

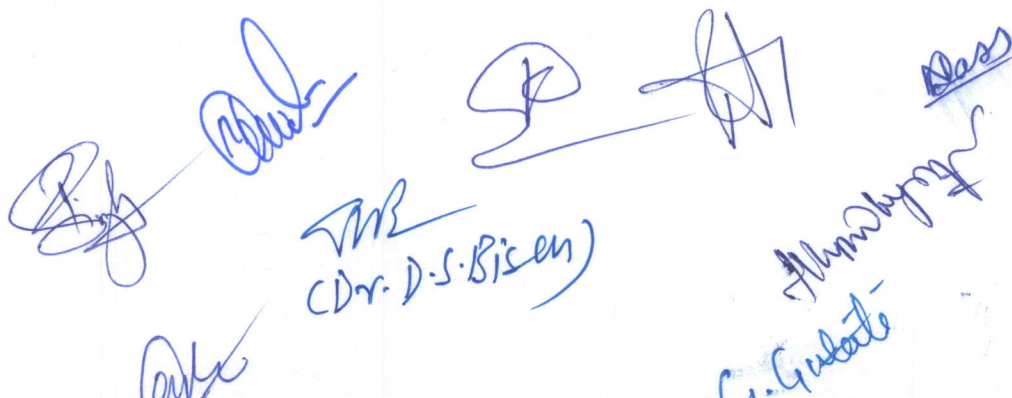
Bachelor of Arts and Bachelor of Education
Chhindwara University, Chhindwara (M.P)
COURSE OF STUDIES

For
 Four Year Integrated
 B.Sc. B.Ed (Eight Semester) Course

SECOND SEMESTER

Subject/Paper	Paper	Intern.	Total	Pds./week
B.Sc Part: Foundation Course	40	10	50	3
Basic of Computer	40	10	50	3
Language - Hindi	40	10	50	3
English				
Elective I+Practicum	60+25	15	100	9
Elective II+Practicum	60+25	15	100	9
Elective III+Practicum	60+25	15	100	9
Total	375	75	450	
B.Ed Part Cognition & Learning	40	10	50	3
Psychology Practical	-	25	25	2
Health, Physical Education & Yoga	-	25	25	2
Art & Aesthetics	-	25	25	2
Work Education	-	25	25	2
Total	40	110	150	
Grand Total	415	185	600	

- Elective 1 – Physics/Botany
- Elective 2 – Chemistry
- Elective 3 – Zoology/Mathematics



 (Dr. D.S. Bisen)

(All electives will have one theory paper and external practical examination except Mathematics where there will be two theory papers and practicum which will be valued internally)

Semester Name	Paper	Marks	Paper Code	Name of Papers
3	Paper Theory-III	30	M-2.1	Differential Equations And Vector Calculus
	Paper Theory-IV	30	M-2.2	3-D Geometry
	Internal Test	15		Related To Above Papers
	Practicum	25		Related To Above Papers

Work Education: Electricity and Electronics/ Agriculture

B.Sc. Component:

Foundation Course: Basics of Computers

Contact Periods/week: 03

Maximum Marks – 40

Min. Pass Marks – 13

Internal – 10

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

- Appreciate the historical development of computer,
- Demonstrate understanding of the main components of the computer hardware in use.
- Use various digital technologies (hardware and software) for creating resources and providing learning experiences for all types of learners (including differently abled).
- Differentiate between digital and non-digital resources.
- Explain various operating systems and their main functions.
- Use a word processor, spread sheet, drawing and presentation software skillfully and intelligently to produce various teaching learning resources for educational use.
- Use internet technologies efficiently to access remote information, communicate and collaborate with others in different learning situations.
- Understand the social, economic, security and ethical issues associated with the use of Computer and internet.

UNIT-I: Introduction to Computer

- History of computer
- What is a computer: Computer hardware fundamentals (anatomy, input devices, output devices, storage devices, display devices).
- Types of computers: Super Computer, Server Computer, Workstation Computer, Personal Computer or PC, Microcontroller
- Numeral System
 - Introduction
 - Decimal Numeral System
 - Binary Numeral System: Converting Binary to Decimal and vice versa
 - Hexadecimal Numeral System: Converting Hexadecimal to Decimal and vice versa
- Data sizes: bit, nibble, byte, word, KB, MB, GB, TB, PB
- Measurements of Data Speed: bps, kbps, mbps, gbps

UNIT-II: Hardware and Software

- Hardware Fundamentals
 - Use of digital still and video camera, digital sound recorder, scanner, printer, interactive white board, visualizer, and multimedia projector for creating and using multimedia resources
- Software Fundamentals
 - Software - Meaning and types; System software and Application software
 - Operating systems - Meaning and types; Windows, Linux, Macintosh
 - Navigating the desktop, control panel, file manager, explorer, and accessories
 - Concept, philosophy, types, and advantages of Proprietary software, open source software, shareware and freeware
 - Licenses - Software license, document license, fair use and piracy

UNIT-III: Software Applications

- Application software- Meaning and types
- Introduction to office applications
 - Word processing - Text (Indian and English), common features, functions and use, Educational applications of word processing

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- Spreadsheet – Common features, functions and use; Educational applications of spreadsheets-Recording, reporting, and research
- Presentations – Common features, functions and use; Educational applications of presentations
- Databases – Common features, functions and use; Educational applications of database
- Drawing tools – Diagrams, concept maps, timelines, flow charts; Educational applications of these tools
- File formats and conversion, utility tools
- Cloud computing: Meaning and advantages
- Online software tools and applications and their educational use

UNIT-IV: Motherboard and Computer Networks

- Introduction to the motherboard
- Expansion slots: Graphics card, Sound card, Network Interface Cards (NICs), PC Card, Express Card
- Ports: USB, Firewire, Parallel, Thunderbolt, Ethernet
- Definition of network
- Why were networks created?
- Types of common networks: LAN, WAN, The Internet, VPN
- Internet: concept and architecture; Locating internet resources – browsing, navigating, searching, selecting, evaluating, saving and bookmarking
- Computer security: Privacy, hacking, virus, spy ware, misuse, abuse, antivirus, firewall and safe practices

