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शासकीय मो.ह.गृह विज्ञान एवं विज्ञान महिला, महाविद्यालय

GOVERNMENT M. H. COLLEGE OF HOME SCIENCE & SCIENCE FOR WOMEN

नैपियर टाउन, जबलपुर - 482002 मध्य प्रदेश, भारत

Napier Town, Jabalpur - 482002 Madhya Pradesh, India

## *Course Outcome*

### Department of Chemistry

#### B. Sc. First Year

##### MAJOR PAPER 1

##### FIRST PAPER -FUNDAMENTALS OF CHEMISTRY

<b>CO1:</b>	Ancient Indian chemical techniques.
<b>CO2:</b>	Various theories and principles applied to reveal atomic structure.
<b>CO3:</b>	Significance of quantum numbers.
<b>CO4:</b>	Concept of periodic properties of elements.
<b>CO5:</b>	Theories related to chemical bonding.
<b>CO6:</b>	Acid-base concept, pH, buffer.
<b>CO7:</b>	Factors responsible for reactivity of organic molecules.
<b>CO8:</b>	Basics and mechanism of chemical kinetics.
	Properties of electrolytes.

##### MAJOR PAPER 2/MINOR/ ELECTIVE

##### SECOND PAPER -ANALYTICAL CHEMISTRY

<b>CO1:</b>	Basic concepts of Mathematics for Chemists.
<b>CO 2.</b>	Fundamentals of analytical chemistry and steps involved in analysis.
<b>CO 3.</b>	Basic knowledge of Computer for chemists.

CO 4.	Basic Concepts of Chemical equilibrium.
CO 5.	Principles of Chromatography and chromatographic techniques.
CO 6.	Various techniques of Spectroscopic Analysis.

**GENERIC ELECTIVE**

**THIRD PAPER – CHEMISTRY IN EVERYDAY LIFE**

CO1:	Learn about the chemistry of ancient India. Ancient construction materials and discoveries.
CO2:	Gain information about acids, bases and salts involved in our day to day life.
CO3:	Have an idea of food adulteration, its harmful effects, and methods to detect adulteration and the important constituents of our food.
CO4:	Student will be familiar with the chemical nomenclature of the commonly used materials in daily life including toiletries, kitchen and beverages.
CO5:	Have an Elementary idea of disinfectants, pesticides and cleaners.

**LABORATORY COURSE: CHEMISTRY PRACTICAL –  
MAJOR (PAPER I) - QUALITATIVE & QUANTITATIVE CHEMICAL ANALYSIS  
CORE COURSE –**

By the end of this course students will learn the following aspects of laboratory exercises in chemistry:

CO1:	Importance of chemical safety and lab safety while performing experiments in laboratory
CO2:	Qualitative inorganic analysis
CO3:	Elemental analysis of organic compounds (non-instrumental)
CO4:	Qualitative identification of functional group of organic compounds
CO5:	Techniques of pH measurements
CO6:	Preparation of buffer solutions

**LABORATORY COURSE: CHEMISTRY PRACTICAL –  
MAJOR (PAPER II) ANALYTICAL PROCESSES AND TECHNIQUES CORE COURSE/  
MINOR/ ELECTIVE –**

By the end of this course students will learn the following aspects of laboratory exercises in chemistry:

CO1:	Concepts and analytical methods in Chemistry.
CO2:	Preparation of solutions of different concentrations.
CO3:	Standardization of the solution.
CO4:	Identification of Organic compounds by chromatographic techniques.
CO5:	Analysis by Spectral Techniques.

**LABORATORY COURSE: CHEMISTRY PRACTICAL –  
OPEN ELECTIVE**

**CHEMISTRY IN EVERYDAY LIFE - GENERIC ELECTIVE –**

By the end of course students will learn the following aspects of laboratory exercises in chemistry

CO1:	Concepts and analytical methods in chemistry.
CO2:	Identification of acids, bases and salts involved in our day to day life.
CO3:	Methods to detect adulteration in commonly used food materials.
CO4:	Preparation of Natural indicator.

## B. Sc. Second Year

Course  
outcome

*On completion of this course, successfully students will be able to learn:*

***Title of the paper***

### **MAJOR PAPER 1**

#### **REACTIONS, REAGENTS AND MECHANISMS IN ORGANIC CHEMISTRY (PAPER 1)**

CO1:	By the end of this course students will acquire the knowledge of following aspects of Chemistry:
CO2:	Various organic reactions, reagents and their mechanisms, which will be helpful in understanding organic synthesis.
CO3:	Application of the reactions in the various industries. like pharmaceutical, polymer, pesticides, textile, Dyes etc.
CO4:	Important key reactions used in further study and Research work.

## MAJOR PAPER 2/MINOR/ELECTIVE

### SECOND PAPER -INORGANIC CHEMISTRY

#### TRANSITION ELEMENTS, CHEMI-ENERGETICS, PHASE EQUILIBRIA (PAPER 2)

By the end of this course students will learn the following aspects of chemistry:

CO1:	Introductory idea about Traditional Indian Chemistry
CO2:	<ul style="list-style-type: none"><li>Chemistry of d- &amp; f-block Elements, Basic Concepts of Coordination Chemistry.</li></ul>
CO3:	<ul style="list-style-type: none"><li>Stereochemistry of Transition Metal Complexes.</li></ul>
CO4:	<ul style="list-style-type: none"><li>Laws of Thermodynamics.</li></ul>
CO5:	<ul style="list-style-type: none"><li>Concepts of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, partially Miscible Liquids.</li><li>Basic Concepts of Electrochemistry.</li></ul>

### GENERIC ELECTIVE -CHEMISTRY FOR FARMERS

At the end of the program student will gain knowledge of following aspects of chemistry-

CO1:	Pro cultivation crop improvement soil and crop management for sustainable organic agriculture production and development.
CO2:	Physical properties of soil and fertilizers types, Soil types and soil structure required for an agricultural field.
CO3:	Analysis and identification of complex agricultural problems and formulating ethical solutions.
CO4:	Innovative processes products and technology to meet the challenges in agriculture and farming practices.
CO5:	Fundamentals of horticulture modern farming and organic farming.

