-I

SESSION 2021-22

संशोधित पाठ्यक्रम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी.
भाग – एक (आधार पाठ्यक्रम)
प्रश्न पत्र– प्रथम (हिन्दी भाषा)

पूर्णांक– 75

नोट :–

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा ।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जायेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय :–

इकाई–1

क. पल्लवन, पत्राचार, अनुवाद, पारिभाषिक शब्दावली एवं हिंदी में पदनाम
ख. ईदगाह (कहानी) – मुंशी प्रेमचंद

इकाई–2

क. शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान–पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द एवं मुहावरे–लोकोक्तियाँ
ख. भारत वंदना (कविता)– सूर्यकान्त त्रिपाठी निराला

इकाई–3

क. देवनागरी लिपि – नामकरण, स्वरूप एवं देवनागरी लिपि की विशेषताएँ, हिंदी अपठित गद्यांश, संक्षेपण, हिंदी में संक्षिप्तीकरण
ख. भोलाराम का जीव (व्यंग्य) – हरिशंकर परसाई

इकाई–4

क. कम्प्यूटर का परिचय एवं कम्प्यूटर में हिंदी का अनुप्रयोग
ख. शिकागो से स्वामी विवेकानंद का पत्र

इकाई–5

क. मानक हिन्दी भाषा का अर्थ, स्वरूप, विशेषताएँ, मानक, उपमानक, अमानक भाषा
ख. सामाजिक गतिशीलता – प्राचीन काल, मध्यकाल, आधुनिक काल

मूल्यांकन योजना :–

प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः 8 एवं 7 होंगे। प्रश्न–पत्र का पूर्णांक 75 निर्धारित है।

पाठ्यक्रम संशोधन का औचित्य :–

व्याकरण के बुनियादी ज्ञान, संप्रेषण, कौशल, सामाजिक संदेश एवं भाषायी दक्षता को ध्यान में रखते हुए यह पाठ्यक्रम प्रस्तावित है।

B.A./B.Sc./B.Com./B.H.Sc. Part-I
FOUNDATION COURSE
PAPER-II
ENGLISH LANGUAGE

M.M. 75

UNIT-I **Basic language skills: Grammar and Usage.**

Grammar and Vocabulary based on the prescribed text.
To be assessed by objective/multiple choice tests.

(Grammar - 20 marks)
Vocalulary - 15 Marks)

UNINT-II **Comprehension of an unseen passage.** **05 Marks**

This should imply not only (a) an understanding of the passage in question, but also (b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent. Composition based on themes and issues raised in the passage.
To be assessed by both objective multiple choice and short answer type tests.

UNIT-III **Composition:** Paragraph writing **10 Marks**

UNIT-IV **Letter writing** (The formal and one Informal) **10 Marks**

Two letters to be attempted of 5 marks each. One formal and one informal.

UNIT-V **Texts:** **15 Marks**

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authrs, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler then modem examples. In all cases, the language should be accessible (with a minumum of explantion and reference to standard dictionaries) to the general body of students schooled in the medium of and Indian language.
Students should be able to grasp the contents of each plece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Priciples of Literary criticism should not be taken up at this stage.
To be assessed by five short answers of three marks each.

BOOK PRESCRIBED-

English Language and Indian Culture - Published by M.P. Hindi Granth Academy Bhopal.

B.A. Part-I
SOCIOLOGY
PAPER - I
INTRODUCTION TO SOCIOLOGY

UNIT-I The Meaning of Sociology - The Sociological perspective - Sociology and social Sciences - The Scientific and humanistic Orientations to Sociological Study. Basic concept - Society, Community, institution, Association, group social structure, Status and role.

UNIT-II Institution, Family and kinship, religion, education, politics. The individual and society. Society- Culture and socialisation-Relation between individual and societysocialcontrol, norms, values.

UNIT-III Social Stratification and mobility meaning forms and theories.

UNIT-IV Social change meaning and type evolution and progress factors of social change.

UNIT-IV Introduction to applied sociology and Social policy and action- Sociology and Development, Sociology and Professions.

ESSENTIAL READINGS: - .

1. Bottomore T. 8. Sociology- A guide to Problems and Liteiacture, Bombay. George Allenand unwin (lndia) 1972.
2. Inkeles, Alex, What is Sociology? New Delhi, Prentice Hall of India 1987.
3. Jayram, n., Introdutory Sociology, Madras Maomillan India 1988.
4. Johnson Hary, m., Sociology of systematic Introduction New Delhi Allied Publishers 1995.

B.A. Part-I
SOCIOLOGY
PAPER-II
FOUNDATIONS OF SOCIOLOGICAL THOUGHT

UNIT-I The Pioneers: emergence of Sociology. Comte: Positivism, Spencer: Social Darwinism, super organic evolutions.

UNIT-II The Classical tradition: Durkheim- Social Solidarity and Suicide. Max Weber - Authority and the Protestant Ethic and the spirit of Capitalism.

UNIT-III Marx: Materialist Conception of history and class Struggle.

UNIT-IV Pareto: Circulation of Elites and Logical and Nonlogical action.

UNIT-V Development of Sociological thought in India:
Mahatma Ghandhi: Ahimsa, Satya Graha,
Radha kamal Mukarjee: The Concept of Value.

ESSENTIAL READNGS _

1. Barres, H.E.: Introduction to the sociology,'Chicago the university of Chicago press 1959.
2. Coser, Levis a.: Master of sociological thought, New York Harcourt Brace Jovanovich 1979.
3. Singh, Yogendra- Indian sociology: social conditioning and emerging frends. New Delhi Vistaar 1986.
4. Zeitlin, lrving-(lndian edition) Rethinking sociology: A critigue of contemporary theory , Jorpur Rawl 1999.

बी. ए. भाग एक
B.A. Part-I
राजनीति विज्ञान
Political Science
प्रथम प्रश्न पत्र : राजनीतिक सिद्धान्त
Paper I : Political Theory

इकाई–1 राजनीति विज्ञान का अर्थ, परिभाषा (आधुनिक अवधारणा सहित)। राजनीति एक विशिष्ट मानवीय व्यवहार के रुप में। शक्ति, सत्ता, प्रभाव : अर्थ, विशेषताएं, प्रकार। राजनीति विज्ञान की अध्ययन पध्दतियां : परम्परागत एवं व्यवहारवाद एवं उत्तर व्यवहारवाद।

UNIT-I Meaning and Definition of Political Science (with modern concept). Politics as a specific human behaviour. Power, Authority and Influence: meaning, features and kinds. Method of Study to Political Science: Traditional , Behaviouralism and Post Behaviouralism.

इकाई–2 राज्य एवं उसके आवश्यक तत्व। राज्योत्पत्ति के विभिन्न सिद्धान्त, मार्क्सवादी सिद्धान्त। सावयविक सिद्धान्त।

UNIT-2 State and its essential elements. Various theories of the origin of the State, Marxist theory. Organismic Theory.

इकाई–3 सम्प्रभुता एवं उसकी बहुलवादी आलोचना। अधिकारः अर्थ, प्रकार, सिद्धान्त। कर्तव्य। स्वतन्त्रता : अर्थ , प्रकार, संरक्षण। समानता : अर्थ, प्रकार एवं स्वतन्त्रता से सम्बंध। प्रजातन्त्र : परिभाषा, व्यापक अर्थ, चुनौतियां, सफलता के लिए आवश्यक शर्तें, गुण–दोष। प्रत्यक्ष प्रजातन्त्र।

UNIT-3 Sovereignty and its pluralistic criticism. Rights: meaning, kinds and theories. Duties. Liberty: meaning, kinds, safeguards. Equality: meaning, kinds and relations with Liberty. Democracy: meaning, comprehensive meaning, challanges, conditions for its success, merits and demerits. Direct Democracy.

इकाई–4 शासन के प्रकार : एकात्मक व संघात्मक, संसदीय व अध्यक्षात्मक, निरंकुशतन्त्र। शासन के अंग : कार्यपालिका, व्यवस्थापिका, न्यायपालिका। शक्ति पृथक्करण का सिद्धान्त व नियंत्रण –संतुलन का सिद्धान्त। संविधान : अर्थ, प्रकार। प्रतिनिधित्व के सिद्धान्त एवं निर्वाचन प्रणालियां।

UNIT-4 Kinds of Government: Unitary and Federal, Parliamentary and Presidential. Dictatorship. Organs of Government: Executive, Legislature and Judiciary. Theory of Separation of Powers and Checks and Balances. Constitution: meaning and kinds. Theories of representation and Electoral Process.

इकाई–5 लोककल्याणकारी राज्य। दल पद्धति : अर्थ , प्रकार, पद्धति। दबाव समूह : अर्थ, प्रकार, तकनीक। सामाजिक परिवर्तन : अर्थ, विशेषताएं, सिद्धान्त। नारीवाद, राष्ट्रवाद।

UNIT-5 Public Welfare State. Party System: meaning, kinds, process. Pressure Groups: meaning, kinds and technique. Social Change: meaning, characteristics, theories. Feminis. Nationalism.

बी.ए. प्रथम वर्ष
प्रथम प्रश्न पत्र
राजनीतिक सिद्धांत

1. ओ.पी. गाबा, समकालीन राजनीति सिद्धांत, मयूर पेपर बैक्स नोएडा।
2. ओ.पी. गाबा, राजनीति सिद्धांत की रूपरेखा, मयूर पेपर बैक्स नोएडा।
3. जे.सी. जौहरी व सीमा जौहरी, आधुनिक राजनीति विज्ञान के सिद्धांत, स्टर्लिंग पब्लिकेशन।
4. पंत गुप्ता जैन, राजनीति शास्त्र के आधार, सेन्ट्रल पब्लिकेशिंग हाउस इलाहाबाद।
5. प्रो. आनंद प्रकाश अवस्थी, भारतीय शासन एवं राजनीति, लक्ष्मीनारायण अग्रवाल, आगरा।
6. Andrew Haywood Political Theory , An Introduction.
7. O.P. Gaba An Introduction to Political Theory, Macmillan India Ltd.

बी.ए. भाग एक
B. A. Part-I
राजनीति विज्ञान
Political Science
द्वितीय प्रश्न पत्र : भारतीय शासन एवं राजनीति
Paper II: Indian Government and Politics

इकाई–1 भारतीय राष्ट्रीय आन्दोलन : 1858 का प्रथम स्वतन्त्रता संग्राम, असहयोग आन्दोलन, सविनय अवज्ञा आन्दोलन, भारत छोड़ो आन्दोलन। भारत का संविधानिक विकास : 1858, 1909, 1919 और 1935 का भारत शासन अधिनियम।

UNIT-1 Indian National Movement: First Independence Movement 1858, Non cooperation Movement, Civil Disobedience Movement and Quit India Movement.Constitutional Development of India: Govt. of India Act of 1858,1909, 1919 and 1935.

इकाई–2 भारतीय संविधान : विशेषताएं, प्रस्तावना, स्त्रोत,। संघीय व्यवस्था, मौलिक अधिकार, मूल कर्तव्य,नीति निर्देशक तत्व। संविधान संशोधन प्रक्रिया।

UNIT-2 Constitution of India: Characteristics, Preamble, Sources. Federal System. Fundamental Rights and Duties, Directive Principles of State Policy. Constitution Amendment Process.

इकाई–3 संघीय कार्यपालिका : राष्ट्रपति, उपराष्ट्रपति, मन्त्रिपरिषद् और प्रधानमन्त्री। संघीय व्यवस्थापिका : संसद : लोकसभा और राज्यसभा। संसदीय प्रक्रिया।

UNIT-3 Union Executive: President, Vice President, Council of MInisters and Prime Minister. Union Legislature: Parliament: Lok Sabha and Rajya Sabha. Parliamentary Procedure.

इकाई–4 संघीय न्यायपालिका : सर्वोच्च न्यायालय : गठन, क्षेत्राधिकार, न्यायिक पुनरावलोकन, न्यायिक सक्रियतावाद। राज्य कार्यपालिका : राज्यपाल, मन्त्रिपरिषद् और मुख्यमन्त्री।

UNIT-4 Union Judiciary: Supreme Court: Organisation, Jurisdiction, Judicial Review, Judicial Activism. State Executive: Governor, Council of Ministers and Chief Minister.

इकाई–5 राज्य व्यवस्थापिका : विधानसंभा एवं विधानपरिषद्। निर्वाचन आयोग व चुनाव सुधार। राष्ट्रीय व क्षेत्रीय दल। भारतीय राजनीति के प्रमुख मुद्दे : जाति, धर्म, भाषा और क्षेत्र। पंचायती राज व्यवस्था।

UNIT-5 State Legislature: Legislative Assembly and Legislative Council. Election Commission and Election Reforms. National and Regional Parties. Major issues of Indian Politics: Caste, Religion, Language and Region. Panchayati Raj System.

संदर्भ पुस्तक (Reference Books)

1. डॉ. सुभाष कश्यप, भारत का संवैधानिक विकास और संविधान, हिन्दी माध्यम कार्यान्वय निदेशालय दिल्ली विश्वविद्यालय।
2. डॉ. सुभाष कश्यप, हमारी संसद, भारत की संसद एक परिचय, राष्ट्रीय पुस्तक न्यास।
3. डॉ. रूपा मंगलानी, भारतीय शासन एवं राजनीति, राजस्थान हिन्दी ग्रंथ अकादमी जयपुर।
4. M.V. Pylee , Constitutional History of India , S.Chand.
5. D.D. Basu Indian Constitution

संशोधित पाठ्यक्रम
बी. ए. भाग–1
हिन्दी साहित्य
प्रथम– प्रश्न पत्र
(प्राचीन हिन्दी काव्य)

पूर्णांक 75

उद्देश्य एवं प्रस्तावना :–

प्राचीन से तात्पर्य है– आधुनिक काल से पूर्व का काल। सही अर्थ में हिन्दी भाषा और साहित्य का विकास आदिकाल से शुरू होता है। इसमें धार्मिक तथा ऐतिहासिक दो प्रकार का साहित्य मिलता है, जो प्रबंध, मुत्तक, रासो, फागु, चरित, सुभाषित आदि विविध काव्यरूपों में अभिव्यंजित है। मध्यकालीन साहित्य की पृष्ठभूमि के रूप में इसे प्रतिष्ठापित किया जाता है।

मध्यकालीन काव्य में भक्तिकाव्य, जहां लोक जागरण को स्वर देने वाला है, वहीं रीतिकाल अपने लौकिक– श्रृंगारिका, परिदृश्य में तत्कालीन सामाजिक, सांस्कृतिक, राजनीतिक स्थितियों को बेलौस अभिव्यंजित करता है। अतः भाषा, संस्कृति, विचार, मानवता, काव्यरूपता, लौकिकत– पारलौकिकता, आदि दृष्टियों से इसका अध्ययन अत्यावश्यक है।

पाठ्य विषय

1. कबीर (कबीर– कांतिकुमार जैन, प्रारंभिक 50 साखियाँ)
2. जायसी – (संक्षिप्त पद्मावत– श्यामसुंदर दास, नागमती वियोग वर्णन)
3. सूर (भ्रमर गीत सार – सं. आचार्य रामचन्द्र शुक्ल, प्रारंभिक 25 पद)
4. तुलसी – "रामचरित मानस'' के सुंदरकाण्ड से प्रारंभिक 30 दोहे चौपाई छंद साहित
5. घनानन्द (घनानन्द – सं. विश्वनाथ प्रसाद मिश्र, प्रारंभिक 25 छंद)

द्रुत पाठ हेतु निम्नांकित तीन कवियों का अध्ययन किया जावेगा– जिसमें से किन्हीं दो पर लघुउत्तरीय प्रश्न पूछे जायेंगे

1. विद्यापति
2. रहीम
3. रसखान

अंक विभाजन

1. व्याख्याएँ (3) – 21 अंक
2. आलोचनात्मक प्रश्न (2) – 24 अंक
3. लघुउत्तरीय प्रश्न (5) – 15 अंक
4. वस्तुनिष्ठ प्रश्न (15) – 15 अंक

संशोधित
बी. ए. भाग–1
हिन्दी साहित्य
द्वितीय–प्रश्न पत्र
हिन्दी कथा साहित्य

पूर्णांक 75

उद्देश्य एवं प्रस्तावना –

गद्य की प्रमुख विधाओं का इतना द्रुत विकास इनकी लोकप्रियता का प्रमाण प्रस्तुत करता है। इसमें आधुनिक जीवन, अपनी विविध कमियों के साथ यथार्थ रूप में अभिव्यंजित हुआ है। जीवन की अनुभूतियाँ, संवेदनाओं तथा विविध परिस्थितियों के साक्षात्कार के लिए इनका अध्ययन सर्वथा अपेक्षित है।

पाठ्य विषय

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक उपन्यास एवं आठ कहानीकारों की एक– एक प्रतिनिधि कहानी का अध्ययन आवश्यक है।

उपन्यास

1. प्रेमचंद – गबन

कहानी

1.	प्रेमचंद	–	कफन
2.	जयशंकर प्रसाद	–	आकाश दीप
3.	यशपाल	–	परदा
4.	फणीश्वनाथ रेणु	–	ठेस
5.	मोहन राकेश	–	मलबे का मालिक
6.	भीष्म साहनी	–	चीफ की दावत
7.	गुलशेर खाँ शानी	–	जली हुई रस्सी
8.	रांगेय राघव	–	गदल

द्रुत पाठ के लिए निम्नांकित तीन कथाकारों का अध्ययन अपेक्षित है, जिनमें से किन्हीं दो पर लघुउत्तरीय प्रश्न पूछे जावेंगे–

1. उपेन्द्रनाथ अश्क, 2. बाल शौरि रेड्डी 3. शिवानी

अंक विभाजन–

व्याख्या (3)	21 अंक
आलोचनात्मक प्रश्न (2)	24 अंक
लघुउत्तरीय प्रश्न (5)	15 अंक
वस्तुनिष्ठ प्रश्न (15)	15 अंक

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
BASTAR VISHWAVIDYALAYA, JAGDALPUR (C.G.)

SYLLABUS
B.A. PART-II
SESSION 2020-21

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
धरमपुरा, जगदलपुर, जिला–बस्तर (छ.ग.) 494001
वेबसाईट www.bvvjdp.ac.in दूरभाष–07782–229037 फैक्स 229297

संशोधित पाठ्यकम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी. भाग–दो,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

खण्ड–क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे – **अंक–35**

1. महात्मा गांधी – चोरी और प्रायश्चित
2. आचार्य नरेंद्र देव – युवकों का समाज में स्थान
3. वासुदेव भारण अग्रवाल – मातृभूमि
4. हरि ठाकुर – डॉ. खूबचंद बघेल
5. पं. माधवराव सप्रे – सम्भाषण–कुशलता

खण्ड–ख हिन्दी भाषा और उसके विविध रूप **अंक–16**

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड–ग हिन्दी की व्याकरणिक कोटियॉ **अंक–24**

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समास, संधि एवं संक्षिप्तियां
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन–

इकाई–1 चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा

इकाई–2 युवकों का समाज में स्थान : आचार्य नरेन्द्र देव/वित्त एवं वाणिज्य की भाषा, मशीनी भाषा

इकाई– 3 मातृभूमिः वासुदेवशरण अग्रवाल / संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण

इकाई– 4 डॉ. खूबचंद बघेल : हरि ठाकुर / समास, संधि

इकाई– 5 सम्भाषण–कुशलता : पं. माधवराव सप्रे, / अनुवाद – अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियॉ

मूल्यांकन योजना –

प्रत्येक इकाई से एक–एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई को दो–दो खण्डों (क्रमांक' 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न–पत्र के पूर्णांक 75 होंगे।

पाठ्यकम संशोधन का औचित्य : विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ–साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सके तथा व्याकरिणक एवं भाशा विशयक प्रस्तावित पाठ्यकम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सके।

अध्यक्ष– हिंदी अध्ययन मंडल

B.A/B.S.c./B.Com/B.H.S.c Part-II
Foundation Course
PAPER - II
ENGLISH LANGUAGE

M.M. 75

The question paper B.A/B.S.c./B.Com/B.H.S.c English Language cultural valuers shall comprise the following units:

UNIT-I Short answer questions to be assed by (Five short answer questions of three marks each) **15 Marks**

UNIT-II (a) Reading comprehension of an unseen passage **05 Marks**
(b) Vocabulary

UNIT-III Report-Writing **10 Marks**

UNIT-IV Expansion of an idea **10 Marks**

UNIT-V Grammar and Vocabulary based on the prescribed text book **20+15 Marks**

Note : Question on all the units shall asked from the prescribed text which will comprise specimens of popular creative/writing and the following it any

(a) Matter & technology
  (i) State of matter and its structure
  (ii) Technology (Electronics Communication, Space Science)

(b) Our Scientists & Institutions
  (i) Life & Work of our eminent scientist Arya Bhatt. Kaurd Charak Shusruta, Nagarjuna, J.C. Bose and C,V. Raman, S. Ramanujam, Homi J. Babha Birbal Sahani.
  (iii) Indian Scientific Institutions (Ancient & Modern)

Book Prescribed:

1. Foundation English for U.G. Second Year - Published by M.P. Hindi Granth Academy, Bhopal.

B.A. Part-II
SOCIOLOGY
PAPER - I
SOCIOLOGY OF TRIBAL SOCIETY

UNIT-I **Tribes:** Concepts, Characteristics, Tribes and Schedule Tribes, Distinction between Tribe and Caste.

UNIT-II **Classification of Tribal people:** Food gatherers and hunters, Shifting cultivates, Nomads, Peasant settled Agriculturists and Artisans.

UNIT-III **Socio-cultural Profile:** Airship, Marriage, Family, Religion and belief cultural traditions.

UNIT-IV **Tribal sensitization:** Tribal Mobility, Schemes of Tribal Development, Various Tribal Movements.

UNIT-V **Problems of Tribal People:** Poverty, Illiteracy, Indebtedness, Agrarian issues, Exploitation study of tribal communities in Chhattisgarh with special reform to Particularly Venerable Tribal Groups (PVTG).

ESSENTIAL READINGS:-

1. Vidyarthi, L.P. 1965. Cultural Counters of Tribal Bihar, Punthi Pustak, Calcutta.
2. Bose, N.K. 1971. Tribal Life in India, National Book Trust, New Delhi.
3. Das, R.K. 1988. The Tribal Social Structure, Inter India Publications, New Delhi.
4. Dubey, S.C. 1977. Tribal F{heritage of India, Ethnicity, Identity and Interaction, Vol.1,Vikash Publishing House, Delhi.
5. Elwin, Verrier. 1989. The Tribal World of Verrier Elwin: An Autobiography, Oxford, New Delhi.
6. Russell, R.V. and Hera Lal. 1916. The Tribes and Castes of Central Province of India, 4 Vols. Cosmo Publications, New Delhi.

B.A. Part-II
SOCIOLOGY
PAPER-II
CRIME AND SOCIETY

UNIT-I **Concept of Crime:** Meaning, Characteristics and Types.
School of Crime: Classical, Sociological and Psychological.

UNIT-II Structure of Crime: Anomie, Criminality and Suicide, Organized Crime,White Collar Crime and Cyber Crime

UNIT-III Social Evils and Crime: Alcoholism, Drug Addiction, Dowry and Beggary.

UNIT-IV Punishment: Meaning, Characteristics, Objectives and Types, Major Theories of Punishment.

UNIT-V Correctional Process: Role of Police and Judiciary in India, Development of Jail reforms in India and Modern correctional concepts- Probation, Parole and after care Program.

ESSENTIAL READTNGS:-

1. Mike & Maguire. QA07). The Oxford Hand Book of Criminology London: Oxford University Press.
2. Haster, S., & Eglin, P.(1992). Sociology of Crime. London: Routledge Publishers.
3. Mead, G. H. (1934). Mind Self and Society. Chicaeo: Chicago University Press
4. Gottfredson, Michael, R., Hirschi, & Travis. (1990). A General Theory of Crime. London: Stanford University Press.
5. Sutherland, & Edwin, H. (1924). Principles of Criminolog,t. Clticago: Chicago University Press.
6. Sutherland, Edward, H., 8L Press, New York.

बी.ए. द्वितीय वर्ष

B.A. Part II Paper I

प्रथम : प्रश्न–पत्र

प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं

Ancient Indian Social and Economic Institution

पूर्णांक : 75

उद्देश्यः इस पाठ्यक्रम का उद्देश्य प्राचीन भारत की सामाजिक तथा आर्थिक संस्थाओं का सामान्य ज्ञान कराना है।

इकाई–1

(1) वर्णाश्रम व्यवस्था (Varna System)
(2) आश्रम व्यवस्था (Ashramas)
(3) पुरूषार्थ चतुश्टय (Purushartha Chatushthaya)
(4) पंचमहायज्ञ (Pancha mahayagya)

इकाई–2

(1) संस्कार (Sanskaras)
(2) विवाह तथा उसके प्रकार (Marriage and their types)
(3) परिवार की उत्पत्ति तथा महत्व, संयुक्त परिवार, पिता,माता, तथा पुत्र की स्थिति, पुत्रों के प्रकार (Origin of Family and its Significance, Joint Family, position of Father, Mother and Sons; Types of Son)

इकाई–3

(1) नारियों की स्थिति (Position of Women)
(2) शिक्षा–उद्देश्य, आदर्श, उपलब्धियॉ तथा प्रमुख शिक्षा केन्द्र (Objectives of Education, Model, Achievements and Important education Centres)

इकाई–4

(1) वैदिक काल से 600 ई.पू. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from Vedic age to 600 B.C.)
(2) श्रेणियों का संगठन और कार्य (Organisation and working of Guilds)
(3) 600 ई.पू. से 319 इ. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from 600 B.C. to 319 A.D.)

इकाई–5

(1) 319 ई से 1200 ई. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from 319A.D. to 1200 A.D.)
(2) आंतरिक और बाह्य व्यापारिक मार्ग (Domestic and International trade routes)

सहायक ग्रंथ :

1. मनोरमा जौहरी – प्राचीन भारतीय वर्णाश्रम व्यवस्था
2. जयशंकर मिश्र – भारत की सामाजिक इतिहास
3. के.सी.जैन – प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं
4. राजबली पाण्डेय – हिन्दू संस्कार
5. हरिदत्त वेदालंकार – हिन्दू परिवार मीमांसा
6. ए.एस.अल्तेकर – प्राचीन भारत में नारियों की स्थिति
7. आर.एस.शर्मा – प्राचीन भारत में शूद्रों की स्थिति
8. ए.एस.अल्तेकर – प्राचीन भारतीय शिक्षण पद्धति
9. रमेशचन्द्र मजुमदार (अनु.कृष्णदत्त बाजपेयी) – प्राचीन भारत में संगठित जीवन
10. मोतीचन्द्र – सार्थवाह
11. कृष्णदत्त बाजपेयी – भारतीय व्यापार का इतिहास

12. कृष्णदत्त बाजपेयी – प्राचीन भारत का विदेशों में सबंध
13. आर.एस.भार्मा – पूर्व मध्यकालीन भारत में सामाजिक परिवर्तन
14. डॉ. चन्द्रदेव सिंह – प्राचीन भारतीय समाज और चिन्तन
15. सुस्मिता पाण्डेय – समाज, आर्थिक व्यवस्था एवं धर्म
16. P.N. Prabhu - Hindu Social Organization
17. S.K. Maity - The Economics life of Northem India in the Gupta Period.
18. L.Gopal - Economic life of Northem Indian
19. D.R. Das - Econimics History of the Dean
20. शिव स्वरूप सहसा – प्राचीन भारतीय सामाजिक, आर्थिक संस्थाएं

बी.ए. द्वितीय वर्ष

द्वितीय : प्रश्न–पत्र

B.A. Part II Paper II

प्राचीन भारतीय राजनय तथा प्रशासन

Ancient Indian Polity and Administration

पूर्णांक : 75

इकाई–1 राज्य की उत्पत्ति, प्रकार, स्वरूप तथा कार्य।
(Origin, types, form, and function of State)

इकाई–2 राजपद, मंत्रिपरिषद्–संगठन एवं कार्य, सप्तांग सिद्धांत।
(Kingship; organisation and working of Council of Ministers; Theory of Saptanga)

इकाई–3 गणराज्य : संगठन, शासन, पद्धति, गुण–दोष
(Republics: organisation, government, system, Pros & Cons)

इकाई–4 अंतर्राष्ट्रीय संबंध, मण्डल सिद्धांत, शााडगुण्य सिद्धांत, दूत व्यवस्था, गुप्तचर व्यवस्था।
(International Relation, Principle of Mandala, Principle of Shadgunya, Ambassadors, Espionage)

इकाई–5 विभिन्न राजवंशों की प्रशासन व्यवस्था : मौर्य, गुप्त, हर्ष कालीन वंश की प्रशासन, राष्ट्रकूट एवं चोलवंश।
(Administrative system of various Dynasties: Mauryas, Guptas, period of Harsha Rashtrakutas and Cholas)

अनुशंसित पुस्तके :

1. अनंत सदाशिव अल्तेकर – प्राचीन भारतीय शासन पद्धति (Ancient Indian Administration)
2. काशी प्रसाद जायसवाल – हिन्दू राजतंत्र, भाग 1, 2 (Hindu Polity)
3. डॉ. रवींन्द्रनाथ अग्रवाल – मध्यप्रदेश क्षेत्र के अंतर्राज्यीय संबंधों का अध्ययन
4. सत्यकेतु विद्यालंकर – प्राचीन भारतीय शासन व्यवस्था एवं राज्य भाास्त्र
5. मनोरमा जौहरी – प्राचीन भारत में राज्य और शासन व्यवस्था
6. हरिशचन्द्र भार्मा – प्राचीन भारतीय राजनीतिक विचारक एवं संस्थाएं
7. राधाकृष्ण चौधरी – प्राचीन भारतीय राजनीति एवं शासन व्यवस्था

बी. ए. भाग 2
B. A. Part II
राजनीति विज्ञान
Political Science
प्रथम प्रश्नपत्र : राजनीतिक चिन्तन
Paper I : Political Thought

इकाई–1 प्लेटो : आदर्श राज्य – न्याय, शिक्षा, साम्यवाद, दार्शनिक शासक।

अरस्तू : राज्य, दासप्रथा, नागरिकता, क्रान्ति।

UNIT -1 Plato : Ideal State : Justice, Education, Communism , Philosopher King.

Aristotle : State, Slavery, Citizenship , Revolution.

इकाई 2 मैकियावेली : युग का शिशु, धर्म व नैतिकता, राजा के कर्तव्य और आचरण।

हॉब्स : सामाजिक समझौता सिद्धान्त – लेवियाथन। लॉक : सामाजिक समझौता सिद्धान्त

रुसो : सामाजिक समझौता सिद्धान्त , सामान्य इच्छा।

UNIT 2 Machiavelli: Child of his times, Religion and Morality, Duties and Conduct of King. Hobbes Social Contract Theory: Leviathan. Locke: Social Contract Theory. Rousseau: Social Contract Theory and General Will.

इकाई–3 बेंथम : उपयोगितावाद। मिल : उपयोगितावाद में संशोधन, स्वतंत्रता और प्रतिनिधि शासन।

ग्रीन : राजनीतिक विचार। मार्क्स : राजनीतिक विचार।

UNIT-4 Bentham: Utilitarianism. Mill: Amendment in Utilitarianism. Liberty and Representative Government. Green: Political Thoughts. Marx: Political Thoughts.

इकाई–4 आदर्शवाद, व्यक्तिवाद, उदारवाद, समाजवाद, फासीवाद : विशेषताएं और आलोचना।

UNIT 4 Idealism, Individualism, Liberalism, Socialism, Fascism: Features and Criticism.

इकाई 5 मनु और कौटिल्यः सप्तांग सिद्धान्त, राजा और राजपद, प्रशासकीय व्यवस्था, राज्यमण्डल।

गांधी : सत्य, अहिंसा, सत्याग्रह एवं राजनीतिक विचार। अम्बेडकर : राजनीतिक एवं सामाजिक विचार

दीनदयाल उपाध्याय : एकात्ममानववाद।

UNIT 5 Manu and Kautilya: Saptang Theory, King and Kingship, Administrative System, Rajyamandal.

Gandhi: Truth, Non violence , Satyagrah and Political thoughts.

Ambedkar: Political and Social thoughts.

Deen Dayal Upadhyay: Akatmamanavvad.

बी.ए.द्वितीय वर्ष
प्रथम प्रश्न पत्र राजनीतिक चिन्तन

क्र.	पुस्तक का नाम	लेखक का नाम
1.	राजनीतिक चिन्तन की रूपरेखा	ओ.पी. गावा
2.	राजनीतिक चिन्तन का इतिहास	जीवन मेहता
3.	राजनीतिक चिन्तन का इतिहास	बी.एल. फाडिया
4.	पाश्चात्य एवं आधुनिक राजनीतिक चिंतन का इतिहास	प्रभु दत्त शर्मा
5.	पाश्चात्य राजनीतिक चिन्तन	जे.पी. सूद
6.	भारतीय राजनीतिक चिन्तन	वी.पी. वर्मा
7.	भारतीय राजनीतिक चिन्तन	अवस्थी एवं अवस्थी
8.	भारतीय राजनीतिक चिन्तन	ओ.पी. गावा
9.	पालीटिकल थॉट	सी.एल. बेपर
10.	हिस्ट्री ऑफ पालीटिकल थियरी	जार्ज एच सेबाइन
11.	रिसेन्ट पालीटिकल थॉट	फ्रान्सीस डब्लू कोकर
12.	मास्टर ऑफ पालीटिकल थॉट	माईकल बी. फास्टर
13.	ग्रेट पालीटिकल थॉट	विटियम इवेस्टीन

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Brian R. Nelson, **Western Political Thought**, Delhi NCR: Pearson Education Ltd., 1996

बी. ए. भाग 2
B. A. Part II
राजनीति विज्ञान Political Science
द्वितीय प्रश्नपत्र : तुलनात्मक शासन एवं राजनीति
Paper II: Comparative Government and Politics

इकाई–1 ब्रिटिश संविधान : विकास, विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका।

UNIT -1 British Constitution: Evolution , Salient Features, Executive, Legislature and Judiciary.

इकाई–2 संयुक्त राज्य अमेरिका का संविधान : विशेषताएं, कार्यपालिका , व्यवस्थापिका, न्यायपालिका शक्ति पृथक्करण व नियंत्रण संतुलन का सिद्धान्त।

UNIT-2 Constitution of United States of America: Salient Features, Executive, Legislature and Judiciary. Theory of Separation of Powers and checks and balances.

इकाई–3 स्विटजरलैण्ड का संविधान : विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका, प्रत्यक्ष प्रजातन्त्र।

UNIT -3 Constitution of Switzerland : Salient Features, Executive, Legislature and Judiciary. Direct Democracy.

इकाई 4 चीन का संविधान :विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका, साम्यवादी दल।

UNIT-4 Constitution of China: Salient Features, Executive, Legislature and Judiciary. Communist Party.

इकाई 5 तुलनात्मक राजनीति : अर्थ, परिभाषा। ईस्टन का व्यवस्था सिद्धान्त, आमण्ड का संरचनात्मक–प्रकार्यात्मक उपागम। राजनीतिक विकास, राजनीतिक समाजीकरण, राजनीतिक संस्कृति की अवधारणा।

UNIT-5 Comparative Politics: meaning , Definition. System Theory of David Easton, Structural - functional Approach of Almond. Concept of Political Development, Political Socialisation, Political Culture

बी.ए. द्वितीय वर्ष
प्रश्न पत्र
तुलान्तमक शासन एवं राजनीति

क्र.	पुस्तक का नाम	लेखक का नाम
1.	तुलनात्मक राजनीति एवं राजनीतिक संस्थाएं	सी बी गेना
2.	तुलनात्मक राजनीति	जे.सी. जौहरी
3.	तुलनात्मक राजनीति	पी.डी शर्मा
4.	तुलनात्मक राजनीति	एस.आर. महेश्वरी
5.	तुलनात्मक राजनीति संस्थाएं और प्रक्रियाएं	तपन बिस्वाल
6.	कम्परेटीव गर्वनेमेंट	एस.ई. फाईनर

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संशोधित

बी. ए. भाग–2

हिन्दी साहित्य

प्रथम प्रश्न पत्र

अर्वाचीन हिन्दी काव्य

पूर्णांक– 75

प्रस्तावना– आधुनिक काव्य आधुनिकता की समस्त विशेषताओं को समेटे हुए है। स्वतंत्रता प्राप्ति के पूर्व की भाव– भाषा, शिल्प, अन्तर्वस्तु सम्बन्धी समस्त विकास धारा यहां सजीव रूप में देखी जा सकती है। इसे अनदेखा करना मनुष्य की विकास यात्रा को नजर अंदाज करना है। इस यात्रा के साक्षात्कार के लिए आधुनिक काव्य का अध्ययन अपेक्षित ही नहीं अपितु अनिवार्य हैं।

पाठ्य विशय–

1. मैथिलीशरण गुप्त – भारत– भारती की कविताएँ
2. सूर्यकान्त त्रिपाठी निराला –
   (1) सखि बसन्त आया।
   (2) वर दे, वीणा वादिनी वर दे।
   (3) हिन्दी के सुमनों के प्रति पत्र।
   (4) तोड़ती– पत्थर।
   (5) राजे ने अपनी रखवाली की।
3. सुमित्रानंदन पंत –
   (1) बादल।
   (2) परिवर्तन 2 पद (1.खोलता इधर जन्मलोचन
   2. आज का दुख कल का आल्हाद)
   (3) ताज।
   (4) झंझा में नीम।
   (5) भारत माता।
4. माखन लाल चतुर्वेदी –
   (1) बलि पंथी से ।
   (2) साँझ और ढोलक की थापें।
   (3) मैं बेच रही हूँ, दही।
   (4) उलाहना।
   (5) निः शस्त्र सेनानी।
5. स. ही. वात्स्यायन अज्ञेय –
   (1) सबेरे उठा तो धूप खिली थी।
   (2) साम्राज्ञी का नैवेद्य दान।
   (3) घर।
   (4) चांदनी जी लो।
   (5) दूर्वांचल।

द्रुतपाठ हेतु निम्न कवियों का अध्ययन किया जाएगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे–

1. अयोध्या सिंह उपाध्याय ''हरिऔध''।
2. सुभद्रा कुमारी चौहान।
3. श्रीकांत वर्मा।

अंक विभाजन–

व्याख्याएं (3)	– 21 अंक
आलोचनात्मक प्रश्न (2)	– 24 अंक
लघुउत्तरीय प्रश्न (5)	– 15 अंक
वस्तुनिष्ठ (15)	– 15 अंक
कुल अंक	**75 अंक**

इकाई विभाजन–

इकाई– 1 व्याख्या

इकाई– 2 गुप्त, निराला

इकाई– 3 पंत, चतुर्वेदी, अज्ञेय

इकाई– 4 द्रुतपाठ के कवि एवं आधुनिक काव्य धारा का इतिहास
(राष्ट्रीय काव्य धारा, छायावाद, प्रगतिवाद, प्रयोगवाद, नई कविता)

इकाई– 5 वस्तुनिष्ठ (सम्पूर्ण पाठ्यक्रम से)

संशोधित

बी. ए. भाग–2

हिन्दी साहित्य

द्वितीय प्रश्न पत्र

हिन्दी निबंध तथा अन्य गद्य विधाएँ

पूर्णांक– 75

पाठ्य विशय–

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक नाटक, पांच प्रतिनिधि निबंध और पाँच एकांकी का निर्धारण किया गया है।

नाटक– अंधेरी नगरी– भारतेन्दु हरिश्चन्द्र

निबंध–
1. क्रोध – आचार्य रामचन्द्र शुक्ल।
2. बसन्त – डॉ. हजारी प्रसाद द्विवेदी।
3. उस अमराई ने राम– राम कही है – डॉ. विद्यानिवास मिश्र।
4. काव्येषु नाट्यम रम्यम् – बाबू. गुलाब राय।
5. बेईमानी की परत – हरिशंकर परसाई

एकांकी–
1. औरंगजेब की आखिरी रात – डॉ. रामकुमार वर्मा
2. स्ट्राईक – भुनेश्वर
3. एक दिन – लक्ष्मीनारायण मिश्र
4. दस हजार – उदयशंकर भट्ट
5. मम्मी ठकुराईन – डॉ. लक्ष्मीनारायण लाल

द्रुत पाठ के लिए तीन गद्यकारों का अध्ययन किया जायेगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे।

1. राहुल सांकृत्यायन 2. महादेवी वर्मा 3. हबीब तनवीर

अंक विभाजन–

व्याख्याएं (3)	– 21 अंक
आलोचनात्मक प्रश्न (2)	– 24 अंक
लघुउत्तरीय प्रश्न (5)	– 15 अंक
वस्तुनिष्ठ (15)	– 15 अंक
कुल अंक	**75 अंक**

इकाई विभाजन–

इकाई– 1 व्याख्या

इकाई– 2 अंधेरी नगरी एवं क्रोध, वसन्त, उस अमराई ने राम– राम कही हैं।

इकाई– 3 औरंगजेब की आखिरी रात, स्ट्राईक, एक दिन, दस हजार, मम्मी ठकुराईन

इकाई– 4 द्रुतपाठ के गद्यकार– राहुल सांकृत्यायन, महादेवी वर्मा, हबीब तनवीर।

इकाई– 5 वस्तुनिष्ठ (समग्र पाठ्य विषय से)

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR (C.G.)

SYLLABUS

B.A. PART-III

SESSION 2021-22

बी.ए./बी.एससी./बी.कॉम./बी.एच.एससी भाग–तीन,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

इकाई–एक (क) भारत माता : सुमित्रानंदन पंत

(ख) कथन की शैलियॉ

1. विवरणात्मक शैली
2. मूल्यांकन शैली
3. व्याख्यात्मक शैली
4. विचारात्मक शैली

इकाई–दो (क) सूखी डाली : उपेन्द्रनाथ अश्क

(ख) विभिन्न संरचनाएँ

1. विनम्रता सूचक संरचना
2. विधि सूचक संरचना
3. निषेध परक संरचना
4. काल–बोधक संरचना
5. स्थान–बोधक संरचना
6. दिशा बोधक संरचना
7. कार्य–कारण सम्बन्ध संरचना
8. अनुक्रम संरचना

इकाई–तीन (क) वसीयत : मालती जोशी

(ख) कार्यालयीन पत्र और आलेख

1. परिपत्र
2. आदेश
3. अधिसूचना
4. ज्ञापन
5. अनुस्मारक
6. पृष्ठाकंन

इकाई–चार (क) योग की भाक्ति : हरिवंश राय बच्चन

(ख) अनुवाद : स्वरूप एवं परिभाषा, उद्देश्य स्त्रोत भाषा और लक्ष्य भाषा, अच्छे अनुवाद की विशेषताएँ, अनुवाद प्रक्रिया, अनुवादक

इकाई–पांच (क) संस्कृति और राश्ट्रीय एकीकरण : योगेश अटल

(ख) घटनाओं, समारोहों आदि का प्रतिवेदन, विभिन्न प्रकार के निमंत्रण पत्र।

मूल्यांकन योजना : प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरित विकल्प होगा। प्रत्येक प्रश्न के **15** अंक होंगे। इसलिए प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः **8 एवं 7** अंक होंगे। प्रश्नपत्र का **पूर्णांक 75** निर्धारित है।

B.A./B.Sc./B.Com./B.H.Sc. Part III

Foundation Course

English Language

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items : Five question to be attempted, each carrying 3 marks.