Sessional Work

- Hands on experience in setting up a desktop PC and working with various input devices, output devices, storage devices, and display devices
- Practicing word processing using Indian language software
- Practice in installing various system and application software
- Using word processor, spread sheet, and presentation software to produce various teaching learning resources and sharing it online
- Locating internet resources – navigating, searching, selecting, saving and evaluating (use standard internet evaluation criteria)

Suggested readings

- Crumlish, C. (1999). The Internet No Experience Required. BPB Publications: New Delhi
- Christopher, M. (2009). Beyond Hardware-Using Existing Technology to promote Higher-Level thinking. Viva Books: New Delhi.
- Evans, M: The International Encyclopedia of Educational Technology.
- James, K.L. (2003). The Internet: A User's Guide. Prentice Hall of India Pvt.Ltd: New Delhi
- Lee, William W., Dianna, L. Owens, (2001) Multimedia based Instructional design: Computer Based Training. Jossey-Bass
- NCERT (2013) Information and Communication Technology for School System: Curricula for ICTs in Education (students and Teachers), Version-1.2, CIET-NCERT, NCERT, New Delhi
(www.ictcurriculum.gov.in)
- Noam Shemtov, Ian Walden, (2014) Free and Open Source Software: Policy, Law and Practice. Oxford University Press
- Sarkar, S.K. & Gupta, A.K. (1998). Elements of Computer Science. S.Chand & Company: New Delhi
- Tahenbaum Andrews (2003). Modern Operating Systems. Prentice Hall of India Pvt.Ltd: New Delhi
- Introduction to Computer: https://en.wikiversity.org/wiki/Introduction_to_Computers

Foundation Course: Language – Hindi

आधार पाठ्यक्रम : हिन्दी भाषा

प्रश्नपत्र – 2

Contact Periods/week: 03

कुल अंक – 40

आन्तरिक मूल्यांकन – 10

प्रश्न एवं उत्तर विभाजन

4 समीक्षात्मक/दीर्घकालीय प्रश्न – 20 अंक (47 X = 20)

अधुनिकतरीय प्रश्न – 07 अंक (35 X 2 = 7)

वस्तुनिष्ठ प्रश्न – 05 अंक (1 X 5 प्रश्न)

आन्तरिक एवं समीक्षात्मक प्रश्नों में आन्तरिक विवरण होंगे।

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- इकाई - 1
1. भाषा पढ़ना (कविता) - सूर्यकांत त्रिपाठी निराला
 2. भुम की अगिला भा (कविता) - मानसलाल वर्मा
 3. आकाश और उसके बाद (कविता) - रामचंद्र
 4. निर्वासन (कविता संग्रह) - विद्यानिवास मिश्र
- इकाई - 2
1. आकाश (कविता) - राहुल जोशी
 2. भौतलम या जीव (कविता) - इंदिराकर परसाई
 3. भारत का सामाजिक व्यवस्था (विज्ञान परंपरा) - जवाहरलाल नेहरू
 4. भारत देश और उसके निवासी (विज्ञान परंपरा) - रामदास सिंह
- इकाई - 3
1. आदिवासी परंपरा (निबंध) - श्री. रामचरण दुबे
 2. भारतीय का अधिराज (निबंध) - गणेशदेवी वर्मा
 3. ब्रह्माण्ड की रचना (वैज्ञानिक लेख) - ज्योतिषी गणेश
 4. प्रमुख वैज्ञानिक आविष्कार - (संक्षिप्त)

Foundation Course: Language English

Paper II

Contact Periods/week: 03

Maximum Marks - 40

Min. Pass Marks - 13

Internal - 10

Distribution of Marks:

1. Four critical questions are to set be from unit 1. Two questions are to be attempted. Each question will carry 5 marks. (5 X 2 = 10 marks)
2. Students are required to write a paragraph on a given topic in about 100-125 words. (4 X 1 = 4 marks).
3. Students are required to attempt five questions based on the given unseen passage. Each question will carry 2 marks. (2 X 5 = 10 marks)
4. Students are required to attempt 6 questions on vocabulary. Each question will carry one mark. (1 X 6 = 6 marks)
5. Students are required to attempt 10 questions on Grammar. Each question will carry one mark. (1 X 10 = 10 marks).

UNIT I : William Wordsworth - The Solitary Reaper; Tagore (Trans) - A Song of Kabir; Khushwant Singh - The Portrait of a Lady; Mahatma Gandhi - Satyagrah; R.K. Narayan - The Axe; C.V. Raman - Water

UNIT II: Letter Writing - Formal, Informal and Business Letter

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UNIT III: Expansion of an Idea

UNIT IV: Word formation; Prefixes & Suffixes; Figures of Speech.

UNIT V: Grammar & Usage – Tenses, Modals, Gerunds, Infinitives, Determiners, Active and Passive Voice, Direct & Indirect Speech

Elective I – Physics

Paper II: Electromagnetic Theory and Elementary Kinetic Theory

Contact Periods/week: 05 + 4 Practical

Maximum Marks – 60

Min. Pass Marks – 20

Internal – 15 (Theory 10 & Practical 5)

Practical – 25 (External)

Note- At least one question will be set from each unit. 20% of the maximum marks will form simple numerical problems and another 20% would be for objective questions with a provision to provide reasoning. All Questions will have 100% Internal Choice

Objectives

After completion of this course, the students will be able to

1. Acquaint themselves with concepts of electric fields, electric flux, electric potential, dielectrics and polarization vector.
2. Understand Coulomb's law, Gauss's law, Ampere's law, Faraday's law and Lorentz force.
3. Solve the problems on Coulomb's law, Ampere's law and Gauss's law.
4. Understand Ampere's law and its applications.
5. Interpret that a bar magnet has a surface distribution of solenoidal current.
6. Appreciate the physical significance of E and B vectors and their role in the electromagnetic wave propagation.
7. Explain the concept of Poynting vector.
8. Explain varying currents

Unit-I: Electrostatics

Coulomb's law in vacuum expressed in vector form; multipole expansion of fields, work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field, Laplace and Poisson equation in electrostatics and their applications, electric potential ϕ , $E = -\nabla\phi$, Torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and application for finding E for symmetric charge distributions.