### LABORATORY COURSE:

#### CHEMISTRY PRACTICAL MAJOR PAPER 1

##### ORGANIC QUALITATIVE ANALYSIS, REACTIONS AND SYNTHESIS (PAPER 1)

CO1:	By the end of this course students will acquire the knowledge of following practical aspects of Chemistry: <ul style="list-style-type: none"><li>To perform various reactions, which will be helpful in</li></ul>
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Understanding organic synthesis.

- To use reagents to perform organic reactions.
- To perform rearrangement reactions.
- To prepare various organic compounds.
- To use chromatographic technique to monitor organic reactions.
- Applications of the reactions in the industries, e.g., pharmaceutical, polymer, pesticides, textile, dyes, etc. industries.

These experiments will also be useful in further study and research work.

## LABORATORY COURSE:

### CHEMISTRY PRACTICAL MAJOR PAPER 2/MINOR/ELECTIVE

#### METAL COMPLEX PREPARATION, THERMOCHEMICAL & PHASE EQUILIBRIA EXPERIMENTS (PAPER 2)

**CO1:** By the end of this course students will learn the following aspects of laboratory exercises of Chemistry:

- Preparation of inorganic complexes.
- Use of calorimeter for thermochemistry experiments.
- Determination of enthalpy of various system and reactions.
- Experiments on phase equilibria.
- Construction of phase diagrams.

Study of reaction equilibrium.

## B. Sc.Third Year

Course  
outcome

*On completion of this course, successfully students will be able to learn:*

***Title of the paper***

MAJOR GROUP A

#### GREEN AND AGRICULTURE CHEMISTRY (PAPER I)

**By the end of this course student will acquired the knowledge of following aspects of green and agriculture chemistry**

**CO1:** Basic principle of green and sustainable chemistry.

**CO2:** Understand stoichiometric calculation and relate them to green process metrics.

**CO3:** Learn alternative solvent media green catalysis and energy sources of chemical

processes.

**CO4:** Understand the requirements of manures and fertilizers for various crops and their proper time of application.

**CO5:** Understand to maintain soil fertility for better crop production.

### **LABORATORY COURSE: PRACTICAL**

By the end of this course student will acquired the knowledge of following aspects of green chemistry.

**CO1:** To learn green synthesis of organic and inorganic compound.

**CO2:** To learn to prepare green ionic liquids.

**CO3:** To understand soil profile sampling and study minerals present in soil.

**CO4:** To learn to estimate organic matter content of soil.

### **GROUP A PAPER II (DSE- 1 PAPER 2)**

#### **LABORATORY SKILL, TECHNIQUES AND MANAGEMENT**

**At the end of course the learner will be -**

**CO1:** Familiarized with the basic facilities available in laboratories  
300 to adopt appropriate disposal procedures and safety method suitable for laboratories.

**CO2:** Expected to gain knowledge of the basic skill of organisation and management of science laboratories.

**CO3:** Unable to expertise in the procedures to procurement and storage of laboratory equipment and materials.

**CO4:** Trained in the operation and maintenance of simple instruments used in Science laboratories.

**CO5:** Unable to develop skills in common laboratory techniques.

**CO6:** Trained to adopt appropriate disposal procedures and safety method suitable for laboratories.

### **GROUP A PAPER II (DSE- 1 PAPER 2)**

#### **LABORATORY COURSE: EXERCISE FOR DEVELOPMENT OF LAB SKILLS**

**On completion of this course learner will able to- handle and run any chemistry lab skillfully.**

Students will be able to perform general exercises like.

CO1:	Preparation of standard solution.
CO2:	Determination of concentration.
CO3:	Determination of MP pH conductivity.
CO4:	Preparation of a stock solution.
CO5:	Preparation of various reagents.

**MAJOR GROUP B**

**INSTRUMENTAL TECHNIQUES IN CHEMISTRY (PAPER I)**

By the end of the course a student will learn the following aspect of instrumental techniques in chemistry

CO1:	Preparation of standard sample for analysis.
CO2:	Instrumentation for analytical methods of chemistry.
CO3:	Instrumentation for various spectroscopic techniques.
CO4:	Principles and instrumentation of various electro analytical techniques.
CO5:	Instrumentation used in optical methods of analysis.
CO6:	Advanced chromatography technique.

**GROUP B PAPER I**

**LABORATORY COURSE: INSTRUMENTAL ANALYTICAL TECHNIQUE IN CHEMISTRY**

By the end of the course student will learn the following aspect of instrumental techniques in chemical analysis

CO1:	Preparation of standard samples for analysis.
CO2:	Determination of concentration of solution spectrometrically.
CO3:	Determination of stoichiometry and stability constant and complexes.
CO4:	Potentiometric and conductometric titrations.
CO5:	Advance chromatography techniques.