UNIT-I	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	**15**
UNIT-II	Essay writing	**10**
UNIT-III	Precise writing	**10**
UNIT-IV	(a) Reading comprehension of an unseen passage	**05**
	b) Vocabulary based on text	**10**
UNIT-V	Grammar Advanced Exercises	**25**

Note: Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geoeconomic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberaliation Method) Demoration decentralization (with reference to 73, 74 constitutional Amendment.

Books Prescribed:

Aspects of English Language and Development-Published by M.P. Hindi Granth Academy, Bhopal.

SULLABUS FOR ENVIRONMENTAL SRUDIES "FOR UNDER FRADUATE COURSES"

1. इन्वाहरमेन्टल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।
   **भाग 1, 2 एवं 3 में किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना, अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।*
2. पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंकर सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर होंगे।
3. सैद्धांतिक प्रश्नों पर अंक–75 (सभी प्रश्न इकाई आधार पर रहेगे जिसमें आंतरिक विकल्प रहेगा)
   (अ) लघु प्रश्नोत्तर –25 अंक
   (ब) निबंधात्मक –50 अंक
4. Field Work – 25 अंकों का मूल्यांक आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रयोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।
5. उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।
6. पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क में संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।
7. स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षकों/परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

SULLABUS FOR
ENVIRONMENTAR STUDIES

M.M. 100

UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES
Definition, Scope and Importance
Natural Resources:
Renewable and Nonrenewable Resources :
Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, Case Studies, Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Case studies.

(d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , Case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equaitable use of resources for sustainable life-styles.

UNIT-II **ECOSYSTEM**
Concept, of an ecosystems.
Structure and Function of and ecosystem

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of The following ecosystem:

a. Forest, Ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatec ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III **Biodiversity and its Conservation**

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeofraphical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at glibal, national and local levels.
- India as mefa diversity nation."
- Hot spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, manwildife conflicts.
- Endangered and endemic species of india.
- Conservation of biodiversity : In sity and Ex-situ conservation if biodiversity

UNIT-IV Environmental Pollution

Definition

- Causes, effects and control measures of
  a. Air pollution
  b. Water pollution
  c. soil pollution
  d. Marine pollution
  e. Noise polluation
  g. Naclear hazards.
- Solid waste managemen : Causes, effects and control measures of urban and industrial
- Wastes.
- Role of an individual in prevention of pollution.
- pollution case studies
- Disaster management : floods, earthquake, cycline and landslides.

Human Population and the Environment

- population growth, variation among nation,
- population explosion - Family Welfare programime.
- Environment and human health.
- Human Rights.

UNIT - V Social Issues and the Environment

- From Umsustainable to Sustainable development.
- urban problems related to energy.
- Water conservationb. rain water harvesting watershed management.
- Resettlement and rehabilitation of people, its problems and concersm. Case studies.
- Environmental ethies : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone Layer dipletion nuclear accidents and holocaust Case studies.
- Wasteland reclamation.
- Consumerism and Waste products. Environment Protection Act
- Air (Pervention and Control of pollution) Act.
- Water (Pervention and Control of pollution) Act.
- Wildlife protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of Environment lefislation.
- public awareness.
- Value Education
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and Human Health.
- Case Studies.

FIELD WORK

- visit to a local area to document environmental assets-river/fores/grassland/hill/mountain.
- visit to locla polluted site : urban/Rural/Industrial/Agriculture.
  Study of common plants, insects, birds.
- Study of simple ecosystms-pond, river, hill slopes. ets. (Field work Equal to 5 lecture Hours)

REFERENCES:

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3. Bruinner R.C. 1989 Hazardous Waste Incineration Mc Graw Hill Inc. 480p.
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22. Wagner K.D., 1998, Environmental Management. W.B. Saunders Co. Philadelphia,USA499p.|

(M) Magazine (R) Reference
(TB) Textbook.

B.A. Part-III
SOCIOLOGY
PAPER-I
FOUNDATIONS OF SOCIOLOGICAL THOUGHT

UNIT-I August Comte: The Law of Three Stages, Positivism, and Hierarchy of Science. Durkheim: Social Solidarity and Suicide.

UNIT-II Karl Marx: Dialectic Materialism, Class Struggle and Surplus value.
Max Weber: Bureaucracy, Authority and the Protestant Ethic and the spirit of Capitalism.

UNIT-III Pareto: Circulation of Elis, Logical, and Non-logical action.
Spencer: Social Darwinism, super organic evolutions.

UNIT-IV Torstein Veblen: The Theory of Leisure Class, Theory of Social Change.
R. K. Morton: Functionalism and Reference Group.

UNIT-V Development of Sociological thought in India: -
Mahatma Gandhi: Ahimsa, Staya Grah and Trusteeship.
Radha kamal Mukherjee: The Concept of Value.

ESSENTIAL READINGS -

1. Barres, H.E.: Introduction to the sociology, Chicago the university of Chicago press 1959
2. Coser, Levis a.,: Master of sociological thought, New York Harcourt Brace Jovanovich 1979
3. Singh, Yogendra- Indian sociology: social conditioning and emerging friends New Delhi Vistaar 1986
4. Zeitlin, living- (Indian edition) Rethinking sociology: A critique of contemporary theory, Jorpur Rawl 1999

B.A. Part-III
SOCIOLOGY
PAPER-II
METHODS OF SOCIAL RESEARCH

UNIT-I Social Research: Meaning, Characteristics and Significance.
Scientific methods, Hypothesis.

UNIT-II Qualitative Research: Ethnography, Observation, Case Study, Content analysis.

UNIT-III Research design: Explanatory, Descriptive, Explanatory, Experimental, and Diagnostic.

UNIT-IV Tools and Techniques of Social Research: Social Survey, Sampling, Questionnaire, Interview - Schedule and Interview - Guide.

UNIT-V Social Statistics: Meaning, Importance and Limitations.
Graphs, Diagrams and Measures of Central Tendency- Mean, Mode, Median, Correlation, Use of Computer in Social Research.

ESSENTIAL READINGS

1. Young, P.V. (1977). Scientific Social Surveys and Research
2. Prentice Hall of India. New Delhi.
3. Bruce, C., & Margaret, M. (1993). Approaches to Social Research. New York: Oxford University Press
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बी. ए. भाग–3
B.A. Part III
राजनीति विज्ञान
Political Science
प्रथम प्रश्नपत्र : अन्तर्राष्ट्रीय राजनीति एवं भारत की विदेश नीति
Paper I : Internatioal Politics and Foreign Policy of India

इकाई–1 अन्तर्राष्ट्रीय राजनीति : अर्थ, प्रकृति, क्षेत्र ।

अन्तर्राष्ट्रीय राजनीति : अध्ययन उपागम – यथार्थवाद, आदर्शवाद, नवयथार्थवाद, विश्व व्यवस्था सिद्धान्त । राष्ट्रीय हित एव राष्ट्रीय शक्ति : अर्थ, परिभाषा एवं तत्व ।

UNIT -I International Politics: meaning, Nature, Scope. International Politics: Approaches to the study: Realism, Idealism, New realism, World System theory. National interest and National power: Meaning Definition and Elements.

इकाई–2 अन्तर्राष्ट्रीय राजनीति के विभिन्न सिद्धान्त : व्यवस्था, खेल, निर्णय निर्माण,सौदेबाजी का सिद्धान्त ।

शक्ति संतुलन । सामूहिक सुरक्षा । निशस्त्रीकरण । शीतयुद्ध । राजनय ।

UNIT-II Various theories of International Politics: System, Game, Decision making, Barganing theory. Balance of Power, Collective Security, Disarmament, Cold war, Diplomacy.

इकाई–3 भारत की विदेश नीति : निर्धारक तत्व, विशेषताएं। गुटनिरपेक्षता : अर्थ, विशेषताएं, प्रासंगिकता।

UNIT-III Foreign Policy of India: Determinating elements, characteristics. Non-alignment: meaning, features , relevance.

इकाई–4 भारत का पडोसियों से सम्बंध –चीन,पाकिस्तान,नेपाल,श्रीलंका। भारत का महाशक्तियों से सम्बंध – संयुक्त राज्य अमेरिका, रुस, ब्रिटेन एवं फ्रांस

UNIT-IV Indias' relations with neighboring countries: China , Pakistan, Nepal, Sri lanka, Relations with Super Powers - USA, Russia, Britain and France.

इकाई–5 अन्तर्राष्ट्रीय राजनीति के कुछ प्रमुख मुद्दे : पर्यावरणवाद । अन्तर्राष्ट्रीय आतंकवाद। वैश्वीकरण । मानव अधिकार । परमाणविक निशस्त्रीकरण ।

UNIT-V Some major issues of International Politics:

Environmentalism, International Terrorism, Globalisation, Human Rights, Nuclear Disarmament.

बी.ए.अंतिम वर्ष
प्रथम प्रश्न पत्र
अंतर्राष्ट्रीय राजनीति एवं भारत की विदेश नीति

सन्दर्भ ग्रन्थ सूची:–

क्र	पुस्तक का नाम	लेखक का नाम
1.	अन्तर्राष्ट्रीय राजनीति के सैद्धान्तिक पक्ष	महेन्द्र कुमार
2.	अन्तर्राष्ट्रीय राजनीति के सिद्धान्त एवं व्यवहार	यू.आर.घई
3.	अन्तर्राष्ट्रीय राजनीति सिद्धान्त समकालिन एवं मुद्दे	बी.एल. फाडिया
4.	अन्तर्राष्ट्रीय संबंध	पुष्पेन्द्र पन्थ
5.	अन्तर्राष्ट्रीय संबंध	दीनानाथ बर्मा
6.	थीयरी ऑफ इन्टरनेशनल पालिटिक्स	के.वाल्टज
7.	इन्टरनेशनल रिलेशन्स	जे.गोल्ड स्टीन
8.	द इन्टरनेशनल पालिटिक्स	पी.कलवरठ
9.	इन्टरनेशनल रिलेशन्स	सी.ब्राउन
10.	समकालीन विश्व एवं भारत	अरूणोदय बाजपेयी

Reference:-

- M.S. Agwani, **Détente: Perspectives and Repercussions,** Vikas, 1975
- John Gray, **False Dawn: The Delusions of Global Capitalism,** Grant Book, U.K. , 1998
- Hans J. Morgenthan, **Politics Among Nations: The Struggle for Power and Peace,** Scientific Book Agency, Calcutta, 1972
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- K.J. Holsti, **International Politics: A Framework for Analysis,** Prentice Hall of India, New Delhi, 1995.
- Paul Kennedy, **Preparing for the Twenty-First Century,** New York, 1993
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बी. ए. भाग–3

B. A. Part III

राजनीति विज्ञान

Political Science

द्वितीय प्रश्नपत्र : लोक प्रशासन

Paper: II : Public Administration

इकाई–1 लोक प्रशासन : अर्थ, परिभाषा, प्रकृति, क्षेत्र । लोक प्रशासन और निजी प्रशासन। अध्ययन पद्धतियां। नवीन लोक प्रशासन । तुलनात्मक लोक प्रशासन।

UNIT-I Public Administration: meaning and definition, nature, scope. Public Administration and Private Administration. Method of Studies. New Public Administration. Comparative Public Administration.

इकाई–2 संगठन के सिद्धान्त : पदसोपान, नियंत्रण का क्षेत्र, आदेश की एकता, प्रत्यायोजन ।

मुख्य कार्यपालिका। सूत्र एवं स्टाफ अभिकरण । विभागीय संगठन, लोक निगम कार्मिक प्रशासन : भर्ती, पदोन्नति , प्रशिक्षण ।

UNIT-II Principles of Organisation: Hierarchy, Span of Control, Unity of Command, Delegation. Chief Executive. Line and Staff Agencies. Departmental Organisation. Public Corporation. Personnel Administration: Recruitment, Promotion, Training.

इकाई–3 विकास प्रशासन : प्रकृति, मुद्दे और विशेषताएं । रिग्स मॉडल । प्रशासन में नागरिक सहभागिता ।

सुशासन और ई शासन । संध लोक सेवा आयोग ।

UNIT-III Development Administration: Nature, Issues, Characteristics.Riggs Model.

Public participation in Administration.Good Governance and e- Governance. Union Public Service Commission.

इकाई–4 वित्तीय प्रशासन : बजट के सिद्धान्त। भारत में बजट प्रकिया। भारत में प्रशासनिक सुधार ।

प्रशासन पर कार्यपालिका, विधायी, न्यायिक और जन नियन्त्रण ।

UNIT-IV Financial Administration: Principles of Budget. Budget procedure in India. Administrative reforms in India. Executive, Legislative, Judicial and Public Control on Administration.

इकाई–5 प्रशासन में भ्रष्टाचार : आम्बुड्समैन, लोकपाल और लोक आयुक्त ।

वैश्वीकरण के युग में लोक प्रशासन । उदारीकरण । नौकरशाही । लोक सम्पर्क ।

UNIT-V Corruption in Administration: Ombudsman, Lokpal and Lok Ayukta.

Public Administration in the age of Globalisation. Liberalisation. Bureaucracy. Public Relation.

संदर्भ ग्रंथ सूची:–

क्र	पुस्तक का नाम	लेखक का नाम
1.	लोक प्रशासन	अवस्था और माहेश्वरी
2.	लोक प्रशासन सिद्धांत एवं व्यवहार	सुषमा यादव और बलराम गौतम–(सम्पा)
3.	तुलनात्मक लोक प्रशासन	रमेश अरोड़ा
4.	लोक प्रशासन सिद्धान्त एवं व्यवहार	पी.डी. शर्मा और हरीषचन्द्र शर्मा
5.	वित्त प्रशासन	गौतम पद्मनाम
6.	लोक प्रशासन के सिद्धांत	सी.पी. भामरी
7.	प्रशासनिक सिद्धान्त	अवस्थी और अवस्थी

Reference:-

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- R. R. Jha: **Lokayukta: The Indian Ombudsman,** Rishi Publications, Varanasi, 1991
- F.A. Nigro and G.I. Nigro, **Modern Public Administration,** New York, Harper Row, 1980
- M. P. Sharma, B. L. Sadana, **'Lok Prashasan: Siddhanth Evam Vyavahar'**,(Allahabad: Kitab Mahal, Latest Hindi and English editions) .
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- S. Kataria, **'Personnel Administration'**, (RBSA Publishers, Jaipur, 2003).

संशोधित पाठ्यक्रम
बी. ए. भाग–3
हिन्दी साहित्य
प्रथम प्रश्न पत्र
जनपदीय भाषा– साहित्य (छत्तीसगढ़ी)

प्रस्तावना–

हिन्दी केवल खड़ी बोली नहीं है, बल्कि एक बहुत बड़ा भाषिक समूह है। हिन्दी जगत में अनेक विभाषाएं, बोलियाँ और उपबोलियाँ विद्यमान हैं जिनमें सकल साहित्य सम्पदा है। इनके सम्यक अध्ययन और अन्वेषण की आवश्यकता है। जनपदीय भाषा छत्तीसगढ़ी निरन्तर विकास की ओर अग्रसर हो रही है अस्तु, इस भाषा का और इसमें रचित साहित्य का इतिहास– विकास स्पष्ट करते हुए इनसे संबंधित प्रमुख रचनाकारों का आलोचनात्मक अनुशीलन करना हिन्दी के वृहत्तर हित में होगा। छत्तीसगढ़ी भाषा का पाठ्यक्रम निम्न बिन्दुओं पर आधारित हैं–

(क) छत्तीसगढ़ी भाषा का इतिहास– विकास

(ख) छत्तीसगढ़ी भाषा में रचित साहित्य का इतिहास

(ग) छत्तीसगढ़ी भाषा के प्रमुख प्राचीन एवं अर्वाचीन रचनाकारों की कृतियों का अध्ययन।

पाठ्य विषय–

रचनाएँ–

(1) प्राचीन कवि संत धर्मदास के 3 पद

1. गुरू पइंया लागों नाम लखा दीजो हो।
2. नैना आगे ख्याल घनेरा।
3. भजन करौ भाई रे, अइसन तन पाय के।

(सन्दर्भ– धर्मदास के शब्दावली से उद्घृत)

(2) लखनलाल गुप्त का गद्य–

1. सोनपान

(गद्य– पुस्तक' सोनपान' के उद्घृत)

(3) अर्वाचीन रचनाकार

डॉ. सत्यभामा आडिल रचित गद्य

1. सीख सीख के गोठ

(गद्य पुस्तक 'गोठ' के उद्घृत)

(4) डॉ. विनय पाठक की कविताएँ–

1. तँय उठथस सुरूज उथे
2. एक किसिम के नियाव

('अकादसी और अनचिन्हार' पुस्तक से उद्घृत)

(5) मुकुन्द कौशल– छत्तीसगढ़ी गजल

''छै बित्ता के मनखे देखों..... से– मछरी मन लाख लेथे'' तक

(पुस्तक' छत्तीसगढ़ी गजल' के पृष्ठ 17 से उद्घृत)

द्रुतपाठ के रचनाकार– (व्यक्तित्व एवं कृतित्व)

1. सुन्दर लाल शर्मा
2. कपिलनाथ कश्यप
3. रामचन्द्र देशमुख (रंगकर्मी)

अंक विभाजन–			
	व्याख्याएं (3)	–	**21 अंक**
	आलोचनात्मक प्रश्न (2)	–	**24 अंक**
	लघुउत्तरीय प्रश्न (5)	–	**15 अंक**
	वस्तुनिष्ठ (15)	–	**15 अंक**
	कुल अंक		**75 अंक**

इकाई विभाजन

इकाई एक	–	व्याख्या
इकाई दो	–	प्राचीन एवं अर्वाचीन रचनाकार
इकाई तीन	–	(अ) छत्तीसगढ़ी भाषा का इतिहास
		(ब) छत्तीसगढ़ी साहित्य का इतिहास
इकाई चार	–	द्रुत पाठ के तीन रचनाकार
इकाई पाँच	–	वस्तुनिष्ठ / (सम्पूर्ण पाठ्यक्रम से)

संशोधित पाठ्यक्रम
बी.ए. भाग– 3
द्वितीय प्रश्न पत्र
हिन्दी भाषा– साहित्य का इतिहास तथा काव्यांग विवेचन

प्रस्तावना–

हिन्दी भाषा का इतिहास जितना प्राचीन है, उतना ही गुढ़– गहन भी। इसमें रचित साहित्य ने लगभग डेढ़ हजार वर्षो का इतिहास पूरा कर लिया है इसलिए हिन्दी भाषा और साहित्य के ऐतिहासिक विवेचन की बड़ी आवश्यकता है। इसी के साथ– साथ हिन्दी ने अपना जो स्वतंत्र साहित्य शास्त्र निर्मित किया हैं, उसे भी रूपायित करने की आवश्यकता है। इसके संज्ञान द्वारा विद्यार्थी की मर्मग्राहिणी प्रतिभा का विकास होगा और ऐतिहासिक परिप्रेक्ष्य में शुद्ध साहित्यिक विवेक का सन्निवेश होगा।

पाठ्य विषय–

(क) हिन्दी भाषा का स्वरूप विकास– हिन्दी की उत्पत्ति, हिन्दी की मूल आकर भाषाएँ तथा विभिन्न विभाषाओं का विकास। हिन्दी भाषा के विभिन्न रूप–

1. बोलचाल की भाषा
2. रचनात्मक भाषा
3. राष्ट्रभाषा
4. राजभाषा
5. सम्पर्क भाषा
6. संचार भाषा

हिन्दी का शब्द भण्डार– तत्सम, तद्भव, देशज, आगत शब्दावली।

(ख) हिन्दी साहित्य का इतिहास :– आदिकाल, पूर्व मध्यकाल, उत्तर मध्यकाल और आधुनिक काल की सामाजिक , सांस्कृतिक पृष्ठभूमि, प्रमुख युग प्रवृत्तियाँ, विशिष्ट रचनाकार और उनकी प्रतिनिधि कृतियाँ, साहित्यिक विशेषताएँ।

(ग) काव्यांग	–	काव्य का स्वरूप एवं प्रयोजन। रस के विभिन्न भेद, विभिन्न अंग, विभावादि तथा उदाहरण।
प्रमुख 5 छंद	–	दोहा, सोरठा, चौपाई, कुण्डलियाँ, सवैया।
शब्दालंकार	–	अनुप्रास, यमक, श्लेष, वक्रोक्ति, पुररूक्ति प्रकाश।
अर्थालंकार	–	उपमा, रूपक, उत्प्रेक्षा, अतिशयोक्ति, भ्रांतिमान।

संदर्भ ग्रन्थ–

(1) हिन्दी साहित्य का इतिहास संपादक– डॉ. सुशील त्रिवेदी व बाबूलाल शुक्ल (प्रकाशक– म. प्र. उ. शि. अनुदान आयोग)
(2) राजभाषा हिन्दी– मलिक मोहम्मद (प्रभात प्रकाशन दिल्ली)
(3) हिन्दी भाषा– डॉ. भोलानाथ तिवारी।

अंक विभाजन–

आलोचनात्मक (4)	–	44 अंक
लघुउत्तरीय प्रश्न (4)	–	16 अंक
वस्तुनिष्ठ प्रश्न (15)	–	15 अंक
	कुल अंक–	75 अंक

इकाई विभाजन–

इकाई–1 हिन्दी भाषा का स्वरूप– विकास– (खण्ड– 'क')

इकाई–2 हिन्दी का शब्द भण्डार– (खण्ड 'क' का अंतिम भाग)

इकाई–3 हिन्दी साहित्य का इतिहास– (खण्ड– ख)

इकाई–4 काव्यांग– रस, छंद, अंलकार (भाग– ग)

इकाई–5 लघुउत्तरीय एवं वस्तुनिष्ठ प्रश्न (सम्पूर्ण पाठ्यक्रम से)

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR, CHHATTISGARH

SYLLABUS

B.Sc. PART-I

SESSION 2021-22

संशोधित पाठ्यक्रम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी.
भाग – एक (आधार पाठ्यक्रम)
प्रश्न पत्र– प्रथम (हिन्दी भाषा)

पूर्णांक– 75

नोट :–

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा ।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जायेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय :–

इकाई–1

क. पल्लवन, पत्राचार, अनुवाद, पारिभाषिक शब्दावली एवं हिंदी में पदनाम
ख. ईदगाह (कहानी) – मुंशी प्रेमचंद

इकाई–2

क. शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान–पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द एवं मुहावरे–लोकोक्तियाँ
ख. भारत वंदना (कविता)– सूर्यकान्त त्रिपाठी निराला

इकाई–3

क. देवनागरी लिपि – नामकरण, स्वरूप एवं देवनागरी लिपि की विशेषताएँ, हिंदी अपठित गद्यांश, संक्षेपण, हिंदी में संक्षिप्तीकरण
ख. भोलाराम का जीव (व्यंग्य) – हरिशंकर परसाई

इकाई–4

क. कम्प्यूटर का परिचय एवं कम्प्यूटर में हिंदी का अनुप्रयोग
ख. शिकागो से स्वामी विवेकानंद का पत्र

इकाई–5

क. मानक हिन्दी भाषा का अर्थ, स्वरूप, विशेषताएँ, मानक, उपमानक, अमानक भाषा
ख. सामाजिक गतिशीलता – प्राचीन काल, मध्यकाल, आधुनिक काल

मूल्यांकन योजना :–

प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः 8 एवं 7 होंगे। प्रश्न–पत्र का पूर्णांक 75 निर्धारित है।

पाठ्यक्रम संशोधन का औचित्य :–

व्याकरण के बुनियादी ज्ञान, संप्रेषण, कौशल, सामाजिक संदेश एवं भाषायी दक्षता को ध्यान में रखते हुए यह पाठ्यक्रम प्रस्तावित है।

B.A./B.Sc./B.Com./B.H.Sc. Part-I
FOUNDATION COURSE
PAPER-II
ENGLISH LANGUAGE

M.M. 75

UNIT-I **Basic language skills: Grammar and Usage.**

Grammar and Vocabulary based on the prescribed text.
To be assessed by objective/multiple choice tests.

(Grammar - 20 marks)
Vocalulary - 15 Marks)

UNINT-II **Comprehension of an unseen passage.** **05 Marks**

This should imply not only (a) an understanding of the passage in question, but also (b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent. Composition based on themes and issues raised in the passage.
To be assessed by both objective multiple choice and short answer type tests.

UNIT-III **Composition:** Paragraph writing **10 Marks**

UNIT-IV **Letter writing** (The formal and one Informal) **10 Marks**

Two letters to be attempted of 5 marks each. One formal and one informal.

UNIT-V **Texts:** **15 Marks**

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authrs, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler then modem examples. In all cases, the language should be accessible (with a minumum of explantion and reference to standard dictionaries) to the general body of students schooled in the medium of and Indian language.
Students should be able to grasp the contents of each plece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Priciples of Literary criticism should not be taken up at this stage.
To be assessed by five short answers of three marks each.

BOOK PRESCRIBED-

English Language and Indian Culture - Published by M.P. Hindi Granth Academy Bhopal.

NEW CURRICULUM OF B.Sc. PART-I

CHEMISTRY

The new currlculam will comprise of Three theory papers of 33, 33 and 34 marks each and practical work of 50 marks. The curricuram 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

M.M.33

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.

a) Atomic and ionic radii,
b) Ionization enthalpy,
c) Electron gain enthalpy,
d) Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales.
e) 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 &

polarisabilitry of ions, Fajans rule, Ionic character in covalent compounds: Bond moment and dipole moment, Percentage ionic character from dipole moment and electronegatiity difference, Metallic bond-free electron, Valence bond & band theories.

UNIT-III CHEMICALBONDING 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: H_2O, NH_3, PCl_3, PCl_5, SF_6. H_3O^+, SF_4, ClF_3, and ICl_2^- Molecular orbital theory. Bond order and bond strength, Molecular orbital diagrams of diatomic and simple polyatomic molecules N_2, O_2, F_2, 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 (H_2S 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.

REFERENCE BOOKS:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.
6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.

B.Sc. Part-I
CHEMISTRY
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 (л) 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.

REFERENCE BOOKS:

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.
5. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
6. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
7. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
8. A Guide Book of Reaction Mechanism by Peter Sykes.

B.Sc. Part-I
CHEMISTRY
PAPER - III
PHYSICAL CHEMISTRY

M.M.34

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 catatysed reactions, Micellar catatysed reactions, Industrial applications of Catalysis.

REFERENCE BOOKS:

1. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 10th Ed., Oxford University Press (2014).
2. Ball, D. W. Physical Chemistry Thomson Press, India (2007).
3. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
4. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
5. Engel, T. & Reid, P. Physical Chemistry 3rd Ed. Pearson (2013).
6. Puri, B.R., Sharma, L. R. and Pathania, M.S., Principles of Physical Chemistry, Vishal Publishing Co., 47th Ed. (2016).
7. Bahl, A., Bahl, B.S. and Tuli, G.D. Essentials of Physical Chemistry, S Chand Publishers (2010).
8. Rakshit P.C., Physical Chemistry, Sarat Book House Ed. (2014).
9. Singh B., Mathematics for Chemist, Pragati Publications.

B.Sc. Part-I
CHEMISTRY
PAPER - IV
LABOBATORY COURSE

A. INORGANIC CHEMISTRY

Semi-micro qualitative analysis (using H_2S 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 : NH_4^+, Pb^{2+}, Bi^{3+}, Cu^{2+}, Cd^{2+}, Fe^{3+}, Al^{3+}, Co^{2+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Na^+ Anions : CO_3^{2-} , S^{2-}, SO_3^{2-}, $S_2O_3^{2-}$, NO_2^-, CH_3COO^-, Cl^-, Br^-, I^-, NO_3^-, SO_4^{2-}

(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 $KMnO_4$ by oxalic acid solution.
- Estimation of Fe(II) using standardized $KMnO_4$ solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of Fe(II) with $K_2Cr_2O_7$ using internal (diphenylamine, anthranilic acid) and external indicator.

D. Iodo / Iodimetric Titrations

- Estimation of Cu(II) and $K_2Cr_2O_7$ 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 $K_2Cr_2O_7$ using sodium thiosulphate solution as titrants.

ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer. 80^o–82^o (Naphthalene), 113.5^o–114^o (Acetanilide), 132.5^o-133^o (Urea), 100^o (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 80°–82°, Benzoic acid 121.5°–122°, Urea 132.5°–133° Succinic acid 184.5° 185°, Cinnamic acid 132.5°–133°, Salicylic acid 157.5°–158°, Acetanilide 113.5°–114°, m Dinitrobenzene 90°, p-Dichlorobenzene 52°, Aspirin 135°.

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 78°, Cyclohexane 81.4°, Toluene 110.6°, Benzene 80°.

   i. Distillation (Demonstration)
   - Simple distillation of ethanol-water mixture using water condenser.
   - Distillation of nitrobenzene and aniline using air condenser.

   ii. Sublimation
   - Camphor, Naphthalene, Phthalic acid and Succinic acid.

   iii. 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.
7. Qualitative Analysis

   Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, CarbonyI, 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 & H_2SO_4 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

B.Sc. Part-I
CHEMISTRY
PRACTICAL EXAMINATION

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble, Interfering & combination of acid radicals)

   OR

   Two Titrations (Acid-Bases,Redox and Iodo/Iodimetry) **12 marks**

2. Detection of functional group in the given organic compound and determine its MPt/BPt. **8 marks**

   OR

   Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.

   OR

   Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.
3. Any one physical experiment that can be completed in two hours including calculations. **14 marks**
4. Viva **10 marks**
5. Sessionals **06 marks**

In case of Ex-Students two marks will be added to each of the experiments

REFERENCE TEXT:

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.
2. Ahluwalia, V. K., Dhingra, S. and Gulati, A. College practical Chemistry, University Press.
3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
4. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
6. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
7. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).

B.Sc. Part–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, Azatobactor, 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, Gloeocaspsa, 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.

Books Recommended:

Dubey R.C. and Maheshwari D.K. ***A text book of Microbiology,*** S. Chand Publishing, New Delhi

Presscott, L. Harley, J.and Klein, D. ***Microbiology***, 7th edition, Tata Mc Graw-Hill Co.New Delhi.

Sharma P.D., ***Microbiology and Plant pathology,*** Rastogi Publication. New Delhi.

Alexopolous, C.J. Mims, C.W. and Blackwell, MM. ***Introduction to Mycology,*** John Wiley & Sons.

Dubey H.C. ***An Introduction to Fungi,*** Vikas Publishing, New Delhi

Mehrotra R.S. & Agrawal A., ***Plant Pathology,*** Tata McGraw, New Delhi

Sharma P.D. ***Plant Pathology***, Rastogi Publishers, Meruth.

Sristava, H.N. ***Fungi***, Pradeep Publications, Jalandhar

Webster, J. & Weber, R. ***Introduction to Fungi***, Cambridge University Press, Cambridge

Kumar H.D. ***Introduction to phycology***, Aff. East-west Press, New Delhi

Lee RE, ***Phycology***, Cambridge University Press U.K.

Srivastava, H.N., ***Algae***, Pradeep Publications, Jalandhar

Pandey S.K. Quick ***Concept of Botany***, Lambert Academic publishing, Germany

Pandey S.N., Mishra S,P. & Trivedi P.S. ***A Text Book of Botany*** (Vol.-I), Vikas Publishing, New Delhi

Singh, Pandey and Jain, ***A Text book of Botany,*** Rastogi Publication, Meerut.

B.Sc.Part-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, Pellia, 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. *Lygenopteris*

Books Recommended:

Parihar, N.S. ***The Biology and Morphology of Pteridophytes,*** Central Book Depot, Allahabad.

Parihar,N.S. ***An introduction to Bryophyta Vol.I:Bryophytes*** Central Book Depot, Allahabad.

Sambamurty,AVSS, ***A textbook of Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany***, IK International Publishers.

Pandey SN, Mishra SP and Trivedi PS ***A text Book of Botany (Vol.II)***, Vikas Publishing, New Delhi

Bhatanagar, SP and Moitra, A. ***Gymnosperm***, New Age International (P) Ltd., Publishers, New Delhi

Biswas C. and Johri BM, ***The Gymnosperms***, Springer-Verlag, Germany.

Srivastava, HN, ***Palaeobotany***, Pradeep Publications Jalandhar

Srivastava, HN, Bryophyta, Pradeep Publications Jalandhar

Singh, Pandey and Jain, ***A Text Book of Botany***, Rastogi Publication, Meerut

Sristava, HN, ***Fundamentals of Pteridophytes,*** Pradeep Publications, Jalandhar

B.Sc. Part-I
BOTANY
PRACTICAL

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

1. Algae: Gloeocapsa, Scytonema, Gloeotrichia, Volvox, Oedogonium, Vaucheria, Chara, Ectocarpus, Sargassum, Batrachosperrmum
2. Gram staining
3. Fungi: Albugo, Aspergillus, Peziza, Agaricus, Puccinia, Alternaria and Cercospora
4. Bryophyta: Riccia, Marchantia, Pellia, Anthoceros, Sphagnum, Funaria
5. Pteridophyta: Lycopodium, Selaginella, Equsetum, Marsilea.
6. Gymnosperm: Cycas, Pinus, Epherda.

PRACTICAL SCHEME

TIME: 4 Hrs.	**M.M.: 50**
1. Algae/Fungi/Gram Staining	10
2. Bryophyta/Pteridophyta	10
3. Gymnosperm	10
4. Spotting	10
5. Viva-Voce	05
6. Sessional	05

MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

B.Sc. Part-I
MATHEMATICS
PAPER-I
ALGEBRA AND TRIGONOMETRY

UNIT-I Elementary operations on matrices, Inverse of a matrix. Linear independence of row and column matrices, Row rank, column rank and rank of a matrix. Equivalence of column and row ranks. Eigenvalues, eigenvectors and the characteristic equations of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.

UNIT-II Application of matrices to a system of linear (both homogeneous and nonhomogeneous) equations. Theorems on consistency of a system of linear equations. Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descarte's rule of signs. Solutions of cubic equations (Cardons method), Biquadratic equation.

UNIT-III Mappings, Equivalence relations and partitions. Congruence modulo n. Definition of a group with examples and simple properties. Subgroups, generation of groups, cyclic groups, coset decomposition, Lagrange's theorem and its consequences. Fermat's and Euler's theorems. Normal subgroups. Quotient group, Permutation groups. Even and odd permutations. The alternating groups An. Cayley's theorem.

UNIT-IV Homomorphism and Isomorphism of groups. The fundamental theorems of homomorphism. Introduction, properties and examples of rings, Subrings, Integral domain and fields Characteristic of a ring and Field.

TRIGONOMETRY:

UNIT-V De-Moivre's theorem and its applications. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Expansion of trigonometrical functions. Gregory's series. Summation of series.

TEXT BOOK:

1. I.N. Herstein, Topies in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd.New Delhi, 2000.
3. Chandrika Prasad, Text-Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.
4. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.

REFERENCES:

8. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in linear Algebra, Wiley Eastern, New Delhi, 1983.
9. P.B. Bhattacharya, S.K.Jain and S.R. Nagpaul, Basic Abstract Algebra (2 edition), Cambridge University Press, Indian Edition, 1997.
10. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
11. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.
12. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.

B.Sc. Part-I
MATHEMATICS
PAPER-II
CALCULUS

DIFFERENTIAL CALCULUS:

UNIT-I $\varepsilon - \delta$ definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuties. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.

UNIT-II Asymptotes. Curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates.

INTEGRAL CALCULUS:

UNIT-III Integration of transcendental functions. Reduction formulae. Definite integrals. Quadrature. Rectification. Volumes and surfaces of solids of revolution.

ORDINARY DIFFERENTIAL EQUATIONS:

UNIT-IV Degree and order of a differential equation. Equations reducible to the linear form. Exact differential equations. First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.

UNIT-V Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.

TEXT BOOK:

1. Gorakh Prasad, Differential Calculaus, Pothishala Private Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
3. D.A. Murray Introductory Course in Differential Equations, Orient Longman (India), 1976.

REFERENCES:

1. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum's outline series, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. P.K. Jain and S.K. Kaushik, an Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
5. G.F. Simmons, Differential Equations, Tata Mc Graw Hill, 1972.
6. E.A. Codington, an Introduction to Ordinary Differential Equations, Prentics Hall of India, 1961.

7. H.T.H. Piaggio, Elementary Treatise on Differential Equations and their Applications, C.B.S. Publishe & Distributors, Dehli, 1985.
8. W.E. Boyce and P.O. Diprima, Elementary Differential Equations and Boundary Value Problems, John Wiley, 1986.
9. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley and Sons, 1999.

B.Sc. Part-I
MATHEMATICS
PAPER-III
VECTOR ANALYSIS AND GEOMETRY

VECTOR ANALYSIS:

UNIT-I Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector differentiation. Gradient, divergence and curl.

UNIT-II Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.

UNIT-III General equation of second degree. Tracing of conics. System of conics. Confocal conics. Polar equation of a conic.

UNIT-IV Sphere. Cone. Cylinder.

UNIT-V Central Conicoids. Paraboloids. Plane sections of conicoids. Generating lines. Confocal Conicoids. Reduction of second degree equations.

TEXT BOOKS:

1. N. Saran and S.N. Nigam, Introduction to vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. R.J.T. Bell, Elementary Treatise on Coordinate Geometry of three dimensions, Machmillan India Ltd. 1994.

REFERENCES:

1. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.
4. Shanti Narayan, a Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. S.L. Loney, the Elements of Coordinate Geometry, Macmillan and Company, London.
6. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wiley Eastern Ltd., 1994.
7. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of three Dimensions, Wiley Eastern Ltd., 1999.
8. N. Saran and R.S. Gupta, Analytical Geometry of three Dimensions, Pothishala Pvt. Ltd. Allahabad.

B.Sc. Part-I
PHYSICS

OBJECTIVES OF THE COURSE

The undergraduate training in physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that undergraduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

EXAMINATION SCHEME:

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments one from each groups as listed in the list of experiments.
4. Practical examination will be of 4 hours duration- one experiment to be completed in 2 hours.

   The distribution practical marks as follows:

Experiment	:	15+15=30
Viva voce	:	10
Internal assessment	:	10

5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

B.Sc. Part-I
Paper-I
PHYSICS
MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER

UNIT-1 Cartesian, Cylindrical and Spherical coordinate system, Inertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and its applications. Motion under a central force, Kepler's laws. Effect of Centrifugal and Coriolis forces due to earth's rotation, Center of mass (C.M.), Lab and C.M. frame of reference, motion of C.M. of system of particles subject to external forces, elastic, and inelastic collisions in one and two dimensions, Scattering angle in the laboratory frame of reference, Conservation of linear and angular momentum, Conservation of energy.

UNIT-2 Rigid body motion, rotational motion, moments of inertia and their products, principal moments & axes, introductory idea of Euler's equations. Potential well and Periodic Oscillations, case of harmonic small oscillations, differential equation and its solution, kinetic and potential energy, examples of simple harmonic oscillations: spring and mass system, simple and compound pendulum, torsional pendulum.

UNIT-3 Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillations of two masses connected by a spring. Superposition of two simple harmonic motions of the same frequency, Lissajous figures, damped harmonic oscillator, case of different frequencies. Power dissipation, quality factor, examples, driven (forced) harmonic oscillator, transient and steady states, power absorption, resonance.

UNIT-4 E as an accelerating field, electron gun, case of discharge tube, linear accelerator, E as deflecting field- CRO sensitivity, Transverse B field, 180o deflection, mass spectrograph, curvatures of tracks for energy determination, principle of a cyclotron. Mutually perpendicular E and B fields: velocity selector, its resolution. Parallel E and B fields, positive ray parabolas, discovery of isotopes, elements of mass spectrography, principle of magnetic focusing lens.

UNIT-5 Elasticity: Strain and stress, elastic limit, Hooke's law, Modulus of rigidity, Poisson's ratio, Bulk modulus, relation connecting different elastic- constants, twisting couple of a cylinder (solid and hallow), Bending moment, Cantilever, Young modulus by bending of beam.
Viscosity: Poiseulle's equation of liquid flow through a narrow tube, equations of continuity. Euler's equation, Bernoulli's theorem, viscous fluids, streamline and turbulent flow. Poiseulle's law, Coefficient of viscosity, Stoke's law, Surface tension and molecular interpretation of surface tension, Surface energy, Angle of contact, wetting.

TEXT AND REFERENCE BOOKS:

1. E M Purcell, Ed Berkely physics course, vol. Mechanics (Mc. Gr. Hill) R P Feynman.
2. R B Lighton and M Sands, the Feynman lectures in physics, vol I (B) publications, Bombay, Delhi, Calcutta, and Madras.
3. D P Khandelwal, Oscillations and waves (Himalaya Publishing House Bombay).

4. R. K. Ghosh, The Mathematics of waves and vibrations (Macmillan 1975).
5. J.C. Upadhyaya- Mechanics (Hindi and English Edition.)
6. D.S. Mathur- Mechanics and properties of matter.
7. Brijlal and Subramanium- Oscillations and waves. Resnick and Halliday- Volume I
8. Physics Part –1: Resnick and Halliday.

B.Sc. Part-I
Paper-II
PHYSICS
ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

UNIT-1 Repeated integrals of a function of more than one variable, definition of a double and triple integral. Gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field, and their geometrical interpretation, line, surface and volume integrals, flux of a vector field. Gauss's divergence theorem, Green's theorem and Stoke's theorem and their physical significance. Kirchoff's law, Ideal Constant-voltage and Constant-current Sources. Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and Maximum Power Transfer theorem.

UNIT-2 Coulomb's law in vacuum expressed in Vector forms, calculations of E for simple distributions of charges at rest, dipole and quadrupole fields. Work done on a charge in a electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between Electric potential and Electric field, torque on a dipole in a uniform electric field and its energy, flux of the electric field.