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Gaussian pillbox, field at the surface of a conductor, screening of E field by conductor, energy of a system of charges.

Unit -2: Magnetostatics

Force on a moving charge, Lorentz force equation and definition of B, Force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot Savart's law, Ampere's law and its applications, Field due to a magnetic dipole, magnetization current, magnetization vector, magnetic permeability (linear cases).

Unit -3: Dielectrics and Capacitors

Dielectrics; parallel plate capacitor with a dielectric, dielectric constant, polarization, solution to boundary value problems, conducting and dielectric spheres in a uniform electric field, displacement vector D, molecular interpretation of Clausius-Mossotti equation, boundary conditions satisfied by E and D at the interface between two homogeneous dielectrics, illustration through a simple example.

Unit-4: Time varying Fields and Electromagnetic waves

Faraday's law of electromagnetic induction, Self and mutual inductance, 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 vector; reflection at a plane boundary of dielectrics; polarization by reflection; reflection and refraction coefficients at the boundary of two dielectrics (normal incidence only); and total internal reflection; waves in a conducting medium; reflection and refraction by the ionosphere.

Unit-5: Varying Currents

Currents through CR and LR circuits, High resistance by leakage, Alternating and Direct current, Analysis of LC and LCR circuits using complex number representation, Resonance, Q factor, Kirchhoff's law and its application to AC circuits, Transformer and choke coil.

Physics Practical List

- I. Conversion of galvanometer into ammeter of given range.
 - I. To determine the resistance of a galvanometer by half deflection.
 - II. To determine the figure of merit of galvanometer.
 - III. To convert the galvanometer into an ammeter of a given range and to calibrate it.
2. To convert the galvanometer into a voltmeter of a given range and to calibrate it.

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3. To determine the inductance of a given coil by Anderson bridge method.
4. To study the dependence of capacitance on separation of the plates of capacitor.
5. To study the variation of magnetic field along the axis of a current carrying circular coil.
6. Study of charging and discharging of capacitor.
7. To verify Kirchhoff's current law and voltage law.
8. To determine the high resistance by leakage method.
9. Calibration of voltmeter.
10. Calibration of ammeter.
11. To study an wave form and to measure rms value of ac voltage using CRO.

Suggested Reading:

1. Electricity Principles and Application, Fowler, Tata McGraw Hills.
2. Electricity and Magnetism, Mahajan, Tata McGraw Hill.
3. Electromagnetic Waves and Radiating systems, Jordan Balmain
4. Electricity and Magnetism, K.K. Tewari
5. Electrodynamics, Griffiths

Elective I – Botany

Paper II: Cell Biology and Genetics

Contact Periods/week: 05 + 4 Practical

Maximum Marks – 60

Min. Pass Marks – 20

Internal – 15 (Theory 10 & Practical 5)

Practical – 35 (External)

Note: Two questions will be set from each unit and students are required to attempt one question from each unit.

Objectives:

To enable the students to have an understanding about origin of life types, and detailed structure of cell inclusions.

Unit I: Origin of life and organization of cell

General account of origin of life, Structural concept of a cell – prokaryotic and eukaryotic organization, cell types

Unit II: Structure and function of cell organelles

Colgi bodies, cytoskeleton, ER, peroxisome, vacuoles, plastids, mitochondria, ribosome.

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Cell envelopes; Plasma membrane – different models; function; cell wall – structure and function.

Unit III: Structure and function of nucleus

General Trystallizat of nucleus, ultrastructure of nuclear membrane and nucleolus

Chromosome – Trystallizat, morphology, centromere, telomere.

Chromosome alterations – deletions, duplications, translocations, inversions, variation in chromosome number – aneuploidy, polyploidy.

Unit IV : Nucleic acids : DNA

Discovery of DNA as genetic material, its structure and types. DNA replication in prokaryotes and eukaryotes, structure of nucleosome. Satellite and repetitive DNA.

Unit V : Nucleic acid : RNA and cell division

Structure, types (m-RNA, t-RNA, r-RNA) and function of RNA.

Cell division : Cell cycle, mitosis and meiosis

Practical

Objectives:

- To develop skills of staining and slide preparations of lower and higher organism.
- To impart understanding of internal structures and their organization.
- To develop the skills for the preparation of smear for studying of cell division.

Cell Biology

1. To study cell structure from onion leaf peels; demonstration of staining and mounting methods.
2. Comparative study of cell structure in onion cells, Hydrilla and Spirogyra. Study of cyclosis in Tradescantia Trystal cells.
3. Study of plastids to examine pigment distribution in plants (e.g. Cassia, Lycopersicon and Capsicum).
4. Examination of electron micrographs of eukaryotic cells with special reference to organelles.
5. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular Trystallizat.
6. Examination of various stages of mitosis and meiosis using appropriate plant material (e.g. onion root tips, onion flower buds).

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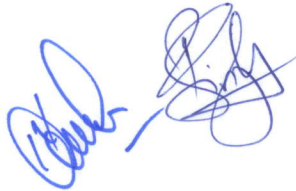
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Scheme of Practical Examination

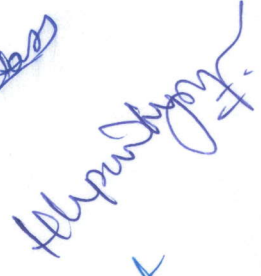
1. Preparation of a smear of root tip/anthers to identify different stages of cell division. 5
2. Demonstration of cytokinesis in the given material. 5
3. To identify the type of plastids in the given material. 5
4. Comment upon the spots. 5
5. Practical Record/Sessional 5
6. Internal evaluation