**GROUP B PAPER II**

**BIO PHYSICAL, BIO INORGANIC AND ORGANOMETALLIC CHEMISTRY (PAPER II)**

*On completion of this course the students will be able to understand*

CO1:	<i>Bio physical concepts like pHbiological oxidation bioenergetics.</i>
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CO2:	<i>Magnetic properties and electronic spectra of transition metal complexes.</i>
CO3:	<i>Structure and bonding analysis of organometallic compounds using the MOtheory.</i>
CO4:	<i>Organometallic compounds of main group elements and their structure and bonding analysis.</i>
CO5:	<i>Bio Inorganic Chemistry and role of metal ions in biological systems.</i>

## GROUP B PAPER II

### GROUP B PAPER 2 LABORATORY COURSE

#### SYNTHESIS AND ANALYTICA TECHNIQUES

***On completion of this course the students will be able to -***

CO1:	<i>How to synthesize ferrocene from ferric chloride.</i>
CO2:	<i>How to synthesis of potassium tries oxalate ferrate.</i>
CO3:	<i>How to determine pH of bio sample</i>
CO4:	<i>How to determine sugar in blood sample by photometry.</i>

## MINOR/ELECTIVE

### PHARMACEUTICAL AND MEDICINAL CHEMISTRY

***After successfully completing this course module students will be able to-***

CO1:	<i>Understand importance of pharmaceutical chemistry and pharmacopoeia.</i>
CO2:	<i>Learn intellectual property rights patents trademark and copyright.</i>
CO3:	<i>Understand definition classification of the drug with example and structures.</i>
CO4:	<i>Describe the structure activity relation of some important class of drugs.</i>
CO5:	<i>Describe the over all process of drug discovery and the role played by medicinal chemistry in this process.</i>
CO6:	<i>Relate the structure and physical properties of drugs to their pharmacological</i>



activity.

**CO7:** explain you chemical properties related to QSAR.

**LABORATORY COURSE GROUP B PAPER 2**

**PHARMACEUTICAL MEDICINAL CHEMISTRY MINOR/ ELECTIVE**

*On completion of this course the students will be able to understand*

**CO1:** How to prepare acetanilide.

**CO2:** How to isolate the caffeine from the tea leaves.

**CO3:** To learn about preparation of simple syrup as per IP and USP.

**CO4:** Morphology of turmeric, Ginger and mentha.

**CO5:** Preparation of suspension emulsion on it means in organic separations pharmaceutical buffer solutions.

**GENERIC ELECTIVE 1**

**PROCESSING OF FATS AND OILS**

*After completing this course the student will-*

**CO1:** Gain knowledge about traditional Indian oil and traditional Indian oil processing methods.

**CO2:** Gain the knowledge about importance type natural resources of fats and oils and their effect on health.

**CO3:** Learn the method of refining and modification of fats and oils..

**CO4:** Know about the nutritional aspects of fats and oils and their storage and handling.

**CO5:** Gain information regarding entrepreneurship in food processing and knowledge of local processing industries.

**GENERIC ELECTIVE**

ENVIRONMENTAL TOXICOLOGY

By the end of the scores students are expected to-

- |      |  |
|------|--|
| CO1: | Learn about definition and sources of toxicants.   |
| CO2: | Learn about chemical toxicants biological toxicants and its assessment.  |
| CO3: | Learn about different parts of ecotoxicology i.e. Immunotoxicology, Xenoviotics, neurotoxicology, bioaccumulation, biodegradation etc. |
| CO4: | Learn about the determination of acceptable risks and limits of environmental toxicants and utility of environmental benchmarks.       |
| CO5: | Learn about environment al cytotoxicity and genotoxicity.  |
| CO6: | Learn about what type of toxic chemicals affects in environment and solid West management.   |
| CO7: | Learn about which factors influence the toxicity.  |

## M. Sc. Chemistry

### Course Outcome

This program is designed with an objective to cover all important topics of physical, inorganic, organic and analytical branches so that students will be able to use this knowledge in advancement of their career.

### M. Sc. First Semester

**Course** On completion of this course, successfully students will be able to learn:

**outcome** *Title of the paper*

#### FIRST PAPER (MCH 101) INORGANIC CHEMISTRY

- |      |   |
|------|---|
| CO1: | Stereochemistry, bonding, VSEPR theory, MO treatment      |
| CO2: | Reaction mechanism of Substitution inertness and lability |

CO3:	Electronic spectra of transition metal complexes
CO4:	Metal carbonyls, Dioxygen Complexes
CO5:	Wilkinson's Catalyst, borane chemistry including topology, nomenclature, reactivity and bonding.

### SECOND PAPER (MCH102) ORGANIC CHEMISTRY

CO1:	Structure and bonding in organic molecules
CO2:	Aromaticity, antiaromaticity, homo aromaticity including weaker bonds.
CO3:	Stereochemistry, symmetry, chirality, optical activity and conformational analysis,
CO4:	Reaction mechanism, Hammett equation, SN1, SN2 and SET mechanism,
CO5:	UV-VIS, ORD & CD Spectroscopy.

### THIRD PAPER (MCH 103) PHYSICAL CHEMISTRY

CO1:	Schrodinger Wave equation, variation and perturbation theory,
CO2:	Classical thermodynamics,
CO3:	Phase rule, chemical dynamics, Arrhenius Equation,
CO4:	Theory of reaction rate and application of rate law on dynamic chain reaction
CO5:	Reaction catalysts.

### FOURTH PAPER (MCH104) SPECTROSCOPY

CO1:	Electromagnetic spectrum
CO2:	Microwave spectroscopy
CO3:	Infrared Spectroscopy
CO4:	Raman and Electronic spectroscopy.
CO5:	CARS (Coherent and Stokes Raman Spectroscopy) and application of these spectral techniques in structure determination of molecule.

### FIFTH PAPER (MCH 105 A) MATHEMATICS FOR CHEMIST

CO1:	Basic concept of mathematical technique involved in Chemistry like Mathematics Algebra
CO2:	Differential calculus, integral calculus,
CO3:	Elementary differential equation
CO4:	Permutation
CO5:	Probability.