Gauss's law and its application: E due to (1) an Infinite Line of Charge, (2) a Charged Cylindrical Conductor, (3) an Infinite Sheet of Charge and Two Parallel Charged Sheets, capacitors, electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field.

UNIT-3 Dielectric constant, Polar and Non Polar dielectrics, Dielectrics and Gauss's Law, Dielectric Polarization, Electric Polarization vector P, Electric displacement vector D. Relation between three electric vectors, Dielectric susceptibility and permittivity, Polarizability and mechanism of Polarization, Lorentz local field, Clausius Mossotti equation, Debye equation,

Ferroelectric and Paraelectric dielectrics, Steady current, current density J, non-steady currents and continuity equation, rise and decay of current in LR, CR and LCR circuits, decay constants, AC circuits, complex numbers and their applications in solving AC circuit problems, complex impedance and reactance, series and parallel resonance, Q factor, power consumed by an a AC circuit, power factor.

UNIT-4 Magnetization Current and magnetization vector M, three magnetic vectors and their relationship, Magnetic permeability and susceptibility, Diamagnetic, paramagnetic and ferromagnetic substances. B.H. Curve, cycle of magnetization and hysteresis, Hysteresis loss.

Biot-Savart's Law and its applications: B due to (1) a Straight Current Carrying Conductor and (2) Current Loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital law (Integral and Differential Forms).

UNIT-5 Electromagnetic induction, Faraday's law, electromotive force, integral and differential forms of Faraday's law Mutual and self inductance, Transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwell's

equations, electromagnetic field energy density. The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, Poynting's vector.

TEXT AND REFERENCE BOOKS:

1. Berkeley Physics Course, Electricity and Magnetism, Ed. E.M. Purcell (Mc Graw - Hill).
2. Halliday and Resnik, Physics, Vol. 2.
3. D J Grifith, Introduction to Electrodynamics (Prentice-Hall of India).
4. Raitz and Milford, Electricity and Magnetism (Addison-Wesley).
5. A S Mahajan and A A Rangwala, Electricity and Magnetism (Tata Mc Graw-hill).
6. A M Portis, Electromagnetic fields.
7. Pugh & Pugh, Principles of Electricity and Magnetism (Addison-Wesley).
8. Panofsky and Phillips, Classical Electricity and Magnetism, (India Book House).
9. S S Atwood, Electricity and Magnetism (Dover).

B.Sc. Part-I
PHYSICS
PRACTICALS

Minimum 16 (Eight from each group)
Experiments out of the following or similar experiments of equal standard

GROUP-A

1. Study of laws of parallel and perpendicular axes for moment of inertia.
2. Moment of inertia of Fly wheel.
3. Moment of inertia of irregular bodies by inertia table.
4. Study of conservation of momentum in two dimensional oscillations.
5. Study of a compound pendulum.
6. Study of damping of a bar pendulum under various mechanics.
7. Study of oscillations under a bifilar suspension.
8. Study of modulus of rigidity by Maxwell's needle.
9. Determination of Y, k, η by Searl's apparatus.
10. To study the oscillation of a rubber band and hence to draw a potential energy curve from it.
11. Study of oscillation of a mass under different combinations of springs.
12. Study of torsion of wire (static and dynamic method).
13. Poisson's ratio of rubber tube.
14. Study of bending of a cantilever or a beam.
15. Study of flow of liquids through capillaries.
16. Determination of surface tension of a liquid.
17. Study of viscosity of a fluid by different methods.

GROUP-B

1. Use of a vibration magnetometer to study a field.
2. Study of magnetic field B due to a current.
3. Measurement of low resistance by Carey-Foster Bridge.
4. Measurement of inductance using impedance at different frequencies.
5. Study of decay of currents in LR and RC circuits.
6. Response curve for LCR circuit and response frequency and quality factor.
7. Study of waveforms using cathode-ray oscilloscope.
8. Characteristics of a choke and Measurement of inductance.
9. Study of Lorentz force.
10. Study of discrete and continuous LC transmission line.
11. Elementary FORTRAN programs, Flowcharts and their interpretation.
18. To find the product of two matrices.
19. Numerical solution of equation of motion.
20. To find the roots of quadratic equation.

TEXT AND REFERENCE BOOKs:

1. B saraf et al Mechanical Systems (Vikas publishing House, New Delhi).
2. D.P. khandelwal, A Laboratory Manual of Physics for Undergraduate classes (Vani Publication House, New Delhi).
3. C G Lambe Elements of statistics (Longmans Green and Co London New York, Tprpnto).
4. C Dixon, Numerical analysis.
5. S Lipsdutz and A Poe, schaum's outline of theory and problems of programming with Fortran (MC Graw-Hill Book Company, Singapore 1986).

B.Sc. Part-I
ZOOLOGY
PAPER-I
CELL BIOLOGY AND NON-CHORDATA

UNIT-I

1. The cell (Prokaryotic and Eukaryotic)
2. Organization of Cell: Extra-nuclear and nuclear
3. Plasma membrane, Mitochondria, Endoplasmic reticulum, Golgi body, Ribosome and Lysosome).
4. Nucleus, Chromosomes, DNA and RNA

UNIT-II

1. Cell division (Mitosis and Meiosis).
2. An elementary idea of Cancer cells And Cell transformation.
3. An elementary idea of Immunity: Innate & Acquired Immunity, Lymphoid organs, Cells of Immune System, Antigen, antibody and their interactions

UNIT-III

1. General characters and classification of Phylum Protozoa, Porifera, and Coelenterata up to order.
2. Protozoa: Type study - Paramecium,
3. Porifera: Type study - Sycon.
4. Coelenterata: Type study - Obelia

UNIT-IV

1. General characters and classification of Phylum Platyhelminthes, Nemathelminthes, Annelida and Arthropoda up to order.
2. Platyhelminthes and Nemathelminthes: Type Study – Fasciola, Ascaris
3. Annelida: Type Study - Pheretima.
4. Arthropoda: Type Study - Palaemone.

UNIT-V

1. General characters and classification of Phylum Mollusca and Echinodermata up to order.
2. Mollusca: Type Study - Pila.
3. Echinodermata- Type Study- Asterias (Starfish).

B.Sc. Part-I
ZOOLOGY
PAPER-I
CHORDATA AND EMBRYOLOGY

UNIT-I

1. Classification of Hemichordata
2. Hemichordata- Type study-Balanoglossus
3. Classification of Chordates upto orders..
4. Protochordata-Type study - Amphioxus.
5. A comparative account of Petromyzon and Myxine.

UNIT-II

1. Fishes-Skin & Scales, migration in fishes, Parental care in fish.
2. Amphibia-Parental care and Neoteny.
3. Reptilia- Poisonous & Non-poisonous Snakes, Poison apparatus, snake venom and Extinct Reptiles

UNIT-III

1. Birds- Flight Adaptation, Migration, and Perching mechanism, Discuss-Birds are glorified reptiles.
2. Mammals-Comparative account of Prototheria, Metatheria, Eutheria and Affinities.
3. Aquatic Mammals and their adaptations.

UNIT-IV

1. **Fertilization**
2. Gametogenesis, Structure of gamete and Typesof eggs
3. Cleavage
4. Development of Frog up to formation of three germ layers.
5. Parthenogenesis

UNIT-V

1. Embryonic induction, Differentiation and Regeneration.
2. Development of Chick (a) up to formation of three germ layers, (2) Extra-embryonic
3. membranes.
4. Placenta in mammals.

B.Sc. Part-I
Zoology
PRACTICAL

The practical work will, in general be based on the syllabus prescribed in theory and the candidates will be required to show knowledge of the following:-

- Dissection of Earthworm, Cockroach, Palaemon and Pila
- Minor dissection—appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila.

(Alternative methods: By Clay/Thermacol/drawing/Model etc.)

- Adaptive characters of Aquatic, terrestrial, aerial and desert animals.
- Museum specimen invertebrate
- Slides- Invertebrates, frog embryology, Chick embryology and cytology,

Scheme of Practical Exam	**Time: 3hrs**
1. Major Dissection	10 Marks
2. Minor Dissection	05 Marks
3. Comments on Excersice based on Adaptation	04 Marks
4. Cytological Preparation	05 Marks
5. Spots-8 (Slides-4, Specimens-4)	16 Marks
6. Sessional	10 Marks

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
BASTAR VISHWAVIDYALAYA, JAGDALPUR (C.G.)

SYLLABUS
B.Sc. PART-II
SESSION 2020-21

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
धरमपुरा, जगदलपुर, जिला–बस्तर (छ.ग.) 494001
वेबसाईट www.bvvjdp.ac.in दूरभाष–07782–229037 फैक्स 229297

संशोधित पाठ्यकम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी. भाग–दो,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

खण्ड–क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे – **अंक–35**

1. महात्मा गांधी – चोरी और प्रायश्चित
2. आचार्य नरेंद्र देव – युवकों का समाज में स्थान
3. वासुदेव भारण अग्रवाल – मातृभूमि
4. हरि ठाकुर – डॉ. खूबचंद बघेल
5. पं. माधवराव सप्रे – सम्भाषण–कुशलता

खण्ड–ख हिन्दी भाषा और उसके विविध रूप **अंक–16**

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड–ग हिन्दी की व्याकरणिक कोटियॉ **अंक–24**

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समास, संधि एवं संक्षिप्तियां
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन–

इकाई–1 चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा

इकाई–2 युवकों का समाज में स्थान : आचार्य नरेन्द्र देव/वित्त एवं वाणिज्य की भाषा, मशीनी भाषा

इकाई– 3 मातृभूमिः वासुदेवशरण अग्रवाल / संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण

इकाई– 4 डॉ. खूबचंद बघेल : हरि ठाकुर / समास, संधि

इकाई– 5 सम्भाषण–कुशलता : पं. माधवराव सप्रे, / अनुवाद – अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियॉ

मूल्यांकन योजना –

प्रत्येक इकाई से एक–एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई को दो–दो खण्डों (क्रमांक' 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न–पत्र के पूर्णांक 75 होंगे।

पाठ्यकम संशोधन का औचित्य : विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ–साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सके तथा व्याकरिणक एवं भाशा विशयक प्रस्तावित पाठ्यकम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सके।

अध्यक्ष– हिंदी अध्ययन मंडल

B.A/B.S.c./B.Com/B.H.S.c Part-II
Foundation Course
PAPER - II
ENGLISH LANGUAGE

M.M. 75

The question paper B.A/B.S.c./B.Com/B.H.S.c English Language cultural valuers shall comprise the following units:

UNIT-I Short answer questions to be assed by (Five short answer questions of three marks each) **15 Marks**

UNIT-II (a) Reading comprehension of an unseen passage **05 Marks**
(b) Vocabulary

UNIT-III Report-Writing **10 Marks**

UNIT-IV Expansion of an idea **10 Marks**

UNIT-V Grammar and Vocabulary based on the prescribed text book **20+15 Marks**

Note : Question on all the units shall asked from the prescribed text which will comprise specimens of popular creative/writing and the following it any

(a) Matter & technology
  (i) State of matter and its structure
  (ii) Technology (Electronics Communication, Space Science)
(b) Our Scientists & Institutions
  (i) Life & Work of our eminent scientist Arya Bhatt. Kaurd Charak Shusruta, Nagarjuna, J.C. Bose and C,V. Raman, S. Ramanujam, Homi J. Babha Birbal Sahani.
  (iii) Indian Scientific Institutions (Ancient & Modern)

Book Prescribed:

1. Foundation English for U.G. Second Year - Published by M.P. Hindi Granth Academy, Bhopal.

SULLABUS FOR ENVIRONMENTAL SRUDIES "FOR UNDER FRADUATE COURSES"

1. इन्वाहरमेन्टल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।
   **भाग 1, 2 एवं 3 में किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना, अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।*
2. पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंकर सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर होंगे।
3. सैद्धांतिक प्रश्नों पर अंक–75 (सभी प्रश्न इकाई आधार पर रहेगे जिसमें आंतरिक विकल्प रहेगा)
   (अ) लघु प्रश्नोत्तर –25 अंक
   (ब) निबंधात्मक –50 अंक
4. Field Work – 25 अंकों का मूल्यांक आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रयोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।
5. उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।
6. पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क में संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।
7. स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षकों/परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

SULLABUS FOR
ENVIRONMENTAR STUDIES

M.M. 100

UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES
Definition, Scope and Importance

Natural Resources:

Renewable and Nonrenewable Resources :

Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, Case Studies, Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Case studies.

(d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , Case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equaitable use of resources for sustainable life-styles.

UNIT-II **ECOSYSTEM**

Concept, of an ecosystems.

Structure and Function of and ecosystem

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of The following ecosystem:

a. Forest, Ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatec ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III **Biodiversity and its Conservation**

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeofraphical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at glibal, national and local levels.
- India as mefa diversity nation."
- Hot spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, manwildife conflicts.
- Endangered and endemic species of india.
- Conservation of biodiversity : In sity and Ex-situ conservation if biodiversity

UNIT-IV Environmental Pollution

Definition

- Causes, effects and control measures of
  a. Air pollution
  b. Water pollution
  c. soil pollution
  d. Marine pollution
  e. Noise polluation
  g. Naclear hazards.
- Solid waste managemen : Causes, effects and control measures of urban and industrial
- Wastes.
- Role of an individual in prevention of pollution.
- pollution case studies
- Disaster management : floods, earthquake, cycline and landslides.

Human Population and the Environment

- population growth, variation among nation,
- population explosion - Family Welfare programime.
- Environment and human health.
- Human Rights.

UNIT - V Social Issues and the Environment

- From Umsustainable to Sustainable development.
- urban problems related to energy.
- Water conservationb. rain water harvesting watershed management.
- Resettlement and rehabilitation of people, its problems and concersm. Case studies.
- Environmental ethies : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone Layer dipletion nuclear accidents and holocaust Case studies.
- Wasteland reclamation.
- Consumerism and Waste products. Environment Protection Act
- Air (Pervention and Control of pollution) Act.
- Water (Pervention and Control of pollution) Act.
- Wildlife protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of Environment lefislation.
- public awareness.
- Value Education
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and Human Health.
- Case Studies.

FIELD WORK

- visit to a local area to document environmental assets-river/fores/grassland/hill/mountain.
- visit to locla polluted site : urban/Rural/Industrial/Agriculture.
  Study of common plants, insects, birds.
- Study of simple ecosystms-pond, river, hill slopes. ets. (Field work Equal to 5 lecture Hours)

REFERENCES:

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8. Gloick, H.P. 1993 Water in crisis, Pacifec Institute for Studies in Deve Environment & Security Stockholm Eng. Institute. Oxford Univ. Press. 437p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural. History Society, Mumbai ®.
10. Heywood, V.H. & Wastson, R.T. 1965 Global Biodiversity Assessment, Cabridge Univ. Press. 1140p.
11. Jadhav H. & Bhosale, V.H. 1965 Environmental Protection and Laws. Himalaya Pub. House. Delhi 284p.
12. Mckinney M.L. & School R.M. 1996. Environmental Science Systems & Solutions, Web enhanced editio. 639p.
13. Mhqaskar A.K. Matter Hazardous, Techno-Science Publication (T.B.).
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (T.B.).
15 Odurn E.P. 1971 Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16 Rao M.N. & Datta A.K. 1987, Waste Water Treatment. Oxford & IBH Publ.
co. Pvt. Ltd. 345p.
17. Sharma B.K. 2001 Environmental Chemistry, Goel Publ. House, Meerut.
19. Townsend C. Harper J. and Michael Begon Essentials of Ecology, Blackwll science (T.B).
20. Trivedi R.K. Handbook of Environment Environmental Laws. Rules, Guidelines, Compliances and Standards, Vol. I and II Environmenta Media (R.).
21 Trivedi R.K. and P.K. Goel, Introduction to air pollution, Tchno Science Publlication (T.B.).
22. Wagner K.D., 1998, Environmental Management. W.B. Saunders Co. Philadelphia,USA499p.|

(M) Magazine (R) Reference
(TB) Textbook.

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, H_2SO_4, Ionic liquids.

REFERENCE BOOKS

1. Basic Inorganic Chemistry, F. A. Cotton, G. Wilkinson and P. L. Gaus, Wiley
2. Concise Inorganic Chemistry, J. D. Lee, ELBS
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.
5. Inorganic Chemistry, W. W. Porterfield, Addison – Wiley.

6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agarwal and Agarwal
10. Advanced Inorganic Chemistry, Puri, Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub
13. Uchchattar Akarbanic Rasayan, satya Prakash & G. D. Tuli, Shyamal Prakashan
14. Uchchattar Akarbanic Rasayan, Puri & Sharma
15. Selected topic in Inorganic Chemistry by Madan Malik & Tuli, S. Chand.

Paper – II
ORGANIC CHEMISTRY

UNIT-I **CHEMISTRY OF ORGANIC HALIDES**

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – S_N1, S_N2 and S_N^i mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution; SNAr, 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 HIO_4] 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, $LiAlH_4$ and $NaBH_4$ 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.

REFERENCE BOOKS

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L. G. Wade Jr. Prentice Hall.
3. Fundamentals of Organic Chemistry, Solomons, John Wiley.
4. Organic Chemistry, Vol I, II, III S. M. Mukherjee, S. P. Singh and R. P. Kapoor, Wiley Easters (New Age).
5. Organic Chemistry, F. A. Carey, McGraw Hill.
6. Introduction to Organic Chemistry, Struiweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P. L. Soni.
8. Organic Chemistry, Bahl and Bahl.
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bahl and Bahl.
11. Carbanic Rasayan, R. N. Singh, S. M. I. Gupta, M. M. Bakidia & S. K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.

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 Kp, Kc and Kx. 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

A. PHASE EQUILIBRIUM

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.

REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semi micro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:
CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-},$S_2O_3^{2-}$, CH_3COO^-, F^-,Cl^-, Br^-, I^-, NO_3^-, BO_3^{3-}, $C_2O_4^{2-}$, PO_4^{3-}, NH_4^+, K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}.
Mixtures should preferably contain one interfering anion, or insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-}, NO_2^- and NO_3^-, Cl^-, Br^-, and I^-.

Volumetric analysis

(a) Determination of acetic acid in commercial vinegar using NaOH.
(b) Determination of alkali content-antacid tablet using HCl.
(c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.
(d) Estimation of hardness of water by EDTA.
(e) Estimation of ferrous & ferric by dichromate method.
(f) 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 benzylacohol, (v) azo dye.

PHYSICAL CHEMISTRY

Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/ dialometric method (e.g. $MnCl_2.4H_2O$/$SrBr_2.2H_2O$). Thermo chemistry
- 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:

~~Paper –IV~~
LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semi micro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:
CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-},$S_2O_3^{2-}$, CH_3COO^-, F^- ,Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-}, $C_2O_4^{2-}$, PO_4^{3-}, NH_4^+ , K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}.
Mixtures should preferably contain one interfering anion, or insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-}, NO_2^- and NO_3^-, Cl^-, Br^-, and I^-.

Volumetric analysis

(a) Determination of acetic acid in commercial vinegar using NaOH.
(b) Determination of alkali content-antacid tablet using HCl.
(c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.
(d) Estimation of hardness of water by EDTA.
(e) Estimation of ferrous & ferric by dichromate method.
(f) 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 benzylacohol, (v) azo dye.

PHYSICAL CHEMISTRY

Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/ dialometric method (e.g. $MnCl_2.4H_2O/SrBr_2.2H_2O$). Thermo chemistry
- 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:
  (i) $I_2(aq) + I^- \rightarrow I^-_3(aq)^{2+}$
  (ii) $Cu^{2+}(aq) + nNH_3 \rightarrow Cu(NH_3)n$

Molecular Weight Determination

- Determination of molecular weight by Rast Camphor and Landsburger method.

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

Reference Books

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tachell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Agarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York

Hrs.5 **PRACTICAL EXAMINATION** **M.M.50**

Three Experiments are to be performed.

1. Inorganic–Qualitative semi micro analysis of mixtures. **12 marks**

   OR

   One experiment from synthesis and analysis by preparing the standard solution.
2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt. **6 marks**

   (b) Determination of Rf value and identification of organic compounds by paper chromatography. **6 marks**
3. Any one physical experiment that can be completed in two hours including calculations. **12 marks**
4. Viva **10 marks**
5. Sessional **04 marks**

   In case of Ex-Students one marks will be added to each of the experiment.

B.Sc. Part-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, Brassicaeae, 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, Ashwangandha, Ghritkumari, Giloy, Brahmi, sarpgandha, ---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), Anamolous 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, polyembryonoy, apomixes and parthenocarpy.

Books Recommended:

1. Singh, Pandey, Jain. **Diversity and Systematic of Seed Plants**, Rastogi Publications Merrut
2. Sharma OP, **Plant Taxonomy,** Tata Mc Graw Hill, New Delhi
3. Pandey BP, **Taxonomy of Angiosperms,** S. Chand Publishing, New Delhi
4. Pandey, BP, **Plant Anatomy,** S.Chand Publishing, New Delhi
5. Pandey, BP, **Economic Botany,** S.Chand Publishing, New Delhi
6. Bhojwani, SS and Bhatnagar SP, **Embryology of Angiosperm**, Vikas Publication House, New Delhi
7. Singh, Pandey, Jain, **Embryology of Angiosperms**, Rastogi Publication, Meerut
8. Sharma, V, Alum, A. ***Ethnobotany***, Rastogi Publications, Meerut
9. Tayal, MS ***Plant Anatomy***, Rastogi Publication, Meerut

B.Sc. Part-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 adapataions 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, ecads, keystone specie

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

Biogeochemical 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, stomata 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, Kreb's cycle, factors affecting respiration, R.Q.

UNIT-V Plant growth hormones: Auxin, Gibberellins, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering, Florien concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

Books Recommended:

1. Koromondy, EJ. **Concepts of Ecology,** Prentice Hall, USA
2. Singh, JS Singh SP and Gupta SR. **Ecology and Environmental Science and Conservation**, S. Chand Publishing, New Delhi
3. Sharma, PD. **Ecology and Environment,** Rastogi Publications, Merrut
4. Hopkins, WG and Huner, PA. **Introduction to Plant Physiology,** John Wiley and Sons.
5. Pandey SN and Sinha BK, **Plant Physiology,** Vikas Publishing, New Delhi
6. Taiz, Land Zeiger. E. **Plant Physiology,** 5th edition, Sinauer Associates Inc. M.A, USA
7. Srivastava, HS **Plant Physiology and Biotechnology**, Rastogi Publications, Meerut

B.Sc. Part-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 O_2 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.

PRACTICAL SCHEME

TIME: 4 Hrs. **M.M.: 50**

1. Anatomy	08
2. Economic Botany	04
3. Physiology	08
4. Ecology	10
5. Spotting	10
6. Viva-Voce	05
7. Project Work/ Field Study	10

B.Sc. Part-II

PHYSICS

OBJECTIVES OF THE COURSE

The undergraduate training in physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that undergraduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

EXAMINATION SCHEME:

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments one from each groups as listed in the list of experiments.
4. Practical examination will be of 4 hours duration- one experiment to be completed in 2 hours.
5. The distribution practical marks as follows:

Experiment: 15+15=30

Viva voce: 10

Internal assessment: 10

5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

B.Sc. Part-II
PHYSICS
PAPER-I
THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

UNIT-1 The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, carnot theorem, second law of thermodynamics. Claussius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

UNIT-2 Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermo dynamical equations and their applications, TdS equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

UNIT-3 Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.
Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Viral Equation. Andrew's Experiments on CO2 Gas. Critical Constants.

UNIT-4 The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, γ phase space and μ phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy.
Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.

UNIT-5 Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

TEXT AND REFERENCE BOOKS:

1. B.B. Laud, "Introduction to Statistical Mechanics" (McMillan 1981)
2. F. Reef: "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haung: "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeeman sky.
8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: Brij Lal and N. Subrahmanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

B.Sc. Part-II
PHYSICS
PAPER-II
WAVES, ACOUSTICS AND OPTICS

UNIT-1 Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

UNIT-2 Fermat's Principle of Extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens.

Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

UNIT-3 Interference of light: The principle of superposition's, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refract meter, Twyaman-Green interferometer and its uses.

UNIT-4 Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N-Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating , Prism, telescope.

Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygens's theory, Nicoll prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

UNIT-5 Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne laser and. Applications of laser : Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

TEXT AND REFERENCE BOOKS:

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; 'Optics' (Oxford University Press)
4. Sears: 'Optics'
5. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud: Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson: 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, 'Waves and Oscillations'
9. I.G. Main, 'Vibrations and Waves' (Cambridge University Press)
10. H.J. Pain: 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John wiley, 1971)
14. Born and Wolf: 'Optics'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowls.
19. Optics: P. K. Srivastav

B.Sc. Part-II

PHYSICS

PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

1. Study of Brownian motion
2. Study of adiabatic expansion of a gas
3. Study of conversion of mechanical energy into heat
4. Heating efficiency of electrical kettle with varying voltage
5. Study of temperature dependence of total radiation
6. Study of temperature dependence of spectral density of radiation
7. Resistance thermometry
8. Thermo emf thermometry
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched strings.
13. Studies on tensional waves in a lumped system.
14. Study of interference with two coherent source of sound.
15. Chlandi's figures with varying excitation and loading points.
16. Measurements of sound intensities with different situations.
17. Characteristics of a microphone-loudspeakers system
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle point of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Study of diffraction grating and its resolving power.
25. Resolving power of telescope system.
26. Polarization of light by reflection; also cos-squared law.
27. Study of optical rotation for any system.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of a triangles.
32. To find the sum of the sine and cosines series and print out the curve.
33. To solve simultaneous equation by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve
36. Convert a given integer into binary and octal systems and vice versa .
37. Inverse of a matrix.
38. Spiral array.

TEXT AND REFERENCE BOOKS

1. D.P. Khandelwal, Optics and Atomic physics (Himalaya Publishing house, Bombay 1988).
2. D.P. Khandelwal, A Laboratory Manual for Undergraduate Classes (Vani Publishing House, New Delhi).
3. S. Lipschutz and a Poe, Schaum's outline of theory and Problems of Programming with Fortran (McGraw-hill Book Company 1986).
4. C Dixon, Numerical Analysis.

B.Sc. Part-II
ZOOLOGY
PAPER-I
ANATOMY AND PHYSIOLOGY

Comparative Anatomy of various organ systems of vertebrates:

UNIT-I

1. Integument and its derivatives: structure of scales, hair and feathers
2. Alimentary canal and digestive glands in vertebrates
3. Respiratory organs : Gills and lung , air-sac in birds

UNIT-II

1. Endoskeleton: (a) Axial Skeleton- Skull and Vertebrae, (b) Appendicular Skeleton Limbs and girdles
2. Circulatory System: Evolution of heart and aortic arches
3. Primogenital System: Kidney and excretory ducts

UNIT-III

1. Nervous System: General plan of brain and spinal cord
2. Ear and Eye: structure and function
3. Gonads and genital ducts

UNIT-IV

1. Digestion and absorption of dietary components
2. Physiology of heart, cardiac cycle and ECG
3. Blood Coagulation
4. Respiration: mechanism and control of breathing

UNIT- V

1. Excretion: Physiology of excretion, osmoregulation
2. Physiology of muscle contraction
3. Physiology of nerve impulse, Synaptic transmission

B.Sc. Part-II

ZOOLOGY

PAPER-II

VERTEBRATE ENDOCRINOLOGY, REPRODUCTIVE BIOLOGY BEHAVIOUR, EVOLUTION AND APPLIED ZOOLOGY

UNIT-I

1. Structure and function of Endocrine glands
2. Hormone receptor
3. Biosynthesis and secretion of thyroid, adrenal, ovarian and testicular hormones
4. Endocrine disorder of pituitary, thyroid, adrenal and pancreas

UNIT-II

1. Reproductive cycle in vertebrates
2. Menstruation, lactation and pregnancy
3. Mechanism of parturition
4. Hormonal regulation of gametogenesis

UNIT -III

1. Evidences of organic evolution.
2. Theories of organic evolution.
3. Variation, Mutation, Isolation and Natural selection.
4. Evolution of Horse

UNIT-IV

1. Introduction to Ethology: Branches and concept of ethology.
2. Patterns of Behaviour, Taxes, Reflexes, Drives and Stereotyped behaviour.
3. Reproductive behavioural patterns.
4. Drugs and behavior, Hormones and behaviour

UNIT-V

1. Prawn Culture
2. Sericulture
3. Apiculture
4. Pisciculture
5. Poultry keeping
6. Elements of Pest Control: Chemical & Biological Control

B.Sc. Part-II
ZOOLOGY
PRACTICAL

The practical work in general shall be based on the syllabus prescribed and the students will be required to show the knowledge of the following:

- Study of the representative examples of the different chordates (Classified characters).
- Dissection of various systems of scoliodon-Afferent and Efferent bronchial cranial nerves, internal ear.

  Alternative methods: By Clay/Thermacol/ Drawing/ Model etc.)
- Simple microscopic technique through unstained or stained permanent mount.
- Study of prepared slides histological, as per theory papers.
- Study of limb girdles and vertebrae of Frog, Varanus, Fowl and Rabbit.
- Identification of species and individual of honey bee.
- Life cycle of honey bee and silkworm.
- Exercise based on Evolution and Animal behavior.

Scheme of Practical Exam **Time: 3:30hrs**

• Major dissection (Cranial nerves/efferent branchial vessel)	10
• Exercise based on evolution	05
• Exercise based on applied zoology	05
• Exercise based on animal behavior	04
• Spotting-8 (slides-4,bones-2,specimen-2)	16
• Viva	05
• Sessional marks.	05

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR (C.G.)

SYLLABUS

B.Sc. PART-III

SESSION 2021-22

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर (छ.ग.)
SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR JAGDALPUR, (C.G.)

बी.ए./बी.एससी./बी.कॉम./बी.एच.एससी भाग–तीन,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

इकाई–एक (क) भारत माता : सुमित्रानंदन पंत

(ख) कथन की शैलियॉ

1. विवरणात्मक शैली
2. मूल्यांकन शैली
3. व्याख्यात्मक शैली
4. विचारात्मक शैली

इकाई–दो (क) सूखी डाली : उपेन्द्रनाथ अश्क

(ख) विभिन्न संरचनाएँ

1. विनम्रता सूचक संरचना
2. विधि सूचक संरचना
3. निषेध परक संरचना
4. काल–बोधक संरचना
5. स्थान–बोधक संरचना
6. दिशा बोधक संरचना
7. कार्य–कारण सम्बन्ध संरचना
8. अनुक्रम संरचना

इकाई–तीन (क) वसीयत : मालती जोशी

(ख) कार्यालयीन पत्र और आलेख

1. परिपत्र
2. आदेश
3. अधिसूचना
4. ज्ञापन
5. अनुस्मारक
6. पृष्ठाकंन

इकाई–चार (क) योग की भाक्ति : हरिवंश राय बच्चन

(ख) अनुवाद : स्वरूप एवं परिभाषा, उद्देश्य स्त्रोत भाषा और लक्ष्य भाषा, अच्छे अनुवाद की विशेषताएँ, अनुवाद प्रक्रिया, अनुवादक

इकाई–पांच (क) संस्कृति और राश्ट्रीय एकीकरण : योगेश अटल

(ख) घटनाओं, समारोहों आदि का प्रतिवेदन, विभिन्न प्रकार के निमंत्रण पत्र।

मूल्यांकन योजना : प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरित विकल्प होगा। प्रत्येक प्रश्न के **15** अंक होंगे। इसलिए प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः **8 एवं 7** अंक होंगे। प्रश्नपत्र का **पूर्णांक 75** निर्धारित है।

B.A./B.Sc./B.Com./B.H.Sc. Part III
Foundation Course
English Language

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items : Five question to be attempted, each carrying 3 marks.

UNIT-I	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.		**15**
UNIT-II	Essay writing		**10**
UNIT-III	Precise writing		**10**
UNIT-IV	(a)	Reading comprehension of an unseen passage	**05**
	b)	Vocabulary based on text	**10**
UNIT-V	Grammar Advanced Exercises		**25**

Note: Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geoeconomic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberaliation Method) Demoration decentralization (with reference to 73, 74 constitutional Amendment.

Books Prescribed:

Aspects of English Language and Development-Published by M.P. Hindi Granth Academy, Bhopal.

SULLABUS FOR ENVIRONMENTAL SRUDIES "FOR UNDER FRADUATE COURSES"

1. इन्वाहरमेन्टल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।
   **भाग 1, 2 एवं 3 में किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना, अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।*
2. पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंकर सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर होंगे।
3. सैद्धांतिक प्रश्नों पर अंक–75 (सभी प्रश्न इकाई आधार पर रहेगे जिसमें आंतरिक विकल्प रहेगा)
   (अ) लघु प्रश्नोत्तर –25 अंक
   (ब) निबंधात्मक –50 अंक
4. Field Work – 25 अंकों का मूल्यांक आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रयोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।
5. उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।
6. पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क में संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।
7. स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षकों/परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

SULLABUS FOR
ENVIRONMENTAR STUDIES

M.M. 100

UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance

Natural Resources:

Renewable and Nonrenewable Resources :

Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, Case Studies, Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Case studies.

(d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , Case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equaitable use of resources for sustainable life-styles.

UNIT-II **ECOSYSTEM**

Concept, of an ecosystems.

Structure and Function of and ecosystem

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of The following ecosystem:

a. Forest, Ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatec ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III **Biodiversity and its Conservation**

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeofraphical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at glibal, national and local levels.
- India as mefa diversity nation."
- Hot spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, manwildife conflicts.
- Endangered and endemic species of india.
- Conservation of biodiversity : In sity and Ex-situ conservation if biodiversity

UNIT-IV Environmental Pollution

Definition

- Causes, effects and control measures of
  a. Air pollution
  b. Water pollution
  c. soil pollution
  d. Marine pollution
  e. Noise polluation
  g. Naclear hazards.
- Solid waste managemen : Causes, effects and control measures of urban and industrial
- Wastes.
- Role of an individual in prevention of pollution.
- pollution case studies
- Disaster management : floods, earthquake, cycline and landslides.

Human Population and the Environment

- population growth, variation among nation,
- population explosion - Family Welfare programime.
- Environment and human health.
- Human Rights.

UNIT - V Social Issues and the Environment

- From Umsustainable to Sustainable development.
- urban problems related to energy.
- Water conservationb. rain water harvesting watershed management.
- Resettlement and rehabilitation of people, its problems and concersm. Case studies.
- Environmental ethies : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone Layer dipletion nuclear accidents and holocaust Case studies.
- Wasteland reclamation.
- Consumerism and Waste products. Environment Protection Act
- Air (Pervention and Control of pollution) Act.
- Water (Pervention and Control of pollution) Act.
- Wildlife protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of Environment lefislation.
- public awareness.
- Value Education
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and Human Health.
- Case Studies.

FIELD WORK

- visit to a local area to document environmental assets-river/fores/grassland/hill/mountain.
- visit to locla polluted site : urban/Rural/Industrial/Agriculture.
  Study of common plants, insects, birds.
- Study of simple ecosystms-pond, river, hill slopes. ets. (Field work Equal to 5 lecture Hours)

REFERENCES:

1. Agarwal k.c. 2001 Environmental Biology. Nidi Pubi. Ltd. Bikaner.
2. Bharucha Erach the Biodiversity of India Mapin pubishing Pvt Ltd. Ahmedabad 380013. India Email : Mapin@icenet.net
3. Bruinner R.C. 1989 Hazardous Waste Incineration Mc Graw Hill Inc. 480p.
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB).
5. Cuningham, W.P, Cooper T.H. Gorhani, E& Hepworth. M.T.200.
6. Dr A.K. Environmental Chemisry, Wiley Estern Ltd.
7. Down to Earth Centre for Science and Environment
8. Gloick, H.P. 1993 Water in crisis, Pacifec Institute for Studies in Deve Environment & Security Stockholm Eng. Institute. Oxford Univ. Press. 437p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural. History Society, Mumbai ®.
10. Heywood, V.H. & Wastson, R.T. 1965 Global Biodiversity Assessment, Cabridge Univ. Press. 1140p.
11. Jadhav H. & Bhosale, V.H. 1965 Environmental Protection and Laws. Himalaya Pub. House. Delhi 284p.
12. Mckinney M.L. & School R.M. 1996. Environmental Science Systems & Solutions, Web enhanced editio. 639p.
13. Mhqaskar A.K. Matter Hazardous, Techno-Science Publication (T.B.).
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (T.B.).
15 Odurn E.P. 1971 Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16 Rao M.N. & Datta A.K. 1987, Waste Water Treatment. Oxford & IBH Publ.
co. Pvt. Ltd. 345p.
17. Sharma B.K. 2001 Environmental Chemistry, Goel Publ. House, Meerut.
19. Townsend C. Harper J. and Michael Begon Essentials of Ecology, Blackwll science (T.B).
20. Trivedi R.K. Handbook of Environment Environmental Laws. Rules, Guidelines, Compliances and Standards, Vol. I and II Environmenta Media (R.).
21 Trivedi R.K. and P.K. Goel, Introduction to air pollution, Tchno Science Publlication (T.B.).
22. Wagner K.D., 1998, Environmental Management. W.B. Saunders Co. Philadelphia,USA499p.]

(M) Magazine (R) Reference
(TB) Textbook.

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 Legend 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 $\mu_{so(spin\ only)}$ and $\mu_{eff.}$ 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 d^1 and d^2 states, discussion of the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ 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), Zeist's salt: Preparation and structure.

Catalysis by Organometallic Compounds –

Study of the following industrial processes and their mechanism :

1. Alkene hydrogenation (Wilkinsons Catalyst)
2. Polymeration 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.

REFERENCE BOOKS

1. Basic Inorganic Chemistry, F. A. Cotton, G. Wilkinson and P. L. Gaus, Wiley.
2. Concise Inorganic Chemistry, J. D. Lee, ELBS.
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.
5. Inorganic Chemistry, W. W. Porterfield, Addison – Wiley.
6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agarwal and Agarwal.
10. Advanced Inorganic Chemistry, Puri, Sharma, S. Naginchand.
11. Inorganic Chemistry, Madan, S. Chand.
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub.
13. Uchchattar Akarbanic Rasayan, satya Prakash & G. D. Tuli, Shyamal Prakashan.
14. Uchchattar Akarbanic Rasayan, Puri & Sharma.
15. Selected topic in Inorganic Chemistry by Madan Malik & Tuli, S. Chand.

Paper – II
ORGANIC CHEMISTRY

60 Hrs. Max Marks 33

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. Robbinson 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, Bath chromic 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}CMR spectroscopy: Principle and applications.

REFERENCE BOOKS

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L. G. Wade Jr. Prentice Hall.
3. Fundamentals of Organic Chemistry, Solomon's, John Wiley.
4. Organic Chemistry, Vol I, II, III S. M. Mukherjee, S. P. Singh and R. P. Kapoor, Wiley Easters (New Age).
5. Organic Chemistry, F. A. Carey, McGraw Hill.
6. Introduction to Organic Chemistry, Struiweisser, Heathcock and Kosover, Macmillan.
7. Acheson, R.M. Introduction to the Chemistry of Heterocyclic compounds, John Wiley & Sons (1976).
8. Graham Solomons, T.W. Organic Chemistry, John Wiley & Sons, Inc.
9. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning IndiaEdition, 2013.
10. Kalsi, P. S. Textbook of Organic Chemistry 1st Ed., New Age International (P) Ltd. Pub.
11. Clayden, J.; Greeves, N.; Warren, S.; Wothers, P.; Organic Chemistry, Oxford University Press.

Paper – III
PHYSICAL CHEMISTRY

60 Hrs. Max Marks 34

UNIT-I **QUANTUM MECHANICS–I**

Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect. Operator: Hamiltonian operator, angular momentum operator, Palladian 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 ant bonding wave functions, Concept of σ, σ^*, π, π^* orbital's and their characteristics, Hybrid orbitals-sp,sp^2,sp^3 Calculation of coefficients of A.O.'s used in these hybrid orbital's.

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.

Vibration Spectroscopy: Fundamental vibration and their symmetry vibrating diatomic molecules, Energy levels of simple harmonic oscillator, selection rules, pure vibration spectrum, determination of force constant, enharmonic oscillator

Raman spectrum: Concept of polarizability, quantum theory of Raman spectra, stokes and antismoke lines, pure rotational and pure vibration 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 valiancy of ions , solubility product and activity coefficient

D. Corrosion-types, theories and prevention

REFERENCE BOOKS

1. Physical chemistry, G.M. Barrow. International Student Edition McGraw Hill.
2. University General Chemistry, CNR Rao, Macmillan.
3. Physical Chemistry R.A. Albert, Wiley Eastern.
4. The elements of Physical Chemistry P.W. Alkin, Oxford.
5. Physical Chemistry through problems, S.K. Dogra, Wiley Eastern.
6. Physical Chemistry B.D. Khosla.
7. Physical Chemistry, Puri & Sharma.
8. Bhoutic Rasayan, Puri & Sharma.
9. Bhoutic Rasayan, P.L. Soni.
10. Bhoutic Rasayan, Bahl & Tuli.
11. Physical Chemistry, R.L. Kapoor, Vol- I-IV.
12. Introduction to quantum chemistry, A.K. Chandra, Tata McGraw Hill.
13. Quantum Chemistry, Ira N. Levine, Prentice Hall.

B.Sc. Part- III
PRACTICAL

Max. Marks-50

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 $Fe(OH)_3$.
- Estimation of Al (III) by precipitating with oxen and weighing as Al $(oxen)_3$ (aluminum oxinate).
- Estimation of Barium as $BaSO_4$

Inorganic Preparations:

- Tetraanminecopper (II) sulphate, $[Cu(NH_3)_4]SO_4.H_2O$
- Cis and trans K $[Cr(C_2O_4)_2.(H_2O)_2]$ Potassium dioxalatodiaquachromate(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
   - Acetylating of one of the following compounds: amines (aniline, o-, m-, p- toluidines and o-,m-, p-anisidine) and phenols (β-naphthol, vanillin, salicylic acid)
   - Benzolyation 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 Shorten-Baumann reaction.
   - Bromination of any one of the following: a. Acetanilide by conventional methods b.Acetanilide using green approach (Bromated-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.
   - Benzylisothiouronium 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 glycogen by Sorenson's formalin method.
7. Study of the titration curve of glycogen.
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 conduct metric 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 conduct metrically using standard alkali solution.
- To determine the solubility and solubility product of a sparingly soluble electrolyte conduct metrically
- To study the saponification of ethyl acetate conduct metrically Potentiometer/pH metry Perform the following potent/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 $CuSO_4/KMnO_4/K_2Cr_2O_7$ in a solution of unknown concentration
- Determine the concentrations of $KMnO_4$ and $K_2Cr_2O_7$ in a mixture.
- Study the kinetics of iodination of prop none in acidic medium.
- Determine the amount of iron present in a sample using 1,10-phenathroline.
- 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 $KMnO_4$ and $K_2Cr_2O_7$ (in 0.1 M H_2SO_4) and determine λ_{max} values.