Suggested Readings

1. Kleinmitch, L.J. and Kish, V.M. 1995 Principles of Cell and Molecular Biology. Harper Collins College Publishers, New York, USA
2. Lodish, H. Berk, A. Zipursky, S.L., Matsudaira, P. Baltimore, D. and Darnell / 2000 Molecular Cell Biology. W.H. Freeman & Co. New York, USA
3. Baltimore, D. and Darnell, J. 2000 Molecular Cell Biology. W.H. Freeman & Co. New York, USA
4. Gunning, B.E.S. and Steer M.W. 1996. Plant Cell Biology, Structure and Function Jones and Bartlett Publishers Boston Massachusetts
5. Harris, N. and Oparka, K.J. 1994. Plant Cell Biology. A practical approach IRI. Press Oxford U.K.
6. Sharma A.K. and Sharma. A 1999 Plant Chromosomes: Analysis, Manipulation and Engineering Harwood Academic Publishers Australia.
7. Watson, James D, T.A. Baker, S.P. Bell, A. Gann, M. Levine, R. Losick. 2004 Molecular Biology of the Gene, 5th edition, Pearson Education.
8. Gupta, P.K. 2006-07, Cell and Molecular Biology, 3rd edition, Rastogi Publication







Elective II – Chemistry

Paper II

Contact Periods/week: 05 + 4 Practical

Maximum Marks – 60

Min. Pass Marks – 20

Internal – 15 (Theory 10 & Practical 5)

Practical – 25 (External)

Note: Two questions will be set from each unit and students are required to attempt one question from each unit.

Objectives:

After the end of the 2nd semester the students should be able to:

- * get the knowledge of basic concept of organic chemistry, like the tetravalency of Carbon, the concept of hybridization, the concept of resonance, hyperconjugation, and aromaticity.
- * strengthen the knowledge regarding the nomenclature of organic compounds.
- * explain the properties of organic compounds in terms of the structure of the functional groups.
- * Acquire knowledge regarding the directional characteristics of covalent bond and discuss the stereochemistry of organic compounds centering around the directional characteristics of the covalent bond.
- * highlight the importance of the study of kinetics in elucidation of mechanism of organic reactions.
- * explain the reactions in organic chemistry in terms of free radical mechanism, substitution reactions, addition reactions and molecular rearrangement pattern.
- * Acquire knowledge regarding the role of aryl radical as it affects the properties of organic compounds.
- * develop competency to explain the chemistry of organic compounds in terms of comparative

Triethyl of alkyl and aryl com

* Differentiate phenols and alcohols on the basis of their acidic and neutral behaviours.

Instructional Strategy:

The teacher while discussing the stereochemistry may use ball and stick model to focus the clarity in concept formation. While adopting the lecture technique, the teacher may make the presentation of subject matter interesting by adopting the structural approach (high lighting

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importance of reaction mechanism in the teaching of organic chemistry). In the subject treatment of open chain and closed

chain compounds and alkyl and aryl derivatives the teacher may take the help of comparative organizers (a type of advance organizer).

Unit-I: Structure and Bonding

Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bond, van der Waals interactions, inclusion compounds, clathrates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding.

Mechanism of Organic Reactions

Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, Trystalli and heterolytic bond breaking. Types of organic reactions, Energy consideration.

Reactive intermediates (carbocations, carbanions, free radicals, carbenes, arynes and nitrenes with examples). Assigning formal charges on intermediates and other ionic species.

Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

Stereochemistry of Organic Compounds

Concept of isomerism. Types of isomerism.

Optical isomerism-elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature. Geometric isomerism-determination of configuration of geometric isomers. E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane, derivatives.

Newman projection and Sawhorse formulae, Fischer and Flying wedge formulae.

Difference between configuration and conformation.

Unit-II: Alkanes and Cycloalkanes

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IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes, isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and chemical reactions of alkanes.

Mechanism of free radical Trystallizati of alkanes : orientation, reactivity and selectivity. Cycloalkanes- nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations, Ring strain in small rings (cyclopropane and cyclobutane); theory of strainless rings. The case of cyclopropanering : banana bonds.

Arenes and Aromaticity

Nomenclature of benzene derivatives. The aryl group. Aromatic nucleus and side chain.

Structure of benzene : molecular formula and Kekule structure. Sublity and carbon-carbon bond lengths of benzene, resonance structure, MO picture.

Aromaticity : the Huckel rule, aromatic ions. Aromatic electrophilic substitution-general pattern of the mechanism, role of (and complexes). Mechanism of nitration, Trystallizati, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivative, Birch reduction. Methods of formation and chemical reactions of alkylbenzenes, alkyne benzenes and Trystall.

Unit-III Alkenes, Cycloalkenes, Dienes and Alkynes

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation with KMnO_4 . Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene. Methods of formation, conformation and chemical reactions of cycloalkenes. Nomenclature and classification of dienes : isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions-1, 2 and 1, 4 additions. Diels-Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions, oxidation and polymerization.

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Unit-IV Alkyl and Aryl Halides

Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides, SN^2 and SN^1 reactions with energy profile diagrams.

Polychlorinated compounds: chloroform, carbon tetrachloride.

Methods of formation of aryl halides, nucleic and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides. Synthesis and uses of DDT and BHC Freons.

Unit-V Alcohols

Classification and nomenclature. Monohydric alcohols - nomenclature, methods of formation of reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature, Reactions of alcohols.

Dihydric alcohols - nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage (Ph (Oxo)I and HIO₄) and pinacol-pinacolate rearrangement. Trihydric alcohols - nomenclature and methods of formation, chemical reactions of glycerol.

Phenols

Nomenclature, structure and bonding, Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophilic aromatic substitution, acylation and sulfoxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman reactions, Harben-Hoesch reaction, Lederer-Mann reaction and Reimer-Tiemann reaction.

Exercises

1. Qualitative analysis of single organic compound.
2. One stage preparation and Crystallization of three organic compound from the list given below -
 - (a) Benzoyl chloride to Benzamide.
 - (b) Aniline to Acetanilide.
 - (c) Preparation of p-bromo acetanilide from acetanilide.
 - (d) Benzoylation of aniline.
 - (e) Preparation of Iodoform.

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(f) Benzamide to Benzoic acid.