#### FIFTH PAPER (MCH 105 B) BIOLOGY FOR CHEMIST

CO1:	Cell structure
CO2:	Cell organs, and their function
CO3:	Carbohydrates,
CO4:	Lipids and fats, amino acids
CO5:	Nucleic acids.

#### LABORATORY COURSE: CHEMISTRY PRACTICAL COURSE MCH 106: INORGANIC CHEMISTRY

CO1:	Qualitative and Quantitative Analysis
CO2:	Chromatography
CO3:	Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra.

#### COURSE MCH 107: ORGANIC CHEMISTRY

CO1:	Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis.
CO2:	Organic Synthesis-Purification of compounds by TLC and column chromatography.
CO3:	Aromatic electrophilic substitutions, Reduction reaction
CO4:	Quantitative Analysis- <i>Determination of the percentage or number of hydroxyl groups</i>

in an organic compound by acetylation method

### COURSE MCH 108: PHYSICAL CHEMISTRY

CO1:	Adsorption
CO2:	Phase Equilibria
CO3:	Chemical Kinetics
CO4:	Solutions

## M. Sc. Second Semester

Course On completion of this course, successfully students will be able to:

outcome **Title of the paper**

### FIRST PAPER (MCH 201) INORGANIC CHEMISTRY

CO1:	Metal ligand equilibrium, reaction mechanism, base hydrolysis, conjugate base mechanism in octahedral and mechanism of square planar complexes.
CO2:	Metal-ligand bonding
CO3:	Calculations of $Dq$ , $B$ and $\beta$ parameters
CO4:	Preparation, properties, structure and applications of metal nitrosyls.
CO5:	Symmetry elements, symmetry operations and the principle involved in group theory.

### SECOND PAPER (MCH 202) ORGANIC CHEMISTRY

CO1:	Mechanism- aromatic/aliphatic electrophilic substitution
CO2:	Free radical, allylic halogenation reaction,
CO3:	Addition to carbon-carbon and carbon-hetero atom multiple bond and aromatic nucleophilic substitution, $SE1$ , $SE2$ , $SN1$ $SN2$ & $SRN1$ reactions.
CO4:	ESR Spectroscopy
CO5:	IR and Raman spectra and their application in characterization of organic

compounds.

### THIRD PAPER (MCH 203) PHYSICAL CHEMISTRY

CO1:	Chemical dynamics
CO2:	Adsorption and electrokinetic phenomenon,
CO3:	Micellization, DHO equation.
CO4:	Lipmann electro-capillary phenomenon including different models.
CO5:	Macromolecules and colloid including their types, emulsification, irreversible electrode phenomenon including decomposition voltage overlaps.

### FOURTH PAPER (MCH 204) SPECTROSCOPY & DIFFRACTION METHODS

CO1:	Photoelectron spectroscopy, photoacoustic spectroscopy,
CO2:	X ray Diffraction, Neutron Diffraction.
CO3:	Biological cell, constituents,
CO4:	Bioenergetics
CO5:	Thermodynamics of biopolymer solution and transport of ion through the cell membrane.

### FIFTH PAPER (MCH 205) COMPUTER FOR CHEMIST

CO1:	Basic knowledge of computer and computing
CO2:	BASIC and FORTRAN based programming with especial reference to programming in chemistry.
CO3:	Rerunning of standard program in MS Word and MS Excel
CO4:	Search engines and various types of files like PDF, RTF, JPG
CO5:	OMR & Webcam.

### LABORATORY COURSE: CHEMISTRY PRACTICAL

### COURSE MCH 206: INORGANIC CHEMISTRY

CO1:	Chromatography Separation of cations and anions by Column Chromatography
CO2:	Estimation of Ni – Fe, Ni (Gravimetrically), Fe (Volumetrically)
CO3:	Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra.
CO4:	Interpretation of TG and NMR spectra of some known compounds

### COURSE MCH 207: ORGANIC CHEMISTRY

CO1:	Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis.
CO2:	Preparation of phenyl azo – $\beta$ – naphthol from aniline.
CO3:	Aromatic electrophilic substitutions, Reduction reaction
CO4:	Quantitative Analysis- <i>Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method</i>

### COURSE MCH 208: PHYSICAL CHEMISTRY

CO1:	<i>Electrochemistry</i>
CO2:	<i>Conductometry</i>
CO3:	<i>Potentiometry/pH merry</i>
CO4:	<i>Polarimetry</i>

## M. Sc. Third Semester

Course Outcome On completion of this course, successfully students will be able to:  
outcome **Title of the paper**

### FIRST PAPER (MCH 301) INORGANIC CHEMISTRY

CO1:	Group theory, Character tables, orthogonality theorem, applications for C <sub>2v</sub> and
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	C <sub>3v</sub> point groups
CO2:	Correlation of vibrational spectroscopy with group theory. They will also understand molecular energy levels and M.O. Diagrams, bonding of multidentate ligands, characterization by IR & Raman spectroscopy.
CO3:	Shift reagents in NMR spectroscopy
CO4:	Structure and functioning of metalloenzymes e.g., carboxypeptidase, carbonic anhydrase
CO5:	Structure and functioning of biomolecules like Hemoglobin.

### SECOND PAPER (MCH 302) ORGANIC CHEMISTRY

CO1:	Basic theory of NMR spectroscopy, applications to characterize organic compounds.
CO2:	Photochemical reactions.
CO3:	Mechanism of pericyclic reaction, विकास
CO4:	Woodward-Hoffmann, FMO & PMO approach
CO5:	Sigma tropic rearrangements.