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

REFERENCE BOOKS:

1. Vogel, A.I. Quantitative Organic Analysis, Part 3, Pearson (2012).31
2. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)

3. Furness, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
4. Ahluwalia, V.K. & Agarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
5. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000)
6. Manual of Biochemistry Workshop, 2012, Department of Chemistry, University of Delhi.

8 Hrs. **PRACTICAL EXAMINATION** **M.M.50**

Five experiments are to be performed.

1. **Inorganic** - Two experiments to be performed. Gravimetric estimation compulsory **08 marks**. (Manipulation 3 marks)

   Anyone experiment from synthesis and analysis **04 marks**.
2. **Organic** - Two experiments to be performed. Qualitative analysis of organic mixture containing two solid components. compulsory carrying **08 marks** (03 marks for each compound and two marks for separation).

   One experiment from synthesis of organic compound (Single step) **04 marks**.

3. Physical-One physical experiment **12 marks**.
4. Sessional **04 marks**.
5. Viva Voce **10 marks**.

In case of Ex-Students, one mark each will be added to Gravimetric analysis and Qualitative analysis of organic mixture and two marks in Physical experiment.

B.Sc.Part-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 groung 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.

BOOKS RECOMMENDED:

- Singh, RS, Plant Diseases, Oxford & IBH, New Delhi.
- Pandey, BP, Plant Pathology, S.Chand Publishing, New Delhi
- Sharma, PD, Microbiology and Plant pathology, Rastogi Publications, Meerut
- Sharma PD, Mycology and Phytopathology, Rastogi Publications, Meerut
- Singh JS, Singh SP and Gupta, SR, Ecology Environmental Science and Conservation, S. Chand Publishing, New Delhi
- Sharma, PD. Ecology and Environment, Rastogi Publiications, Meerut
- Bhojwani, SS and Razdan, MK, Plant Tissue Culture:Theory and Practices, Elsevier
- Sharma AK, Text book of Biostatistics, Discovery Publishing House Pvt. Ltd.

B.Sc.Part-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 classifaction, components of enzyme, theories of enzyme action, enzyme kinetics (Michaelis-Menten constant), allosteric enzymes, isozymes, Abzymes. Ribozymes, factors affecting enzyme activity.

BOOKS RECOMMENDED:

- Nelson, DL, Cox, MM, Lehninger Principles of Biochemistry, W.H. freeman and Company, New York, USA.
- Cooper, GM, The Cell: A Molecular Approach, ASM Press & Sunderland, Washington, D.C. Sinauer Associates, MA.
- Singh BD, Fundamental of Genetics, Kalyani Publication
- Singh BD, Genetics, Kalyani Publication
- Gupta, PK, Cell and Molecular Biology, Rastogi Publications, Meerut
- Singh, BD, Biotechnology: Expanding Horizons, Kalyani publications
- Gupta, PK, Elements of Plant Biotechnology, Rastogi Publications, Meerut
- Gupta, SN, Concepts of Biochemistry, Rastogi Publications, Meeru
- Jain, JL., Jain S, Jain, N, Fundamentals of Biochemistry, S Chand Publishing, New Delhi

B.Sc.Part-III
BOTANY
PRACTICAL

1. Study of host parasite relationship pf 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

PRACTICAL SCHEME

TIME: 4 Hrs. **M.M.: 50**

1.	Plant Disease/Symptoms	10
2.	Instrumentation techniques	05
3.	Staining of Microbes	05
4.	Tissue Culture techniques	05
5.	Spotting	10
6.	Project Work/ Field Study	05
7.	Viva-Voce	05
8.	Sessional	05

B.A./B.Sc. Part-III
MATHEMATICS

There shall be three theory papers. Two compulsory and one optional. Each paper carrying 50 marks is divided into five units and each unit carry equal marks.

B.A./B.Sc. Part-III
PAPER - I
ANALYSIS

REAL ANALYSIS

UNIT-I Series of arbitrary terms. Convergence, divergence and oscillation. Abel's and Dirichlet's test. Multiplication of series. Double series. Partial derivation and differentiability of real-valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Fourier series. Fourier expansion of piecewise monotonic functions.

UNIT-II Riemann integral. Inerrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus. Improper integrals and their convergence. Comparison tests. Abel's and Dirichlet' tests. Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

COMPLEX ANALYSIS

UNIT-III Complex numbers as ordered pairs. Geometrical representation of complex numbers. Stereographic projection. Continuity and differentiability of complex functions. Analytic functions. Cauchy- Riemann equations. Harmonic functions. Elementary functions. Mapping by elementary functions. Mobius transformations. Fixed points, Cross ratio. Inverse points and critical mappings. Conformal mappings.

METRIC SPACES

UNIT-IV Definition and examples of metric spaces. Neighborhoods, Limit points, Interior points, Open and Closed sets, Closure and interior. Boundary points, Sub-space of a metric space. Cauchy sequences, Completeness, Cantor's intersection theorem. Contraction principle, construction of real numbers as the completion of the incomplete metric space of rationals. Real numbers as a complete ordered field.

UNIT-V Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces. Continuous functions. Extension theorem. Uniform continuity, isometry and homeomorphism. Equivalent metrics. Compactness, sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and Compact sets, Connectedness, Components, Continuous functions and Connected sets.

REFERENCES:

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. R.R. Goldberg, Real Analysis, Oxford & IBH publishing Co., New Delhi, 1970.
3. S. Lang, Undergraduate Analysis, Springer-Verlag, New York, 1983.
4. D. Somasundaram and B. Chaudhary, A First Coarse in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co. New Delhi.
6. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
7. R.V. Churchill and J.W. Brown, Complex Variables and Applications, 5th Edition, McGraw- Hill, NewYork, 1990.
8. Mark J. Ablowitz and A.S. Fokas, Complex Variables : Introduction and Applications, Cambridge University Press, South Asian Edition, 1998.
9. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
10. E.T. Cop son, Metric Spaces, Cambridge University Press, 1968.
11. P.K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House, New Delhi, 1996.
12. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963.

B.A./B.Sc. Part-III
MATHEMATICS
PART - II
ABSTRACT ALGEBRA

UNIT-I Group-Auto orphisms, inner auto orphism. Auto orphism of groups and their computations, Contumacy relation, Normalize, Counting principle and the class equation of a finite group. Center for Group of prime-order, Abelianizing of a group and its universal property. Sylow's theorems, Sylow subgroup, Structure theorem for finite Abelian groups.

UNIT-II Ring theory-Ring homomorphism. Ideals and quotient rings. Field of quotients of an integral domain, Euclidean rings, polynomial rings, Polynomials over the rational field. The Eisenstein criterion, polynomial rings over commutative rings, Unique factorization domain. R unique factorization domain implies so is $R[x_1, x_2 \ldots x_n]$. Modules, Sub modules, Quotient modules, Homomorphism and Isomorphism theorems.

UNIT-III Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces. Linear span, Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.

UNIT-IV Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bidual space and natural isomorphism. Ad joint of a linear transformation. Eigenvalues and eigenvectors of a linear transformation. Diagonalisation. Annihilator of a subspace. Bilinear, Quadratic and Hermitian forms.

UNIT-V Inner Product Spaces-Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal Complements. Orthonormal sets and bases. Bessel's inequality for finite dimensional spaces. Gram-Schmidt Orthogonalization process.

REFERENCES:

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. N. Jacobson, Basic Algebra, Vols. I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
3. Shanti Narayan, A Text Book of Modern Abstract Algebra, S.Chand & Co. New Delhi.
4. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal, Basic Abstract Algebra (2"" Edition) Cambridge University Press, Indian Edition, 1997.
6. K. Hoffman and R. Kunze, Linear Algebra, (2nd Edition), Prentice Hall. Englewood Cliffs, New Jersey, 1971.
7. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic Linear Algebra with MATLAB. Key College Publishing (Springer-Verlag) 2001.
8. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
9. Vivek Sahai and Vikas Bist, Algebra, Norosa Publishing House, 1997.
10. I.S. Luther and I.B.S.Passi, Algebra, Vol. I-Groups, Vol. II-Rings. Narosa Publishing House (Vol. I-1996, Vol. II-1999)
11. D.S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw- Hill International Edition, 1997.

B.A./B.Sc. Part-III
MATHEMATICS
PAPER - III (OPTIONAL)
(I) PRINCIPLES OF COMPUTER SCIENCE

UNIT-I **Data Storage** - Storage of bits. Main Memory. Mass Storage. Coding Information of Storage. The Binary System. Storing integers, storing fractions, communication errors.
Data Manipulation - The Central Processing Unit. The Stored-Program Concept. Programme Execution. Other Architectures. Arithmetic/Logic Instructions. Computer-Peripheral Communication.

UNIT-II **Operating System and Networks** - The Evolution of Operating System. Operating System Architecture. Coordinating the Machine's Activities. Handling Competition Among Process. Networks. Networks Protocol.
Software Engineering - The Software Engineering Discipline. The Software Life Cycle. Modularity. Development Tools and Techniques. Documentation. Software Ownership and Liability.

UNIT-III **Algorithms** - The Concept of an Algorithm, Algorithm Representation. Algorithm Discovery. Iterative Structures. Recursive Structures. Efficiency and Correctness. (Algorithms to be implemented in C++). **Programming Languages** - Historical Perspective. Traditional Programming Concepts, Program Units. Language Implementation. Parallel Computing. Declarative Computing.

UNIT-IV **Data Structures** - Arrays. Lists. Stacks. Queues. Trees. Customised Data Types. Object Oriented Programming.
File Structure - Sequential Files. Text Files. Indexed Files. Hashed Files. The Role of the Operating System.
Database Structure - General Issues. The Layered Approach to Database Implementation. The Relational Model. Object-Oriented Database. Maintaining Database Integrity. E-R models

UNIT-V **Artificial Intelligence** - Some Philosophical Issues. Image Analysis. Reasoning, Control System Activities. Using Heuristics. Artificial Neural Networks. Application of Artificial Intelligence.
Theory of Computation - Turning Machines. Computable functions. A Non computable Function. Complexity and its Measures. Problem Classification.

REFERENCES:

1. J. Glen Brook hear, Computer Science: An Overview, Addition -Wesley.
2. Stanley B. Lippmann, Josee Lojoie, C++ Primer (third Edition), Addison-Wesley.

B.A./B.Sc. Part-III
MATHEMATICS
PAPER - III (OPTIONAL)
(II) DISCRETE MATHEMATICS

UNIT-I **Sets and Propositions** - Cardinality. Mathematical Induction, Principle of inclusion and exclusion. **Computability and Formal Languages** - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

UNIT-II **Relations and Functions** - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle.
Graphs and Planar Graphs - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs. Trees.

UNIT-III **Finite State Machines** - Equivalent Machines. Finite State Machines as Language Recognizers. **Analysis of Algorithms** - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

UNIT-IV **Recurrence Relations and Recursive Algorithms** - Linear Recurrence Relations with constant coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

UNIT-V **Boolean Algebras** - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Prepositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

REFERENCES:

1. C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986

B.A./B.Sc. Part-III
MATHEMATICS
PAPER - III (OPTIONAL)
(III) PROGRAMMING IN C AND NUMERICAL ANALYSIS
(Theory & Practical)
Theory component will have maximum marks 30.
Practical component will have maximum marks 20.

UNIT-I Programmer's model of a computer. Algorithms. Flow Charts. Data Types. Arithmetic and input/output instructions. Decisions control structures. Decision statements. Logical and Conditional operators. Loop. Case control structures. Functions. Recursions. Preprocessors. Arrays. Puppetting of strings. Structures. Pointers. File formatting.

Numerical Analysis

UNIT-II **Solution of Equations:** Bisection, Secant, Regula Falsi, Newton's Method, Roots of Polynomials. **Interpolation:** Lagrange and Hermite Interpolation, Divided Differences, Difference Schemes, Interpolation Formulas using Differences. Numerical Differentiation. Numerical Quadrature: Newton-Cote's Formulas. Gauss Quadrature Formulas, Chebychev's Formulas.

UNIT-III **Linear Equations:** Direct Methods for Solving Systems of Linear Equations (Guass Elimination, LU Decomposition, Cholesky Decomposition), Iterative Methods (Jacobi, GaussSeidel, Relaxation Methods).
The Algebraic Eigen value problem: Jacobi's Method, Givens' Method, Householder's Method, Power Method, QR Method, Lanczos' Method.

UNIT-IV **Ordinary Differential Equations:** Euler Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method, Methods Based on Numerical Integration, Methods Based on Numerical Differentiation, Boundary Value Problems, Eigenvalue Problems.
Approximation: Different Types of Approximation, Least Square Polynomial Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions, Exponential Functions, Chebychev Polynomials, Rational Functions.

Monte Carlo Methods

UNIT-V Random number generation, congruential generators, statistical tests of pseudo-random numbers. Random variate generation, inverse transform method, composition method, acceptance rejection method, generation of exponential, normal variates, binomial and Poisson variates.
Monte Carlo integration, hit or miss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo integration.

REFERENCES:

1. Henry Mulish and Herbert L. Cooper, Spirit of C: An Introduction to Modern Programming, Jaico Publishers, Bombay.
2. B.W. Kernighan and D.M. Ritchie. The C Programming Language 2nd Edition, (ANSI features) Prentice Hall, 1989.
3. Peter A Darnel and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House, 1993.
4. Robert C. Hutehisonand Steven B. Just, Programming using C Language, McGraw Hill, 1988.
5. Les Hancock and Morris Krieger, The C Primer, McGraw Hill, 1988.

6. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
7. Byron S. Gottfried, Theory and Problems of Programming with C, Tata McGraw-Hill Publishing Co. Ltd., 1998.
8. C.E. Froberg, Introduction to Numerical Analysis, (Second Edition), Addison-Wesley, 1979.
9. James B. Scarborough, Numerical Mathematical Analysis, Oxford and IBH Publishing Co. Pvt. Ltd. 1966.
10. Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan publishing Co., Inc. New York, 1982.
11. M.K. Jain, S.R.K. iyengar, R.K. Jain, Numerical Methods Problems and Solutions, New Age International (P) Ltd., 1996.
12. M.K. Jain, S.R.K. iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
13. R.Y. Rubinstein, Simulation and the Monte Carlo Methods, John Wiley, 1981.
14. D.J. Yakowitz, Computational Probability and Simulation, Addison-Wesley, 1977.

B.A./B.Sc. Part-III
MATHEMATICS
PAPER - III (OPTIONAL)
(IV) PRACTICAL
PROGRAMMING IN C AND NUMERICAL ANALYSIS

LIST OF PRACTICAL TO BE CONDUCTED...

1. Write a program in C to find out the largest number of three integer numbers.
2. Write a program in C to accept monthly salary from the user, find and display income tax with the help of following rules :
   Monthly Salary Income Tax
   9000 or more 40% of monthly salary
   7500 or more 30% of monthly salary
   7499 or less 20% of monthly salary
3. Write a program in C that reads a year and determine whether it is a leap year or not.
4. Write a program in C to calculate and print the first n terms of Fibonacci series using looping statement.
5. Write a program in C that reads in a number and single digit. It determines whether the first number contains the digit or not.
6. Write a program in C to computes the roots of a quadratic equation using case statement.
7. Write a program in C to find out the largest number of four numbers using function.
8. Write a program in C to find the sum of all the digits of a given number using recursion.
9. Write a program in C to calculate the factorial of a given number using recursion.
10. Write a program in C to calculate and print the multiplication of given 2D matrices.
11. Write a program in C to check that whether given string palindrome or not.
12. Write a Program in C to calculate the sum of series:
$$1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \ldots\ldots + \frac{1}{n!}x^n$$
13. Write a program in C to determine the grade of all students in the class using Structure. Where structure having following members - name, age, roll, sub1, sub2, sub3, sub4 and total.
14. Write a program in C to copy one string to another using pointer. (Without using standard library functions).
15. Write a program in C to store the data of five students permanently in a data file using file handling.

B.Sc. Part-III
PHYSICS
OBJECTIVES OF THE COURSE

The undergraduate training in physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that undergraduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

EXAMINATION SCHEME:

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments one from each groups as listed in the list of experiments.
4. Practical examination will be of 4 hours duration- one experiment to be completed in 2 hours.
   The distribution practical marks as follows:
   Experiment : 15+15=30
   Viva voce : 10
   Internal assessment : 10
5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

B.Sc. Part-III
PHYSICS
PAPER-I
RELATIVITY, QUANTUM MECHANICS,
ATOMIC MOLECULAR AND NUCLEAR PHYSICS

UNIT-I Reference systems, inertial frames, Galilean invariance propagation of light, Michelson-Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition, variation of mass with velocity, mass-energy equivalence, particle with zero rest mass.

UNIT-II Origin of the quantum theory : Failure of classical physics to explain the phenomena such as black-body spectrum, photoelectric effect, Compton effect, Wave-particle duality, uncertainty principle, de Broglie's hypothesis for matter waves, the concept of Phase and group velocities, experimental demonstration of mater waves. Davisson and Garner's experiment. Consequence of de Broglie's concepts, Bohr's complementary Principle, Bohr's correspondence principle, Bohr's atomic model, energies of a particle in a box, wave packets. Consequence of the uncertainty relation, gamma ray microscope, diffraction at a slit.

UNIT-III Quantum Mechanics: Schrodinger's equation, Statistical interpretation of wave function, Orthogonality and normalization of wave function, Probability current density, Postulator basis of quantum mechanics, operators, expectation values, Ehrenfest's theorem, transition probabilities, applications to particle in a one and three dimensional boxes, harmonic oscillator in one dimension, reflection at a step potential, transmission across a potential barrier.

UNIT-IV Spectra of hydrogen, deuteron and alkali atoms spectral terms, doublet fine structure, screening constants for alkali spectra for s, p, d and f states, selection rules. Discrete set of electronic energies of molecular, quantization of vibration and rotational energies, determination of inter-nuclear distance, pure rotational and rotation vibration spectra. Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complimentary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy.

UNIT-5 Structure of nuclei:- Basic Properties of Nuclei: (1) Mass, (2) Radii, (3) Charge, (4) Angular Momentum, (5) Spin, (5) Magnetic Moment (μ), (6) Stability and (7) Binding Energy, Nuclear Models:- Liquid Drop Model, Mass formula, Shell Model, Types of Nuclear reactions, laws of conservation, Q-value of reactions, Interaction of Energetic particles with matter, Ionization chamber, GM Counter, Cloud Chambers, Fundamental Interactions, Classification of Elementary Particles, Particles and Antiparticles, Baryons, Hyperons, Leptons, and Mesons, Elementary Particle Quantum Numbers: Baryon Number, Lepton Number, Strangeness, Electric Charge, Hypercharge and Is spin, introductory idea of discovery of High's Boson.

TEXT AND REFERENCE BOOKS:

1. H.S. Mani and G.K. Mehta: "Introduction to Modern Physics"" (Affiliated East-West Press, 1989).

2. A Beiger, "Prospective of Modern Physics".
3. H.E. White, Introduction to Atomic Physic".
4. Barrow, "Introduction to Molecular Physics".
5. R.P. Feynman, R.B. Leighton and M Sands, "The Feynman Lectures on Physics", Vol.III (B.I. Publications, Bombay, Delhi, Calcutta, Madras).
6. T.A. Littlefield and N Thorley, "Atomic and Nuclear Physics" (Engineering Language Book Society)
7. H.A. Engel, "Introduction to Nuclear Physics", (Addision-Wesly)
8. Eisenberg and Renwick, "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles" (John Wiley)
9. D.P. Khandelwal, "Optics and Atomic Physics", (Himalaya Publishing House, Bombay, 1988).
10. Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi, 1984.
11. Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000).
12. Theoretical Nuclear Physics, J.M. Blatt & V.F.Weisskopf (Dover Pub. Inc., 1991).

B.Sc. Part-III
PHYSICS
PAPER-II
SOLID STATE PHYSICS, SOLID STATE DEVICES AND ELECTRONICS

UNIT-I Amorphous and crystalline solids, Elements of symmetry, seven crystal system, Cubic lattices, Crystal planes, Miller indices, Laue's equation for X-ray diffraction, Bragg's Law, Bonding in solids, classification. Cohesive energy of solid, Made lung constant, evaluation of Parameters, Specific heat of solids, classical theory (Dulong-Petit's law), Einstein and Debye theories, Vibration modes of one dimensional monatomic lattice, Dispersion relation, Brillion Zone.

UNIT-II Free electron model of a metal, Solution of one dimensional Schrödinger equation in a constant potential, Density of states, Fermi Energy, Energy bands in a solid (Kronig-Penny model without mathematical details), Difference between Metals, Insulator and Semiconductors, Hall effect, Die, Para and Ferromagnetism, Langevin's theory of die and para-magnetism, Curie- Weiss's Law, Qualitative description of Ferromagnetism (Magnetic domains), B-H curve and Hysteresis loss.

UNIT-III Intrinsic and extrinsic semi conductors, Concept of Fermi level, Generation and recombination of electron hole pairs in semiconductors, Mobility of electrons and holes, drift and diffusion currents, p-n junction diode, depletion width and potential barrier, junction capacitance, I-V characteristics, Tunnel diode, Zinger diode, Light emitting diode, solar cell, Bipolar transistors, pnp and npn transistors, characteristics of transistors, different configurations, current amplification factor, FET and MOSFET Characteristics.

UNIT-IV Half and full wave rectifier, rectifier efficiency ripple factor, Bridge rectifier, Filters, Inductor filter, L and π section filters, Zinger diode, regulated power supply using zinger diode, Applications of transistors, Bipolar Transistor as amplifier, h-parameter, h-parameter equivalent circuit, Transistor as power amplifier, Transistor as oscillator, principle of an oscillator and Bark House's condition, requirements of an oscillator, Wein-Bridge oscillator and Hartley oscillator.

UNIT-V Digital Circuits: Difference between Analog and Digital Circuits, Binary Numbers, Decimal to Binary and Binary to Decimal Conversion, AND, OR and NOT Gates (Realization using Diodes and Transistor), NAND and NOR Gates as Universal Gates, XOR and XNOR Gate, De Morgan's Theorems, Boolean Laws, Simplification of Logic Circuit using Boolean Algebra, Digital to Analog Converter, Analog to Digital Converter.

TEXT AND REFERENCE BOOKS:

1. Introduction to solid state physics: C. Kittle.
2. Solid State Physics: A.J. Dekkar.
3. Electronic Circuits: Mottershead.
4. Electronic Circuits: Millman and Halkias.
5. Semiconductor Devices: S.M. Size.
6. Electronic devices: T.L. Floyd.
7. Device and Circuits: J. Millman and C. Halkias.
8. Electronic Fundamental and Applications: D. Chatopadhyay and P.C. Rakshit.
9. Electricity and Magnetism: K.K. Tiwari.

B.Sc. Part-III
PHYSICS
PRACTICALS
Minimum 16 (Eight from each group)
Experiments out of the following or
Similar experiments of equal standard

1. Determination of Planck is constant.
2. Determination of e/m by using Thomson tube.
3. Determination of e by Millikan's methods.
4. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron proton).
5. Absorption spectrum of iodine vapor.
6. Study of alkali or alkaline earth spectra using a concave grating.
7. Study of Zeeman effect for determination of a Lande g-factor.
8. Analysis of a given band spectrum.
9. Study of Raman spectrum using laser as an excitation source.
10. Study of absorption of alpha and beta rays.
11. Study of statistics in radioactive measurement.
12. Goniometric study of crystal faces.
13. Determination of dielectric constant.
14. Hysteresis curve of transformer core.
15. Hall-probe method for measurement of magnetic field.
16. Specific resistance and energy gap of semiconductor.
17. Characteristics of transistor.
18. Characteristics of tunnel diode.
19. Study of voltage regulation system.
20. Study of regulated power supply.
21. Study of lissajous figures using CRO.
22. Study of VTVM.
23. Study of RC and TC coupled amplifiers.
24. Study of AF and RF oscillators.
25. Find roots of f(x) = 0 by using Newton-Rap son Method.
26. Find root of f(x) = 0 by using secant method.
27. Integration by Simpson rule.
28. To find the value of V at
29. String manipulations.
30. Towers of Hanoi (Non-recursive).
31. Finding first four perfect numbers.
32. Quadratic interpolation using Newton's forward-difference formula of degree two.

TEXT AND REFERENCE BOOKS:

1. B.G. Strachan, Solid state electronics devices II edition (Prentice-Hall of India New Delhi 1986)
2. W.D. Stanley, Electronics devices, circuits and applications (Prentice-Hall new jersey, USA 1988).
3. S. Lipschutz and A Poe; Schaum's outline of theory and problems of programming with Fortran (Mc Graw-Hill Book Co. Singapore, 1986).
4. C Dixon, Numerical Analysis.

B.Sc. Part-III
ZOOLOGY
PAPER-I
ECOLOGY, ENVIRONMENTAL BIOLOGY:
TOXICOLOGY, MICROBIOLOGY AND MEDICAL ZOOLOGY

UNIT- I **(Ecology)**

- Aims and scopes of ecology
- Major ecosystems of the world-Brief introduction
- Population- Characteristics and regulation of densities
- Communities and ecosystem
- Bio-geo chemical cycles
- Air & water pollution
- Ecological succession

UNIT- II **(Environmental Biology)**

- Laws of limiting factor
- Food chain in fresh water ecosystem
- Energy flow in ecosystem- Trophic levels
- Conservation of natural resources
- Environmental impact assessment

UNIT-III **(Toxicology)**

- Definition and classification of Toxicants
- Basic Concept of toxicology
- Principal of systematic toxicology
- Heavy metal Toxicity (Arsenic, Mercury, Lead, Cadmium)
- Animal poisons- snake venom, scorpion & bee poisoning
- Food poisoning

UNIT-IV **(Microbiology)**

- General and applied microbiology
- Microbiology of domestic water and sewage
- Microbiology of milk & milk products
- Industrial microbiology: fermentation process, production of penicillin, alcoholic beverages', bioleaching.

UNIT-V **(Medical Zoology)**

- Brief introduction to pathogenic microorganisms, Ricketssia, Spirochetes, AIDS and Typhoid
- Brief account of life history & pathogen city of the following pathogens with reference to man: prophylaxis & treatment
- Pathogenic protozoan's- Endameba, Trypanosome & Plasmodium
- Pathogenic helminthes- Schist soma
- Nematode pathogenic parasites of man
- Vector insects

B.Sc. Part-III
ZOOLOGY
PAPER-II
GENETICS, CELL PHYSIOLOGY, BIOCHEMISTRY, BIOTECHNOLOGY AND BIOTECHNIQUES

UNIT-I **(Genetics)**

- Linkage & linkage maps, Sex Determination and Sex Linkage
- Gene interaction- Incomplete dominance & Co dominance, Supplementary gene, Complementary gene, Epitasis Lethal gene, Pleiotropic gene and multiple alleles.
- Mutation: Gene and chromosomal mutation
- Human genetics: chromosomal alteration: Down, Edward, Patau, Turner and Klinefelter Syndrome Single gene disorders: Alkaptonuria, Phenylketonuria, Sickle cell anemia, albinism and color blindness

UNIT-II **(Cell Physiology)**

- General idea about pH & buffer
- Transport across membrane: Diffusion and Osmosis
- Active transport in mitochondria & endoplasmic reticulum
- Enzymes-classification and Action

UNIT-III **(Biochemistry)**

- Amino acids & peptides- Basic structure & biological function
- Carbohydrates & its metabolism-Glycogenesis; Gluconeogenesis; Glycolysis; Glycogenolysis; Cosi-cycle
- Lipid metabolism- Oxidation of glycerol; Oxidation of fatty acids
- Protein Catabolism- Deamination, transamination, transmethylation

UNIT-IV **(Biotechnology)**

- Application of Biotechnology
- Recombinant DNA & Gene cloning
- Cloned genes & other tools of biotechnology (Tissue culture, Hybridism, Transgenic Animals and Gene library)

UNIT- V **(Biotechniques)**

1. Principles & techniques about the following:
   i. pH meter
   ii. Colorimeter
   iii. Microscopy- Light microscopes: Compound, Phase contrast & Electron microscopes
   iv. Centrifuge
   v. Separation of bimolecular by chromatography & electrophoresis

B.Sc. Part-III
ZOOLOGY
PRACTICAL

The practical work in general shall be based on syllabus prescribed in theory.
The candidates will be required to show knowledge of the following:

- Estimation of population density, percentage frequency, relative density.
- Analysis of producers and consumers in grassland.
- Detection of gram-negative and gram-positive bacteria.
- Blood group detection (A,B,AB,O)
- R. B. C. and W.B.C count
- Blood coagulation time
- Preparation of hematin crystals from blood of rat
- Observation of Drosophila, wild and mutant.
- Chromatography-Paper or gel.
- Colorimetric estimation of Protein.
- Mitosis in onion root tip.
- Biochemical detection of Carbohydrate, Protein and Lipid.
- Study of permanent slides of parasites, based on theory paper.
- Working principles of pH meter, colorimeter, centrifuge and microscope.

Scheme of marks distribution **Time: 3:30hrs**

• Hematological Experiment	08
• Ecological Experiment: Grassland Ecosystem/ Population Density/Frequency/relative density	06
• Bacterial staining	05
• Biochemical experiment	06
• Practical based on Instrumentation (Chromatography/ pH meter/microscope/centrifuge.	05
• Spotting (5 spots)	10
• Viva	05
• Sessional	05

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR, CHHATTISGARH

SYLLABUS

B.Com. PART-I

SESSION 2021-22

संशोधित पाठ्यक्रम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी.
भाग – एक (आधार पाठ्यक्रम)
प्रश्न पत्र– प्रथम (हिन्दी भाषा)

पूर्णांक– 75

नोट :–

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा ।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जायेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय :–

इकाई–1

क. पल्लवन, पत्राचार, अनुवाद, पारिभाषिक शब्दावली एवं हिंदी में पदनाम
ख. ईदगाह (कहानी) – मुंशी प्रेमचंद

इकाई–2

क. शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान–पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द एवं मुहावरे–लोकोक्तियाँ
ख. भारत वंदना (कविता)– सूर्यकान्त त्रिपाठी निराला

इकाई–3

क. देवनागरी लिपि – नामकरण, स्वरूप एवं देवनागरी लिपि की विशेषताएँ, हिंदी अपठित गद्यांश, संक्षेपण, हिंदी में संक्षिप्तीकरण
ख. भोलाराम का जीव (व्यंग्य) – हरिशंकर परसाई

इकाई–4

क. कम्प्यूटर का परिचय एवं कम्प्यूटर में हिंदी का अनुप्रयोग
ख. शिकागो से स्वामी विवेकानंद का पत्र

इकाई–5

क. मानक हिन्दी भाषा का अर्थ, स्वरूप, विशेषताएँ, मानक, उपमानक, अमानक भाषा
ख. सामाजिक गतिशीलता – प्राचीन काल, मध्यकाल, आधुनिक काल

मूल्यांकन योजना :–

प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः 8 एवं 7 होंगे। प्रश्न–पत्र का पूर्णांक 75 निर्धारित है।

पाठ्यक्रम संशोधन का औचित्य :–

व्याकरण के बुनियादी ज्ञान, संप्रेषण, कौशल, सामाजिक संदेश एवं भाषायी दक्षता को ध्यान में रखते हुए यह पाठ्यक्रम प्रस्तावित है।

B.A./B.Sc./B.Com./B.H.Sc. Part-I
FOUNDATION COURSE
PAPER-II
ENGLISH LANGUAGE

M.M. 75

UNIT-I **Basic language skills: Grammar and Usage.**

Grammar and Vocabulary based on the prescribed text.
To be assessed by objective/multiple choice tests.

(Grammar - 20 marks)
Vocalulary - 15 Marks)

UNINT-II **Comprehension of an unseen passage.** **05 Marks**

This should imply not only (a) an understanding of the passage in question, but also (b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent. Composition based on themes and issues raised in the passage.
To be assessed by both objective multiple choice and short answer type tests.

UNIT-III **Composition:** Paragraph writing **10 Marks**

UNIT-IV **Letter writing** (The formal and one Informal) **10 Marks**

Two letters to be attempted of 5 marks each. One formal and one informal.

UNIT-V **Texts:** **15 Marks**

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authrs, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler then modem examples. In all cases, the language should be accessible (with a minumum of explantion and reference to standard dictionaries) to the general body of students schooled in the medium of and Indian language.
Students should be able to grasp the contents of each plece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Priciples of Literary criticism should not be taken up at this stage.
To be assessed by five short answers of three marks each.

BOOK PRESCRIBED-

English Language and Indian Culture - Published by M.P. Hindi Granth Academy Bhopal.

B.Com Part-I
COMPULSORY
GROUP–I
PAPER–I
FINANCIAL ACCOUNTING

OBJECTIVE – To Impart basic accounting knowledge as applicable to business**.**

UNIT–I Accounting: An Introduction: Development, Definition, Needs, objectives; Branches of accounting; Basic Accounting Principles, Concepts & Conventions.Accounting Standard: International Accounting Standard only outlines, Accounting Standard in India.
Accounting Transaction: Concept of Double Entry System, Concept of Capital & Revenue, Book of original records: Journal; Ledger; Sub-Division of Journal: Cashbook.

UNIT–II Final Accounts; Trial balance; Manufacturing account; Trading account; Profit & loss account; Balance sheet; Adjustment entries.
Rectification of errors; Classification of errors; Location of errors; Rectification of errors; Suspense account; Effect on profit.

UNIT–III Depreciation, Provisions, and Reserves; Concept of depreciation; Causes of deprecation; Depreciation, depletion amortization, Depreciation accounting; Methods of recording depreciation; Methods for providing depreciation; Depreciation of different assets; Depreciation of Replacement cost; Depreciation policy; as per Indian accounting Standard : provisions and Reserves. Accounts of Non-Trading Institutions.

UNIT –IV Special Accounting Areas:
Hire-purchase and installment purchase system: Meaning of hire-purchase contract, Legal provision regarding hire-purchase contract; Accounting for goods of substantial sale values, and accounting records for goods for small values; Installment purchase system; after sales Service.

UNIT–V Partnership Account: Dissolution of a Partnership Firm, Amalgamation of Partnership Firms, Conversion of Partnership Firm into Joint Stock Company.

Suggested Readings:

1. Gupta, R.L. and Radhaswamy. M; Financial Accounting; Sultan Chand and Sons, New Delhi. (Both Hindi and English medium)
2. Monga J.R. Ahuja Girish and Sehgal Ashok: Financial Accounting; Mayur Paper Back, Noida.
3. Shukla. M.C., Grewal T.S. and Gupta, S.C.: Advanced Accounts; S. Chand & Co. New Delhi.
4. Singh B.K.; Financial Accounting; Wisdom Publishing House, Varanasi.
5. S.M. Shukla; Financial Accounting; Sahitya Bhawan Publication; Agra. (Both Hindi and English medium)
6. Karim & Khanuja; Financial Accounting; SBPD Publishing House; Agra. (Both Hindi and English medium)
7. Agrawal & Mangal; Financial Accounting; Universal Publication. (Both Hindi and English medium)

बी.कॉम. भाग–एक
अनिवार्य
समूह–1
प्रश्नपत्र–1
वित्तीय लेखांकन

इकाई–1 लेखांकन का परिचय : विकास, परिभाषा, आवश्यकता, उद्देश्य, लेखांकन की शाखाएं; लेखांकन के सिद्धांत, अवधारणा एवं परंपराएं।
लेखांकन मानक : अन्तर्राष्ट्रीय लेखांकन मानक (सिर्फ रूपरेखा) : भारत में लेखांकन मानक।
लेखांकन व्यवहार ;दोहरी प्रविष्टि प्रणाली की अवधारणा।
पूँजी एवं आगम की अवधारणा, मूल प्रविष्टि की पुस्तकेंः जर्नल, खाताबही, जर्नल का विभाजन : रोकड़ पुस्तक ।

इकाई–2 तलपट, अन्तिम खाते : निर्माणी खाता, व्यापार खाता, लाभ–हानि खाता, चिट्ठा एवं समायोजन प्रविष्टियॉ। अशुद्धियों का सुधार या संशोधन, अशुद्धियों का वर्गीकरण, अशुद्धियों की स्थिति, अशुद्धियों का सुधार, उचंत खाता लाभ पर प्रभाव।

इकाई–3 मूल्य ह्रास (अवक्षयण), आयोजन एवं संचय; ह्रास की अवधारणा, ह्रास के कारण, ह्रास रिक्तता, अपलेखन ह्रास लेखांकन, ह्रास अभिलेखन की विधियाँ; विभिन्न सम्पत्तियों पर ह्रास आयोजन की विधियाँ; प्रतिस्थापन लागत पर ह्रास, भारतीय लेखांकन मानक के अनुसार लेखांकन नीतियाँ, आयोजन एवं संचय; गैर–व्यापारिक संस्थाओं के खाते।

इकाई–4 विशेष लेखांकन क्षेत्रः
किराया क्रय एवं किस्त क्रय पद्धति : किराया क्रय अनुबन्ध का अर्थ, किराया क्रय अनुबन्ध संबंधित प्रॉवधान, अधिक मूल्य की वस्तुओं के लिए लेखांकन अभिलेख, किस्त क्रय पद्धति एवं क्रय पश्चात् सेवा।

इकाई–5 साझेदारी खाते : साझेदारी फर्म का विघटन, साझेदारी फर्मो का एकीकरण, साझेदारी फर्म की संयुक्त स्कन्ध प्रमण्डल में परिवर्तन।

Suggested Readings:

1. Gupta, R.L. and Radhaswamy. M; Financial Accounting; Sultan Chand and Sons, New Delhi. (Both Hindi and English medium)
2. Monga J.R. Ahuja Girish and Sehgal Ashok: Financial Accounting; Mayur Paper Back, Noida.
3. Shukla. M.C., Grewal T.S. and Gupta, S.C.: Advanced Accounts; S. Chand & Co. New Delhi.
4. Singh B.K.; Financial Accounting; Wisdom Publishing House, Varanasi.

5. S.M. Shukla; Financial Accounting; Sahitya Bhawan Publication; Agra. (Both Hindi and English medium)
6. Karim & Khanuja; Financial Accounting; SBPD Publishing House; Agra. (Both Hindi and English medium)
7. Agrawal & Mangal; Financial Accounting; Universal Publication. (Both Hindi and English medium)

B.COM PART- I
COMPULSORY
GROUP–II
PAPER–I
BUSINESS MATHEMATICS

OBJECTIVE – To enable the students to have such minimum knowledge of mathematics as is applicable to business and economic situations.

UNIT–I Simultaneous Equations– Meaning, Characteristics, Methods of Solving Equations in Two Variables– Graphical, Substitution, Elimination and Cross Multiplication.
Linear Programming –Formulation of LLP: Graphical method of solution; Problems relating to two variables including the case of mixed constraints.

UNIT–II Matrices and Determinants: Definition of a matrix; Type of a matrices; Algebra of matrices; Properties of determinants; Calculation of values of determinants upto third order; Logarithms & Antilogarithm's.

UNIT–III Simple interest and Compound Interest.
Annuties: Types of annuities; Present value and amount of an annuity, including the case of continuous compounding; Valuation of simple loans and debentures; Problems relating to sinking funds.

UNIT–IV Ratio & Proportion.
Average, Percentage.

UNIT–V Commission, Brokerage, Discount, Profit and loss.

Suggested Readings:

1. Dr. Amarnath Dikshit, Dr. Jinendra Kumar Jain; Business Mathematics; Himalaya Publishing House, Mumbai. (Both Hindi and English medium)
2. N.K. Nag: Business Mathematics; Kalyani publication, New Delhi. .
3. Dr. V.K. Shukla. : Business Mathematics; Madhya Pradesh Hindi Granth Academy: Bhopal.
4. S.M. Shukla; Business Mathematics; Sahitya Bhawan Publication; Agra. (Both Hindi and English medium)
5. Dr. Karim & Agrawal; Business Mathematics; SBPD Publishing House; Agra. (Both Hindi and English medium)
6. Dr. Ramesh Mangal; Business Mathematics; Satish Printer and Publishers, Indore.

बी.कॉम. भाग – एक
अनिवार्य
समूह–2
प्रश्नपत्र–1
व्यावसायिक गणित

इकाई–1 युगपद् समीकरण – अर्थ, विशेषताऐं, दो चर वाले समीकरण को हल करने की विधियॉ – रेखीय विधि,प्रतिस्थापन विधि, विलोपन विधि, वज्रगुणन विधि।
रेखीय प्रक्रमन : रेखीय प्रक्रमन समस्या को गणितीय रूप मे लिखना : ग्राफीक विधि से हल, द्विचर से संबंधित मिश्रित निबाध समस्याएं।

इकाई–2 आव्यूह एवं सारणिक : आव्यूह की परिभाषा, आव्यूह के प्रकार, आव्यूह बीजगणित, सारणिक के गुण, तृतीयक्रम के सारणिकों के मान की गणना।
लघुगणक एवं प्रतिलघुगणक।

इकाई–3 साधारण ब्याज एवं चक्रवृद्धि ब्याज ।
वार्षिकी : वार्षिकी के प्रकार, वार्षिकी का वर्तमान मूल्य एवं मिश्रधन, ब्याज का सतत संयोजन, साधारण ऋण एवं ऋणपत्र का मूल्यांकन, शोधन निधि के प्रश्न।

इकाई–4 अनुपात एवं समानुपात।
औसत : साधारण, भारित एवं सांख्यकीय औसत (समान्तर माध्य)।
प्रतिशतता।

इकाई–5 कमीशन, दलाली, बट्टा, लाभ एवं हानि।
परिवहन समस्या।

Suggested Readings:

1. Dr. Amarnath Dikshit, Dr. Jinendra Kumar Jain; Business Mathematics ;Himalaya Publishing House, Mumbai. (Both Hindi and English medium)
2. N.K. Nag: Business Mathematics; Kalyani publication, New Delhi. .
3. Dr. V.K. Shukla.: Business Mathematics; Madhya Pradesh Hindi Granth Academy: Bhopal.
4. S.M. Shukla; Business Mathematics; Sahitya Bhawan Publication; Agra. (Both Hindi and English medium)
5. Dr. Karim & Agrawal; Business Mathematics; SBPD Publishing House; Agra. (Both Hindi and English medium)
6. Dr. Ramesh Mangal; Business Mathematics; Satish Printer and Publishers, Indore.