3. Determination of molecular mass of organic compounds.

Scheme of Examination (Practical) Time allotted - 5 hrs

Experiments

(1)	Qualitative org. analysis	-	5
(2)	One stage preparation	-	5
(3)	Molecular mass determination	-	5
	Internal assessment	-	5
	Viva	-	5

Suggested Readings:

1. Paula Yurkanis Bruice, Organic Chemistry, Pearson Education, Ltd.
2. Morrison and Boyd, Organic Chemistry, Prentice Hall
3. Solomon and Fryhle, Organic Chemistry, WILEY International
4. Carey, Francis A., Organic Chemistry, Tata McGraw Hill
5. Eliel, Ernest, L., / Wilen, Samuel H., Stereo chemistry of organic compounds, John Wiley & Sons, 2004.
6. Tiwari K.S., Vishnoi, N.K., A Test book of Organic Chemistry, VIKAS Publishing House.
7. Agarwal, O.P., Organic Chemistry, Reactions and Reagents, Guel Publishing House, Meerut.
8. Bhal, Arun & Bhal, B.S., Organic Chemistry, S. Chand & Company

Elective III - Zoology

Paper II: VERTEBRATES

Contact Periods/week: 05 + 4 Practical

Maximum Marks - 60

Min. Pass Marks - 20

Internal - 15 (Theory 10 & Practical 5)

Practical - 25 (External)

Note: Two questions will be set from each unit and students are required to attempt one question from each unit.

Objective:

To gain knowledge of classification of Vertebrates, their structure, organization, representative animals and comparative anatomy.

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A. Chakraborty
G. Chakraborty

Unit-1

1. Classification of Vertebrata upto orders with examples.
2. Affinities and special characters of cyclostomes (comparison between Petromyzon and Myxine).
3. Elasmobranchs - Type study of Scollodon.
4. Teleosts - Type study of Labeo.
5. Air bladder and gills in fishes.

Unit-2

1. Amphibia- Type study of frog
2. Parental care, neoteny and metamorphosis in amphibians.
3. Reptilia - Type study of Uromastix.
4. Anatomical peculiarities in snake.
5. Biting mechanism and poison apparatus in snakes.

Unit-3

1. Aves-Type study of pigeon.
2. Flight and perching mechanism in birds.
3. Mammalia - Type study of rabbits.
4. Affinities of Prototheria and Metatheria.

Unit-4

Comparative anatomy from Pisces to Mammalia

1. Comparative study of integumentary system and study of integumentary derivatives (scales, feathers, horns and hooves).
2. Comparative study of digestive system.
3. Comparative study of respiratory system.
4. Comparative study of heart and aortic arches.
5. Comparative study of urinogenital system.
6. Comparative study of brain.

Unit-5

Comparative study of endoskeleton from Amphibia to Mammalia.

1. Skull
2. Limb Bones and Girdles.
3. Vertebrae.

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4. Special endoskeletal structures (urostyle, astragalus, calcaneum, synsacrum, pygostyle)

PRACTICAL

Objective- To study and develop skill of identification of animals, their histology, comparison of anatomy, physiology and their osteology.

1. Study of museum specimen, slides, relevant to the theory from Cyclostomes to Mammalia.
2. Permanent slide preparation- scales of fishes.
3. Comparative study of integument, digestive tract and blood cells of vertebrates through permanent slides.
4. Comparative study of brain of different vertebrates through charts and models.
5. Comparative vertebrate osteology e.g frog, fowl, rabbit (skull, limb bones, girdles, special bones, vertebrae)
6. Comparative study of heart and aortic arches, respiratory system and urinogenital system through charts and models.

SCHEME OF PRACTICAL EXAMINATION

1. Spotting	-	10
2. Mounting	-	03
3. Exercise based on bones	-	05
4. Practical Records	-	03
5. Viva-voce	-	04
Total	-	25 Marks

Referred books :-

1. Textbook Of Zoology Vol II (Vertebrate)-Parker & Haswell
2. Animal Biology (Vol II) -Adhikari, Ganguly & Sinha
3. Textbook of Vertebrates- B.L. Kotpal
4. Chordates -Jordan and Vernal
5. Zoology of Chordates -Nigam H.C
6. Comparative anatomy of Vertebrates - Kent
7. Outline of comparative anatomy of vertebrates - Kingsley.
8. Element of chordates anatomy - Weichert.
9. Practical Zoology Vertebrates -S.S.Lal
10. Practical Zoology of Chordates -P.S. Verma

Elective III – Mathematics

Contact Periods/week: 05 = 4 Practicum

Maximum Marks – 30+30=60

Min. Pass Marks – 20

Internal – 15 (Theory 10 & Practicum 5)

Practicum – 25 (Internal)

M-Z1 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

NOTE : Two questions will be set from each unit with Internal choice

Objectives :

- To develop understanding of Differential Equations and their applications
- To develop understanding of basic concepts of Vector Integration
- To enable them to solve the problems based on Green, Gauss and Stokes

- Unit – I Degree and order of differential equation. Equations of first order and first degree. Equations in which the variables are separable. Homogeneous equations.
- Unit – II Linear equations and 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.
- Unit – III Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Linear differential equations of second order. Transformation of the equation by changing the dependent variable/ the independent variable.
- Unit – IV Method of variation of parameters. Ordinary simultaneous differential equations.
- Unit – V Vector Integration, Gauss Theorem, Theorems of Green, Gauss, Stokes and problems based on these.

Content as in :

- Daniel Murray: Introductory Course in Differential Equations - Orient Long Man.
- Manglik and Seth Vector Calculus
- B.R. Thakur, Nigam, Sinha and Saren - Vector Analysis

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M – 2.2: 3-D GEOMETRY

NOTE: Two questions will be set from each unit with internal choice

Objectives:

- To develop understanding of conicoids
- To develop the ability to reduce second degree equation in 3-Dimensions
- To develop ability to treat general equation of second degree including con-focal conics
- To make them familiar with the mechanism of deriving equations of surfaces in 3-dimensions.
- To enable them to treat conics in polar form

Unit-I General equation of second degree, Tracing of conics, system of conics, confocal conics

Unit-II Polar equation of a conic.

