# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

रायपुर नाका दुर्ग (छ.ग.)-491001

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क्र. 3861 /अका./2021 दुर्ग, दिनांक 30/7/21

प्रति,

प्राचार्य,

समस्त संबद्ध महाविद्यालय,

हेमचंद यादव विश्वविद्यालय,

दुर्ग (छ.ग.)

विषयः— स्नातक स्तर भाग–तीन के पाठ्यक्रम विषयक।

संदर्भः— संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05. 2019।

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विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग–तीन के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2021–22 से लागू किये जाते हैंः—

1. बी.ए. — आधार पाठ्यक्रम – हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान
2. बी.एस–सी. — आधार पाठ्यक्रम–हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.ए./बी.एस.सी (गृह विज्ञान) — आधार पाठ्यक्रम – हिन्दी भाषा एवं गृह विज्ञान।
4. बी.सी.ए. — भाग–3
5. बी.कॉम. — भाग–1, भाग–2 एवं भाग–3 का परिवर्तित पाठ्यक्रम सत्र 2019–20 में जारी कर लागू किया जा चुका है।

कृ.प.उ.

उपरोक्त विषयों को शिक्षा सत्र 2021–22 से संशोधित रूप में स्नातक स्तर भाग–तीन के लिए लागू किया जाता है स्नातक स्तर भाग–एक हेतु सत्र 2019–20 एवं स्नातक स्तर भाग–दो हेतु सत्र 2020–21 में लागू पाठ्यक्रम मान्य होंगे।

**टीपः– परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय की वेबसाईट पर उपलब्ध है।**

कुलसचिव

क्र. 3862 /अका./2021

दुर्ग, दिनांक 30/7/21

प्रतिलिपिः–

1. संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019 के परिपेक्ष्य में सूचनार्थ
2. उपकुलसचिव, परीक्षा विभाग एवं उपकुलसचिव, गोपनीय विभाग हेमचंद यादव विश्वविद्यालय, दुर्ग।
3. वेबसाईट प्रभारी, वेबसाईट पर पाठ्यक्रम प्रकाशित करने हेतु।
4. कुलपति के निज सहायक एवं कुलसचिव के निज सहायक, हेमचंद यादव विश्वविद्यालय, दुर्ग।

सहा. कुलसचिव (अका.)

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

**Website - www.durguniversity.ac.in, Email - durguniversity@gmail.com**

# SCHEME OF EXAMINATION
# &
# SYLLABUS
# of

## B.Sc. Final Year
## Session 2021-22

## (Approved by Board of Studies)
## Effective from July 2021

बी.ए. / बी.एस–सी. / बी.कॉम. / बी.एच.एस.–सी.
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 शक्ति : हरिवंश राय बच्चन

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

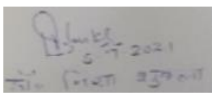
**इकाई–पांच** **(क)** संस्कृति और राष्ट्रीय एकीकरण : योगेश अटल

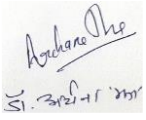
**(ख)** घटनाओं, समारोहों आदि का प्रतिवेदन, विभिन्न प्रकार के निमंत्रण पत्र

**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।

5/7/2024

डॉ आशा दीवान





## Foundation Course-III

English Language

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

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 Geo-economic 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.

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## NEW CURRICULUM OF B.Sc. PART III

## SESSION 2021-22

## CHEMISTRY

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

### Paper – I

### INORGANIC CHEMISTRY 60 Hrs., Max Marks 33

**UNIT-I**

**METAL-LIGAND BONDING IN TRANSITION METAL COMPLEXES**

(A) Limitations of valence bond theory, Limitation of Crystal Field Theory, Application of CFSE, tetragonal distortions from octahedral geometry, Jahn–Teller distortion, square planar geometry. Qualitative aspect of Ligand field and MO Theory.

(B) Thermodynamic and kinetic aspects of metal complexes. A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes, Trans- effect, theories of trans effect. Mechanism of substitution reactions of square planar complexes.

**UNIT-II**

**MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES**

Types of magnetic behavior, methods of determining magnetic susceptibility, spin only formula, L-S coupling, correlation of $\mu_{so\ (spin\ only)}$ 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), Zeise's salt: Preparation and structure.

28.06.21 (Dr. Alka Tiwari) | 28.06.2021 (Dr. C. Bose) | 28.06.2021 (Dr. Rajmani Patel) | 28.6.2021 | 28.06.2021 Jagjit Kumar

**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.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**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.

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**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 $\lambda_{max}$, Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption Visible spectrum and colour.

**C.** **NMR SPECTROSCOPY**

Basic principles of Proton Magnetic Resonance, Tetramethyl silane (TMS) as internal standard, chemical shift and factors influencing it; Spin – Spin coupling and coupling constant (J); Anisotropic effects in alkene, alkyne, aldehydes and aromatics, Interpretation of NMR spectra of simple organic compounds. $^{13}$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, 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. 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.


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**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, Laplacian operator, postulate of quantum mechanics, eigen values, eigen function, Schrodinger time independent wave equation, physical significance of $\psi$ & $\psi^2$, application of Schrodinger wave equation to particle in a one dimensional box, hydrogen atom (separation into three equations ) radial and angular wave functions.

**UNIT-II**

**A. QUANTUM MECHANICS–II**

Quantum Mechanical approach of Molecular orbital theory, basic ideas-criteria for forming M.O. and A.O., LCAO approximation, formation of $H_2^+$ ion, calculation of energy levels from wave functions, bonding and antibonding wave functions, Concept of $\sigma$, $\sigma^*$, $\pi$, $\pi^*$ orbitals and their characteristics, Hybrid orbitals-sp,$sp^2$,$sp^3$ Calculation of coefficients of A.O.'s used in these hybrid orbitals.

Introduction to valence bond model of $H_2$, comparison of M.O. and V.B. models. Huckel theory, application of Huckel theory to ethene, propene, etc.

**UNIT III**

**SPECTROSCOPY**

**Introduction**: Characterization of Electromagnetic radiation, regions of the spectrum, representation of spectra, width and intensity of spectral transition, Rotational Spectrum of Diatomic molecules. Energy levels of a rigid rotor, selection rules, determination of bond length, qualitative description of non-rigid rotator, isotopic effect.

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

**Raman spectrum:** Concept of polarizability, quantum theory of Raman spectra, stokes and antistokes lines, pure rotational and pure vibrational Raman spectra. Applications of Raman Spectra.

**Electronic Spectroscopy:** Basic principles, Electronic Spectra of diatomic molecule, Franck-Condon principle, types of electronic transition, application of electronic spectra.

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**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 $\Delta G$, $\Delta H$ and $\Delta S$ for cell reactions.

**B.** Single electrode potential : standard hydrogen electrode, calomel electrode, quinhydrone electrode, redox electrodes, electrochemical series

**C.** Concentration cell with and without transport, liquid - junction potential, application of concentration cells in determining of valency of ions , solubility product and activity coefficient

**D.** Corrosion-types , theories and prevention

**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.Alberty, Wiley Eastrn.
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.


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**B.SC.-III**

**PAPER- I (BOTANY)**

**(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, Spectrophotometere

**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, Pytoremediation. 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 Publications, 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.-III**

**PAPER- II (BOTANY)**

**(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, cytolasmic 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 Polsaccharides

Fat: Structure and properties of fats and fatty acids, synthesis and breakdown.

**UNIT- V**

ENZYMES: Nomenclature and classifaction, components of enzymes, 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.- 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 |