B.COM PART- I
COMPULSORY
GROUP–I
PAPER–II
BUSINESS COMMUNICATION

OBJECTIVE – To develop effective business communication skills among the students.

UNIT–I Introducing Business Communication: Definitions, concept and Significance of communication, Basic forms of communicating; Communication models and process; principles of effective communication; Theories of communication; Self-Development and Communication; Development of positive personal attitudes, SWOT analysis;

UNIT–II Corporate Communication: Formal and Informal communication networks; Grapevine; Miscommunication (Barriers); improving communication. Practices in business communication; Group discussions; Seminars; Effective Listening: Principles of effective listening; Factor affective listening exercises; Oral, Written, and video session, Audience analysis and feedback**.**

UNIT–III Writing skill: Business letters – Defination, concepts, structure, advantages disadvantage, need and kinds of business letter, Essentials of effective business letter. Good news and bad new letters; Office memorandum. Writing Resume and Letter of Job Application.

UNIT–IV Report Writing: Introduction to a proposal, Short report and formal report, report preparation.

Oral Presentation: Principles of oral presentation, factor affecting presentation, sales presentation, training presentation, conducting surveys, speeches to motivate, presentation skill.

UNIT–V Non-Verbal Aspects of Communicating. Body Language: Kinesics, Proxemics, Para Language.

Interviewing skills: Appearing in interviews; conducting interviews; mock interview.

Modern Forms of Communicating: Fax; E-Mail; video conferencing; etc.

International Communication for global business.

Suggested Readings:

1. Dr. P. K. Agrawal, Dr. A.K. Mishra; Business Communication; Sahitya Bhawan Publication; Agra (Hindi medium)

2. Balasubramanyam: Business Communication; Vikas Publishing House, Delhi. (English medium)
3. Dr. Vinod Mishra: Business Communication; Sahitya Bhawan Publication; Agra. (Hindi medium)
4. Kaul: Effective Business Communication; Prentice Hall, New Delhi. (English medium)
5. Patri VR: Essentials of Communication; Greenspan Publications, New Delhi. (English medium)
6. Senguin J: Business Communication; The Real World and Your Career, Allied Publishers, New Delhi. (English medium)
7. Dr. Mishra, Shukla & Patel; Business Communication; SBPD Publishing House, Agra. (Both Hindi and English medium)

बी,कॉम. भाग–एक
अनिवार्य
समूह–1
प्रश्नपत्र–2
व्यावसायिक संचार

इकाई–1 व्यावसायिक संचार परिचय : परिभाषा, अवधारणाएं एवं संचार का महत्व, संचार के आधारभूत प्रकार एवं मॉडल, प्रक्रिया एवं प्रभावी संचार के सिद्धांत ।

आत्म विकास एवं संचार, सकारात्मक व्यक्तिगत दृष्टिकोण का विकास, स्वॉट विश्लेषण ।

इकाई–2 व्यावसायिक संस्था का संचार तंत्र :– औपचारिक एवं अनौपचारिक संचार तंत्र, अंगूरी लता संचार, संचार की बाधाएं एवं सुधार।

व्यवहार में व्यावसायिक संचार :– सामूहिक परिचर्चा, संगोष्ठी, प्रभावपूर्ण सूनना : प्रभावपूर्ण सूनने के सिद्धांत, प्रभावपूर्ण सूनने के कारक, मौखिक, लिखित एवं विडियो सत्र का व्यवहारिक अध्ययन, श्रोता विश्लेषण एवं प्रतिपुष्टी।

इकाई–3 लेखन कुशलता : व्यावसायिक पत्र – परिभाषा, अवधारणा, संरचना, गुण दोष, आवश्यकता एवं विभिन्न प्रकार के व्यावसायिक पत्र, प्रभावी व्यापारिक पत्र व्यवहार के मूल तत्व। अनुकुल एवं प्रतिकुल संवाद पत्र, कार्यालयीन ज्ञापन व पत्र। जीवनवृत लेखन एवं नौकरी के लिए आवेदन पत्र।

इकाई–4 रिर्पोट लेखन – एक प्रस्ताव का परिचय, लघु रिर्पोट एवं औपचारिक रिर्पोट, रिर्पोट लेखन की तैयारी।

मौखिक प्रस्तुती : मौखिक प्रस्तुती के सिद्धांत, प्रस्तुतीकरण को प्रभावित करने वाले कारक, विक्रय प्रस्तुतीकरण, प्रशिक्षण प्रस्तुतीकरण, सर्वेक्षण आयोजित करना, प्रेरक भाषण, प्रभावी प्रस्तुती कौशल।

इकाई–5 अशाब्दिक संचार के पहलू – दैहिक भाषा, समय एवं पार्श्व भाषा, साक्षात्कार कुशलता : साक्षात्कार में शामिल होना, साक्षात्कार का आयोजन, मॉक साक्षात्कार।

संचार के आधुनिक रूप – फैक्स, ई मेल, वीडियो कॉन्फ्रेसिंग आदि।

अंतराष्ट्रीय संचार : सांस्कृतिक संवेदनशीलता एवं सांस्कृतिक संदर्भ, भूमण्डलीय व्यावसाय के लिए अंतराष्ट्रीय संप्रेषण।

Suggested Readings:

1. Dr. P. K. Agrawal, Dr. A.K. Mishra; Business Communication; Sahitya Bhawan Publication; Agra (Hindi medium)
2. Balasubramanyam: Business Communication; Vikas Publishing House, Delhi. (English medium)
3. Dr. Vinod Mishra: Business Communication; Sahitya Bhawan Publication; Agra. (Hindi medium)
4. Kaul: Effective Business Communication; Prentice Hall, New Delhi. (English medium)

5. Patri VR: Essentials of Communication; Greenspan Publications, New Delhi. (English medium)
6. Senguin J: Business Communication; The Real World and Your Career, Allied Publishers, New Delhi. (English medium)
7. Dr. Mishra, Shukla & Patel; Business Communication; SBPD Publishing House, Agra. (Both Hindi and English medium)

B.Com Part- I
COMPULSORY
GROUP – II
PAPER – II
BUSINESS REGULATORY FRAMEWORK

OBJECTIVE – To provide a brief idea about the framework of Indian business laws.

UNIT–I Law of Contract (1872) –I: Nature of contract; Classification; Offer and acceptance; Capacity of parties to contract, free consent, Considerations, Legality of object; Agreement declared void.

UNIT–II Law of Contract (1872) - II: Performance of contract, Discharge of contract; Remedies for breach of contract.
Special contracts; Indemnity; Guarantee; Bailment and pledge; Agency.

UNIT–III Sale of Goods Act (1930) ;Formation of contracts of sale ;Goods and their classification, price, Conditions and warranties; Transfer of property in goods; Performance of the contract of sales; Unpaid seller and his rights; sale by auction; Hire purchase agreement.

UNIT–IV Negotiable Instrument Act (1881): Definition of negotiable instrument; Feature; Promissory note; Bill of Exchange & cheque; Holder and holder in the due course; crossing of a cheque, types of crossing; Negotiation; Dishonor and discharge of negotiable instrument.

UNIT –V The Consumer Protection Act 1986: Main Provision, Definition of consumer, Consumer Disputes, Grievance redressal machinery; Indian Partnership Act 1932. Limited Liabilities Partnership Act 2008.
Introduction of Intellectual Property Right Act – Copyright, Patent & Trademark.

Suggested Readings:

1. Kuchal M.C.; Business Law; Vikas Publishing House, Delhi. (English medium)
2. Kapoor N.D.: Business Law; Sultan Chand & Sons, New Delhi. (English medium)
3. Chandha P.R.: Business Law; Galgotia, New Delhi. (English medium)
4. Dr. J.K. Vaishnav: Business Law; Sahitya Bhawan publication, Agra. (English medium)
5. Prof. R. C. Agrawal; Business Regulatory Framework; SBPD Publishing House, Agra. (Hindi medium)
6. K.R. Bulchandani; Business Law; Himalaya Publishing House, Mumbai. (Both Hindi and English medium)
7. R.L. Navlakha; Business Law; Ramesh Book depot, Jaipur. (Both Hindi and English medium)
8. Arun Kumar Gangele; Business Regulatory Framework; Ram Prasad & Sons, Agra. (Hindi medium)

बी.कॉम. भाग – एक
अनिवार्य
समूह–2
प्रश्नपत्र–2
व्यावसायिक नियमन रूपरेखा

इकाई–1 भारतीय अनुबंध अधिनियम (1872) : अनुबंध की प्रकृति : वर्गीकरण, प्रस्ताव तथा स्वीकृति, अनुबंध के योग्य पक्षकार, पक्षकारो की स्वतंत्र सहमति, प्रतिफल, उद्देश्य की वैधता, व्यर्थ घोषित ठहराव।

इकाई–2 अनुबंध का निष्पादन ;अनुबंधो की समाप्ति, अनुबंध भंग के उपाय एवं परिणाम। विशिष्ट अनुबंध : क्षतिपूर्ति, प्रतिभूति, निक्षेप, गिरवी अनुबंध, एजेंसी।

इकाई–3 वस्तु विक्रय अधिनियम (1930) : वस्तु विक्रय अनुबंध का निर्माण, माल का वर्गीकरण, कीमत, शर्ते और आश्वासन, माल के स्वामित्व का हस्तांतरण, विक्रय अनुबंध का निष्पादन, अदत्त विक्रेता के अधिकार, नीलाम द्वारा विक्रय, किराया क्रय ठहराव।

इकाई–4 विनिमय साध्य विलेख अधिनियम (1881) : परिभाषाएं, विशेषताएं, प्रतिज्ञा पत्र, विनिमय विपत्र और धनादेश (चैक) : धारक तथा यथाविधिधारी, रेखांकित चैक, रेखांकन के प्रकार, परक्रामण, विनिमय साध्य विलेख का अनदारण व मुक्ति।

इकाई–5 उपभेक्ता संरक्षण अधिनियम (1986) : मुख्य विशेषताएं, उपभोक्ता की परिभाषा, उपभोक्ता विवाद निवारण अभिकरण।
भारतीय साझेदारी अधिनियम 1932।
सीमित दायित्व वाली साझेदारी अधिनियम 2008।
बौद्धिक संपदा अधिकार अधिनियम का परिचय – कॉपीराईट, पेटेन्ट एवं ट्रेडमार्क।

Suggested Readings:

1. Kuchal M.C.; Business Law; Vikas Publishing House, Delhi. (English medium)
2. Kapoor N.D.: Business Law; Sultan Chand & Sons, New Delhi. (English medium)
3. Chandha P.R.: Business Law; Galgotia, New Delhi. (English medium)
4. Dr. J.K. Vaishnav: Business Law; Sahitya Bhawan publication, Agra. (English medium)
5. Prof. R. C. Agrawal; Business Regulatory Framework; SBPD Publishing House, Agra. (Hindi medium)
6. K.R. Bulchandani; Business Law; Himalaya Publishing House, Mumbai. (Both Hindi and English medium)
7. R.L. Navlakha; Business Law; Ramesh Book depot, Jaipur. (Both Hindi and English medium)
8. Arun Kumar Gangele; Business Regulatory Framework; Ram Prasad & Sons, Agra. (Hindi medium)

B.Com Part- I
Compulsory
Group–III
Paper–I
BUSINESS ENVIRONMENT

OBJECTIVE – To acquainting the students with the emerging issues in business at the national and international level in the light of the policies of liberalization and globalization.

UNIT–I Business Environment: Concept, Components and Importance, Economic Trends (overview): Income: Saving and investment; Trade and balance of payment, Money and Finance.

UNIT–II Problems of Growth: Unemployment; Poverty; Regional imbalances; Social Injustice; Inflation ; Parallel economy; Industrial sickness.

UNIT–III Role of Government; Monetary and fiscal policy; Industrial policy; Industrial licensing. Privatization; Liberalisation, Globalisation Devaluation; Demonitisation; Export-Import policy.

UNIT–IV Economic Planning in India: Need, objectives, Strategy; Review of Previous Plans, Planning Commission.
Foreign Exchange Management Act 2000: Basic Concept and Main Provisions.

UNIT–V International Environment; Trends in World trade and the problems of developing countries; Foreign trade and economic growth; International economic groupings – GATT., WTO ,UNCTAD, World Bank, IMF; FDI.

Suggested Readings:

1. Agarwal A. N.: Indian Economy, Vikas Publishing House Delhi. (English medium)
2. Khan Faroog A: Business and Society; S. Chand, Delhi. (English medium)
3. Dutt R. and Sundharam K. Pm.; Indian Economy; S. Chand, Delhi. (English medium)
4. Misra S.K. and Puri V.K.: Indian Economy; Himalaya Publishing House, New Delhi. (English medium)
5. Dr. V.C. Sinha; Business Environment; SBPD Publishing House, Agra. (Both Hindi and English medium)
6. Dr. J. K. Jain; Business Environment; Madhya Pradesh Hindi Granth Academy: Bhopal. (Hindi medium)
7. Gupta & Pathak; Business Environment; Ram Prasad & Sons, Raipur. (Hindi medium)
8. S.K. Singh; Business Environment; SBPD Publishing House, Agra. (Both Hindi and English medium)

बी.कॉम. भाग – एक
अनिवार्य
समूह–3
प्रश्नपत्र–1
व्यावसायिक पर्यावरण

इकाई–1 व्यावसायिक पर्यावरण : अवधारणा, संघटक व महत्व,
आर्थिक प्रवृत्तियॉ : आय, बचत एवं विनियोग; व्यापार एवं भुगतान सन्तुलन, मुद्रा एवं वित्त।

इकाई–2 विकास की समस्याऍ : बेरोजगारी, निर्धनता एवं क्षेत्रीय असन्तुलन, सामाजिक अन्याय, मुद्रास्फीति, समान्तर अर्थव्यवस्था, औद्योगिक रूग्णता।

इकाई–3 शासन की भूमिका (वर्तमान परिदृश्य में) : मौद्रिक एवं राजकोषीय नीति, औद्योगिक नीति, औद्योगिक लाइसेंसिंग नीति, निजीकरण, उदारीकरण, भूमण्डलीकरण, अवमूल्यन, विमुद्रिकरण निर्यात–आयात नीति, विदेशी विनियोग का नियमन।

इकाई–4 भारत में आर्थिक नियोजन : आवश्यकता, उद्देश्य एवं व्यूहरचना, पुर्व पंचवर्षीय योजनाओं की समीक्षा, चालू पंचवर्षीय योजना।
विदेशी विनिमय प्रबंध अधिनियम 2000 : अवधारणा एवं मुख्य प्रवधान।

इकाई–5 अंतराष्ट्रीय पर्यावरण : विश्व व्यापार की प्रवृत्ति एवं विकासशील देशों की समस्याऍ, विदेशी व्यापार एवं आर्थिक विकास, अंतराष्ट्रीय आर्थिक समूह– प्रशुल्क एवं व्यापार संबंधि सामान्य समझौता (गैट), विश्व व्यापार संगठन, विश्व बैंक, अंतराष्ट्रीय मुद्रा कोष, प्रत्यक्ष विदेशी निवेश, संयुक्त राष्ट्र व्यापार एवं विकास संगठन (अंकटाड़)।

Suggested Readings:

1. Agarwal A. N.: Indian Economy, Vikas Publishing House Delhi. (English medium)
2. Khan Faroog A: Business and Society; S. Chand, Delhi. (English medium)
3. Dutt R. and Sundharam K. Pm.; Indian Economy; S. Chand, Delhi. (English medium)
4. Misra S.K. and Puri V.K.: Indian Economy; Himalaya Publishing House, New Delhi. (English medium)
5. Dr. V.C. Sinha; Business Environment; SBPD Publishing House, Agra. (Both Hindi and English medium)
6. Dr. J. K. Jain; Business Environment; Madhya Pradesh Hindi Granth Academy: Bhopal. (Hindi medium)
7. Gupta & Pathak; Business Environment; Ram Prasad & Sons, Raipur. (Hindi medium)
8. S.K. Singh; Business Environment; SBPD Publishing House, Agra. (Both Hindi and English medium)

B.Com Part- I
COMPULSORY
GROUP–III
BUSINESS ECONOMICS
PAPER–II
BUSINESS ECONOMICS

OBJECTIVE – To acquaint the students with the principles of Business Economics as are applicable in business.

UNIT–I Introduction: Definition, Nature and Scope of Economics, Difference between Micro and Macro Economics, Method of Economic Study: Inductive and Deductive Methods.
Basic problem of Economy, Working of Price Mechanism.
Utility Analysis: Measurements of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility.

UNIT-II Law of demand: Meaning and Definitions, Effecting Factors, Types; Exception of Law of demand.
Elasticity of Demand: Concept, Definitions, Importance, Types and Measurement of Elasticity of Demand, Factors affecting the Elasticity of Demand.

UNIT–III Production: Factors of Production, their characteristics and importance.
Production Functions: Law of Variable Proportions, Return to scale and Equal Product Curve Analysis. Internal and external economies and diseconomies.

UNIT–IV Market Structure – Concept, Characteristics, Classification. Determination of Price under condition of Perfect Competition, Imperfect Competition and Monopoly, Monopolistic Competition, Oligopoly and Duopoly.

UNIT–V Theories of distribution, Marginal Productivity theory of distribution, Concept and theories of Wages, Rent, Interest & Profit.

Suggested Readings:

1. John P. Gould, Jr. and Edward P. Lazear: Micro economic theory; All India Traveller, Delhi. (English medium)
2. Koutsoyianni A.: Modern Microeconomics: Macmillan, New Delhi. (English medium)
3. Khan Faroog A: Business and Society; S. Chand, Delhi. (English medium)
4. Misra S.K. and Puri V.K.: Indian Economy; Himalaya Publishing House, New Delhi. (English medium)
5. M. L. Jhingan: Micro Economics, Vrinda publication, Delhi. (Both English and Hindi medium)
6. Dr. J. K. Jain; Business Economics; Madhya Pradesh Hindi Granth Academy: Bhopal. (Hindi medium)
7. Dr. V.C. Sinha; Business Economics; SBPD Publishing House, Agra. (Both English and Hindi medium)
8. Dr. Jai Prakash Misra; Business Economics; Sahitya Bhawan Publication, Agra. (Hindi medium)

बी.कॉम. भाग – एक
अनिवार्य
समूह–3
प्रश्नपत्र–2
व्यावसायिक अर्थशास्त्र

इकाई–1 परिचयः अर्थशास्त्र की परिभाषा, प्रकृति एवं क्षेत्र, व्यष्टि एवं समष्टि अर्थशास्त्र में भेद, आर्थिक अध्ययन की प्रणालियां : निगमन एवं आगमन।
अर्थव्यवस्था की मूल समस्याएं, कीमत संयंत्र का कार्यकरण।
उपयोगिता विश्लेषण – उपयोगिता की माप, सीमांत उपयोगिता ह्रास नियम, समसीमांत उपयोगिता नियम।

इकाई–2 मांग का नियम : अर्थ, परिभाषा, प्रभावित करने वाले धटक, मांग के रूप, मांग के नियम के अपवाद।
मांग की लोच : अवधारणा, परिभाषा, महत्व, प्रकार एवं मापन की विधियां, मांग की लोच को प्रभावित करने वाले धटक।

इकाई–3 उत्पादन : उत्पादन के कारक ,उनकी विशषताएं एवं महत्व।
उत्पादन फलन : परिवर्तनशील अनुपातों का नियम, पैमाने का प्रतिफल, समोत्पाद वक्र विश्लेषण। आंतरिक एवं बाह्य मितव्ययिता एवं अपमितव्ययिता।

इकाई–4 बाजार संरचनाः अवधारणा, परिभाषाएं, विशेषताएं एवं वर्गीकरण। पूर्ण प्रतियोगिता, अपूर्ण प्रतियोगिता, एकाधिकारी प्रतियोगिता, एकाधिकृत प्रतियोगिता, अल्पाधिकार एवं द्वयाधिकार में कीमत निर्धारण।

इकाई–5 वितरण का सिद्धांत : सीमान्त उत्पादकता का सिद्धांत, मजदूरी, लगान, ब्याज एवं लाभ की अवधारणा एवं सिद्धांत।

Suggested Readings:

1. John P. Gould, Jr. and Edward P. Lazear: Micro economic theory; All India Traveller, Delhi. (English medium)
2. Koutsoyianni A.: Modern Microeconomics: Macmillan, New Delhi. (English medium)
3. Khan Faroog A: Business and Society; S. Chand, Delhi. (English medium)
4. Misra S.K. and Puri V.K.: Indian Economy; Himalaya Publishing House, New Delhi. (English medium)
5. M. L. Jhingan: Micro Economics, Vrinda publication, Delhi. (Both English and Hindi medium)
6. Dr. J. K. Jain; Business Economics; Madhya Pradesh Hindi Granth Academy: Bhopal. (Hindi medium)
7. Dr. V.C. Sinha; Business Economics; SBPD Publishing House, Agra. (Both English and Hindi medium)
8. Dr. Jai Prakash Misra; Business Economics; Sahitya Bhawan Publication, Agra. (Hindi medium)

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
BASTAR VISHWAVIDYALAYA, JAGDALPUR (C.G.)

SYLLABUS
B.Com. PART-II
SESSION 2020-21

बस्तर विश्वविद्यालय, जगदलपुर (छ.ग.)
धरमपुरा, जगदलपुर, जिला–बस्तर (छ.ग.) 494001
वेबसाईट www.bvvjdp.ac.in दूरभाष–07782–229037 फैक्स 229297

NOV 2020

SYLLABUS
B.COM. PART-II
GROUPING OF SUBJECTS AND SCHEME OF EXAMINATION

Subject		Max.	Min.
A. Foundation Course			
I. Hindi Language		**75**	**26**
II. English Language		**75**	**26**
B. Three Compulsory Groups			
Group-I			
I. Corporate Accounting	**75**	**150**	**50**
II. Company Law	**75**		
Group-II			
I. Cost Accounting	**75**	**150**	**50**
II. Principles of Bus. Management	**75**		
Group-III			
I. Business Statistics	**75**	**150**	**50**
II. Fundamental of Entrepreneurship	**75**		

संशोधित पाठ्यक्रम
बी.ए./बी.एस–सी./बी.कॉम./बी.एच.एस.–सी. भाग–दो,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

खण्ड–क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे – **अंक–35**

1. महात्मा गांधी – चोरी और प्रायश्चित
2. आचार्य नरेंद्र देव – युवकों का समाज में स्थान
3. वासुदेव भारण अग्रवाल – मातृभूमि
4. हरि ठाकुर – डॉ. खूबचंद बघेल
5. पं. माधवराव सप्रे – सम्भाषण–कुशलता

खण्ड–ख हिन्दी भाषा और उसके विविध रूप **अंक–16**

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड–ग हिन्दी की व्याकरणिक कोटियॉ **अंक–24**

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समास, संधि एवं संक्षिप्तियां
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन–

इकाई–1 चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा

इकाई–2 युवकों का समाज में स्थान : आचार्य नरेन्द्र देव/वित्त एवं वाणिज्य की भाषा, मशीनी भाषा

इकाई– 3 मातृभूमिः वासुदेवशरण अग्रवाल / संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण

इकाई– 4 डॉ. खूबचंद बघेल : हरि ठाकुर / समास, संधि

इकाई– 5 सम्भाषण–कुशलता : पं. माधवराव सप्रे, / अनुवाद – अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियॉ

मूल्यांकन योजना –

प्रत्येक इकाई से एक–एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई को दो–दो खण्डों (क्रमांक' 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न–पत्र के पूर्णांक 75 होंगे।

पाठ्यक्रम संशोधन का औचित्य : विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ–साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सके तथा व्याकरिणक एवं भाशा विशयक प्रस्तावित पाठ्यक्रम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सके।

अध्यक्ष– हिंदी अध्ययन मंडल

B.A/B.S.c./B.Com/B.H.S.c Part-II
Foundation Course
PAPER - II
ENGLISH LANGUAGE

M.M. 75

The question paper B.A/B.S.c./B.Com/B.H.S.c English Language cultural valuers shall comprise the following units:

UNIT-I Short answer questions to be assed by (Five short answer questions of three marks each) **15 Marks**

UNIT-II
(a) Reading comprehension of an unseen passage **05 Marks**
(b) Vocabulary

UNIT-III Report-Writing **10 Marks**

UNIT-IV Expansion of an idea **10 Marks**

UNIT-V Grammar and Vocabulary based on the prescribed text book **20+15 Marks**

Note : Question on all the units shall asked from the prescribed text which will comprise specimens of popular creative/writing and the following it any

(a) Matter & technology
  (i) State of matter and its structure
  (ii) Technology (Electronics Communication, Space Science)
(b) Our Scientists & Institutions
  (i) Life & Work of our eminent scientist Arya Bhatt. Kaurd Charak Shusruta, Nagarjuna, J.C. Bose and C,V. Raman, S. Ramanujam, Homi J. Babha Birbal Sahani.
  (iii) Indian Scientific Institutions (Ancient & Modern)

Book Prescribed:

1. Foundation English for U.G. Second Year - Published by M.P. Hindi Granth Academy, Bhopal.

B.Com. II year
C O M P U L S O R Y
Group - I
PAPER – I (CORPORATE ACCOUNTING

Objective
This course enable the students to develop awareness about corporate accounting in conformity with the provisions of companies Act.

(As per company act 2013)
Proposed Syllabus

UNIT-I Issue, Forfeiture, and Re-issue of Shares: Redemption of preference shares; Issue and redemption of debentures.

UNIT-II Final Accounts (as per company act 2013) Liquidation of Company.

UNIT-III Valuation of Goodwill and Shares.

UNIT-IV Accounting for Amalgamation of Companies as per Indian Accounting Standard 14; Accounting for internal reconstruction - excluding intercompany holdings and re-construction schemes.

UNIT-V Consolidated Balance Sheet of holding companies with one subsidiary only.

SUGGESTED READINGS:

1. Dr. S.M. Shukla, Shahitya Bhawan Agra.
2. Dr. Mangal Mehta & Agrawal Published - Indore.
3. Dr. Karim Khanuja - Published - Agra.
4. Gupta R.L., Radhaswamy M; Company Accounts; Sultan Chand & Sons, New Delhi.

Group - I - PAPER - II
COMPANY LAW

OBJECTIVE

This objective of this course is to provide basic knowledge of the provisions Companies Act. 2013, along with relevant case law.

Proposed Syllabus

UNIT-I Corporate personalities; Kinds of Companies, Nature & Scope, promotion on and incorporation of companies.

UNIT-II Memorandum of Association; Articles of Association; Prospectus, Shares; share capital - transfer and transmission

UNIT-III Capital management- borrowing powers, mortgages and charges, debentures. Directors - Managing Director, whole time director, Appointment, Remuneration, and duties.

UNIT-IV Company meetings - kinds, Notice, quorum, voting, proxy, resolutions, minutes.

UNIT-V majority powers and minority rights; Prevention of oppression and mismanagement. Winding up - kinds and conduct.

SUGGESTED READINGS:

1. Singh Avtar: Company Law; Eastern Book Co., Lucknow.
2. Dr. S.M. Shukla, Shahitya Bhawan Agra.
3. Dr. R.C. Agrawal, Shahitya Bhawan Agra.
4. Kapoor N.D. : Company Law - Incorporating the Provisions of the companies Amendment
5. Act, 2013 Chand & Sons, New Delhi.

Group - II
PAPER – I (COST ACCOUNT)

OBJECTIVE

This course exposes the students to the basic concepts and the tools used in cost accounting

UNIT-I Introduction: Nature and scope of cost accounting; Cost concepts and classification; Methods and techniques; Installation of costing system; Concept of cost audit. Accounting for Material: Material Control; Concept and techniques; Pricing of material issues; Treatment of material losses.

UNIT-II Accounting for Labour: Labour cost control procedure; Labour turnover; Idle time and overtime; Methods of wage payment- time and piece rates; Incentive schemes. Accounting for overheads; Classification and departmentalization; Absorption of overheads; Determination of overhead rates; Under and over absorption, and its treatment.

UNIT-III Cost Ascertainment: Unit costing; Job, batch and contract costing.

UNIT-IV Operating costing; Process Costing- excluding inter- process profits, and joint and by products.

UNIT-V Cost Records: Intergal and non-integral system; Reconciliation of cost and financial accounts; Break Even Point.

SUGGESTED READINGS:

1. M.L. Agrawal: Shahitya Bhawan Agra.
2. Maheshwari S.N.: Advanced Problems and Solutions in Cost Accounting; Sultan Chand,
3. New Delhi.
4. Arora M.N.: Cost Accounting - Principles and Practice; Vikas, New Delhi.
5. Jain S.P. and Narang K.L.: Cost Accounting; Kalyani New Delhi.

Group - II - PAPER - II
PRINCIPLES OF BUSINESS MANAGEMENT

OBJECTIVE

This Course familiarizes the students with the basics of principles of management.

Proposed Syllabus

UNIT-I Introduction: Concept, nature, process, and significance of management; manage-ment roles (Mint berg); An overview of functional areas of management; Development management thought; Classical and neo-classical systems; Concept approaches.

UNIT-II Planning Concept, process and types. Decision making-concept and Bounded rationality; Management by objectives; Corporate planning; Environment analysis and diagnosis; Strategy formulation

UNIT-III Organizing: Concept, nature, process and significance; Authority and resident relationships; Centralization and decentralization; Departmentation; Organization structure - forms and contingency factors.

UNIT-IV Motivating and Leading People at work: Motivation- concept; Theories Herzberg, McGregor, and Ouchi; Financial and non- financial incentives. Leadership - concept and leadership styles; Leadership theories (Tannenb Schmidt.); Likert's System Management; Communication - nature, process, networks, and barriers, Effective Communication.

UNIT-V Managerial Control: Concept and process; Effective control system; Technical control-traditional and modern. Management of Change: Concept, nature, and process of planned Resistance to change; emerging horizons of management in a environment.

SUGGESTED READINGS:

1. Dr. R.C. Agrawal, Agra.
2. Dr. S.C. Saxena, Agra.
3. Weihrich and Koontz, et al: Essentials of Management; Tata McGraw Hill, New Delhi.

Group - III - PAPER - I
BUSINESS STATISTICS

OBJECTIVE

It enables the students to gain understanding of statistical techniques as are applicable to business.

Proposed Syllabus

UNIT-I Introduction : Statistics as a subject; Descriptive Statistics- compared to Inferential Statistics; Types of data; Summation operation; Rules of Sigma E operations, Analysis of University Data; Construction of a frequency distribution; Concept of central tendency.

UNIT-II **Dispersion- and their measures; Partition values; Skewness and measures;**

UNIT-III **Analysis of Bivariate Data: Linear regression two variables and correlation**

UNIT-IV Index Number; Meaning, types, and uses; Methods of Constructing price and quantity indices (simple and aggregate); Tests of adequacy; Chain - base index numbers; Base shifting, splicing and deflating; Problems in constructing index numbers; Consumer price index. Analysis of Time Series : Cause of Variation in time series data; Components of a time series; Decomposition - Additive and Multiplicative models; Determination of trend - Moving Averages Method and method of least squares (including linear, second degree, parabolic, and exponential trend); Computation of seasonal indices by simple averages, ratio - to - trend, ratio - to - moving average, and link relative methods.

UNIT-V Forecasting and Methods: Forecasting - concept, types and importance; General approach to forecasting; Methods of forecasting; demand; Industry Vs Company sales forecast; Factors affecting company sales. Theory of Probability: as a concept; The three approaches to defining probability; Addition and multiplication laws of probability; Conditional Probability; Bayes' Theorem; Expectation and Variance of a random variable.

SUGGESTED READINGS:

1. S.M.Shukla, Shahitya Bhawan, Agara.
2. Statistical Analysis, Dr. Rajesh Shukla and J.B. Agrawal

Group - III PAPER - II
FUNDAMENTALS OF ENTREPRENEURSHIP

OBJECTIVE

It provides 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.

Proposed Syllabus

UNIT-I Introduction: The entrepreneur; Definition; Emergence of entrepreneurial class; Theories of entrepreneurship; Role of socio - economic environment; Characteri-stics.

UNIT-II Promotion of a Venture; Opportunities analysis; External environmental analysis economic, social and technological; Competitive factors; Legal requirements for establishment of a new unit, and raising of funds; Venture capital sources and documentation required.

UNIT-III Entrepreneurial Behavior: Innovation and entrepreneur; Entrepreneurial behavior and Psycho - Theories, Social responsibility.

UNIT-IV Entrepreneurial Development Programs (EDP): EDP, their role, relevance, and achievements; Role of Government in organizing EDPs; Critical evaluation

UNIT-V Role of Entrepreneur : Role of an entrepreneur in economic growth as an innovator, generation of employment opportunities, complementing and supplementing economic growth, bringing about social stability and balanced regional development of industries; Role in export promotion and import substitution, forex earnings, and augmenting and meeting local demand.

SUGGESTED READINGS:

1. Srivastava S.B.: A Practical Guide to industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
2. Tandon B.C.: Environment and Entrepreneur; Chugh Publications, Allahabad.
3. Prasanna Chandra: Project Preparation, Appraisal, Implementation; Tata McGrow Hill, New Delhi

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर (छ.ग.)

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR (C.G.)

SYLLABUS

B.Com. PART-III

SESSION 2021-22

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर (छ.ग.)
SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR JAGDALPUR, (C.G.)

SYLLABUS
B.COM. PART-III

GROUPING OF SUBJECTS AND SCHEME OF EXAMINATION

Subject		Max.	Min.
Foundation Course			
I. Hindi Language		75	26
II. English Language		75	26
Compulsory Groups			
Group-I			
I. Income Tax	75	150	50
II. Auditing	75		
Group-II			
I. Indirect Taxes with GST	75	150	50
II. Management Accounting	75		
Group-III Optional			
Option Group A (Finance Area)			
I. Financial Management	75	150	50
II. Financial Market Operations	75		
Option Group B (Marketing Area)			
I. Principles of Marketing	75	150	50
II. International Marketing	75		
Option Group C (Commercial Area)			
I. Information Technology and its Applications in Business	75	150	50
II. Essential of e-Commerce	75		
Option Group D (Money Banking & Insurance Area)			
I. Fundamental of Insurance	75	150	50
II. Money & Banking System	75		

बी.ए. / बी.एससी. / बी.कॉम. / बी.एच.एससी भाग–तीन,
आधार पाठ्यक्रम
प्रश्न पत्र–प्रथम
हिन्दी भाषा

पूर्णांक– 75

इकाई–एक (क) भारत माता : सुमित्रानंदन पंत

(ख) कथन की शैलियॉ

1. विवरणात्मक शैली
2. मूल्यांकन शैली
3. व्याख्यात्मक शैली
4. विचारात्मक शैली

इकाई–दो (क) सूखी डाली : उपेन्द्रनाथ अश्क

(ख) विभिन्न संरचनाएँ

1. विनम्रता सूचक संरचना
2. विधि सूचक संरचना
3. निषेध परक संरचना
4. काल–बोधक संरचना
5. स्थान–बोधक संरचना
6. दिशा बोधक संरचना
7. कार्य–कारण सम्बन्ध संरचना
8. अनुक्रम संरचना

इकाई–तीन (क) वसीयत : मालती जोशी

(ख) कार्यालयीन पत्र और आलेख

1. परिपत्र
2. आदेश
3. अधिसूचना
4. ज्ञापन
5. अनुस्मारक
6. पृष्ठाकंन

इकाई–चार (क) योग की भाक्ति : हरिवंश राय बच्चन

(ख) अनुवाद : स्वरूप एवं परिभाषा, उद्देश्य स्त्रोत भाषा और लक्ष्य भाषा, अच्छे अनुवाद की विशेषताएँ, अनुवाद प्रक्रिया, अनुवादक

इकाई–पांच (क) संस्कृति और राश्ट्रीय एकीकरण : योगेश अटल

(ख) घटनाओं, समारोहों आदि का प्रतिवेदन, विभिन्न प्रकार के निमंत्रण पत्र।

मूल्यांकन योजना : प्रत्येक इकाई से एक–एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरित विकल्प होगा। प्रत्येक प्रश्न के **15** अंक होंगे। इसलिए प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः **8 एवं 7** अंक होंगे। प्रश्नपत्र का **पूर्णांक 75** निर्धारित है।

B.A./B.Sc./B.Com./B.H.Sc. Part III
Foundation Course
English Language

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items : Five question to be attempted, each carrying 3 marks.

UNIT-I	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	**15**
UNIT-II	Essay writing	**10**
UNIT-III	Precise writing	**10**
UNIT-IV	(a) Reading comprehension of an unseen passage	**05**
	b) Vocabulary based on text	**10**
UNIT-V	Grammar Advanced Exercises	**25**

Note: Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geoeconomic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberaliation Method) Demoration decentralization (with reference to 73, 74 constitutional Amendment.

Books Prescribed:

Aspects of English Language and Development-Published by M.P. Hindi Granth Academy, Bhopal.

B.COM PART III

COMPULSORY CORE COURSE

TITLE OF PAPER - Group-I

PAPER – I - INCOME TAX

OBJECTIVE

It enables the students to know the basics of Income Tax Act and its implications.

M.M. 75

UNIT- I Basic Concepts: Income, agricultural Income, casual income, assessment year, previous year, gross total income, total income, person.
Basis of charge: Scope of total income, residence and tax liability, income whichdoes not form part of total income.

UNIT- II Heads of Income: Salaries; Income from house property.

UNIT- III Profit and gains of business or profession, including provisions relating to specific business; Capital gains, Income from other sources.

UNIT-IV Computation of Tax Liabilty: Set-off and carry forward of losses; Deduction from grosstotal income.Aggregation of income; Computation of total income and tax liability of individualand& HUF.

UNIT-V Tax Management: Tax deduction at source; Advance payment of tax; Assessmentprocedures; Tax planning for individuals.
Tax evasion, Tax Avoidance and Tax planning. Tax Administration: Authorities, appeals, penalties.
Preparation of return of income
-Manually and on line

Suggested Reading:

1. Singhania V.K.: Students Guide to Income Tax; Taxmann, Delhi.
2. Prasad, Bhagwati: Income Tax Law &Prectice; Wily Publication, New Delhi.
3. Mehrotra H.C.: Income Tax Law & Accounts: SahityaBhawan, Agra.
4. Girish Ahuja and Ravi Gupta: Systematic approach to income tax: Sahitya Bhawan Publications, New Delhi.
5. Chandra Mahesh and Shukla D.C.: Income Tax Law and Practice; Pragati Publications, New Delhi.
6. R.K. Jain: Income Tax & Law (Hindi & English) ShahityaBhavan, Publication, Agra.

B.COM PART III

COMPULSORY CORE COURSE

TITLE OF PAPER - Group-I

PAPER – II- AUDITING

M.M. 75

OBJECTIVE

This course aims at imparting knowlege about the principles and methods of auditingand their applications.

UNIT-I Introduction: Meaning and objectives of auditing; Types of audit; Internal audit. Audit Process: Audit programme; Audit note books; Working papers and evidences.

UNIT-II Internal Check System: Internal control.

Audit Procedure: Vouching: Verification of assets and liabilities.

UNIT-III Audit of Limited Companies:

a. Company auditor – Qualification, Appointment, powers, duties, Resignation and liabilities.
b. Divisible profits and dividend.
c. Auditor's report - standard report and qualified report.
d. Special audit of banking companies.
e. Audit of educational institutions.
f. Audit of Insurance companies.

UNIT-IV Investigation: Investigation; Audit of non profit companies,

a. Where fraud is suspected, and
b. When a running a business is proposed.
c. Varifications & Valuation of assets.

UNIT-V Recent Trends in Auditing: Nature and significance of cost audit; Tax audit;

Management audit.

Suggested Reading:

1. Gupta KaPal: Contemporary Auditing: Tata Mcgraw Hill, New Delhi.
2. Tandon B.N.: Principles of Auditing: S. Chand & Co., New Delhi.
3. Pagare Dinkar: Principles and Practice of Auditing: Sultan Chand, New Delhi.
4. Sharma T.R.: Auditing Principles and Problems, SahityaBhawan, Agra.
5. Shukla S.M.: Auditing - ShahityaBhavan, Agra, (Hindi)
6. Batliboy: Auditing.

B.COM PART III

COMPULSORY CORE COURSE

PAPER – II

Group-II -PAPER – I - INDIRECT TAXES WITH GST

OBJECTIVE

This course aims at imparting basic knowlege about GST and apply the provisions of GST law to various situations.

M.M. 75

UNIT-I Customs : Role of customs in international trade; Important terms and definitionsgoods; Duty; Exporter; Foreign going vessel; Aircraft goods; Import; Import Manifest;

Importer; Prohibited goods; Shipping bill; Store; Bill of lading; Export manifest; Letter of credit; Kinds of duties - basic, auxillary, additional or coutervailing; Basics of levyadvalorem,specific duties; Prohibition of export and import of goods, and provisions

regarding notified & specified goods; Import of goods - Free import and restrictedimport; Type of import - import of cargo, import of personal baggage, import ofstores.Clearance Procedure - For home consumption, for warehousing for re-export; Clearance procedure for import by post; Prohibited exports; Canalised exports; Export against licensing; Type of exports export of cargo, export of baggage; Export of cargo by land, sea, and air routes.

UNIT-II State Excise, CENVAT. Detail study of State Excise during calculation of Tax.

UNIT-III INTRODUCTION TO GOODS AND SERVICES TAX (GST) -Objectives and basic scheme of GST, Meaning – Salient features of GST – Subsuming of taxes –Benefits of implementing GST , Structure of GST (Dual Model) – Central GST – State / Union Territory GST – Integrated GST

GST Council: Structures Power and Functions. Provisions fro amendments.

UNIT-IV Registration under GST: Procedure for registration, Persons liable for registration, Persons not liable for registration, Compulsory registration. Exempted goods and services - Rates of GST.

Procedure relating to Levy: (CGST & SGST): Scope of supply, Tax liability on Mixed and Composite supply, Time of supply of goods and services, Value of taxable supply.

Eway-Billing

UNIT-V ASSESSMENT AND RETURNS -

Input tax Credit: Eligibility, Apportionment, Inputs on capital goods, Distribution of credit by Input Service Distributor (ISD)

Furnishing details of outward supplies and inward supplies, First return, Annual return and Final return.