Unit – III Central Conicoids, Paraboloids

Unit – IV Plane sections of conicoids, Generating lines, Confocal Conicoids

Unit – V Reduction of second degree equations

Content as in:

5. R.J.T. Bell : Elementary Treatise on Coordinate Geometry of 3-Dimension
Mc. Milan

M – 2.3 Mathematics Practicum

List of Activities:

- Activity oriented problem solving / Experiments using Mathematical software or computer programming language based on the content studied in semester II Mathematics papers M-2.1 and M-2.2.
- Mathematics seminar.

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Education Component:

Cognition and Learning

Contact Periods/week: 03

Maximum Marks - 40

Min. Pass Marks - 15

Internal - 10

Objectives

- Explore the possibilities of an understanding of processes in human cognition and meaning-making them as basis for designing learning environments and experiences in school
- To become aware of different contexts of learning and situate schools as a special environment for learning
- To develop awareness of the different contexts of learning.
- To reflect on their own implicit understanding of the nature and kinds of learning.
- Gain an understanding of different theoretical perspectives on learning with a focus on cognitive views of learning as well as social-constructivist theories.
- Appreciate the critical role of learner's based on differences and contexts in making meanings, and hence draw out implications for schools and teachers.

UNIT 1: COGNITION

- Meaning of Cognition and its Role in learning
- Structure and Process of Cognition: sensation, perception, attention, memory, concept formation and problem-solving in learning.
- Socio-cultural factors that influence cognition

UNIT 2: THEORETICAL PERSPECTIVES ON LEARNING

- Implicit knowledge and beliefs about learning (demystifying misconceptions)
- Perspectives on human learning: Behaviourist (conditioning paradigms in brief), cognitivist, information-processing view, humanist, social-constructivist (drawing selectively on the ideas of Skinner, Piaget, Rogers, Vygotsky).
- Concepts and principles of each perspective and their applicability in different learning situations.

UNIT 3: ROLE OF LEARNER IN LEARNING

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- Role of learner in various learning situations, as seen in different theoretical perspectives
- Role of teacher in teaching-learning situations: a) transmitter of knowledge, b) model, c) facilitator, d) negotiator, e) co-learner. (The focus is on building understanding of different psychological perspectives of learning and helping student teachers to learn to apply them in different learning situations)
- Distinctions between learning as 'construction of knowledge' and learning as 'transmission and reception of knowledge'.

UNIT 4: INDIVIDUAL DIFFERENCES AMONG LEARNERS

- Dimensions of differences in psychological attributes—cognitive abilities, interest, aptitude, creativity, personality, values.
- Understanding learners from multiple intelligences perspective with a focus on Gardner's theory of multiple intelligences including emotional intelligence.
- Differences in learners based on socio-cultural contexts
- Understanding differences based on a range of cognitive abilities— learning difficulties, slow learners and dyslexics, intellectual deficiency, intellectual giftedness and implications for classroom practices and teaching.

Suggested Sessional Work:

- Reflective Written Assignments - comments and grade
- Field observation notes - comments and grade
- Participation in discussions - to be assessed qualitatively (along a set of rubrics)
- Analysis of a learning situation and case study, using theoretical perspectives - to assess for conceptual grasp and clarity of analysis - comments, further questions, grade
- A written test can be given on 'conceptual grasp' of theories of teaching, learning and cognition, as well as 'working understanding' of constructivist approach to construction of knowledge - evaluated with marks
- Assignment on the implications of Piaget/Vygotsky/Ausubel's approach to teaching-learning
- Student panel discussion of selected themes.
- Class presentations
- Readings and class discussions
- Assignments

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Suggested Reading

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- Jeanne Ellis Ormrod Educational Psychology: Developing Learners. Fourth Edition
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Psychology Practical

Contact Periods/week: 03

Maximum Marks – 25

Min. Pass Marks – 08

Internal – 25

Any five from the following:

- I. Intelligence (Verbal, Non-Verbal and Performance Tests)
- II. Personality
- III. Creativity
- IV. Motivation
- V. Learning
- VI. Concept Formation
- VII. Problem Solving

Health, Physical Education & Yoga –II

Contact Periods/week: 2 Practical

Maximum Marks – 25

Min. Pass Marks – 08

Internal – 25

Unit I

Programme of Physical Fitness and Muscular Development (Free Hand and Callisthenic Exercise) : Circuit Training and Weight Training.

Unit II

Athletics in Printing and Distance Running- Crouch Start, Striding, Curve Running and Finishing Technique.

Jumps- Approach Run, Take off, Clearance and Landing.

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Throws- Hold/Grip, Placement/Swing, Stance, Action, Releasing and Recovery.

Unit III

Layout and Marking of Track and Field and Different Play Grounds.

Unit IV

Teaching Skills of Major Games, Teaching Rules, Officiating and Organizing Tournaments of Major

Games.

-Cricket, Football, Kabaddi, Kho-Kho, Volleyball, Basketball, Table-Tennis, Lawn-Tennis, Badminton

-Instruction and demonstration of basic skills

-Equipments and dimensions of play fields

-Common rules and interpretation

-Organization and conduct of tournament/competition.

Unit V

Teaching/lesson in physical education and sports (skills)

Art & Aesthetic

Contact Periods/week: 02

Maximum Marks - 25

Min. Pass Marks - 08

Internal - 25

Introduction:

The need of integrate arts education in the formal schooling of our students is to retain our unique cultural identity in all its diversity and richness and encourage little children and creative minds to do the arts. An understanding of the arts and aesthetics will give our children to give ability to appreciate the richness and variety of artistic traditions as well as make them liberal, creative thinker and after all a good citizen of the nation.

In National Curriculum frame work (2000, 2005) and National Education Policy introduced arts education as a mainstream curricular area, which must be taught in every elementary and primary schools as a compulsory subject up to secondary level, keeping this in view, its all the more important that arts education is integrated in the school curriculum to provide an

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aesthetically viable atmosphere in elementary levels encouraging creativity. For this, not only the art teachers but every teacher should be sensitive to appreciate this.