### THIRD PAPER (MCH 303) PHYSICAL CHEMISTRY

CO1:	Atomic concepts, Russell-Saunders terms and coupling. Molecular Orbitals, Huckel theory of conjugated systems like ethylene, butadiene
CO2:	Homo and heterogeneous catalysis.
CO3:	Crystal defects. Schottky and Frankel defects
CO4:	Solid state reactions. Metallic bond
CO5:	Conductors, semiconductors, insulators and superconductors

### FOURTH PAPER (MCH 304 B) ANALYTICAL CHEMISTRY

CO1:	Statistical Analysis., Sample Preparation for Chromatography.
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<b>CO2:</b>	Chromatography. Theory of Chromatography, Gas Chromatography, High-Performance Liquid Chromatography, Capillary Electrophoresis.
<b>CO3:</b>	Ion Exchange, Solvent Extraction
<b>CO4:</b>	Atomic Absorption Spectrometry, Electrolytic Methods
<b>CO5:</b>	Acid-Base Titrations, Precipitation Titrations, Complexometric Titrations, Redox Titrations.

### **FIFTH PAPER (MCH 304C) ELECTIVE PAPER: PHOTOCHEMISTRY**

<b>CO1:</b>	Photochemical Reactions
<b>CO2:</b>	Determination of Reaction Mechanism
<b>CO3:</b>	Photochemistry of Alkene
<b>CO4:</b>	Photochemistry of Carbonyl
<b>CO5:</b>	Miscellaneous Photochemical Reactions, Photo degradation of polymers. Photochemistry of vision.

### **LABORATORY COURSE: CHEMISTRY PRACTICAL COURSE MCH 306: INORGANIC CHEMISTRY**

<b>CO1:</b>	<b>Synthesis</b> Synthesis of selected inorganic compounds and their studies by measurements of decomposition temperatures and molar conductance, magnetic and IR electronic spectra.
<b>CO2:</b>	Qualitative test of suitable anion and determination of metal content gravimetrically in the above compounds.
<b>CO3:</b>	Interpretation of ESR and mass spectra of some known coordination compounds.

### **COURSE MCH 307: ORGANIC CHEMISTRY**

<b>CO1:</b>	<b>Qualitative Analysis</b>
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Separation, purification and systematic identification of the components of a mixture of three organic compounds (solids and liquids). Preparation of one derivative of each compound. Use of TLC for ascertainment of purity of compounds.

**CO2: Multi-step Synthesis**  
This exercise should illustrate the use of organic reactions/ diverse conditions and principles for organic synthesis. Purification of compounds by chromatographic techniques.

### COURSE MCH 308: PHYSICAL CHEMISTRY

**CO1:** Potentiometry

**CO2:** Conductivity

**CO3:** Spectrophotometry

**CO4:** Molecular Modeling

## M.Sc. Fourth Semester

*Course outcome* On completion of this course, successfully students will be able to:

*outcome* **Title of the paper**

### FIRST PAPER (MCH 401) INORGANIC CHEMISTRY

**CO1:** ESR Spectroscopy

**CO2:** Mossbauer, IR, Raman spectroscopy,

**CO3:** Point groups and vibrational spectroscopy.

**CO4:** Bio-inorganic chemistry, chlorophyll, photo systems one and two,

**CO5:** Metalloproteinscytochromes, iron Sulphur protein, Nitrogen fixation.

### SECOND PAPER (MCH 402) ORGANIC CHEMISTRY

**CO1:**  $^{13}\text{C}$  NMR Spectroscopy

CO2:	Mass spectroscopy.
CO3:	Reaction mechanism of elimination, E1, E2 & E1CB type,
CO4:	Substitution reactions.
CO5:	Enzymes, structure and functioning.

### THIRD PAPER (MCH 403) PHYSICAL CHEMISTRY

CO1:	NMR, ESR spectroscopy.
CO2:	Laws of photochemistry, fluorescence,
CO3:	Steric and conformational properties of molecules,
CO4:	Winstein-Holmer and Curtin-Hammett Equations
CO5:	CO5: Electronic effects involved in SN1 and SN2 type of reactions, and curve crossing model.

### FOURTH PAPER (MCH404) POLYMER CHEMISTRY

CO1:	Basic theory, classification of polymers
CO2:	Characterization, important properties of polymers
CO3:	Commercial importance of polymers
CO4:	Processing to understand different types of casting like die-rotational, film
CO5:	Methods for designing variety of polymers

### FIFTH PAPER (MCH 405A) ELECTIVE: CHEMISTRY OF NATURAL PRODUCTS

CO1:	<i>Terpenoids</i>
CO2:	<i>Alkaloids</i>
CO3:	<i>Steroids</i>
CO4:	<i>Plant Pigments. Carotenoid, Flavonoids, Chlorophyll</i>
CO5:	<i>Vitamins and Antibiotics, Antibiotics.</i>