Suggested Reading:

1. Deloitte: GST Era Beckons, Wolters Kluwer.
2. Madhukar N Hiregange: Goods and Services Tax, Wolters Kluwer.
3. All About GST: V.S Datey - Taxman's.
4. Guide to GST: CA. Rajat Mohan,
5. Goods & Services Tax – Indian Journey: N.K. Gupta &SunnaniaBatia, Barat's Publication
6. Goods & Services Tax – CA. Rajat Mohan,
7. Goods & Services Tax: Dr. Sanjiv Agrawal & CA. Sanjeev Malhotra.
8. GST - Law & Practice: Dr. B.G. Bhaskara, Manjunath. N & Naveen Kumar IM,
9. Understanding GST: Kamal Garg, Barat's Publication.

B.COM PART III

COMPULSORY CORE COURSE

TITLE OF PAPER -Group-II

PAPER – II -MANAGEMENT ACCOUNTING

OBJECTIVE

This course provides the students an understanding of the application of accounting techniques for management.

M.M. 75

UNIT-I Management Accounting : Meaning, nature, scope, and functions of managementAccounting; Role of managment accounting in decision making; Managementaccounting vs financial accounting; Tools and techniques of management accounting;Financial statement; Objectives and methods of financial statements analysis; Ratioanalysis; Classification of ratios - Profitability ratios, turnover ratios, liquidity ratios,turnover ratios; Advantages of ratio analysis; Limitations of accounting ratios.

UNIT-II Funds Flow Statement as per Indian Accounting Standard 3, cash flow statement.

UNIT-III Absorption and Marginal Costing: Marginal and differential costing as a tool fordecision making - make or buy; Change of product mix; Pricing, Break-even analysis;
Exploring new markets; Shutdown decisions.

UNIT-IV Budgeting for profit Planning and control: Meaning of budget and budgetary control; Objectives; Merits and limitations; Types of budgets; Fixed and flexible budgeting;
Control ratios; Zero base budgeting; Responsibility accounting;
Performance Budgeting.

UNIT-V Standard Costing and Variance Analysis: Meaning of standard cost and standardcosting; Advantages and application; Variance analysis - material; Labour and overhead (Two-way analysis); Variances.

Suggested Reading:

1. Arora M.N.: Cost Accounting - Principles and Practice, Vikas, New Delhi.
2. Jain S.P. &Narang K.L.: Cost Accounting; Kalyani, New Delhi.
3. Anthony, Rogert& Reece, at al: Principles of Management Accounting; Richard Irwin Inc.
4. Horngren, Charles, Foster and Datar et al: Cost Accounting - A Managerial Emphasis; Prentice Hall, New Delhi.
5. Khan M.Y. and Jain P.K.: Management Accounting: Tata McGraw Hill, New Delhi.
6. Kaplan R.S. and Atkonson A.A.: Advanced Management Accounting; Printice Hall India, New Delhi.
7. J.K. Agrawal & R.K. Agrawal: Jaipur (English & Hindi).
8. Dr. M.R. Agrawal: Minakshi Prakashan Meruth.
9. Dr. S.P. Gupta - Agra (Hindi & English).

B.COM PART III

OPTIONAL GROUP A (Finance Area)

TITLE OF PAPER - FINANCIAL MANAGEMENT

PAPER – I

OBJECTIVE

The objective of this course is to help students understand the conceptual framework of financial management.

M.M. 75

UNIT-I Financial Management: Financial goals; Profit vs wealth maximization; Financial functions-investment, financing, and dividend decisions; Financial planning.

UNIT-II Capital Budgeting : Nature of investment decisions, Investment evaluation criteria,payback period, accounting rate of return, net present value, internal rate of return profitability index; NPV and IRR comparison.

UNIT-III Cost of Capital: Significance of cost of capital; Calculating cost of debt; Preference shares, equity capital, and retained earnings; Combined (weighted) cost of capital.Operating and financial Leverage : Their measure; Effects on profit, analyzing alternatefinancial plans, combined financial and operating leverage.

UNIT-IV Capital Structure: Theories and determinates. Dividend Policies: Issues in dividend policies; Walter's model; Gordon's model; M.M.Hypothesis, forms of dividends and stability in dividends, determinats.

UNIT-V Management of Working Capital: Nature of working capital, significance of workingcapital, operating cycle and factors determining of working capital requirements,

Management of working capital - cash, recevables, and inventories.

Suggested Reading:

1. Van Home J.C. : Financial Management and Policy; Prentice Hall of India, New
   Delhi.
2. Khan M.Y. and Jain P.K. : Financial Management, Text and Problems; Tata McGrow Hill, New Delhi.
3. Prasanna Chandra L Financial Management Theory and practice; Tata McGrow
   Hill, New Delhi.
4. Pandey I.M.: Financial Management Vikas Publishing Hous, New Delhi.
5. Brigham E.F. Gapenski L.C., and Ehrhardt M.C.: Financial Management - Theory and Practice; Harcourt College Publishers, Singapore.
6. Bhalla V.K.: Modern Working Capital Management, Anmol Pub. Delhi.

B.COM PART III

OPTIONAL GROUP A (Finance Area)

TITLE OF PAPER - FINANCIAL MARKET OPERATIONS

PAPER – II

OBJECTIVE

This course aims at acquainting the students with the working of financial markets in India.

M.M. 75

UNIT-I Money Market: Indian money market's composition and structure; (a) Acceptance houses, (b) Discount houses and (c) Call money market; Recent trends in Indianmoney market.

UNIT-II Capital Market: Security market - (a) New issue market, (b) Secondary market;
Functions and role of stock exchange; listing procedure and legal requirements; Public issue - pricing and marketing; Stock exchanges - National Stock Exchange, Bombay stock exchange

UNIT-III Securities contract and Regulations Act: Main provgisions.Investors Protection: Grievancesconcerning stock exchange dealings and theirremoval; Grievance cells in stock exchanges; SEBI; Company Law Board; Press;
Rmedy through courts.

UNIT-IV Functionaries on Stock Exchanges: Brokers, sub brokers, market makers, jobbers, portfolio consultants, institutional investors, and NRIs.

UNIT-V Financial Services: Marchant banking - Functions and roles; SEBI guide-lines; Creditrating - concept, functions, and types.

Suggested Reading:

1. Chandler M.V. and Goldfeld S.M.: Economics of money and Banking, Harper and Row, New Delhi.
2. Gupta Suraj B. Monetary Economics; s. chand and Co. New Delhi.
3. Gupta Suraj B. Monetary Planning in India; Oxford, Delhi.
4. Bhole L.M.: Financial Markets and Institutions: Tata McGrow Hill, New Delhi.
5. Hooda R.P.: Indian Securities Market - Investors view point; Excell Books, New Delhi.
6. R.B.I.: Functions and Working.
7. R.B.I.: Report in Currency and Finance.
8. R.B.I.: Report of the Committee to Review the working of the monetary system Chakravarty committee.
9. R.B.I.: Report of the Committee on the Financial System, Narsimham Committee.

B.COM PART III
OPTIONAL GROUP B (Marketing Area)
TITLE OF PAPER -PRINCIPLES OF MARKETING
PAPER – I

OBJECTIVE
The Objective of this course is to help students to understand the concept of marketing and its applications.

M.M. 75

UNIT-I Introduction: Nature and scope of marketing; Importnace of marketing as a business function, and in the economy; Marketing concepts - traditional and modern; Selling vs. Marketing; Marketing mix; Marketing environment.

UNIT-II Consumer Behaviour and Market Segmentation: Nature, scope, and significance ofconsumer behaviour; Market segmentation - concept and importance; Bases for market segmentation.

UNIT-III Product: Concept of product, consumer, and industrial goods; Product planning and development; Packaging role and functions; Brand name and trade mark; after sales service; Product life cycle concept. Price: Importance of price in the marketing mix; Factors affecting price of a product/service; Discounts and rebates.

UNIT-IV Distributions Channels and Physical Distribution; Distribution channels - Concept and role; Types of distribution channels. Factors affecting choice of a distribution channel; Retailer and holesaler; Physical distribution of goods; Transportation, Warehousing, Inverntory control; Order processing.

UNIT-V Promotion: Methods of promotion; Optimum promotion mix; Advertising media – the irralative merits and limitations; Characteristics of an effective advertisement; Personal selling; Selling as a career; Classification of successful sales person; Functions of sales man.
Recent development in marketing – social marketing, online marketing, direct marketing, Services marketing, Green marketing.

Suggested Reading:

1. Philip Kotler: Marketing Management Englewood Cliffs; Prentice Hall, N.J.
2. William M. Pride and O.C. Ferrell: Marketing: Houghton - Mifflin Boston.
3. Stanton W.J. Etzel Michael J., and Walker Bruce J. Fundamentals of Marketing; McGrawHill, New York.
4. Lamb Charies W., Hair Joseph F. and McDaniel Carl : Principles of Marketing; South-Western-Publishing, Cincinnati, Ohio.
5. Cravens David W. Hills Gerald E., Woodruff Robert B : Marketing management :
   RichardD. Inwin, Home wood Illinois.
6. Kotler Philip and Armstrong Gary : Principles of Marketing; Prentice Hall of India, New Delhi.
7. Dr. R.C. Agrawal, Agra.
8. Dr. S.C. Saxena Agra.
9. Dr. S.K. Jain, Hindi GranthAcademi. M.P.
10. Dr. N.C. Jain

B.COM PART III

OPTIONAL GROUP B (Marketing Area)

TITLE OF PAPER -INTERNATIONAL MARKETING

PAPER – II

OBJECTIVE

This course aims at acquainting student with the operations of marketing in internation alenvironment.

M.M. 75

UNIT-I International Marketing: Nature, definiton, and scope of international marketing; Domestic marketing vs. International marketing; International environment externaland internal.

UNIT-II dentifying and Selecting Foreign Market: Foreign market entry mode decisions. Product Planning for international Market: Product designing; Standardization vs. adaptation; Branding and packaging; Labeling and quality issues; after sales service. International pricing: Factors Influenceing International price; Pricing process-processand methods; International price quotation and payment terms.

UNIT-III Promotion of Product/Services Abroad: Methods of international promotion; Direct mail and sales literature; Advertising; Personal selling; Trade fairs and exhibitions.

UNIT-IV International Distribution: Distribution channels and logistics decisions; Selection and appointment of foreign sales agents.

UNIT-V Export Policy and Practices in India: Exim policy - an overview; Trends in India's foreign trade; Steps in starting an export business; Product selection; Market Selection; Export pricing; Export finance; Documentation; Export procedures; Export Assistance and incentives. Marketing Control Process

Suggested Reading:

1. Bhattacharya R.L. and Varshney B.: International Mrketing Management; Sultan Chand, New Delhi.
2. Bhattacharya B. : Export Marketing Strategles for Success; Global Press, New Delhi.
3. Keegan W.J.: Multinational Marketing Management; Prentice Hall, New Delhi.
4. Kriplani V.: International marketing; Prentice Hall New Delhi.
5. Taggart J.H. and Moder Mott. M.C.: The Essence of International Business; Prentice Hall New Delhi.
6. Kotler Phillip: Principles of Marketing; Prentice Hall New Delhi.
7. Fayer Weather John: International Marketing; Prentice Hall N.J.
8. Caterora P.M. and Keavenay S.M.: Marketing an international Perspective; Erwin Homewood, Illinois.
9. Paliwala, Stanely J. The Essence of International marketing; Prentice Hall, NewDelhi.

B.COM PART III

OPTIONAL GROUP C (Commercial Area)

TITLE OF PAPER - INFORMATION TECHNOLOGY AND ITS APPLICATIONS IN BUSINESS

PAPER – I

OBJECTIVE

The objective of the course is to famillatize the students with the innovation information technology and how it affects business. An understanding of the group rules of these technologies will enable the students to appreciate the nitty-gritty Commerce.

M.M. 75

UNIT-I Information Revolution and information Technology (IT) : Deployment of Business; Basic features of IT; Impact of IT on business environment and social fabric; Invention of writing; Written books; Printing Press and movable type Gutenberg's invention;Radio; telephone, wireless and satelite communication computing and dissemination of information and knowledge and convergence technologies (Internet with Wireless-WAP).

UNIT-II Fundamentals of Computer: Data, information and EDP: Data, information and concept of data and information; Levels of information from data; processing; Electronic data processing; Electronic machines;

a. Number Systems and Codes: Different number systems - binary, octal decimal, hexagonal, and their conversion codes used in computers; Bed, EBCDIC, ASCII; Gray and conversions.
b. Computer Arithmetic and Gates: Binary arithmetic, complements, addition subtraction; Conversion from one system to another; Logic Gates, truthtable and applicationsminimisation, and K-maps.
c. Computer Processing System: Definition of computer; Hardware/Software concepts; Generation of computers; Types of computers; Elements of computer; CPU and its functions, various computer systems.
d. I/O devices: Basic concepts of I/O devices; various input devices Keyboard, mouse; MICR, OCR, microphones.
e. Various output devices: VDU, printer, plotter, spooling, L.S.
f. Storage Devices: Primary and secondary memory; Types of memory capacityand its enhancement; Memory devices and comparisons; Auxiliary storage, tapes, disks (magnetic and potical); various devices and their comparison.

g. System Software - Roale of Software, Different System Software: O.S., utilization element of O.S. - Its types and variations; DOS and windows.

h. Computer and Networks: Need of communication; Data transmission; Baud; Bandwidth; Communication Channel; Multiplexing; Basic network concepts; O.S.I. model; Types of topologies; LAN, WAN, Client server concept.

UNIT-III Computer-based Business Applications

a. Word Processing : Meaning and role of word processing in creating of documents, editing, formatting, and printing documents, using tools such as spelling check, thesaurus, etc. in word processors (MS-Word).

b. Electronic Spreadsheet : Structure of spreadsheet and its applications to accounting, finance, and marketing functions of business; Crating a dynamic/sensitive worksheet; Concept of absolute and relative cell reference; Using builtinfunctions; Goal seeking and solver tool; Using graphics and formatting of Worksheet; sharing data with other desktop applications; Strategies of cratingerror-free worksheet (MS-Excel, Lotus 123). Practical knowledge on WingsAccounting (Software).

c. Programming under a DBMS environment: The concept of data base management system; Data field, records, and files, Sorting and indexing data;Searching records, designing queries, and reports; Linking of data files; Understanding programming environment in DBMS; Developing menu drivenapplications in query language (MS-Access).

UNIT-IV Electronic Data Interchange (EDI), Introduction to EDI; Basics of EDI; EDI standards; Financial EDI (FEDI); FEDI for international trade transaction; Applications of EDI; Advantages of EDI; Future of EDI.

UNIT-V The Internet and its Basic ConceptsInternet-concept, history development in India; Technological foundation of internet; Distributed computing; Client-server computing; Internet protocol suite; Application of distributed computing; Client-server computing; Internet protocol suite in the internet environment; Domain Name System (DNS); Domain Name Service (DNS); Generic top-lelveldomian (gTLD); Country code top-level domain (ccTLD); - India; Llocation of second-level doomains; IP addresses; Internet protocol; Applications of Internet in business, education, governance, etc. Information System Audit Basic idea of information audit; Difference with the traditional concepts of audit; Conduct and applications of IS audit in internet environment.

Suggested Reading:

1. AgrawalaKamlesh N. and Agarwala Deeksha: Business on the Net - Introduction to Ecommerce, Macmillan India, New Delhi.
2. AgarwalaKamlesh, N. and Agarwala Deeksha: Bulls, Bears and The mouse; and introduction to On-line Service Market Trading; Macmillan India, New Delhi.
2. Agarwala Kamlesh, N. and Agarwala Prateek Amar; WAP the Net; an Introduction on Wireless Application Protocol; Macmillan India, New Delhi.
3. Bajaj Kamlesh K. and Nag Debjanl: E-Commerce; The cutting Edge of Business; Tata McGraw Hill, New Delhi.
4. Edwards, Ward and Bytheway : The Essence of Information Systems; Prentice Hall, NewDelhi.
5. Garg & Srinivasan: Work Book on Systems Analysis & Design; Prentice Hall New Delhi.
7. Kanter: Managing with Information; Prentice Hall New Delhi.
8. Minoli Daniel, Minoli Emma: Web Commerce Technology Handbook; Tata McGraw Hill, New Delhi.
9. Minoli Daniel: Internet & Internet Engineering; Tata McGrow Hill, New Delhi.
10. Yeats: Systems Analysis & Design; Macmillan India, New Delhi.
11. Goyal: Management information System; Macmillan India, New Delhi.
12. Timothi J O'Leary: Microsoft Office 2000; Tata McGrow Hill, New Delhi.

B.COM PART III

OPTIONAL GROUP C (E-Commerce Area)

TITLE OF PAPER -ESSENTIAL OF E-COMMERCE

PAPER – II

OBJECTIVE

The objective of this course is to familiarize the students with the basics of e-commerce and to comprehend its potential.

M.M. 75

UNIT-I Internet and Commerce: Business operations; E-Commerce practices; Concepts b2b, b2c, b2g, g2h; Benefits of e commerce to organization, consumers, and society; Limitation of e-commerce; Management issues relating to e-commerce.

Operations of E-Commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTP); Electronic payment systems; secure electronic transaction (SET); Set's encryption; Process; Cybercash; Smart cards; Indian payment models.

UNIT-II Applications in B2C: Consumer's shopping procedure on the internet; Impact on disintermediation and re-inermediation; Global market; Strategy of traditional department stores; Products in b2c model; Success factors of e-brokers; Broker based services on-line; Online travel tourism services; Benefits and impact of e-commerce on travel industry; Real estate market; Online stock trading and its benefits; Online banking and its benefits; Online financial services and their future; Educations benefits, implementation, and impact.

UNIT-III Applications in B2B; Applications of b2b, Key technologies for b2b; Architectural models of b2b; Characteristics of the supplier-oriented marketplace, buyer-oriented market place, and intermediary-oriented marketplace; Benefits of b2b on procurement re-engineering; Just in Time delivery in b2b; Internet-based EDI from traditional EDI; Integrating EC with back-end information systems; Marketing issues in b2b.

UNIT-IV Applications in Governance: EDI in governance; E-government; E-governance applications of the internet; Concept of government to business, business to government and citizen-to-government; E-governance models; Private sector interfacein e-governance.

UNIT-V Emerging Business Models: Retail model; Media model; Advisory model, Mode-toordermanufacturing model; Do-it yourself model; Information service model; Emergin hybrid models; Emerging models in India. Security and Legal aspects of E-commerce.

Suggested Reading:

1. AgarwalaKamlesh. N. and AgarwalaDeekhsa: Bridge to Online Storefornt; MacmillanIndia, New Delhi.
2. AgarwalaKamlesh. N. and AgarwalaDeeksha: Business on the Net Introduction to theE-commerce; Macmillan India New Delhi.
3. AgarwalaKamlesh N. and AgarwalaDeeksha: Bulls, Bears and TheMouse: AnIntroduction to Online Stock Market Trading; Macmillan India New Delhi.
4. Tiwari Dr. Murli D.: Eductaion and E-Governance; Macmillan India, New Delhi.
5. Minoli Daniel, MinoliEmma: Web Commerce Technology Handbook; Tata McGraw Hill, New Delhi.
6. MinoliDeniel, Internet & Internet Engineering: Tata McGrow Hill, 1999.
7. BhatnagarSubhash and Schware Robert (Eds): Information and CommunicationTechnology in Development; Sage Publications India, New Delhi.
7. Amor, Daniel: E-business R evealuation, The : Living and Working in an InterconnectedWorld; Prentice Hall, U.S.
8. Afuah, A., and Tuccu, C.: Internet usiness models and Strategies; McGraw Hill,
   New York.

B.COM PART III

OPTIONAL GROUP D (Money Banking & Insurance Area)

TITLE OF PAPER FUNDAMENTAL OF INSURANCE

PAPER – I

OBJECTIVE

This course enables the students to know the fundamentals of insurance.

M.M. 75

UNIT-I Introduction to Insurance: Purpose and need of insurance; Insurance as a social security tool; Insurance and economic development.

UNIT-II Fundamentals of Agency Law: Definiton of an agent; Agents regulations; Insurance intermediaries; Agents compensation.

UNIT-III Procedure for Becoming an Agent : Prerequisite for obtaining a license; Duration of license; Cancellation of incense; Revocation or suspension/termination of agent appointment; Code of conduct; Unfair practices. Functions of the Agent: Proposal form and other forms for grant of cover; Financial and medical underwriting; Material information; Nomination and assignment; Procedure regarding settlement of policy claims.

UNIT-IV Company Profile : organizational set-up of the company; Promotion strategy; Market share; Important activities; Structure; Product; Actuarial profession; Product pricing actuarial aspects; Distribution channels.

UNIT-V Fundamentals/Principles of Life insurance/ Marine /Fire /Medical/General Insurance; Contracts of various kinds; Insurable Interest. Online insurance procedure

Suggested Reading:

1. Mishra M.N.: Insurance Principle and Practice; S. Chand and Co., New Delhi.
2. Insurance Regulatory Development Act. 1999.
3. Life Insurance Corporation Act. 1956.
4. Gupta OS: Life Insurance; Frank brothers, New Delhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV: Insurance - Principles and Practice,
   S. Chand and Co. New Delhi.
6. Mishra MN: Life Insurance Corporation of India, Vols I, II & III; Raj Books, Jaipur.
7. BalchandShriwastava, Agra.
8. Dr. M.L. Singhai, RAmesh Book Depot, Jaipur.

B.COM PART III

OPTIONAL GROUP D (Money Banking & Insurance Area)

TITLE OF PAPER - MONEY & BANKING SYSTEM

PAPER –II

OBJECTIVE

This course enables the students to know the working of the Indian Money & banking system.

M.M. 75

UNIT-I Money: Function, Alternative Measures tomoney supply in India - their differentcomponents. Meaning and changing relative importance of each.

UNIT-II Indian Banking System : Structure and organization of banks; Reserve Bank of India;Apex banking Institutions; Commercial banks; Regional rural banks; Cooperativebanks; Development banks.

UNIT-III Banking Regulation Act, 1947 : History; Social control; Banking Regulation Act asapplicable to banking companies and public sector banks; Banking Regulation Act asapplicable to Cooperative banks.

UNIT-IV Regional Rural and Cooperative Banks in India: Functions; Role of regional rural andcooperative banks in rural India; Progress and performance.

UNIT-V Reserve Bank of India: Objectives; Organization; Functions and working; Monetarypolicy; Credit control measures and their effectiveness.

State Bank of India, Project History, Objectives, Functions & Organization working& progress.

Internet banking system

Suggested Reading:

1. Basu A.K.: Fundamentals of Banking-Theory and Practice; a Mukherjee and Co., Calcutta.
2. Sayers R.S.: Modern Banking: Oxford University Press.
3. Panandikar S.G. And Mithani D.M.: Banking in India; orient Longman.
4. Reserve Bank of India: Functions and Working.
5. Dekock: Central Banking; Crosby lock wood Staples, London.
6. Tannan M.L.: Banking - Law and Practice in India: India Law House, New Delhi.
7. Knubchandani B.S.: Practice and Law of Banking; Macmillan, New Delhi.
8. Shekhar and Shekhar: Banking Theory and Practice; Vikas Publishing House, New Delhi.
9. Harishchandra Sharma.
10. M.L. Singhai.

SYLLABUS FOR 2014-15

COURSE OF STUDIES FOR M.A. EXAMINATION IN SOCIOLOGY (UNDER SEMESTER SYSTEM IN UNIVERSITY TEACHING DEPARTMENT AND AFFILETED COLLEGES

M.A. Examination in Sociology shall be conducted in four semesters, each having 500 hundred marks, totaling to 2000 marks.

The detailed Course Structure Semester wise is mentioned below.

Sl. No.	Paper No.	Title	Marks		

A. FIRST SEMESTER:

Sr. No.	Paper	Subject	I	T	Total
1	Paper-I	Classical Sociological Tradition	20	80	100
2	Paper-II	Philosophical and Conceptual Foundation of Research Methodology	20	80	100
3	Paper-III	Social Change in India	20	80	100
4	Paper-IV	Rural Sociology	20	80	100
5	Paper-V	Practical-I			100

B. SECOND SEMESTER

6.	Paper-VI	Classical Sociological Thinkers	20	80	100
7.	Paper-VII	Quantitative Research Techniques in Sociology	20	80	100
8.	Paper-VIII	Sociology of Development	20	80	100
9.	Paper-IX	Indian Rural Society	20	80	100
10.	Paper-X	Practical-II			100

C. THIRD SEMESTE

11.	Paper-XI	Classical Sociological Theories	20	80	100
12.	Paper-XII	Social Movements in India	20	80	100
13.	Paper-XIII	Perspectives of Study to Indian Society	20	80	100
14.	Paper-XIV	Industry and Society in India-I	20	80	100
15	Paper-XV	Criminology-I	20	80	100

D. FOURTH SEMESTER					
16	Paper-XVI	Modern Sociological Theories	20	80	100
17	Paper-XVII	Comparative Sociology	20	80	100
18	Paper-XVIII	Industry and Society in India-II	20	80	100
19	Paper-XIX	Criminology-II	20	80	100
20	Paper-XX	Project Report	-	-	100

FIRST SEMESTER

Paper No. I **Marks-80**

CLASSICAL SOCIOLOGICAL TRADITION

Unit-I: Historical Background of The Emergence of Sociology

a. Traditional Feudal Economy and Social Structure
b. Impact of Industrial Revolution and New Mode of Production on Society and Economy.
c. Emergence of Capitalist Mode of Production- Nature and Feature of Capitalism
d. Enlightenment and It's Impact on Thinking and Reasoning

Unit-II: Auguste Comte

a. Social Statics and Dynamics
b. Law of Three Stages
c. Hierarchy of Sciences
d. Positivism

Unit-III: Emile Durkheim

a. Social Facts
b. Mechanical and Organic Solidarity
c. Division of Labour
d. Theory of Suicide

Unit-IV: Vilfredo Pareto

a. Logical and Non- Logical Action
b. Residues and Derivations
c. Theory of Social Change
d. Contributions to Methodology

Unit-V: Herbert Spencer

a. The survival of the fittest
b. Social Darwinism
c. Evolution
d. Synthetic Philosophy

References:

1. Abraham, F and Morgan, J.H. 1985 — Sociological Thought from Comte to Sorokin, Macmillan, New Delhi.

2. Adams, B.N. and Sydie, R.A. 2002 — Sociological Theory, Vistaar Publications, New Delhi
3. Aron, R. 1965 — Main Currents in Sociological Thought Vol: I and Vol.II Penguin, New Delhi.
4. Co er, L.A. 2001 — Masters of Sociological Thought, Rawat Publishers, Jaipur
5. Rex, John 1973 — Discovering Sociology Routledge and Kegan Paul, London
6. Turner, J.H. 2001 — The Structure of Sociological Theory, Rawat Publishers, Jaipur.
7. Zeitlin, I.M. 1981 — Ideology and the Development of Sociological Theory, Prentic Hall, London.
8. _____ 1998 — Rethinking Sociology: A Critique of Contemporary Theor Rawat Publishers, Jaipur.

Paper-II **Marks-80**

PHILOSOPHICAL AND CONCEPTUAL FOUNDATION OF RESEARCH METHODOLOGY

Unit-I: Philosophical Roots of Social Research

a. Issues in the Theory of Epistemology: Forms and Types of knowledge, Validation of knowledge
b. Positivism and It's Critique: Contributions of Comte, Durkheim and Popper.
c. Methodological perspectives in Sociology.

Unit-II: Values and Theories in Sociology

a. Debates on values: Value Neutrality V/S Value Loadedness.
b. Theories in Sociology Classical V/S Modern
c. Problems of concept and theory- Transfer to developing countries.

Unit-III: Nature of Social Reality and Approaches to It

a. Research Design: Steps and Processes of It's Formulation
b. Type of Research Design: Exploratory, Descriptive, Explanatory, Diagnostic and Experimental
c. Role of concepts and Hypotheses
d. Problems of Objectivity

Unit-IV: Qualitative Methods in Social Research

a. Techniques and methods of Qualitative Research: Observation and Interview Guide
b. Case study, Content Analysis
c. Participatory Rural Appraisal (PRA)
d. Encounters and Experiences in Field work

Unit-V: Issues in Social Research

a. Inter disciplinary Research
b. Issues in Qualitative Research

c. Theoretical Vs. Applied Research
d. Processing of Data: Classification, Tabulation and Interpretation.

References:

1. Bailey, K.D. 1979 — Methodology of Social Research Macmillan, Free Press- London
2. Barnes, J.A. 1979 — Who should known what? Social Science, Privacy and Ethics, Penguin, London.
3. Beteille, A Madan, T.N. 1975 — Encounter and Experience: Personal Accounts of field work, Vikas, new Delhi
4. Bose, P.K. 1995 — Research methodology, ICSSR, New Delhi.
5. Bryman, A 1988 — Quality and Quantity in Social Research Unwin Hyman, London.
6. Madge, J 1970 — The Origins of Scientific sociology Tavistock, London
7. Mukherjee, P.N. 2000 — Methodology in Social Research: Dilemmas and perspectives Essays in Honour of Ramakrishna Mukherjee Sage, New Delhi.
8. Mukherjee, R.K. 1979 — What will it be? Explorations in Inductive Sociology Allied, Bombay.
9. _____ 1993 — Systemic Sociology Sage, New Delhi.
10. Popper, K 1999 — The Logic of Scientific Discovery Routledge and Kegan Paul London
11. Punch, K 1986 — Introduction to Social Research Sage, New Delhi
12. Sjoberg, G and Roger, N., 1997 — Methodology of Social research Rawat, Jaipur
13. Srinivas, M.N. and Shah, A.M., 1979 — Field worker and the Field Oxford, New Delhi.
14. Weber, M 1974 — The Methodology of Social Sciences Free Press, Chicago
15. Young, P.V. 1977 — Scientific Social Surveys and Research Prentice Hall, New Delhi.
16.

Paper No. III **Marks-80**

SOCIAL CHANGE IN INDIA

Unit-I: Conceptual and Theoretical Frame work

a. Concept
b. Forms

c. Linear Theory
d. Cyclic Theory

Unit-II: Factors of Social change

a. Techno- Economic
b. Socio- Psychological
c. Cultural and Religious
d. Media

Unit-III: Trends and Processes of Change in Modern India

a. Sanskritization
b. Secularization
c. Gandhian
d. Globalization

Unit- IV: Changes in Tribal and Rural India

a. Changes in Tribal and Rural Economy
b. Changes in Socio-cultural spheres
c. Land Alienation
d. Welfare Measures and Consequent Changes

Unit-V:- Changes in Urban and Industrial India

a. In Migration and Growth of informal sector.
b. Development of Slums.
c. Development of Criminal Activities.
d. Welfare measures and Consequent Changes.

References:

1. Beteille, A. 2003 — The Idea of natural inequality and other essays. Oxford, New Delhi.
2. Desai, AR 2001 — Rural Sociology in India. Popular, Bombay
3. Jhingan, M.L. 2003 — The economics of Development and Planning. Vrinda Publications, New Delhi
4. Kanungo, S. 2002 — Making Information Technology Work, Sage, new Delhi
5. Mathur, H.M. (ed) 1994 — Development, Displacement and Resettlement: focus on Asian experiences Vikas, New Delhi.
6. Preston, P. 2001 — Reshaping communications, Technology Information and Social Change. Sage, New Delhi.
7. Ramachandran, P.S. et al (ed) 2002 — Traditional Ecological Knowledge for managing Bio-sphere reserves in south and central Asia. Oxford, New Delhi.
8. Reid, Suctitus 1976 — Crime and Criminology, Illiois: Deyen Press
9. Schuurman, F.J. 1999 — Globalization and Development, Vistaar, new Delhi.
10. Parekh, B 1999 — Colonialism, Tradition and Reform: An analysis of Gandhi's Political Discourse Sage, New Delhi.

11. Sharma, K.L. 1997 — Social Stratification in India: Issues and Themes. Sage, New Delhi.
12. Shiva, V. and Bedi, G. 2002 — Sustainable Agriculture and food scarcity Sage, New Delhi.
13. Singh, Y. 1999 — Modernization of Indian tradition Rawat, jaipur.
14. _____ 2003 — Culture Change in India Rawat, Jaipur
15. Singharoy, D.K. et al (ed) 2000 — Social Development and Empowerment of Marginalised groups, Sage, New Delhi.
16. Srinivas, M.N. 1998 — Social Change in Modern India. Orient and Longman, New Delhi.
17. Vidyarthi, L.P. and Rai, B.K., 1977 — Tribal culture in India Concept Publication Company New Delhi.

Paper No. IV **Marks-80**

RURAL SOCIOLOGY

Unit-I: Characteristics and Approaches

a. Concept andCharacteristics of Peasant Society
b. Concept andCharacteristics of Agrarian Society
c. Caste and Jamani Approach
d. Subalturn Approach

Unit-II: Agrarian Institutions

a. Land Ownership and Its Types :British period
b. Land Ownership and Its Types:After Independence
c. Agrarian Relations and Modes of Production
d. Agrarian Society Structure

Unit- III: Planned Change

a. Rural leadership
b. Factionalism
c. Panchayati Raj before and after 73rd Amendment
d. Five Year's Plans in India

Unit-IV: Rural Development and Change

a. Green Revolution
b. Land Reform
c. Globalization and its Impact on Agriculture

Unit-V: Welfare measures and consequent Changes

a. Self-help Group
b. MNREGA
c. SSA

References:

1. Basu, K. (ed) 2000 — Agrarian Questions Oxford, New Delhi.
2. Berberglu, B. (ed) 1992 — Class, State and Development in India sage, New Delhi.
3. Beteille, A. 1974 — Six essays in comparative sociology oxford, New Delhi.
4. _____ 1974 — Studies in Agrarian social structure oxford, New Delhi.
5. Breman, J. 1974 — Patronage and Exploitation oxford, New Delhi.
6. Desai, A.R. (ed) 1977 — Rural sociology in India popular, Mumbai.
7. _____, (ed) 1977 — Rural society in transition Popular, Mumbai.
8. Gough, K and Sharma, H.P.(Ed) 1973 — Imperialism and Revolution in South Asia, Monthly Reviewed Press, New York.
9. Guha, R (ed) 1999 — Subaltern Studies Oxford, New Delhi.
10. Joshi, P.C. (ed) 1976 — Land Reforms in India Allied, New Delhi.
11. Long, N. 1982 — An Introduction to the sociology of Rural development, Tavistock, London.
12. Mencher, J.P. (ed) 1983 — Social Anthropology of peasantry, Somaiya Publications New Delhi
13. Patnaik, U. 1990 — Agrarian Relations and Accumulation: the Mode of production debate in India.
14. Shanin, T. (ed) 1971 — Peasants and Peasant Societies, Penguin, London.
15. Thorner, D. 1956 — The Agrarian prospects in India University press, New Delhi.
16. _____ 1962 — Land and labour in India, Asia publications, Mumbai.

Paper No. V **Marks-100**

PRACTICAL-I

Practical based on Field Work & Preparation of tools
Interview Guide and case study
Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

SECOND SEMESTER

Paper No. -VI **Marks-80**

CLASSICAL SOCIOLOGICAL THINKERS

Unit-I: Karl Marx
- a. Materialistic Interpretation of History
- b. Class and Class Struggle
- c. Alienation

Unit-II: Thurstein Veblen
- a. Theory of Leisure class
- b. Concepts of Social Change
- c. Comparison of Marx and Veblen's theories

Unit-III: Max Weber
- a. Theory of Social Action
- b. Concepts of Status, Class and power
- c. Sociology of Religion and Economic Development

Unit-IV Talcott Parsons
- a. Social Action
- b. Pattern variables
- c. Social System

Unit-V: Robert K. Merton
- a. Reference Group
- b. Social Conformity and Anomie
- c. Functional Paradigm

References:

1. Abraham, F and Morgan, J.H. 1985 — Sociological Thought from Comte to Sorokin Macmillan, New Delhi.
2. Aron, R. 1965 — Main Currents in Sociological Thought Vol. I and II Penguin, London.
3. Adams, B.N. and Sydie, R.A. 2001 — Sociological theory Vistaar, New Delhi.
4. Collins, R. 1997 — Theoretical Sociology Rawat, Jaipur
5. Coser, L.A. 2001 — Masters of Sociological Thought Rawat, Jaipur
6. Giddens, A. 1977 — Capitalism and Modern Social Theory: An Analysis of Writings of Marx., Durkeheim and Weber Cambridge University press. London.
7. Rex, J. 1973 — Discovering Sociology Routledge and Kegan Paul London.
8. Simmel George and Kurt H.Wdff,1950 — The Sociology of George Simmel, Glancoe, IIIFree Press

9. Simmel George and Kurt H.Wdff,1922 — Conflict and the web of Group Glancoe, IL,Freepress.
10. ----------1972 — On Individuality and Social Forms, Chicago, University of Chicago Press.
11. Turner, J.H. 2001 — The Structure of Sociological Theory Rawat, jaipur
12. Zeitlin, I.M. 1981 — Ideology and the Development of Sociology Prentice Hall, London.
13. _____ 1996 — Rethinking Sociology Rawat, Jaipur.

Paper No.-VII **Marks-80**

QUANTITATIVE RESEARCH TECHNIQUES IN SOCIOLOGY

Unit-I: Sampling
- a. Rational
- b. Types
- c. Sampling error
- d. Survey Vs. Sampling based study in sociology

Unit-II: Quantitative method and survey Research
- a. Techniques of Survey Research: Interview
- b. Tools of Research; Preparation of Questionnaire and Interview Schedule
- c. Processing of Data: Classification, Tabulation and Interpretation
- d. Use of Computer in Data Processing

Unit-III: Measurement and Scaling Techniques
- a. Levels of Measurements: Types of Scales- Nominal and Ordinal
- b. Reliability and Validity of Scaling
- c. Measures of Social Distance: Thurston, Lickert and Bogardus Scale
- d. Sociometry

Unit-IV: Statistics in Social Research
- a. Measures of Central Tendency: Mean, Median and Mode
- b. Measures of Dispersion- Standard Deviation
- c. Correlation Analysis- Chi Square
- d. Quantitative Vs. Qualitative research in sociology

Unit-V:Qualitative and Quantitative research method
- a. Triangulation;mixing Qualitative and Quantitative methodologies
- b. Social Research, Action research and Participatory research
- c. Application of computers in Social research; MS office.
- d. Ethical issues in social research.

References:

1. Bailey, K.D. 1979 — Methodology of social Research Macmillan, Free Press.

2. Bryman, Allan 1988 — Quality and Quantity in Social Research Unwin, Hyman, London.
3. Ethance, D.M. — Fundamental of Statistics
4. Irvine, J. M et al (ed), 1979 — Demystifying social statistic, Pluto Press, London.
5. Lutz, G, M 1983 — Understanding Social Statistics, Macmillan Publishing co., Inc., New York.
6. Mukharjee, R, 1979 — What will it be? Explorations in inductive sociology, Allied Publishers, Bombay.
7. Mukherjee, P.N, 2000 — Methodology in Social Research Dilemamas and Perspectives, Essays in honour of Ramakrishna Mukharjee, Sage Publication, New Delhi.
8. Wilkinson, T.S. and Bhandarkar, P.L. — Methodology and Techniques of Social Research: Himalaya Publication House, Bombay,
9. Young, P.V. 1977 — Scientific Social Surveys and Research. Prentice Hall of India, New Delhi.

Paper No. -VIII **Marks-80**

SOCIOLOGY OF DEVELOPMENT

Unit-I: Perspectives on Development
- a. Modernization
- b. Marxist
- c. Dependency
- d. Alternative

Unit-II: Changing Conception of Human Development
- a. Mainstream vs. Indigenous Model of Development
- b. Human Indicator Index
- c. Sustainable Development: Socio- Cultural
- d. Impact of Bio-Technology and Information Technology on Development.

Unit-III: Indian Experience on Development
- a. Sociological Appraisal of Five Year Plans
- b. Sociai Consequences of Economic Reforms
- c. Socio Cultural Impact of Globalization
- d. Social Implication of InfoTech and Bio-Tech Revolution

Unit-IV: Consequences of Development
- a. Development and Displacement
- b. Development and Socio- Economic Disparities
- c. Ecological Degradation
- d. Development and Migration.

Unit-V: Issues and development in Contemporary India.
- a. Social Exclution
- b. Gender Discrimination

- c. Privatization and unfavorable Service condition.
- d. Sustainability.

References:

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5. Berberglu, B. (ed) 1992 — Class, State and Development in India, Sage, New Delhi
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13. Melkote, S.R. 1991 — Communications for Development in Third WorldSage, New Delhi
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21. Schuurman, F.J. 2003 — Globalisation and Development Vistaar, New Delhi
22. Singharoy, D (ed) 2001 — Social Development and Empowerment of Marginalised Groups Sage, New Delhi.

23. Sings, C.C. And Denemark, R.A. — The Underdevelopment of Development Sage, New Delhi.
24. Sharma ,S.L1986 — Development: socio-Cultural Dimensions, Jaipur,Rawat Publications.
25 ----------1994 — Perspective on Sustainable Development in South Asia, KualaLumpur, ADIPA

Paper No. IX **Marks-80**

INDIAN RURAL SOCIETY

Unit-I: Tribal Society as Agrarian Society
- a. Tribe Concept and Characteristic
- b. Tribe class
- c. Changing problems of Tribal Land

Unit-II: Social Issues
- a. Migration
- b. Land Alienation
- c. Loss of Livelihood

Unit-III: Contemporary Issues
- a. Health
- b. Education
- c. Changing status of Rural Women
- d. Inequality

Unit-IV: Peasant Movement
- a. Causes
- b. Types
- c. Tebhaga
- d. Telengana

Unit-V: Naxlite movement in Contemporary India.
- a. Origin and affected area
- b. Causes
- c. Present status; Governments measures and peoples response:

References:

1. Beteille, A. 1986 — Inequality and Social Change Oxford, New Delhi.
2. Bardhan, p. — Poverty, Agrarian Structure and Political Economy in India.
3. Desai, A.R. 1979 — Rural Society in Transition Popular, Mumbai
4. _____ 1979 — Peasant Struggle in India Oxford, New Delhi
5. _____ (ed) 2003 — Rural Sociology in India Popular, Mumbai

6. Dreze, J and Sen A. 2002 — India : Development and Participation, Oxford New Delhi.
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9. Joshi, P.C. 2003 — Land Reforms in India Allied, New Delhi.
10. Leiten, G.K. 2002 — Power, Politics and Rural Development Manohar, New Delhi
11. Patel, M.L. 1974 — Changing land Problems of Tribal India, Progress Publisher, Bhopal.
12 Prakash Singh 2007 — The Naxalite Movement in India, Rupa Publication
13. Rao, M.S.A. (ed) 1978 — Social Movements In India, Manohar, New Delhi.
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15. Singhroy, D et al 2001 — Social development and the empowerment of mariginalised groups, Sage New Delhi.
16. Thorner, A. 2002 — Daniel Thorner, Memorial Lecturers, Manohar, New Delhi.
17. Vidyarthi, L.P. and Rai, B.K. 1977 — Tribal Culture in India, Concept Publishing Company, New Delhi.