Aim:

Teaching Arts education in elementary and school may be perceived as a tool for development of aesthetics sensitivity among learners to enable them to respond to the beauty in different form of arts. For effectiveness and interest of teaching, curricular area of arts education are required. Some broader objectives are follow-

• Objectives:

- अध्ययन-अध्ययन प्रक्रिया को कला के माध्यम से रोचक बनाना।
- शिक्षण-अधिगम के दौरान आसपास के वातावरण, विद्यालय, घर-समुदाय को स्वच्छ एवं सुन्दर रखने हेतु कलात्मक कार्य की प्रेरणा देना।
- सीखने-सीखने हेतु सीढ़ी, संवेदना एवं कल्पनाशीलता का समन्वय करना।
- कलात्मक वृद्धिमान एवं सांस्कृतिक घटकों की समझ हेतु अवसर उपलब्ध करवाना।
- अभिप्राय-अभिव्यक्ति के माध्यम से कलाई तथा द्रव्य की समझ को विविधता से विकसित करना।
- प्रकृति-परिवेश पर्यावरण और गणितीय जैसे विषयों की विभिन्न कलाओं के माध्यम से सीखने को अवसर प्रदान करना।
- अध्ययन प्रक्रिया में कलाओं को जोड़कर कार्यनिष्ठ प्राप्त करना।
- सृजनशीलता एवं सौंदर्यबोध के अधिष्ठापन से नैतिक एवं राष्ट्रीय भावनाओं का विकास करना।
- शिक्षणार्थी, गायन, शिल्प-शास्त्र एवं अन्य दृश्य-श्रव्य कलाओं को टेक्नोलॉजी के माध्यम से समझना एवं गवाचाई सीखना।
- कलाओं के साथ अन्य विषयों के समन्वय से राष्ट्रीय भरोहर एवं संस्कृति के प्रति लगाव पैदा करना।
- विभिन्न कलाकारों और उनके जीवन को जानना।

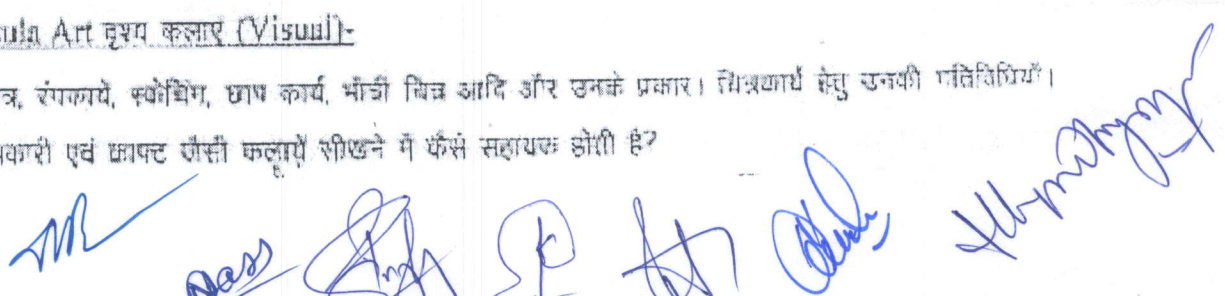
COURSE - CONTENT

Unit - 1 Art क्या है, कलाओं के प्रकार, Concept of Art Education-

- कलाओं का महत्व क्यों समझना है। कलाओं का जीवन में स्थान। कलाओं से जीवनयापन आदि।
- कला और शिक्षा -
 - कला शिक्षण और कलाओं के साथ सम्बन्धित शिक्षण।
 - कला के क्षेत्र (work) विस्तार।

Unit - 2 Visual Art दृश्य कलाएँ (Visual)-

- रेखाचित्र, रंगकल्प, स्केचिंग, छाया कार्य, भौती चित्र आदि और उनके प्रकार। चित्रणार्थ हेतु उनकी गतिविधियाँ।
- चित्रकारी एवं छाया जैसे कलाएँ सीखने में कैसे सहायक होती हैं?



- इसे पर्यावरण, भाषाएँ, विज्ञान, गणित जैसे विषयों के साथ जोड़ना।
- अनेक गतिविधियों से कला एवं शैक्षिकीय अवसर प्राप्त करना।

Unit - 3 नाटक तथा किताबें

- अभिनय, रंगमंच, कला प्रदर्शन, नाटक के संसार, अभिव्यक्ति, प्रगीत, लोक नाटक, जैसे समाजवादी व प्रयुक्त करना।
- नाटक की ऐतिहासिक पृष्ठभूमि, भारतीय व पाश्चात्य अवधारणा।
- नाटक, अभिनय गीत, मूल्या नीति, खेल, व्यायाम, योग, चरित्र विकास एवं नृत्यसंस्कृति शिक्षा को जोड़ना।

Activities & Assignments -

1. विभिन्न कलाओं के बारे में जानने तथा उसने समुदाय का संसार करें।
2. प्राथमिक, माध्यमिक, उच्चमध्यम स्तरों के पाठ्यपुस्तकों में नाट्य, जिस कला की बात हुई उसकी लिख बनानी। साथ ही उनके चित्र, मूर्तियाँ आदि को इकट्ठा करें।
3. अपने क्षेत्र में प्रचलित लोककलाएँ जैसे मंडन, भित्तिचित्र, मोहन मोहरी, गठहर, गौरी, खरही, रंगोली, आदि के चित्र इकट्ठा करने वाले से प्रेरित करवाएं।
4. अपने क्षेत्र में पाई जाने वाली सांस्कृतिक धरोहरों, मूर्तियाँ, कलाकला, जमाकला, स्टोन हज, मिट्टी-कलाकला के बारे में जानकारी लेकर सूची बनाएं तथा उनके स्थानीय कलाकारों से पूछ करवायें। (Experience) list
5. अपने क्षेत्र एवं भारत के प्रचलित लोककला और लोकगीतों की जानकारी ऑनलाइन वीडियो के माध्यम से प्राप्त करना तथा स्थानीय कलाकारों से जांचना करना।
(Documentation of Arts, Dance/Folk lore etc.)
6. नाटक, रंगमंच, एक्जॉजी, एक प्राचीन अभिनय अभिनय गीत, आदि को गतिविधि के विषयवस्तु के साथ Integrate करके संयोजन करें।
7. सांस्कृतिक अभिनय, अभिनय गान, सांस्कृतिक गान, सांस्कृतिक नृत्य आदि करवायें। नाटक हेतु व्यायाम, योग, मोहरी अभिव्यक्ति, संगीत प्रदान करें।
8. नाट्य का परिचय एवं प्रायोगिक कार्य करवा सकते हैं।