**LABORATORY COURSE: CHEMISTRY PRACTICAL**

**COURSE MCH 406: INORGANIC CHEMISTRY**

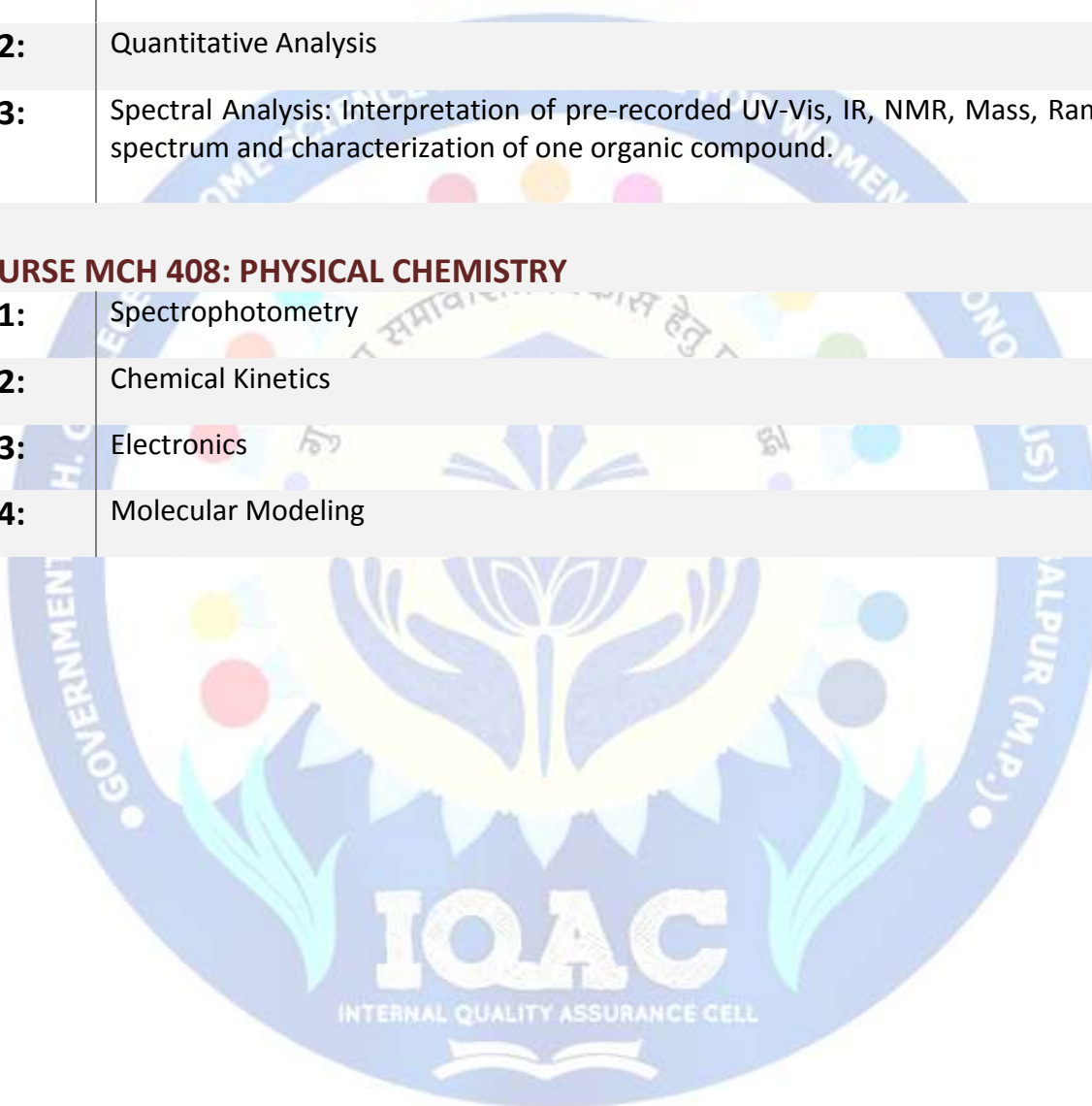
<b>CO1:</b>	Spectrophotometric Determination
<b>CO2:</b>	Flame photometric determination
<b>CO3:</b>	Model Experiments on Cyclic Voltammetry
<b>CO4:</b>	Interpretation of ESR, NMR and Thermogravimetric pre-recorded results of known compounds

**COURSE MCH 407: ORGANIC CHEMISTRY**

<b>CO1:</b>	Multi-step Syntheses - Qualitative & Quantitative
<b>CO2:</b>	Quantitative Analysis
<b>CO3:</b>	Spectral Analysis: Interpretation of pre-recorded UV-Vis, IR, NMR, Mass, Raman spectrum and characterization of one organic compound.

**COURSE MCH 408: PHYSICAL CHEMISTRY**

<b>CO1:</b>	Spectrophotometry
<b>CO2:</b>	Chemical Kinetics
<b>CO3:</b>	Electronics
<b>CO4:</b>	Molecular Modeling





## Course Outcome

Department of Mathematics

### B. Sc. First Year

#### **FIRST PAPER -MAJOR-1 ALGEBRA, VECTOR ANALYSIS AND GEOMETRY**

- |   |  |
|---|--|
| 1 | Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. using the rank of matrix. |
| 2 | To find the Eigen values and corresponding Eigen vectors for a square matrix.  |
| 3 | Using the knowledge of vector calculus in geometry.  |
| 4 | Enhance the knowledge of three dimensional geometrical figures (eg. cone and cylinder).  |

#### **SECOND PAPER -MAJOR-2 , MINOR, ELECTIVE : CALCULUS AND DIFFERENTIAL EQUATIONS**

- |    |  |
|----|--|
| 1. | Sketch curves in a plane using its Mathematical properties in the different coordinate systems of reference. |
| 2. | Using the derivatives in Optimization, Social sciences, Physics and Life sciences etc.                       |
| 3. | Formulate the Differential equations for various Mathematical models.  |
| 4. | Using techniques to solve and analyze various Mathematical models.   |

5. Sketch curves in a plane using its Mathematical properties in the different coordinate systems of reference.

## BSc II<sup>nd</sup> year Mathematics

### **FIRST PAPER -MAJOR-1 ABSTRACT ALGEBRA & LINEAR ALGEBRA**

1.	Recognize the algebraic structures as a group, and classify them as abelian, cyclic and permutation groups, etc.
2.	Link the fundamental concepts of groups and symmetrical figures.
3.	Analyze the subgroups of cyclic groups
4.	Explain the significance of the notion of cosets, normal subgroups, and quotient groups.
5.	The fundamental concept of rings, fields, subrings, integral domains and the corresponding morphisms.
6.	Analyze whether a finite set of vectors in a vector space is linearly independent. Explain the concepts of basis and dimension of a vector space.
7.	Understand the linear transformations, rank and nullity, matrix of a linear transformation, algebra of transformations and change of basis.
8.	Compute the characteristic polynomial, eigenvalues, eigenvectors, and Eigen spaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.