Paper No. X **Marks-100**

PRACTICAL-II

Practical based on Field Work & Preparation of tools
Questionnaire, Interview Schedule Preparation and Tabulation.
Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

THIRD SEMESTER

Paper No. XI **Marks-80**

CLASSICAL SOCIOLOGICAL THEORIES

Unit-I: Positivism
- a. Origin and Basic Postulates
- b. Contributions of Comte
- c. Contributions of Durkheim
- d. Criticism

Unit-II: Functionalism
- a. Origin and Basic Postulates
- b. Contributions of Parsons
- c. Contribution of Merton
- d. Criticism

Unit-III: Conflict theory
- a. Contribution of L.A Coser
- B Contributions of Karl Marx
- c Contribution of Dahrendorf
- d Criticism

Unit-IV: Structuralism
- a. Origin and Basic Postulates
- b Contribution of Red Cliff Brown
- c Contribution of Levistrauss
- d Criticism

Unit-V: Exchange Theory
- a. Origin and Basic postulates
- b. Contribution of peter Blau
- c. Contribution of George Homans.
- d. Criticism

References:

1. Abraham, M.F. 2001 — Modern Sociological Theory: An Introduction Oxford, New Delhi.
2. Alexander, J.C. 1987 — Twenty Lectures; Sociological theories since World War- II Columbia University press- New York.
3. Coser, L.A. 2001 — Masters of Sociological thoughts Rawat, Jaipur
4. Collins, R. 1997 — Sociological theory Rawat, Jaipur
5. Craib, I 1992 — Modern Social Theory: From parsons to Habermas, Harvester, London.
6. Giddens, A. 1983 — Central Problems in Social theory, Action, Structure and contradiction in social analysis. Mac Millan, London.
7. _____, 1996 — Capitalisation and modern social theory Cambridge University Press. London.
8. Godelier, M. — Structural Anthropology Tavistock, London.
9. Sturrock, J (ed) 1979 — Structuralism and since: from Levistrancess to Derrida Oxford, London.
10. Turner, B.S. 1999 — Classical sociology sage, New Delhi
11. Turner, J.H. 2001 — The structure of sociological theory Rawat, Jaipur
12. Zeitlin, I.M. 1998 — Rethinking sociology: A critique of contemporary Theory Rawat, Jaipur.

Paper No.XII **Marks-80**

SOCIAL MOVEMENTS IN INDIA

Unit-I: Nature and Types
- a. Characteristics
- b. Types
- c. Reasons
- d. Power Structure and Social Movements

Unit –II: Basis of Social Movement
- a. Class, Caste, Ethnicity and Gender
- b. Types of leadership and relationship between leaders and masses
- c. Political institution and social movement.
- d. Role of media in social movement.

Unit-III: Theoretical Perspectives
- a. Marxian and Post-Marxian
- b. Weberian and Post-Weberian
- c,. Structural-Functional
- d. Postmodernist

Unit-IV: Traditional Social Movements
- a. Labour and Trade Union
- b. Tribal
- c. Peasant
- d. Nationalist

Unit-V: New Social Movements
- a. Dalit
- b. Women
- c. Ethnic
- d. Environmental

References:

1. Banks, J.A., 1972; The Sociology of Social Movements (London : Macmillan)
2. Desai, A.R., Ed., 1979; Peasant Struggles in India (Bombay : Oxford University Press)
3. Danagare, D.N., 1983; Peasant Movements in Indian 1920-1950 (Delhi : Oxford University Press.

4. Gore, M.S., 1993; The Social Context of an Ideology : Ambedkar's Political and Socia Thoughts (New Delhi : Sage)
5. Oomen, T.K., 1990 : Protest and Change : Studies in Social Movements (Delhi : Sage).

Paper No.XIII **Marks-80**

PERSPECTIVES OF STUDY TO INDIAN SOCIETY

Unit-I: Indological / Textual
- a. Approach of Study
- b. G.S. Ghurye
- c. Louis Dumont
- d. Criticism

Unit-II: Structural Functionlism
- a. Approach of Study
- b. M.N.Srinivas
- c. S.C.Dube
- d. Criticism

Unit-III: Marxism
- a. Approach of Study
- b. D.P.Mukharjee
- c. A.R. Desai
- d. Criticism

Unit-IV: Subaltern Perspective
- a. Approach of Study
- b. B.R. Ambedkar
- c. David Hardiman
- d. Criticism

Unit-V: Civilization
- a. Approach of study
- b. N.K.Bose
- c. Surjeet Sinha
- d. Criticism

References:

1. Das, V. 1982 — Structure and Cognition aspects of Hindu caste and rituals Oxford, New Delhi.
2. Desouza, P.R. (ed) 2000 — Contemporary India Transitions. Sage, New Delhi.
3. Dhanagare, D.N. 1993 — Themes and Perspectives in Indian Sociology Rawat, Jaipur
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5. _____ 1973 — Social Sciences in a chanign society. Lucknow university press, Lucknow
6. Dumont, L. 1970 — Homo Hierarchicus: the caste system and its implications Vikas, New Delhi.
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8. _____ 1996 — Feeding the Bania: Peasants and usurers in western India. Oxford, New Delhi.
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12. Singh, y. 1986 — Indian Sociology: Social conditioning and Emerging concerns, Vistaar, New Delhi.
13. Srinivas, M.N. 1960 — India's Villages Asia publishing House, Bombay.

Paper No. XIV **Marks-80**

INDUSTRY AND SOCIETY IN INDIA-I

Unit-I: Industrial Sociology and Classical Sociological Tradition
- a. Classical Scientific Management
- b. Division of Labour
- c. Bureaucracy and Rationality
- d. Production Relations and Alienation

Unit-II: Industrial Organizations
- a. Formal and Informal Organizations, Structure and Function
- b. Line and Staff Organization
- c. Contemporary Organization Realities

Unit-III: Problems through Industrialization process
- a. Family
- b. Stratification
- c. Habitat and Settlement
- d. Environmental

Unit-IV: Subjective Experience of Work
- a. Work Ethics, Work Value, Work Attitude and Work Process
- b. Motivation to Work,
- c. Work Satisfaction, Incentives and Its Effects

Unit-V: Technological Change and Automation
- a. Technology and Social Structure in Industry
- b. Organizational Choice and Technological Change
- c. Resistance to Automation and Change

References:

1. Agrawal R.D. 1972 — Dynamics of Indian labour relations in India (A Boo regarding Mc-Graw Hill, Bombay)
2. Aziz Abdul 1984 — Labour problems of developing economy Ashis Publishin house, New Delhi
3. Gilbert S.J. 1985 — Fundamentals of Industrial Sociology Tata Mc-Graw hi Bombay
4. Karnik V.B. 1990 — Indian trade Union A survey, Popular Prakashan- Bombay
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6. Memoria, C.B. and Memoria, 1992 — Dynamics of Indian Relations in India Himalaya publishin house: Mumbai
7. Miller, D.c. and Farm W.M., 1964 — The Sociology of Industry George Allen and Onwin, London
8. Philip H and Mellissa T, 2001 — Work Post Modernism and organization Sage, New Delhi
9. Ramaswamy E.A. 1977 — The worker and His union, Allied New Delhi
10. _____, 1978 — Industrial Relations in India OUP, new Delhi
11. Thiwait, P.K. 1987 — Social Structure of a Planned Town, Institute of Socia Research and Applied Anthropology, Calcutta.
12. Watson K. Tony 1995 — Sociology, work and industry Routlodge and Kagan Paul, London.

Paper No.XV **Marks-80**

CRIMINOLOGY-I

Unit-I: Conceptual and Theoretical Approaches
- a. Legal, and Sociological;,
- b. Crime and Deviance ,Causes, Prevention and Control
- c. Theories on Crime Causation; Sociological and Geographical

Unit-II: Type of Criminals and Crime
- a. Juvenile delinquency
- b. Women and Crime
- c. White collar crime

Unit-III: Changing Profile of Crime and Criminals;
- a. Corruption: Types, Causes, and Consequences.
- b Cyber Crime: Causes, Prevention and Control
- c Crime Against Women: Causes, Prevention and Control

Unit-IV: Theories of Punishment
- a. Retributive, Deterrent: Theories and Criticism
- b. Reformative Theory: Probation and Parole
- c. Open Prison- Its Success and Failure

Unit-V: Terrorism
- a. Concept of Terrorism and Its Characteristics
- b. Terrorism in India
- c. Social and Legal Measures for Its Prevention and Control

References:

1. Ahuja, R. 1969 — Female offenders in India Meenakshi Prakashan, Meerut
2. Madan, G.R. 1985 — Indian social problems-I Allied Publishers, New Delhi
3. Mahapatra, S. 2002 — Rays of Hope: Forum for fact findihg documentation and Advocacy Raipur.
4. Mishra, R and Mohanty, S. 1992 — Police and Social change in India Ashish publishing House, New Delhi.
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FOURTH SEMESTER

Paper No. XVI **Marks-80**

MODERN SOCIOLOGICAL THEORIES

Unit-I: Symbolic Interectionism
- a. Origin and Basic Postulates
- b. Contributions of G.H. Mead
- c. Contribution of H.Blumer
- d. Criticism

Unit-II: Phenomenology
- a. Origin, Basic Postulates of Phenomenology
- b. Contributions of Schutz
- c. Contributions of Berger
- d. Criticism

Unit- III: Ethnomethodology,
- a. Origin Basic postulates of Ethnomethodology
- b. Contribution of Garfinkel
- c. Contribution of Goffman
- d. Criticism

Unit-IV: Critical Theory
- a. Origin and Development
- b. Contributions of Adorno
- c. Contributions of Habermas
- d. Criticism

Unit-V: Post Modernism
- a. Origin and Development
- b. Contributions of Foucault
- c. Contributions of Derrida
- d. Criticism

References:

1. Abraham, M.F. 2001 — Modern Sociological Theory: An introduction Oxford, New Delhi
2. Adams, B.N. and Sydie, R.A., 2001 — Sociological Theory, Vistaar, New Delhi
3. Alexander, J.C. 1987 — Twenty lecturers: Sociological theories since world war-II Columbia Univ. Press New York
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7. Coser, L.A. 2001 — Masters of Sociological thought Rawat, Jaipur.
8. Collins, R. 1997 — Sociological Theory Rawat, Jaipur
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10. Giddens, A. 1983 — Central Problems in social theory, action, structure and contradictions in social analysis Macmillan; London.
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13. Lash, S. 1996 — Sociology of Post Modernism Routledge and Kegan Paul, London.
14. Podogorecki, A and Los, M. 1979 — Multi Dimensional Sociology Routledge and Kegan Paul, London.
15. Sturrock, J (ed) 1984 — Structuralism and since from Levistrauss to Derrida Oxford, New York
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17. Turner, J.H. 2001 — The structure of sociological theory Rawat, Jaipur
18. Zeitlin, I.M. 1998 — Rethinking Sociology, A critique of contemporary Theory. Rawat, Jaipur.

Paper No. XVII **Marks-80**

COMPARATIVE SOCIOLOGY

Unit-I: Historical and Social Context of Emergence of Sociology in the West
- a. Emergence of growth of Sociology in West
- b. Eurocentric Moorings western Sociological Tradition
- c. Americanization of Sociology

Unit-II: Central Themes in Comparative sociology
- a. Modernity and Development
- b. Diversity and multy Culturalism
- c. Enviornment
- d. Globalization

Unit-III: Theoretical Concern,s in Comparative sociology
- a. Problems of theoring in sociology
- b. Theoretical and Methodological approaches in sociology
- c. Policy issues: Formulation and Evalution

Unit IV: Current Debates

a. Contextitualization
b. Indianization
c. Use of Native Categories
d. Criticism.

Unit-V: Debate on "For Sociology of India"

a. Sociology of India
b. Sociology in India
c. Sociology For India
d. Criticism

References:

1 Anderski, S 1961: Elements of Comparative Sociology(London , Widenfeld and Nicolson)

2 Beteille, Andre 1987: Essays in Comparative Sociology(New Delhi: Oxford University Press)

3 Beteille, Andre 1992: Society and Policies in India: Essays in Comparative Sociology(New Delhi: Oxford University Press)

4 Berremen, G.D 1981: The Politocs of Truth : essays in Critical Anthopology, New Delhi: South Asian Publishers)

5 Dube, S. C. 1973: Modernization and Development: The search for alternative paradigm (New Delhi: Vistar)

6 ----------1973: Social Sciences in a chanign society. Lucknow university press, Lucknow

7 Ferreira, J.V. and A.R. Momineds: 1983: Nemesis–CulturalPerspectives on modernization (Bombay, Ramkrishna Publication)

8. Genov, Nikolai, 1989: National Traditions in Sociology (Delhi: Sage)

9 Kiely R and Phil Marfleet, eds. 1998: Globalization and the third world (London: Routledge)

10 Kothari,Rajan1988 : Rethinking Development: In search of Human Alternatives Delhi: Ajanta.

11 Kuper A 1996 : Social Science Encyclopaedia, (London: Routledge)

12 MohanR.P and A.S. Wilke, eds.1994: International Hand book of Contemporary Developments of Sociology (London : Mansell)

13 Oommen,T.K.& P.N. Mukherjee eds. 1986: Indian Sociology: Reflection and Introspection popular, Mumbai.

14 Parekh, Bhikhu 2000 Rethinking Multiculturalism: Cultural Diversity and Political Theory(London: Macmillian)

15 Saraswati B.N.1994: Interface of Cultural Identity and Development (New Delhi: Indira Gandhi National Centre of the Arts)

16 World Commission on environment and Development, 1987: (New Delhi: Oxford University Press)

17 Wallerstein, Immanuel Modern World System (New York: Oxford University Press) 1974:

Paper No.XVIII **Marks-80**

INDUSTRY AND SOCIETY IN INDIA-II

Unit-I: Industrial Relation

a. Importance of Human Relations at work
b. Conflict: Causes and Types, Resolution of Conflict
c. Conciliation and Collective Bargaining
d. Workers Participation in Management

Unit-II: Trade Union and Industrialization

a. History of Trade Unionism in India
b. Objectives and Functions
c. ILO and Trade Unions in India
d. Trade Unionism in Globalization

Unit-III: Industry and Society

a. Impact of Industry on Family
b. Impact of Industry on Stratification
c. Industrialization and Migration
d. Industrialization and Religion

Unit-IV: Industrilization in Third world Countries in the Era of Globlization

a. FDI and Third World
b. International Agencies: World Bank and Third world countries
c. Status of Industries in Third World Countries

Unit-V: Contemporary Issues

a. Industrialization and Women Labour
b. Industrialization and Child Labour
c. Industrialization and Environment
d. Problem of Industrialization in Developing Countries

References:

1. Agrawal R.D. 1972 Dynamics of Indian labour relations in India (A Book regarding Mc-Graw Hill, Bombay)

2. Aziz Abdul 1984 Labour problems of developing economy Ashis Publishing house, Hew Delhi

3. Gilbert S.J. 1985 Fundamentals of Industrial Sociology Tata Mc-Graw hill Bombay

4. Karnik V.B. 1990 Indian trade Union A survey, Popular Prakashan- Bombay

5. Laxmana, C et al 1990 Workers Participation and industrial democracy: Global perspectives: Ajanta publication, New Delhi.

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8. Philip H and Mellissa T, 2001 — Work Post Modernism and organization Sage, New Delhi
9. Ramaswamy E.A. 1977 — The worker and His union, Allied New Delhi
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11. Thiwait, P.K. 1987 — Social Structure of a Planned Town, Institute of Social Research and Applied Anthropology, Calcutta.
12. Watson K. Tony 1995 — Sociology, work and industry Routlodge and Kagan Paul, London.

Paper No.-XIX **Marks-80**

CRIMINOLOGY-II

Unit-I: Roots of Correction to prevent Crime
- a. Socialization
- b. Family values
- c. Role of education

Unit-II: Correction and It's Forms
- a. Meaning and Significance of Correction; Prison Based and Community Based
- b. Correctional Programmes in Prison; History of Prison Reforms in India
- c. After Care and Rehabilitation Programme.

Unit-III: Problem of Correctional Administration
- a. Overcrowding; Lack of Inter Agency Co-Ordination among Police Prosecution, Judiciary and Prison
- b. Prison Offences
- c. Problem of Criminal Justice Administration

Unit-IV: Victimological Perspective
- a. Victrim's Responsibility in Crime
- b. Violation of Prisoner's Human Rights
- c. Problems of Women Offenders.

Unit-V: Community Policing
- a. Concept andObjectives
- b. Types
- c. Significance

References:

1. Ahuja, R., 1981 — The Prison System Sahitya Bhawan, Agra
2. _____, 1997 — Contemporary Social problems in India Rawat, Jaipur.
3. Advani, NH, 1978 — Perspectives on Adult Crime and correction. Abhinav Publication, New Delhi.
4. Bedi, K., 1998 — It is always possible sterling, New Delhi.

5. Devasia, L and Devasia, V.V. (ed), 1989 — Female criminals and Female Victims: An Indian Perspective Dattsons, Nagpur.
6. Gosmami, B.K., 1983 — Criminology and Penology Allahabad
7. Mohanty, S, 1990 — Crime and Criminals in India Ashish Pub. House New Delhi.
8. Reid, S. , 1976 — Crime and Criminology Deydan press, Illinayse
9. Shankardas, R.D. 2000 — Punishment and the Prison: India and International perspective, Sage, New Delhi.
10. Sutherland, E.H. and Donald, R.C., 1968 — Principles of Criminology The Times of India Press, Bombay.
11. William, H.E., 1990 — The correction Profession Sage, New Delhi.

Paper No.-XX **Marks-100**

PROJECT REPORT

On Rural and Urban Problems

Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

EXAMINATION SCHEME

M.Sc. examination will be conducted in four SEMESTERS. Each semester exam shall consist of FOUR THEORY PAPERS AND TWO LAB COURSES.

SEMESTER –I (20 CREDIT)

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH - 1	GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES	4	3 Hrs	20	80	100
CH - 2	CONCEPTS IN ORGANIC CHEMISTRY	4	3 Hrs	20	80	100
CH - 3	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - I	4	3 Hrs	20	80	100
CH - 4	THEORY AND APPLICATIONS OF SPECTROSCOPY-I	4	3 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 5	Lab Course - I	2	8 Hrs	100
CH - 6	Lab Course - II	2	8 Hrs	100

SEMESTER –II (20 CREDIT)

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH - 7	TRANSITION METAL COMPLEXES	4	3 Hrs	20	80	100
CH - 8	REACTION MECHANISMS	4	3 Hrs	20	80	100
CH - 9	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - II	4	3 Hrs	20	80	100
CH - 10	THEORY AND APPLICATIONS OF SPECTROSCOPY-II	4	3 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 11	Lab Course - III	2	8 Hrs.	100
CH - 12	Lab Course - IV	2	8 Hrs.	100

SEMESTER –III (20 CREDIT)

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 13	RESONANCE SPECTROSCOPY, PHOTOCHEMISTRY AND ORGANOCATALYSIS	4	3 Hrs	20	80	100
CH – 14	CHEMISTRY OF BIOMOLECULES	4	3 Hrs	20	80	100
CH – 15	CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY	4	3 Hrs	20	80	100
CH – 16	ANALYTICAL TECHNIQUES AND DATA ANALYSIS	4	3 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH – 17	Lab Course - V	2	8 Hrs.	100
CH – 18	Lab Course - VI	2	8 Hrs.	100

SEMESTER –IV (20 CREDIT)

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 19	INSTRUMENTAL METHODS OF ANALYSIS	4	3 Hrs	20	80	100
CH – 20	NATURAL PRODUCTS AND MEDICINAL CHEMISTRY	4	3 Hrs	20	80	100
CH – 21	MATERIAL AND NUCLEAR CHEMISTRY	4	3 Hrs	20	80	100
CH - 23	APPLIED CHEMICAL ANALYSIS	4	3 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 17	Lab Course - VII	2	8 Hrs.	100
CH - 18	Lab Course - VIII	2	8 Hrs.	100

SCHEME FOR PRACTICAL EXAMINATION

EXPERIMENT	MARKS
Experiment-1	30
Experiment -2	30
Viva-voce	20
Sessional Marks	20
TOTAL MARKS	**100**

FIRST SEMESTER

PAPER NO. CH –1

GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES

Max. Marks 100

UNIT - I

SYMMETRY AND GROUP THEORY IN CHEMISTRY: Symmetry elements and symmetry operation, definitions of group, subgroup, relation between orders of a finite group and its subgroup. Conjugacy relation and classes. Point symmetry group. Schonflies symbols, representations of groups by matrices (representation for the C_n, C_{nv}, C_{nh}, D_{nh} etc. groups to be worked out explicitly). Character of a representation. The great orthogonality theorem (without proof) and its importance. Character tables and their use; spectroscopy.

UNIT - II

A. METAL-LIGAND BONDING: Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar complexes, bonding and molecular orbital theory.

B. METAL-COMPLEXES: Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structural elucidation, important reactions of metal carbonyls; preparation, bonding, structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes; tertiary phosphine as ligand.

UNIT –III

A. METAL–LIGAND EQUILIBRA IN SOLUTION: Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry.

B. ISOPOLY ACID AND HETEROPOLYACID: Isopoly and heteropoly acids of Mo and W. Preparation, properties and structure. Classification, Preparation, properties and structures of borides, carbides, nitrides and silicides. Silicates- classification and Structure, Silicones- preparation, properties and application.

UNIT - IV

A. METAL CLUSTERS: Higher boranes, carboranes, metalloboranes and metallocarboranes. Metal carbnonyl and halide cluster, compounds with metal-metal multiple bonds.

B. CHAINS: catenation, heterocatenation, intercatenation.

C. RINGS: Borazines, phosphazines.

BOOK SUGGESTED:

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
2. Inorganic Chemistry, J.E. Huhey, Harpes and Row.
3. Chemistry of the Elements, N.N. Greenwood and A. Earnshow, Pergamon.
4. Inorganic Electronic Spectroscopy, A.B.P. Lever, Elsevier.
6. Comprehensive Coordination Chemistry Eds. G. Wilkinson, R.D. Gillars and J.A. McCleverty, Pergamon.

PAPER NO. CH –2

CONCEPTS IN ORGANIC CHEMISTRY

Max. Marks 100

UNIT - I

A. NATURE OF BONDING IN ORGANIC MOLECULES: Localized and Delocalized chemical bond, conjugation and cross-conjugation, Bonding in Fullerenes, Bonds weaker than covalent, addition compounds,

Crown ether complexes and cryptands. Inclusion compounds, Cyclodextrins, Catenanes and Rotaxanes.

B. AROMATICITY: Aromaticity in benzonoid and non-benzenoid compounds, Huckel anti-aromaticity, homo-aromaticity. PMO approach for Aromaticity, Annulenes.

UNIT - II

A. CONFORMATIONAL ANALYSIS: Conformational analysis of cycloalkanes, decalins, effect of conformation on reactivity, conformation of sugars, steric strain due to unavoidable crowding.

B. STEREOCHEMISTRY: Elements of symmetry, chirality, molecules with more than one chiral center, methods of resolution, optical purity, stereospecific and stereoselective synthesis. Asymmetric synthesis. Optical activity in the absence of chiral carbon (Biphenyls, allenes and spiranes), chirality due to helical shape**.**

UNIT - III

A. REACTION INTERMEDIATES: Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes and nitrenes. Sandmeyer reaction, Free radical rearrangement and Hunsdiecker reaction.

B. ELIMINATION REACTIONS: The E_2, E_1 and E_1cB mechanisms. Orientation of the double bond. Reactivity, effects of substrate structures, attacking base, the leaving group and the medium.

UNIT - IV

PERICYCLIC REACTIONS: Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions - conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cycloadditions - antrafacial and suprafacial additions, 4n and 4n+2 system, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and cheleotropic reactions. Sigmatropic rearrangements - suprafacial and antarafacial shifts of H, sigmatrophic shifts involving carbon moieties, 3,3- and 5,5- sigmatropic rearrangements. Claisen, Cope and Aza-Cope rearrangements. Ene reaction.

BOOKS SUGGESTED:

1. Advanced Organic Chemistry, F. A. Carey and R. J. Sundberg, Plenum.
2. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
3. Structures and Mechanism in Organic Chemistry, C. K. Ingold, Cornell University Press.
4. Organic Chemistry, R. T. Morrison and R. N. Boyd, Prentice-Hall.
5. Modern Organic Reactions, H. O. House, Benjamin.
6. Principles of Organic Synthesis, R. O. C. Norman and J. M. Coxon, Blackle Academic and Professional.
7. Pericyclic Reactions, S. M. Mukherji, Macmillan, India.
8. Reaction Mechanism in Organic Chemistry, S. M. Mukherji and S. P. Singh, Macmillian.
9. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
10. Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press.
11. Rodd's Chemistry of Carbon Compounds, Ed. S. Coff
12. Organic Chemistry, Vol 2, I. L. Finar, ELBS.
13. Stereo selective Synthesis: A Practical Approach, M. Nogradi, and VCH.
14. Organic Chemistry, Paula Yurkanis Bruice, Pearson Education.

PAPER NO. CH –3

QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - I

Max. Marks 100

UNIT - I

A. MATHEMATICAL CONCEPT IN QUANTUM CHEMISTRY :

Vector quantities and their properties Complex numbers and Coordinate transformation. Differential and Integral Calculus, Basis rules of differentiation and Integration Applications.

B. The Schrodinger equation and postulates of quantum mechanics. Discussion of solutions of the Schrodinger equation to some model systems viz Particle in a box the harmonic oscillator, the rigid rotator, the hydrogen atom.

UNIT –II

BASICS OF THERMODYNAMICS: Maxwell's thermodynamic relations isotherm, Vant's Hoff hypothesis. Partial molar volume and partial molar heat content. Chemical potential, Gibbs Duhem equation, variation of

chemical potential with temperature and pressure. Chemical potential of ideal gases, pure solids, liquids and mixture of ideal gases. Activity and Fugacity, Determination of Fugacity, Variation of Fugacity with Temperature and Pressure.

UNIT –III

ELECTROCHEMISTRY–I: Electrochemistry of solution. Debye-Huckel Onsager treatment and its extension, ion solvent interactions. Debey-Huckel-Limiting Law. Debye-Huckel theory for activity coefficient of electrolytic solutions. Determination of activity and activity coefficient, ionic strength, Thermodynamics of electrified interface equations. Derivation of electro-capillarity, Lippmann equation (surface excess), methods of determination.

UNIT –IV

CHEMICAL DYNAMICS –I: Methods of determining rate laws, consecutive reactions, collision theory of reaction rates, steric factor, Activated complex theory, kinetic salt effects, steady state kinetics, and thermodynamic and Kinetic control of reactions. Dynamic chain (Hydrogen-bromine and Hydrogen-chlorine reactions) and Oscillatory reactions (Belousov-Zhabotinsky reaction)

BOOKS SUGGESTED :

1. Physical Chemistry, P.W. Atkins, ELBS.
2. Coulson's Valence, R. McWeeny, ELBS.
3. Chemical Kinetics, K. J. Laidler, Pearson.
4. Kinetics and Mechanism of Chemical Transformations, J. Rajaraman and J. Kuriacose, McMillan.
5. Modern Electrochemistry Vol. I and Vol. II, J.O.M. Bockris and A.K.N. Reddy, Plenum.
6. Thermodynamics for Chemists, S. Glasstone EWP.
7. An Introduction to Electrochemistry S. Glasstone EWP.
8. Organic Chemist's Book of Orbitals. L. Salem and W.L. Jorgensen, Academic Press
9. The Physical Basis of Organic Chemistry, H. Maskill, Oxford University Press

PAPER NO. CH - 4

THEORY AND APPLICATIONS OF SPECTROSCOPY- I

Max. Marks 100

UNIT - I

UNIFYING PRINCIPLES :

Electromagnetic radiation, interaction of electromagnetic radiation with matter-absorption, emission transmission, reflection, dispersion, polarization and scattering, Uncertainty relation and natural line width and natural line broadening, transition probability, selection rules, intensity of spectral lines, Born-Oppenheimer approximation, rotational, vibrational and electronic energy levels. Region of spectrum, representation of spectra, F.T. spectroscopy, computer averaging, lasers.

UNIT- II

MICROWAVE SPECTROSCOPY:

Classification of molecules in term of their internal rotation mechanism, determination of rotation energy of diatomic and polyatomic molecules, intensities of rotational spectral lined, effect of isotopic substitution on diatomic and polyatomic molecules, intensities of rotational spectral lines and parameters of rotational energy of linear and the transition frequencies, non-rigid rotators, spectral lines and parameters of rotational energy of linear and symmetric top polyatomic molecules. Application in determination of bond length.

UNIT- III

INFRA RED SPECTROSCOPY:

Introduction, simple and anharmonic oscillators in vibrational spectroscopy, diatomic-vibrating rotator, Modes of vibration in polyatomic molecules, vibration-coupling, Fourier Transform IR spectroscopy: instrumentation, interferometric spectrophotometer, sample handling,Factors influencing vibrational frequencies, Application of IR spectroscopy: Interpretation of IR spectraof normal alkanes, aromatic hydrocarbons, alcohols and phenols aldehydes and ketones, eathers, esters, carboxylic acids and amines and amides.

UNIT- IV

RAMAN SPECTROSCOPY:

Classical and quantum theories of Raman effect, pure rotational, vibrational and vibrational-rotational Raman spectra, selection rules mutual exclusion principle, Resonance Raman spectroscopy, Coherent anti Stokes Raman spectroscopy (CARS), Instrumentation , Application of Raman effect in molecular structures, Raman activity of molecular vibration, structure of CO_2, N_2O, SO_2, NO_3^-, ClF_3

BOOKS SUGGESTED

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Fundamentals of Molecular Spectroscopy, C.N. Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy: Principles and Applications, Jag Mohan, Narosa Publication.
5. Spectroscopy Methods in Organic Chemistry, D.H. Williams & I. Fleming, Tata Mcgraw-Hill Publication.
6. Spectrophometric Identification of Organic Compounds, R.M. Silversteion & F. X. Webster, John Wiley Publication.

PAPER NO. CH - 5

LABORATORY COURSE–I

Max. Marks 100

1. QUALITATIVE ANALYSIS OF MIXTURE CONTAINING EIGHT RADICALS INCLUDING TWO LESS COMMON METAL FROM AMONG THE FOLLOWING BY SEMI MICRO METHOD.

1) *Basic Radicals :*

Ag, Pb, Hg, Bi, Cu, Cd, As, Sb, Sn, Fe, Al, Cr, Zn, Mn, Co, Ni, Ba, Sr, Ca, Mg, Na, K, Ce, Th, Zr, W, Te, Ti, Mo, U, V, Be, Li, Au, Pt.

2) *Acid Radicals :*

Carbonate, Sulphite, Sulphide, Nitrite, Nitrate, Acetate, Flouride. Chloride, Bromide, Iodide, Sulphate, Borate, Oxalate, Phosphate, Silicate, Thiosulphate, Ferrocyanide, Ferricyanide, Sulphocyanide, Chromate, Arsenate and Permanganate.

2. QUANTITATIVE ANALYSIS:

Involving separation of two of the following in ores, alloys, or mixtures in solution, one by volumetric and the other by gravimetric methods.

3. ESTIMATION OF:

1) Phosphoric acid in commercial orthophosphoric acid.
2) Boric acid in borax.
3) Ammonia in a ammonium salt.
4) Manganese dioxide in pyrolusite.
5) Available chlorine in bleaching powder.
6) Hydrogen peroxide in a commercial samples.

4. PREPARATIONS:-

Preparation of selected inorganic compound and their studies by I.R. electronic spectra, Mössbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds

(1) VO (acac)2
(2) $TiO(C_9H_8NO)_2 . 2H_2O$
(3) cis-K $[Cr(C_2O_4)_2 (H_2O)_2]$
(4) Na $[Cr (NH_3)_2 (SCN)_4]$
(5) $Mn (acac)_3$
(6) $K_2[Fe(C_2O_4)_3]$
(7) Prussian Blue, Turnbull's Blue.
(8) $[Co (NH_3)_6] [Co (NO_2)_6]$
(9) cis-$[Co(trien) (NO_2)_2] Cl.H_2O$
(10) Hg $[Co (SCN)_4]$
(11) $[Co (Py)_2Cl_2]$
(12) $[Ni (NH_3)_6] Cl_2$
(13) $Ni (dmg)_2$
(14) $[Cu (NH_3)_4] SO_4 . H_2O$

BOOKS SUGGESTED

1. Vogel's Textbook of Quantitative Analysis, revi Mendham, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly, Prentice Hall.

PAPER NO. CH –6

LABORATORY COURSE –II

Max. Marks 100

ADSORPTION/SURFACE CHEMISTRY

1. To Study Surface Tension - Concentration relationship for solutions (Gibbs equation).
2. To Verify the Freundlich and Langmuir Adsorption isotherms using acetic acid/Oxalic acid and activated charcoal.
3. Determination of CMC of surfactants.

PHASE EQUILIBRIA

1. To Construct the Phase diagram for three component system (e.g., chloroform-acetic acid-water).

CHEMICAL KINETICS

1. Determination of the effect of (a) Change of temperature (b) Change of concentration of reactants and catalyst and (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester/ionic reactions.
2. Determination of the velocity constant of hydrolysis of an ester/ionic reaction in micellar media.
3. Determination of the rate constant for the decomposition of hydrogen peroxide by Fe^{+++} and Cu^{++} ions.
4. Determination of the primary salt effect on the kinetics of ionic reactions and testing of the Bronsted relationship (iodide ion is oxidized by persulphate ion).

SOLUTIONS/MOLECULAR WEIGHTS

1. Determination of molecular weight of non-volatile substances by Landsber
2. Determination of Molar masses of Naphthelene/acetanilid
3. Molecular weight of polymers by viscosity measurements.

CONDUCTOMETRY

1. Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by sodium hydroxide conductometrically.
2. Determination of solubility and solubility product of sparingly soluble salts (e.g., $PbSO_4$, $BaSO_4$) conductometrically.
3. Determination of pK_a of Acetic acid and verification of Ostwald dilution law.

POTENTIOMETRY/pH METRY

1. Determination of the strength of strong and weak acids in a given mixture using a potentiometer/pH meter.
2. Determination of the dissociation constatnt of acetic acid in DMSO, DMF, acetone and dioxane by titrating it with KOH.
3. Determination of the dissociation constant of monobasic/dibasic acid by Albert-Serjeant method.
4. Determination of Redox potential of Fe^{++}/Fe^{+++} system.

POLARIMETRY

1. Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
2. Enzyme kinetics –inversion of sucrose.
3. Determine the specific and molecular rotation of optically active substances.

BOOKS SUGGESTED

1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller, Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C. Heath.
3. Systematic Qualitative Organic Analysis, H. Middleton, Adward Arnold.
   Handbook of Organic Analysis –Qualitative and Quantitative, H. Clark, Adward Arnold.
4. Vogel's Textbook of Practical Organic Chemistry,
5. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
6. Findley's Practical Physical Chemistry, B.P. Levi
   Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

SECOND SEMESTER

PAPER NO. CH - 7

TRANSITION METAL COMPLEXES

Max. Marks 100

UNIT - I

REACTION MECHANISM OF TRANSITION METAL COMPLEXES: Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, anation reactions, reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes, the trans effect. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

UNIT - II

ELECTRONIC SPECTRA AND MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES:

Spectroscopic ground states, Correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), Selection rules, mechanism for break down of the selection rules, intensity of absorption, band width, spectra of d-d metal complexes of the type $[M(H_2O)]^{n+,}$ spin free and spin paired ML_6 complexes of other geometries, Calculations of Dq, B and parameters, spin forbidden transitions, effect of spin-orbit coupling, Spectrochemical and Nephelouxetic series. Magnetic properties of complexes of various geometries based on crystal field model, spin free-spin paired equillibria in octahedral stereochemistry.

UNIT - III

A. **TRANSITION METAL COMPLEXES:** Tranisition metal complexes with unsaturated organic molecules,alkanes ,allyl ,diene dienyl,arene and trienyl complex,preparations,properties,nature of bonding and structure features.Imporant reaction relating to nucleophilic and electrophilic attack on ligands and organic synthesis.

B. **TRANSITION METALS COMPOUND WITH BOND TO HYDROGEN:** Transition Metals Compound with Bond to Hydrogen.

UNIT-IV

A. **ALKYLS AND ARYLS OF TRANSITION METALS:** Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis.

B. **COMPOUNDS OF TRANSITION METAL - CARBON MULTIPLE BONDS :** Alkylidenes, low valent carbenes nature of bond and Structural characteristics.

C. **FLUXIONAL ORGANOMETALLIC COMPOUNDS:** Fluxionality and dynamic equilibria in compounds such as olefin, -allyl and dienyl complexes.

BOOKS SUGGESTED :

1. Pinciples and application of organotransition metal chemistry, J.P.Collman, L.S.Hegsdus, J. R. Norton and R.G. Finke, University Science Books.
2. The Organometallic chemistry of the Transition metals, R. H. Crabtree, John Wiley.
3. Metallo - organic chemistry, A.J. Pearson, Wiley.
4. Organometallic chemistry, R. C. Mehrotra and A.Singh, New age International.

PAPER NO. CH - 8

REACTION MECHANISMS

Max. Marks 100

UNIT - I

A. **ALIPHATIC NUCLEOPHILIC SUBSTITUTION:** The S_N2, S_N1, mechanisms.The neighbouring group mechanism, neighbouring group participation by πand σbonds, anchimeric assistance. Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium, phase transfer catalysis, ambident nucleophile and regioselectivity.

B. **AROMATIC NUCLEOPHILIC SUBSTITUTION:** The S_NAr, S_N1, and benzyne mechanisms. Reactivity - effect of substrate structure, leaving group and attacking nucleophile. The von Richter, Sommelet-Hauser, and Smiles rearrangements.

UNIT - II

A. **ALIPHATIC ELECTROPHILIC SUBSTITUTION:** Mechanisms of- S_E2 S_E1, electrophilic substitution accompanied by double bond shifts. Effect of substrates, leaving group and the solvent polarity on the reactivity.

B. **AROMATIC ELECTROPHILIC SUBSTITUTION:** The arenium ion mechanism, orientation and reactivity.

The ortho/para ratio, ipso attack, orienation in other ring systems.Ɵ Reactivity-Effectofsubstrates and electrophilles. Vilsmeir reaction and Gattermann-Koch reaction.

UNIT - III

ADDITION TO CARBON-CARBON MULTIPLE BONDS: Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals, regio- and chemoselectivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic rings Hydroboration, Micheal reaction. Shrapless asymetric epoxdation.

UNIT - IV

ADDITION TO CARBON-HETERO MULTIPLE BONDS: Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids esters and nitriles.Addition of Grignard Reagents, Organo-Zinc and Organo-lithium to carbonyls and unsaturated carbonyl compounds, Wittig reaction.

Mechanism of condensation reactions involving enolates - Aldol, Knoevenagel and Stobbe reactions. Hydrolysis of esters and amides, ammonolysis of esters.

BOOKS SUGGESTED :

1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March,Johan Wiley.
2. Modern Organic Reactions, H. O. House, Benjamin.
3. Principles of Organic Synthesis, R. O. C. Norman and J. M. Coxon, Blackle Academic & Professional.
4. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
5. Structures and Mechanism in Organic Chemistry, C. K. Ingold, Cornell University Press.
6. Reaction Mechanism in Organic Chemistry, S. M. Mukherji and S. P. Singh, Macmillian

PAPER NO. CH –9

QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - II

Max. Marks 100

UNIT –I

A. APPLICATION OF MATRICES IN QUANTUM CHEMISTRY : Addition and multiplication, inverse and transpose of matrices. Determinants, in quantum Chemistry**.**

B. ANGULR MOMENTION IN QUANTUM CHEMISTRY: Angular momentum, angular momentum Operators. Eigen functions and Eigen values Angular momentum, ladder operators.

C. APPROXIMATE METHODS: The variation theorem, linear variation principle. Perturbation theory (first order and non-degenerate). Applications of variation method and perturbation theory to the Helium atom.

UNIT –II

STATISTICAL THERMODYNAMICS : Probability, permutations and combinations

concepts of probability, Maxwell Boltzmann distribution. Different ensembles and Partition functions translational, rotational, vibrational and Electronic. Thermodynamic function using appropriate Partition function. Fermi-Dirac and Bose-Einstein Statistics and statistical basis of entropy. Heat capacity of solids Debye and Einstein Models.

UNIT –III

ELECTROCHEMISTRY –II: Structure of electrified interfaces. Gouy-Chapman, Stern, Over potentials and exchange current density, Derivation of Butler –Volmer equation, Tafel plot.Semiconductor interfaces, Theory of double layer at semiconductor, electrolyte solution interfaces, structure of double layer interfaces. Effect of light at semiconductor solution interfaces. Electro catalysis influence of various parameters. Hydrogen electrode.

UNIT –IV

CHEMICAL DYNAMICS –II: General features of fast reactions by flow method, relaxation method, flash photolysis and the nuclear magnetic resonance method. Dynamics of molecular motions, probing the transition state, dynamics of barrier less chemical reactions in solutions, dynamics of unimolecular reaction. [Lindemann –Hinshelwood and Rice-Ramsperger-Kassel-Marcus {RRKM}] theories of unimolecular reactions.

BOOKS SUGGESTED :

1. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
2. Mathematics for Chemistry, Doggett and Sutclilffe, Longman.
3. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
4. Chemical Mathematics, D.M, Hirst, Longman.
5. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
6. Basic Mathematics for Chemists, Tebbutt, Wiley.
7. Physical Chemistry, P.W. Atkins, ELBS.
8. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.
9. Quantum Chemistry, Ira N. Levine, Prentice Hall.
10. Coulson's Valence, R. McWeeny, ELBS.
11. Chemical Kinetics, K. J. Laidler, Pearson.
12. Kinetics and Mechanism of Chemical Transformations, J. Rajaraman and J. Kuriacose, McMillan.
13. Modern Electrochemistry Vol. I and Vol. II, J.O.M. Bockris and A.K.N. Reddy, Plenum.
14. Thermodynamics for Chemists, S. Glasstone EWP.
15. An Introduction to Electrochemistry S. Glasstone EWP.
16. Physical Chemistry, Ira N. Levine McGraw Hill.
17. Physical Chemistry, Silbey, Alberty, Bawendi, John-Wiley.