Objects:

- i. विभिन्न कलाओं के बारे में सूची बनाएं तथा कलाकारों से जांचना करें।
- ii. पत्रिकाएँ, चर्चा, इन्टरव्यू का आयोजन करें जिसमें क्षेत्रीय कलाकारों से मुलाकात हो सके।
- iii. नाटकों को पढ़ना, बोलना करवायें। (Reading and Acting)
- iv. सांस्कृतिक संपर्क, क्षेत्रों की फिल्में मुलाकात का आयोजन करें एवं एनाइस्टमेंट तथा प्रोजेक्ट कार्य करें।
(Field visit/Report)
- v. जनजातीय, लोककलाएँ, भित्तिचित्र, छायाकलाएँ, मूर्तियाँ, बुद्धिआर्ट, ग्लास (Glass Painting), डेसिग्न आर्ट, क्राफ्ट एवं मोडर्न आर्ट, फोटिक कलाएँ आदि प्रस्तुत कर सकते हैं। (Research based Projects)

Reference:-

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- x. Learning through Art, Sahil, Jain & Sahil, Eklavya, 2009.
- xi. Deevaswapna, Gajabhai Badheka, Indore.

Websites:-

- i. www.Art integrated learning/Edu/primary
- ii. www.Basic Education through Art
- iii. www.Indian Arts and Culture
- iv. www.Youtube/Art/Primary education
- v. DD Bharti- Arts & Culture, www.daibharti.dd.org.in

Work Education II

Option I: Electricity and Electronics

Contact Periods/week: 2 Practical

Maximum Marks – 25

Min. Pass Marks – 08

Internal – 25

Syllabus:

Unit I: Electrical and Electronics measurement and measuring Instrument

Introduction, use, type (based on working and construction) and connections of Ammeter, voltmeter, wattmeter, frequency meter, power factor meter, megger, ohmmeter, Energy meter and Multi-meter. Measuring technique and precaution during their operation in electrical circuit. Introduction of multi- meter and method of its uses, testing of electrical appliances using multi-meter, Principle of fault location and demonstration using multi-meter.

Unit 2: Basic Electronics

Conductor, Insulator and Semiconductor materials, extrinsic and intrinsic semiconductor materials, P-Type and N-Type Semiconductor material, doping, formation of P-N junction diode, forward, and reverse biasing of diode, characteristic and application. Formation of P-N-P and N-P-N junction transistor, biasing of transistor, characteristic, and their application. Soldering – Principle, method, and materials. Practice of soldering.

Unit 3: Electronics component and Materials

Study of electronic components-sign and symbols recognition, specification and testing of components like resistors, capacitors, coil, diode, transistor, zener diode, photo diode, L.E.D. solar cell, P.C. Board, bread board, I.C. (Integrated circuits) using multimeter. Integrated circuits fabrication – Advantages and limitations of I.Cs.

Unit 4: Construction of common Electronics Circuit

Construction of eight L.E.D. disco light, Testing of disco light checking individual components, Construction of battery eliminator. (using half wave/full wave circuit), Testing of battery eliminator, checking individual components, Simple construction of fire alarm (using photocell), Construction of audio amplifier, Construction of oscillator, Construction of Musical bell, Construction of Simple emergency light, Regulated power supply, Testing of musical bell, emergency light, amplifier and oscillator by measuring voltages, Construction of light operated switch. PAS (Public Address System)-(a) Components of PAS and their specification, (b) Demonstration – Installation (c) Connectors used with microphones (d) Locating and repairing of minor faults in PAS.

Unit 5: Repairing of Home Appliances

House appliance repairing like Electrical Press, Heater, Immersion Rod, Electrical Kettle, Fan, Cooler, and Mixer, Rewire the fuse, To find the fault in above electrical appliances and rectify them, Outline the principles of working of Washing Machine and locating faults, Microwave – Outline the working principle and maintenance of a microwave. To study the construction, working and maintenance of different types of electrical motors.

Distribution of marks:

- Internal Exam	-	10 marks
- Practical Exam	-	10 marks
- Record and Viva Vice	-	05

WORK EDUCATION- II

Option II: Agriculture – KITCHEN GARDENING & FRUIT PRESERVATION

Syllabus:

- Unit-I Kitchen gardening – Importance, Establishment & Management.
- Unit-II Identification and cultivation of vegetable crops suitable for kitchen gardening viz: Pea, Carrot, Onion, Okra, Chilli and Radish etc. Identification and cultivation of Fruit crops suitable for kitchen gardening viz: Citrus, Papaya, Banana, Grapes and Mango etc.
- Unit-III Applied knowledge of common manures, fertilizers their uses and methods of application, Identification knowledge of common pesticides and their uses in kitchen garden.
- Unit-IV Fruit Preservation – Principles of Fruit preservation, Different methods of fruit preservation, Causes of Spoilage and their remedies.
- Unit-V Preparation of some fruit products; Jam, Jelly, Squashes, Ketchup & Pickles.

SCHEME OF EXAMINATION (25 marks)

1. Identification of seasonal vegetables and Fruit Crops with comments - 05 marks
2. Drawing layout Plan of a Kitchen Garden - 05 marks
3. Principles and different methods of fruit preservation - 05 marks
4. Preparation method of Jam, Jelly, Ketchup, Sauce and Pickles . - 05 marks
5. Viva and Practical Record - 05 marks

Suggested Readings:

1. Handbook of Horticulture; I.C.A.R., New Delhi
2. Preservation of fruits and vegetables, Giridharul Sidhagar; I.C.A.R., New Delhi
3. Fruit & vegetable preservation industries in India, Bhutani, R.C. ; C.F.T.R.L; Mysore.
4. Vegetable production in India, Chauthan, D.V.S.; Ram Prasad and Sons, Agra.
5. Commercial fruits; Singh, S.P.; Kalyani Publishers, New Delhi.
6. Instant Horticulture; Gupta, S.N.; Naik, K.B; Jain Brothers, New Delhi.