### **SECOND PAPER -MAJOR-2 , MINOR/ELECTIVE:**

### **ADVANCE CALCULUS AND PARTIAL DIFFERENTIAL EQUATIONS**

1:	Understand many properties of the real line $\mathbb{R}$ and sequences.
2:	Calculate the limit superior, the limit inferior, and the limit of a bounded sequence.
3:	Apply the mean value theorems and Taylor's theorem.
4:	Apply the various tests to determine convergence and absolute convergence of an infinite series of real numbers.
5:	Formulate, classify and transform partial differential equations into canonical form.

## B. Sc.Third Year

Course outcome      *On completion of this course, successfully students will be able to learn:*  
                                 ***Title of the paper***

### **FIRST PAPER: MAJOR-1**

#### **NUMERICAL METHODS AND SCIENTIFIC COMPUTATION**

- |    |  |
|----|--|
| 1: | Understand numerical methods to find the solution of a system of linear equations. |
| 2: | Compute interpolation value for real data.   |
| 3: | Find quadrature by using various numerical methods.                                |
| 4: | Solve system of linear equations by using various numerical techniques.            |
| 5: | Obtain solutions of ordinary differential equations by using numerical methods.    |

### **SECOND PAPER -MAJOR-2**

#### **ELEMENT OF DISCRETE MATHEMATICS**

- |    |  |
|----|--|
| 1: | Apply the Boolean algebra, switching circuits and their applications.          |
| 2: | Minimize the Boolean Function using Karnaugh Map.                              |
| 3: | Understand the lattices and their types.                                       |
| 4: | Graphs, their types and its applications in study of shortest path algorithms. |
| 5: | Test whether two given graphs are isomorphic.                                  |
| 6: | Understand the Eulerian and Hamiltonian graphs.                                |
| 7: | Represent graphs using adjacency and incidence matrices.                       |

### **MINOR, ELECTIVE : FUNDAMENTALS OF BOOLEAN ALGEBRA**

- |    |   |
|----|---|
| 1: | Using the Boolean algebra in logical problems.    |
| 2: | Minimize the Boolean Function using Karnaugh Map. |
| 3: | Understanding the various logic gates.            |

## **B. SC. FOURTH YEAR**

Course outcome      *On successful completion of this course, the students will be able to:*  
***Title of the paper***

### **FIRST PAPER: CORE-1**

#### **ADVANCED ABSTRACT ALGEBRA**

- |    |  |
|----|--|
| 1: | To understand the concept of Cost, Inventory Control and Overheads Accounting.   |
| 2: | To understand the determination cost of product/service To understand the learning about fixed and variable cost and its impact on profit as well as decision making |
| 3: | To understand about types and preparation of budget  |
| 4: | To understand the various standards cost of materials, labour and overheads  |

### **PAPER -CORE-2**

#### **REAL ANALYSIS**

- |    |  |
|----|--|
| 1: | Learn the properties of Riemann and Riemann-Stieltjes integrable functions and applications of the fundamental theorems of integration.                          |
| 2: | Understand the concepts of convergence and term by term integration and differentiation of a power series.   |
| 3: | Understanding and evaluating uniform convergence of series of real valued functions.   |
| 4: | Analyzing the relation between uniform convergence and continuity, uniform continuity and differentiation and integration of sequences of real valued functions. |
| 5: | Determine interior, closure, boundary and limit points of metric space.  |

### **PAPER : D1 TOPOLOGY**

- |    |  |
|----|--|
| 1: | On successful completion of this course, the students will be able to:   |
| 2: | Determine interior, closure, boundary, limit points, basis and subbasis of topological spaces.   |
| 3: | Check whether a collection of subsets is a basis for a given topological spaces or not and determine the topology generated by a given basis. 3. Identify the continuous maps between two spaces and maps from a space into product space. |
| 4: | Determine common topological properties of given two spaces.   |
| 5: | Recognize Hausdorff spaces, Tychonoff spaces and normal spaces and understand first and second countable spaces and separable spaces.  |



**PAPER : D2 COMPLEX**

- 1 Visualize complex numbers as points of  $R^2$  and stereographic projection of complex plane on the Riemann sphere.
- 2 Recognize the significance of differentiability and Whalyticity of complex functions.
- 3 Use Cauchy-Goursat theorem and Cauchy integral formula in evaluation of contour integrals.
- 4 Apply Liouville's theorem in fundamental theorem of Algebra.
- 5 Learn Taylor and Laurent series expansions of analytic functions.
- 6 Classify the nature of singularity, poles and residues and apply Cauchy residue theorem.



## M. Sc. (Mathematics)

### Course Outcome

#### M. Sc. First Semester

**Course outcome**     *On completion of this course, successfully students will be able to learn:*

*Title of the paper*

#### FIRST PAPER : ADVANCED ABSTRACT ALGEBRA

<b>CO1:</b>	Students would have knowledge of elements of Galois theorem.
<b>CO2:</b>	Would be able to define & give examples of modules submodules & types of modules & their properties.
<b>CO3:</b>	Concept of Noetherian & Artinian rings & examples.
<b>CO4:</b>	Applications of finitely generated modules.

#### SECOND PAPER: COMPLEX ANALYSIS II

<b>CO1:</b>	Solve problems of complex integration using Cauchy's theorem & integral formula.
<b>CO2:</b>	Find poles & singularities of functions & prove various important theorems.
<b>CO3:</b>	Determine Laurent's & Taylor's expansion of functions.
<b>CO4:</b>	Find bilinear transforms of functions & conformal mappings.