PAPER NO. CH - 10

THEORY AND APPLICATIONS OF SPECTROSCOPY –II

Max. Marks 100

UNIT - I

ULTRAVIOLET AND VISSIBLE SPECTROSCOPY:

Introduction, intensity of vibrational-electronic spectra and Frank-Condon principle for dissociation energy, rotational fine structure of electronic-vibrational spectra, Shape of some molecular orbitals viz., H_2, He_2, N_2, O_2. Electronic spectra of organic molecules, chromophores, application of electronic spectroscopy: spectrophotometric studies of complex ions, determination of ligand/metal ratio in a complex, identification of compounds, determination stability constants.

UNIT - II

SCATTERING SPECTROSCOPY:

Principle, instrumentations and application of Auger spectroscopy and Scanning Electron Microscopy for chemical characterization, electron diffraction of gases and vapours, The Wierl equation and co-related method, application of electron diffraction.

Theory, instrumentation and application of turbidimetry, nephelometry and fluorometry. Fluoroscence and phosphorescence and factors affecting them.

UNIT - III

MASS SPECTROMETRY:

Introduction, basic principles, separation of the ions in the analyzer, resolution, molecular ion peak, mass spectral fragmentation of organic compounds, factors affecting fragmentation, McLafferty rearrangement. Instrumentation, Characteristics of mass spectra of Alkanes, Alkenes, Aromatic hydrocarbons, Alcohols, Amines. Nitrogen rule, ring rule, Molecular weight and formula determination, Gas chromatography-Mass spectrophotometry: Introduction.

UNIT - IV

NUCLEAR RESONANCE SPECTROPHOTOMETRY:

Theory of NMR spectroscopy, interaction of nuclear spin and magnetic moment, chemical shift, processional motion of nuclear particles in magnetic field, spin-spin splitting, coupling constants, factor affecting the chemical shift, shielding effect, effect of chemical exchange, hydrogen bonding, instrumentation of Fourier transform NMR spectrophotometer, structure determination of organic compounds, Carbon-13 NMR spectroscopy, Multiplicity-proton (^1H) decoupling-noise decoupling, off resonance decoupling, selective proton decoupling, chemical shift.

BOOKS SUGGESTED

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Fundamentals of Molecular Spectroscopy, C.N. Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy : Principles and Application, Jag Mohan, Narosa Publication.
5. Spectroscopic Methods in Organic Chemistry, D.H. Williams & I. Fleming, Tata Mcgraw-Hill Publication.
6. Spectrophometric Identification of Organic Compounds, R.M. Silverstein & F.X. Webster, John Wiley Publications.

PAPER NO. CH - 11

LABORATORY COURSE –III

Max. Marks 100

1. GENERAL METHODS OF SEPARATION AND PURIFICATION OF ORGANIC COMPOUNDS WITH SPECIAL REFERENCE TO:

1) Solvent Extraction
2) Fractional Crystallisation

2. DISTILLATION TECHNIQUIES:

Simple distillation, steam distillation, Fractional distillation and distillation under reduced pressure.

3. ANALYSIS OF ORGANIC BINARY MIXTURE:

Separation and Identification of organic binary mixtures containing at least one component with two substituents.
(A student is expected to analyse at least 10 different binary mixtures.)

4. PREPARATION OF ORGANIC COMPOUNDS: SINGLE STAGE PREPARATIONS.

1) **Acetylation:** Synthesis of β-Naphthyl acetate from β-Naphthol / Hydroquinone diacetate from Hydroquinone.
2) **Aldol condensation:** Dibenzal acetone from benzaldehyde.
3) **Bromination:** p-Bromoacetanilide from acetanilide.
4) **Cannizzaro Reaction:** Benzoic acid and Benzyl alcohol from benzaldehyde.
5) **Friedel Crafts Reaction:** O-Benzoyl Benzoic acid from phthalic anhydride.
6) **Grignard Reaction:** Synthesis of triphenylmethanol from benzoic acid,
7) **Oxidation:** Adipic acid by chromic acid oxidation of cyclohexanol.
8) **Perkin's** Cinnamic **Reaction:** acid from benzaldehyde.
9) **Sandmeyer Reaction:** p-Chlorotoluene from p-toluidine/o-Chlorobenzoic acid from anthranilic acid.
10) **Schotten Baumann Reaction:** β-Naphthyl benzoate from:β-Naphthol / Phenyl benzoate from phenol.
11) **Sulphonation Reaction:** Sulphanilic acid from aniline.

BOOK SUGGESTED :

1. Practical Organic chemistry by A. I. Vogel.
2. Practical Organic chemistry by Mann and Saunders.
3. Practical Organic chemistry by Garg and Salija.
4. The Systematic Identification of Organic compounds, R. L. Shriner and D. Y. Curtin.
5. Semimicro Qualitative Organic Analysis, N.D. Cheronis, J. B. Entrikin and E. M. Hodnett.
6. Practical Physical chemistry by Alexander Findlay.
7. Experimental Physical chemistry, D. P. Shoemaker, G. W. Garland and J. W. Niber, Mc Graw Hill Interscience.
8. Findlay's Practical Physical chemistry, revised B

PAPER NO. CH –12

LABORATORY COURSE –IV

Max. Marks 100

I. ERROR ANALYSIS AND STATISTICAL DATA ANALYSIS

1. Linear Regression Analysis
2. Curve Fitting
3. Student "t" Test
4. Data Analysis Using Basic Statistical Parameters
5. Calibration of volumetric Apparatus, Burette, Pipette Weight Box etc.

II. USE OF COMPUTER PROGRAMMES

The students will learn how to operate a PC and how to run standard programmes and packages. Execution of linear regression, X-Y plot, numerical integration and differentiation as well as differential equation solution programmes. Monte Carlo and Molecular dynamics. Programmes with data preferably from physical chemistry laboratory. Further, the student will operate one or two or the packages such as MICROSOFT ECXEL, WORLD, POWERPOINT, SPSS, ORIGIN, MATLAB, EASYPLOT.

III. A. FLAME PHOTOMETRIC DETERMINATIONS

1. Sodium and potassium when present together.
2. Sodium/potassium in solid samples.
3. Solid Sodium and Potassium in Liquid Samples.
4. Lithium/calcium/barium/strontium.
5. Cadmium and magnesium in tap water.

B. NEPHELOMETRIC DETERMINATIONS

1. Sulphate
2. Phosphate
3. Silver

IV. ELECTROPHORESIS

1. To separate cations of inorganic salts by paper electrophoresis.
2. Capillary Electrophoresis of water –soluble Vitamines

V. SPECTROSCOPY

1. Verification of Beer's Lambert Law.
2. Determination of stoichiometry and stability constant of inorganic (e.g. ferric –salicylclic acid) and organic (e.g. amine-iodine) complexes, thiocynam.
3. Characterization of the complexes by electronic and IR, UV spectral data.
4. Determination of Indicator constant (pK_a) of methyl red.

BOOK SUGGESTED :

1. Computer and Common Sense, R. Hunt and J. Shelley, Prentice Hall.
2. Computational Chemistry, A.C. Norris.
3. Microcomputer Quantum Mechanics, J.P. Killngbeck, Adam Hilger.
4. Computer Programming in FORTRAN IV, V. Rajaraman, Prentice Hall.
5. An Introduction to Digital Computer Design, V. Rajaraman and T. Radhakrishnan, Prentice Hall.
6. Experiments in Chemistry, D.V. Jahagirgar.

THIRD SEMESTER

PAPER NO. CH - 13

RESONANCE SPECTROSCOPY, PHOTOCHEMISTRY AND ORGANOCATALYSIS

Max. Marks 100

UNIT –I

A. ELECTRON SPIN RESONANCE SPECTROSCOPY : Hyperfine coupling, spin polarization for atoms and transition metal ions, spin-orbit coupling and significance of g-tensors, application to transition metal complexes (having one unpaired electron).

B. NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY: Quadrupole nuclei, quadrupole moments, electric field gradient, coupling constant, splittings, applications.

UNIT –II

A. PHOTOELECTRON SPECTROSCOPY : Basic principle both for atoms and molecules; Photo-electric effect, ionization process, ectraKoopman'sofsimplemolecules,theorem,Auger p electron spectroscopy, Determination of Dipole moment.

B. PHOTOACOUSTIC SPECTROSCOPY: Basic principle of Photo acoustic Spectroscopy (PAS), PAS –gases and condensed system Chemical and Surface application.

UNIT –III

A. PHOTOCHEMICAL REACTIONS : Interaction of electromagnetic radiation with matter, Stern Volmer equation, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, Actinometry.

B. DETERMINATION OF REACTION MECHANISM: Classification, rate constatnts and life times of reactive energy states –determination of rate constants of reactions. Effect of light intensity on the rate of photochemical reactions.

C. MISCELLANEOUS PHOTOCHEMICAL REACTIONS : Photo-Fries reactions of anilides, Photo-Fries rearrangement. Barton reaction. Singlet molecular oxygen reactions. Photochemical formation of smog. Photodegradation of polymers, Photochemistry of vision.

UNIT –IV

A. ORGANOCATALYSIS

General Principles: Energetic, Catalytic cycles, catalytic efficiency and life time, selectivity. Type of organometallic reaction: Ligand substitution, Oxidative addition, reductive elimination and insertion and deinsertion. Homogeneous catalysis: Hydrogenetion of alkenes, Hydroformylation, Monsanto acetic acid synthesis, Wacker oxidation of alkenes, Alkenes metathesis, Palladium-Catalysed C-C bond forming reactions, asymmetric oxidation. Heterogenous catalysis: The nature of heterogenous catalysts, Fischer- Tropsch synthesis, alkene polymerization

BOOK SUGGESTED:

1. Infrared and Raman Spectra: Inorganic and Coordination Compounds, K. Nakamoto, Wiley.
2. Fundamentals of Photochemsitry, K.K. Rohtagi-Mukherji, Wiley-Eastern.
3. Essentials of Molecular Photochemistry, A. Gilbert and J. Baggott, Blackwell Scientific Publications.
4. Molecular Photochemsitry, N.J. Turro, W.A. Benjamin.
5. Introductory Phtochemistry, A. Cox and T. Camp, McGraw-Hill.
6. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
7. Application of Spectroscopy of Organic Compounds, J.R. Dyer, Prentice Hall.
8. Photochemistry , R.P. Kundall and A. Gilbert, Thomson Nelson.
9. Organic Photochemistry, J. coxon and B. Halton, Cambridge University Press.
10. Shriver& Atkins Inorganic Chemistry: P.Atkins, T.Overtone, J. Rourke, M. Weller, F. Armstrong, Oxford University Press
11. Inorganic Chemistry: C.E. Housecraft, A.G. Sharpe, Pearson Education Limited.
12. Inorganic Chemistry: Principles of Structure and Reactivity: J.E. Huheey, E.A. Keiter, R.L.Keiter, O.K. Medhi, Pearson Education
13. Organometallic Chemistry: A Unified Approach: R.C. Mehrotra, A.Singh, New Age International Publishers.

PAPER NO. CH - 14

CHEMISTRY OF BIOMOLECULES

Max. Marks 100

UNIT –I

A. **BIOENERGETICS:** Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.

B. **ELECTRON TRANSFER IN BIOLOGY**: Structure and function of metalloproteins in electron transport processes –cytochromes and ion-sulphur proteins, synthetic models.

C. **TRANSPORT AND STORAGE OF DIOXYGEN:** Heme proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanins and haemerythrin, model synthetic complexes of iron, cobalt and copper.

UNIT –II

A. **METALLOENZYMES**: Zinc enzymes –carboxypeptibase and carbonic anhydrase. Iron enzymes – catalase, peroxidase and cytochrome P-450. copper enzymes- superoxide dismutase. Molybdenum oxatransferase enzymes –xanthine oxidase.

B. **ENZYME MODELS**: Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, Cyclodextrin-based enzyme models, calixarenes, ionophores, synthetic enzymes or synzymes.

UNIT –III

A. **ENZYMES :** Nomenclature and classification ofnducedEnzyme. F fit hypothesis, concept and identification of active site by the use of inhibitors.

B. **CO-ENZYME CHEMISTRY:** Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD+, NADP+, FMN, FAD, lipoic acid, vitamin B_{12}.

C. **BIOTECHNOLOGICAL APPLICATIONS OF ENZYMES:** Tehcniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilization enzymes in medicine and industry. Enzymes and Recombinant DNA Technology.

UNIT –IV

A. **BIOPOLYMER INTERACTIONS:** forces involved in biopolymer interaction. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.

B. **THERMODYNAMICS OF BIOPOLYMER SOLUTIONS**: Thermodynamics of biopolymer solution, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechnochemical system.

C. **CELL MEMBRANE AND TRANSPORT OF IONS**: Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport and Nerve conduction.

BOOK SUGGESTED:

1. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S.L. Lippard and J.S. Valentine, University Science Books.
3. Inorganic Biochemistry vols II and I.Ed G.L. Eichhorn, Elservier.
4. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
5. Bioinorganic Chemistry, I. Bertinin, H.B. Gary, S.J. Lippard and J.S. Valentine, University Science.
6. Inorganic Biochemistry vols I and II ed. G.L. Eichhorn, Elsevier.
7. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer-verlag.
8. Understanding Enzymes, Trevor palmer, Prentice Hall.
9. Enzyme Chemistry : Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
10. Enzyme Mechanisms Ed, M.I. Page and A. Williams, Royal Society of Chemistry.
11. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
12. Immobilizaed Enzymes: An Introduction and Applications in Biotechnology, Michael D. Trevan, and John Wiley.

13. Enzymatic Reaction Mechanisms, C. Walsh, W.H. Freeman.
14. Enzyme Structure and Mechanisms, A Fersht, W.H. Freeman.
15. Biochemistry: The Chemical Reacitons of liging cells, D.E. Metzler, Academic Press.
16. Principles of Biochemistry, A.L. Lehninger, Wroth Publishers.
17. Biochemistry, L. Stryer, W.H. Freeman.
18. Biochemistry, J. David Rawn, Neil Patterson.
19. Biochemistry, Voet and Voet, John Wiley.
20. Outlines of Biochemistry, E.E. Conn and P.K. Stumpf, John Wiley.
21. Bioorganic Chemistry : A Chemistry Approach to Enzyme Action, H. Dugas and C. Penny, Springer-Verlag.
22. Biochemistry and Molecular Biology of Plants, Buchanan, Gruissem and Jones, I.K. International Pvt. Ltd.

PAPER NO. CH –15

CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY

Max. Marks 100

UNIT –I

ACIDS, BASES, ELECTROPHILES, NUCLEOPHILES AND CATALYSIS :

Acid-base dissociation, Electronic and structural effects, acidity and basicity. Acidity function and their applications. Hard and soft acids and bases. Nucleophilicity scales. Nucleofugacity. The -effect. Ambivalent Nucleophilies. Acid base catalysis-specific and general catalysis. Bronsted catalysis, Enzyme Catalysis.

UNIT –II

MICELLES AND ADSORPTION :

Micelles : Classification of surface active agents, micellization, hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of Surfactants. Thermodynamics of micellization - phase separation and mass action models. Reverse micells, micro-emulsion. Micellar Catalysis, Surface tension capillary action, pressure difference across curved surface (Laplace equation), vapor pressure of droplets (Kelvin equation), Gibbs adsorption isotherm.

UNIT –III

SOLID STATE CHEMISTRY - I :

Crystal defects and Non-stoichiometry - Perfect and imperfect crystals, intrinsic and extrinsic defects - point defect, line and plane defects, vacancies - Schotty defects and Frankel defects. Thermodynamics of Schotty and Frenkel defect, formation of color centres, non-stoichiometry and defects. Electronic properties and Band theory of semiconductors.

UNIT –IV

MACROMOLECULES :

Polymer - Definition types of polymers, electrically conducting, fire resistant, liquid crystal polymers, kinetics of polymerization, mechanism of polymerization.

Molecular mass, average molecular mass molecular mass determination (Osmometry, Viscometry, diffusion and light scattering methods), Sedimentation, chain configuration of macromolecules calculation of average dimensions of various chain structures.

BOOK SUGGESTED :

1. G.W. Castellan, "Physical Chemistry", Addison- Lesley Publishing Co.
2. E.A. Moelwyn Hughes, "Physical Chemistry", Pergamon Press.
3. Denbigh, "Chemical Equilibria", D. Van Nostrand.
4. J. Rose, "Dynamic Physical Chemistry" Sir Issac Pitman and Sons.
5. Solid state "Chemistry and its Applications, A.R. West, Plenum.
6. Principle of Solid State H.V. Kar, Wiley Eastern.
7. Solid State Chemists, D.K. Chakrabarty, New Age International (P) Ltd.
8. Micelles, Theoretical and Applied Aspects, V. Moral Plenum.
9. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
10. Mathematics for Chemistry, Doggett and Sutcliffe, Longman.
11. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
12. Chemical Mathematics, D.M. Hirst, Longman.
13. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
14. Basic Mathematics for Chemists, Tebbutt, Wiley.
15. Quantum Chemistry, Ira N. Levine, Prentice Hall.
16. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.

PAPER NO. CH –16

ANALYTICAL TECHNIQUES AND DATA ANALYSIS

Max. Marks 100

UNIT –I

SAMPLE PREPARATION, DEGESTION AND STATISTICAL ANALYSIS

A. Sampling - Collection, Preservation and preparation of sample, Techniques of sampling solids, liquids and gases, Operation of drying and preparing a solution of the analyte.

Principle, methodology and application of different types of digestions such as acid digestion, base digestion, enzymatic and microwave digestion for liquid and solid materials.

B. Evolution and procession of Analytical Data, Precision and Accuracy, Types of Errors, Propagation of errors, Normal Distribution Curve, Standard deviation, Confidence limit, Graphical presentation of result-method of average, Method of Linear least square, Significant figures, Statistical aid to hypothesis testing-t-test, F-test, Correlation coefficient, Rejection of data.

UNIT –II

SEPARATION TECHNIQUES

A. Efficiency of extraction, Selectivity of extraction, Extraction system, Method of Extraction, applications.

B. Principle, classification of chromatographic techniques, Technique and applications of paper chromatographic, Thin-layer chromatographic, HPTLC, Column chromatography.

UNIT –III

THERMAL AND AUTOMATED METHODS

A. Principle, Instrumentation, Application of TGA, DTA and DSC methods.

B. Automated methods, Principle, instrumentation and application of flow injection analysis.

UNIT –IV

ELECTROCHEMISTRY

A. Principles and instrumentation of pH potentiometry, coulometry and counductometry.

B. Basic principles, Diffusion current, polarized electrode, Micro electrode, Dropping Mercury Electrode llkovic equation, Polarographic wave, Qualitative analysis Stripping methods, Cyclic Voltammetry, Amperometric titration :-curves, Differential pulse polarography and Square wave polarography.

BOOK SUGGESTED :

1. Fundamental of Analytical Chemistry- Skoog D.A. and West D.M.
2. Saunders, College Publication.
3. Textbook of Quantitative Inorganic Analysis-Vogel A.I.
4. Principles and Practice of Analytical Chemistry-Fifield F.W and Kealey
5. D. Black well Science
6. Instrumental Analysis R. Braun, McGraw Hill, International Edition.
7. Analytical Chemistry, Christian, G.D., WSE/Wiley.
8. Instrumental Analysis, Willard Meritt Dean, CBS.
9. Chemical Analysis, Brawn, McGraw Hill.
10. Fundamental of Analytical Chemistry-Skoog D.A. and West D.M.
11. Principles of instrumental analysis, Skoog Holler - Niemann.
12. Instrumental analysis, Wizard Dean and Merit.
13. Principle and PRACTICAL analytical chemistry, Fifield and Kealey.

PAPER NO. CH - 17

LABORATORY COURSE –V

Max. Marks 100

1. To determine the percent efficiency of given counter.
2. To calculate the activity with given radioactive source.
3. Determination of the half-life of Radionuclide.
4. Determination of absorption coefficient & half
5. Determination of absorption coefficient & half thickness of lead for gamma radiation.
6. Determination of range and energy of β particle
7. Prove the inverse square law for gamma rays.
8. Measurement of gamma ray energy by gamma ray spectrometry.
9. Determination of the partition coefficient for iodine between carbon tetrachloride & (a) Water, (b) aqueous potassium iodide.
10. Study of kinetics of exchange between ethyl iodide & the iodide ion.
11. Determination of the solubility product of lead iodide.
12. Determination of the dissociation constant of Barium Nitrate.
13. Determination of the concentration of iodine in a given sample (KI), by isotope dilution technique.
14. To study the effect of temperature, concentration of the reactant and catalyst on the rate of a chemical reaction (Hydrolysis/Nucleophilic Substituttion).
15. Reaction between Sodium Formate and Iodine by
    (i) Volumetric Method.
    (ii) Conductometric Method.
16. Saponification of ethyl acetate
    (i) Volumetric Method.
    (ii) Conductometric Method.
17. Reaction between Acetone and Iodine.
18. To study the autocatalylic reaction between $KMnO_4$ and Oxalic acid.
19. Reaction between $K_2S_2O_8$ and Iodine.
20. Determination of pKa by Kinetic Measurement.
21. Evaluation of Equilibrium constants from kinetic data.
22. Determination of rate constant of the decomposition of benzene diazonium chloride at different temperature.
23. To study the photolysis of uranyl oxalate.
24. To study the effect of substate catalyst etc (i) HCl, $K_2S_2O_8$ (ii) KOH, NaOH.
25. To study the Activation parameters.
26. To study the solvent effect using some Aprotic & Protic Solvents.
27. To examine the substituent effect (Hammett equation).
28. To study the effect of Electrolyte on the rate hydrolysis (KCl, NaCl,)
29. To study some simple enzyme catalyzed reaction.
30. To study the Micellar Catalyzed Reaction.

- **Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students**

BOOK SUGGESTED :

1. Basic Experiment with radioisotopes by John, N. Andrews & David J. Hornsey, Pitam Publishing New York.
2. Practical radiochemistry by M.F.C. Ladd & W.H. Lee, Cleaver Hune press Ltd.
3. Practical Physical Chemistry by Alexander Findlay.
4. Experimental Physical Chemistry, D.P. Shoemaker, C.W. Garland and J.W. Niber, Mc Graw Hill Interscience.
5. Findlay'sicalPractialChemistry,revised B.Phys.Levitt,Longman.

PAPER NO. CH –18

LABORATORY COURSE –VI

Max. Marks 100

A. SPECTROPHOTOMETRIC DETERMINATIONS

I. Manganese / Chromium, Vanadium in steel sample.

II. Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric method.

III. Fluoride / Nitrate / Phosphate.

IV. Iron –phenanthroline complex; Job's Method of con

V. Zirconium –Alizarin Red –S complex: Mole-ratio method.

VI. Copper –Ethylene diamine complex: Slope-ratio method.

B. pH METRY

Stepwise proton-ligand and metal-ligand stability constant of complexes by Leving –Rossoti methods.

C. POLAROGRAPHY

Composition and stability constant of complexes.

D. FLAME PHOTOMETRIC DETERMINATIONS.

(i) Sodium and potassium when present together

(ii) Lithium / calcium / barium / strontium.

(iii) Cadium and magnesium in tap water.

E. REFRACTOMETRY

1. Determination the specific and molar refraction of a given liquid by abbe Refractometer.
2. Determine the variation of refractive index.
3. To verify law of refraction of mixture (glycerol + water).

F. SEPARATION AND QUANTITATIVE ESTIMATION OF BINARY AND TERNARY MIXTURES BY THE USE OF FOLLOWING SEPARATION TECHNIQUES:

1. Paper chromatography –Cadmium and Zinc, Zinc and Magnesium.
2. Thin –layer chromatography –separation of nickel, manganese, cobalt and zinc.
3. Ion-exchange.
4. Solvent extraction.
5. Electrophoretic separation.

❖ **Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students**

BOOK SUGGESTED :

1. Quantitative Inorganic Analysis, A.I. Vogel.
2. Test book of quantitative chemical analysis, A.I. Vogel.
3. Practical Physical chemistry, A.M. James and F.E. Prichard, Longman.
4. Findley's Practical Physical Chemistry, B.P. Levi
5. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

FOURTH SEMESTER

PAPER NO. CH - 19

INSTRUMENTAL METHODS OF ANALYSIS

Max. Marks 100

UNIT –I

ADVANCED CHROMATOGRAPHY :

A. Ion chromatography : Ion exchange equilibrium, Ion-exchange packing and Inorganic Applications.

B. Size exclusion chromatography : Column packing, Theory of size of exclusion chromatography and applications.

C. Supercritical fluid chromatography : Properties of supercritical fluid SFC-Instrumentation and operating variables, comparison with other types of chromatography, applications.

D. Capillary Electrophoresis and capillary electro chromatography : overviews and applications

UNIT –II

X-RAY AND PROTON INDUCED SPECTROSCOPY :

A. X-Ray fluorescent method : Principles-Characteristics x-ray emission.
Instrumentation x-ray tube, Radioactive sources. Wavelength dispersive instruments.
Energy dispersive instruments. Analytical Applications-Qualitative Analysis.

B. Proton Induced X-Ray Spectroscopy : Theory, instrumentation and application.

UNIT –III

ATOMIC EMISSION SPECTROSCOPY

A. Selectivity, sensitivity and interferences of atomic spectroscopy.

B. Theory, instrumentation and application of flame photometer, AES, ICP-AES and AFS.

UNIT –IV

ATOMIC ABSORPTION SPECTROSCOPY AND HYPHENATED TECHNIQUES

A. Theory instrumentation and application of flame and graphite furnace AAS, cold-vapor and hydride generation AAS.

B. Theory, instrumentation and application of hyphenated techniques i.e. GC/HPLC/-MS, GC/IC/HPLC-ICP-MS.

BOOK SUGGESTED :

1. Instrumental methods of analysis, Willard, Meritt and Dean.
2. Basic concepts of analytical chemistry, S.M. Khopkar, John Wiley & Sons.
3. Metallurgical analysis, S.C. Jain.
4. Material Science and Engineering. An Introduction, W.D. Callister, Wiley.
5. Material Science, J.C. Anderson, K.D. Leaver, J.M. Alexander and R.D. Rawlings, ELBS.
6. Fundamentals of Analytical Chemistry, Skoog, Welt, Holler and Crouch Thomson Learning Inc.

PAPER NO. CH - 20

NATURAL PRODUCT AND MEDICINAL CHEMISTRY

Max. Marks 100

UNIT-I

A. **Terpenoids and Carotenoids**: Classification, nomenclature, occurrence, isolation, general methods of structure determination of Citral, Geraniol, α-Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and β – Carotene.

B. **Alkaloids:** Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on Nitrogen heterocyclic ring, role of alkaloids in plant. Synthesis and biosynthesis of the following: Ephedrine, (+)- Coline, Nicotine, Atropine, Quinine and Morphine.

UNIT-II

A. **Steroids:** Isolation, structure determination and synthesis of Cholesterol, Bile acids, Androsterome, Testosterone, Esterone, Progestrone, Aldostrone and Biosythesis of cholesterol.

B. **Plant Pigments**: Occurrence, nomenclature and general method of structure determination. Isolation and synthesis of Apigenin, Luteolin, Quercetin, Myrcetin, Quercetin-3-glucoside, Vitexin, Diadzine, Butein, Aureusin, Cyanidin-7-arebinoside,Cyanidin, Hirsutidin.

C. **Pyrethroids and Rotenones**: Synthesis and reaction of Pyrethroids and Rotenones.

UNIT- III

Drug Design

A. Development of new drugs procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, Structure-Activity Relationship (SAR), Factors affecting bioactivity, resonance, inductive effect. Theories of drug activity: occupancy theory, rate theory, induced fit theory. Quantitative Structure Activity Relationship (QSAR).

B. Concepts of drug receptors, lipophilicity, phamacophore, pharmacological activity and typical range of parameters related to drug likeness.

C. General introduction of pharmacokinetics and pharmacodynamics.

UNIT – IV

A. **Anteoplastic Agents**: Introduction, Alkylating agents, antimetabolites, carcinolytic antibiotics, mitotic inhibitors.

B. **Antibiotics**: Constitution and synthesis of penicillins, chloramphenicol, tetracycline and streptomycin.

C. **Antimalarials**: Synthesis and properties of the following Antimalarial: 8-amino quinolone derivatives- Pamaquine, Primapune, Pentaquinr, Isopentaquine, 4- amino quinolone derivatives- Santoquine, Camaquine, Acridine derivatives- Mepracrine, Azacrin, Pyrimidine and Biguanid derivatives- Paludrine Pyremethamine.

Book Suggested:

1. Natural Products: Chemistry and Biological Significance, J. Mann, R. S. Davidson, J. B. Hobbs.
2. D. V. Banthrope and J. B. Harbrone, Longman, Essex., Organic Chemistry, Vol. 2, I. L. Finar, ELBS.
3. Chemistry, Biologcal and Pharmacological properties of Medicinal Plants from the Americans, Ed. Kurt Hostettmann, M. P. Gupta and A. Marston, Harwood Academic Publishers.

4. Introduction to Flavonoids, B. A. Bhom, Harwood Academic Publishers.
5. New Trends in Natural Product Chemistry, Att-ur-Rahman and M. I. Choudhary, Harwood, Academic Publishers.
6. Insecticides of Natural Origin, Sukh Dev, Harwood Academic Publishers.
7. Introduction to medicinal Chemistry, A Gringuage, Wiley-VCH.
8. Burger's Medicinal Chemistry-1 (Chapter-9 and Ch- 14), Drug Ed. M. E. Discovery, Wolff, John Wiley.

PAPER NO. CH - 21

MATERIAL AND NUCLEAR CHEMISTRY

Max.Marks 100

UNIT- I

NON EQUILIBRIUM THERMODYNAMICS : Fundamental concepts, Forces and Fluxes, Entropy production, Phenomenological Laws and Onsager's r for biological systems, coupled reactions.

UNIT- II

MATERIAL CHEMISTRY :

Preparation and Properties of Nanopaeticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides).physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properties, Electrical and Magnetic Properties, Application of Nanoparticles.

UNIT-III

SUPRAMOLECULAR CHEMISTRY :

Properties of covalent bonds, bond length, inter bond angles, Force constant, bond and molecular dipole moment, molecular and bond polarizability.

Intermolecular Forces, hydrophobic effects, Electro static, induction, dispersion and resonance energy, Hydrogen bond, Magnetic interactions. Principles of molecular association ad organization Biological marcomolecules, Molecular receptors and design principal, cryptands, Cxclophanes, calixerancs and cyclodextrins.

Supramoleular reactivity and catalysis.

UNIT-IV

NUCLEAR AND RADIOCHEMISTRY
NUCLEAR THEORY :

Nuclear cross section and nuclear radii, nuclear shells and magic numbers, theory of nuclear shell model, nuclear potentials, square well and simple harmonic oscillator potentials, application, liquid drop model, semi-empirical mass equation, application and limitations.

NUCLEAR FISSION :

Mass, energy and charge distribution of fission products, decay chains, prompt and neutrons, liquid drop model of nuclear fission.

NUCLEAR ENERGY :

Nuclear fission, chain reaction, multiplication factor, nuclear reactors

APPLIED RADIOCHEMISTRY :

Radioactive isotopes, purity and strength of radioisotopes. Radiochemical principle in the use of tracers, Application of Tracers in Chemical investigations, Physico-chemical methods, Analytical applications, Age determinations, Medical applications, Agricultural application.

BOOKS SUGGESTED:

1. Nuclear and Radiochemistry by G. Friedlander, J.W. Kennedy & J.M. Miller, John Wittey and Sons, Ine New York.
2. Source Book an Atomic Energy –S.Glasstone, Affiliated East –West Press Pvt. Ltd. New Delhi.
3. Nuclear Physics by I. Kaplan, Addision –Welsly. Publishing company London.
4. Nuclear Chemistry and its applications, M. Haissinsky, Addision –Welsley, Publishing Company, London.
5. Essentials of Nuclear chemistry, H.J. Arnikar, Wiley Eatern Ltd, New Delhi.
6. Molecular Mechanics, U. Burkert and N.L. Allinger, ACS Monograph 177, 1982.
7. Mechanism and Theory in Organic Chemistry, T.H. Lowry and K.C. Richrdson, Harper and Row.
8. Introduction to Theoretical Organic Chemistry and Molecular, Modelling, W.B. Smith, VCH, Weinheim.
9. Physical Organic Chemistry, N.S. Isaacs, ELBS./ Longman.

10. Supramolecular Chemistry: concept and Perspectives, J.M. Lehn, VCH.
11. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
12. Mathematics for Chemistry, Doggett and Sutclilffe, Longman.
13. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
14. Chemical Mathematics, D.M, Hirst, Longman.
15. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
16. Basic Mathematics for Chemists, Tebbutt, Wiley.
17. Quantum Chemistry, Ira N. Levine, Prentice Hall.
18. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.

PAPER NO. CH - 22

APPLIED CHEMICAL ANALYSIS

Max. Marks 100

UNIT –I

AIR POLLUTION MONITORING AND ANALYSIS

Classification of air pollution monitoring levels, air quality, standards and index, monitoring and analysis of selected air borne pollutants: SO_2, NO_x, SPM, VOC's, Pb, CO_2, POP's, Hg, carbon and ozone air pollution control devices Viz ESP, scrubber technique, baghouse filters etc. Atmospheric chemistry of acid rains, photochemical smog, green house effect, global warming, ozone hole.

UNIT –II

SOIL AND WATER POLLUTION

Soil and water quality standards, monitoring and analysis of selected soil water contaminants: COD, pesticides, heavy metals, POP's, fluoride, cynide, nitrate, phosphate, oil & greese, Geobiochemical impact of municipal solid waste, steel plants effluent, domestic sewage. Control devices of water pollutants.

UNIT –III

FOOD ANALYSIS

A. Introduction to general Constituents of food, Proximate Constituents and their analysis, Additives- Introduction -Types - Study of preservatives colors and Antioxidants and method of estimation, adulteration - Introduction, Types, Test for adulterants.

B. Introduction standards composition and analysis of following foods : Wheat, Bread, Biscuits, Jam, Jelly, Honey, Milk, Ice Cream, Butter, Cheese, Milk Powder, Oils and Fats, Tea, Coffee, Soft drinks, Alcoholic beverages, Cereal and pulses, Confectionery, Fruits, Vegetables, Egg, Fish, Meat.

UNIT –IV

COSMETICS, CLINICAL AND DRUG ANALYSIS

A. Introduction of Cosmetics, evaluation of cosmetics materials, raw material and additives, Cosmetics colors, Perfumes in cosmetics, Cosmetics formulating, introduction, standards and methods of analysis, Creams, face powders, Make-up, Shaving preparations, Bath preparations.

B. Concepts and principles of analytic methods commonly used in the clinical species: i.e. ammonia, blood urea Nitrogen, Ca, Cl, CO_2, Fe, K, Li, Mg, Na, P, urea, glucose.

Method for analysis of proteins (i.e. albumin, bilirubin, creatinine, cholesterol, HDL-cholesterol, triglycerides, creatinine) and Enzymes (i.e. Aanine Aminotransferase, acid phosphatase, alkaline phosphatase, amylase, aspartate, aminotransferase, cholinesterase, lactate, and lipase).

BOOK SUGGESTED :

1. Environmental Chemistry, S.E. Manahan, Lewis Publishers.
2. Environmental chemistry, Sharma and Kaur, Krishna Publishers.
3. Environmental Chemistry, A.K. De, Wiley Eastern.
4. Environmental Chemistry, Analysis, S.M. Khopkar, Wiley Eastern.
5. Standard Method of Chemical Analysis, F.J. Welcher Vol. III, Van Nostrand Reinhold Co.
6. Environmental Toxicology, Ed. J. Rose, Gordon and Breach Science Publication.
7. Environmental Chemistry, C. Baird, W.H. Freeman.
8. Analytical chemistry, G.D. Christian, J. Wiley.
9. Fundamentals of Analytical Chemistry, D.A. Skoog, D.m. West and F.J. Holler, W.B. Saunders.
10. Analytical Chemistry - Principles, J.H. Kennedy, W. Saunders.
11. Analytical Chemistry-Principles, and Techniques, L.G. hargis, Prentice Hall.
12. Principles of Instrumental Analysis, D.A. Skoog and J.L. Loary, W.B. Saunders.
13. Principles of Instrumental Analysis, D.A. Skoog, W.B. Saunders.
14. Quantitative Analysis, R.A. Day, Jr. and A.L. Underwood, Prentice Hall.
15. Environmental Solution Analysis, S.M. Khopkar, Wiley Eastern.

16. Basic Concepts of Analytical Chemistry, S.M. Khopkar, Wiley Eastern.
17. Handbook of Instrumental Techniques for Analytical Chemistry, F. Settle, Prentice Hall.
18. Environmental Biotechnology, Indushekhar Thakur, I.K. International Pvt. Ltd.
19. Fundamental of Analytical Chemistry, D.A. Skoog, D.m. West, F.J. Holler and S.R. Crouch, Thompson Learning Inc.
20. APHA, 1977, "Methods of air c HealthSamplingAssociationWashingtonand –Analysis US.

PAPER NO. CH –23

LABORATORY COURSE –VII

Max. Marks 100

A. MULTI - STEP SYNTHESIS OF ORGANIC COMPOUNDS

(i) Beckmann Rearrangement: Benzanilide from benzene
(Benzene Benzophenone Benzophenone oxime Benzanilide).

(ii) Benzilic Acid Rearrangement: Benzilic acid from Benzoin (Benzoin Benzil Benzilic acid)

(iii) Skraup's synthesis (Synthesis of heterocyclic
Quinoline from o - Amino phenol

(iv) p - Bromoaniline from Aniline
(Aniline Acetanilide p - Bromoacetanilide p - Bromoaniline)

(v) p - Nitroacetanilide from Acetanilide
(Aniline Acetanilide p - Nitroactanilide p - Nitroaniline)

(vi) m - Nitroaniline from Benzene
(Benzene Nitrobenzene m - dinitrobenzene m - nitroaniline)

(vii) Acridone from Anthranilic acid
(Anthranilic acid o - Chlorobenzoic acid N - Phenylanthranilic acid Acridone)

(viii) Enzymatic Synthesis

Enzymatic reduction : Reduction of ethylace enantiomeric

excess of S(+) ethyl - 3 - hydroxybutanone and determine its optical purity.

B. QUANTITATIVE ORGANIC ANALYSIS

(i) Estimation of Sulphur by Messenger's Method.

(ii) Estimation of Nitrogen by Kjeldahl Method.

C. ESTIMATION OF FUNCTIONAL GROUP

(i) Extimation of Aniline.

(ii) Estimation of Amino Group By Acetylation Method.

(iii) Estimation of Hydroxyl Group By Acetylation Method.

(iv) Estimation of Carbonyl Group By Hydrazone Formation Method.

(v) Estimation of Carboxyl Group By Titration Method.

(vi) Determination of Equivalent Weight of Carboxylic Acid By Silver Salt Method.

(vii) Estimation of Glucose By Fehling Solution Method.

(viii) Estimation of Glycine By Titraiton Method.

D. EXTRACTION OF ORGANIC COMPOUNDS FROM NATURAL SOURCES

(i) Isolation of caffeine from leaves.

(ii) Isolation of Casein from milk.

(iii) Isolation of lactose from milk.

(iv) Isolation of nicotine dipicrate from tabacco.

(v) Isolation of Cinchonine from cinchona bark.

(vi) Isolation of Piperine from black pepper.

(vii) Isolation Lycopene from tomatoes.

(viii) Isolation of β–Carotene from carrots.

(ix) Isolation of Limonene from citrus rinds.

(x) Isolation of protein and carbohydrates from seeds –colour test

(xi) Extraction of Fatty oil from seeds and determination of refractive index of the oil.

(xii) Isolation of protein and carbohydrate (as reducing sugars) from seed-colour test.

E. Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students.

BOOKS SUGGESTED :

1. Practical Organic chemistry by A. I. Vogel.
2. Practical Organic chemistry by Mann and Saunders.
3. Practical Organic chemistry by Garg and Saluja.
4. The Systematic Identification of Organic compounds, R. L. Shriner and D. Y. Curtin.
5. Semimicro Qualitative Organic Analysis, N.D. Cheronis, J. B. Entrikin and E. M. Hodnett.
6. Experimental Organic chemistry, M. P. Doyle and W. S. Mungall.
7. Small Scale Organic preparation, P. J. Hill.
8. Experimental Biochemistry, by B.S.Roa and V.Deshpande. I.K. International Pvt.Ltd.
9. Comprehensive Practical Organic Chemistry, Preparation and Qualitative Analysis, V.K.Ahluwalia and Renu Aggarwal, University Press.

PAPER NO. CH –24

LABORATORY COURSE –VIII

Max. Marks 100

A. TITRIMETIC/GRAVIMETRIC DETERMINATIONS

(i) Manganese in iron / Steel by Bismuthate / Linganane –Karplus/Periodate methods.
(ii) Maganese in pyrolusite ores.
(iii) Nickel in steel by dimethylglyoxine method.
(iv) Lead by dithizone precipitation.

B. SPECTROPHOTOMETRIC DETERMINATIONS

(i) Maganese/Chromium / Vanadium / Copper / Lead in Steel and Environmental / Industrial effluent samples.
(ii) Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric methd.
(iii) Fluoride / Nitrite / Phosphate in tap / pond / river industrial waste water.
(iv) Iron in water samples by thiocyanate and phenanthroline methods.

C. CHROMATOGRAPHIC SEPARATION

1. Sepraration and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of Rf values.
2. Thin layer chromatography – separation of nickel, manganese, cobalt and zinc, Determination of Rf values.

D. FLOW INJECTION ANALYSIS.

Determination of the following anions/cations in synthetic/real/ environmental samples.

(i) Ca^{2+}, Mg^{2+}, Al^{3+}, Mn^{2+}, Cr^{6+}, Fe^{3+}
(ii) F^-, Cl^-, PO_4^{3-}, NO_2^-, NO_3^-, SO_4^{2-}, BO_3^{3-}.

E. ATOMIC ABSORPTION SPECTROPHOTOMETER

Determination of metal contents (Fe/Pb/As/Zn/Co/Ni etc.) in real and environmental samples.

F. MISCELLANEOUS

(i) Nutrient and micronutrient analysis in plant/soil/sediment.
(ii) Speciation of toxic metals i.e. As, Hg, Se, etc.
(iii) Analysis of clinical samples i.e. blood, urine, hair, etc.

- **Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students.**

BOOK SUGGESTED :

1. Quantitative Inorganic Analysis, A.I. Vogel.
2. Standard Methods of Water Analysis.
3. Colorimetric Determination of Traces of Metals, E.B. Sandell.
4. GBC, Manuals on AAS analysis, Austria.