#### THIRD PAPER: FUNCTIONAL ANALYSIS

<b>CO1:</b>	Students would become familiar with continuous map & uniformly continuous maps .
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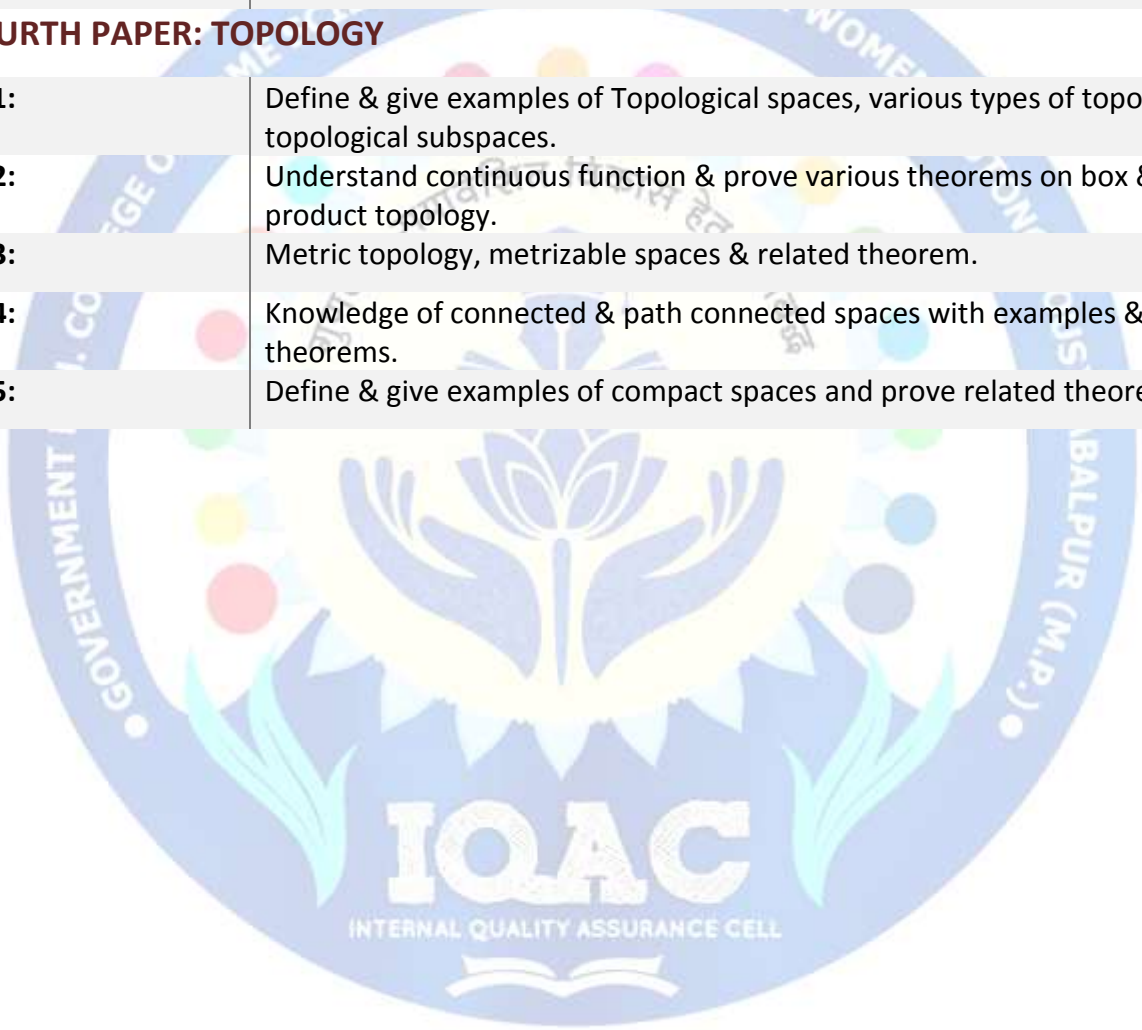
CO2:	Define & give examples of normed linear space & Banach Space.
CO3:	Prove some important theorems on normed linear space & Banach space.
CO4:	Define & give examples of Hilbert space & prove some of its important properties.
CO5:	Concept of spectral theory.

**FOURTH PAPER: REAL ANALYSIS**

CO1:	Understanding of Riemann stoeleges integral & its properties.
CO2:	Would be able to integrate vector valued functions.
CO3:	Would be able to test the convergence of sequence & series of functions using Wierstrass, Abel's & Dirichlets test.
CO4:	Calculate derivatives of functions of sever at variables.
CO5:	Prove theorem like implicit function theorem Stokes theorem etc.

**FOURTH PAPER: TOPOLOGY**

CO1:	Define & give examples of Topological spaces, various types of topologies & topological subspaces.
CO2:	Understand continuous function & prove various theorems on box & product topology.
CO3:	Metric topology, metrizable spaces & related theorem.
CO4:	Knowledge of connected & path connected spaces with examples & related theorems.
CO5:	Define & give examples of compact spaces and prove related theorems.



## M. SC. SECOND SEMESTER

Course On completion of this course, successfully students will be able to:

outcome **Title of the paper**

### FIRST PAPER :ADVANCED ABSTRACT ALGEBRA

CO1:	Students would be able to define & prove elementary propositions of conjugacy relation, normalizer, Cauchy & Sylow's theorems.
CO2:	Knowledge of series of groups.
CO3:	Solvable & nilpotent groups & their properties.
CO4:	Prove theorems & give examples of fields, extension & splitting field, perfect & finite field.

### SECOND PAPER ADVANCED DISCRETE MATHEMATICS

CO1:	Algebraic structures examples & properties.
CO2:	Lattices sublattices & their properties
CO3:	Differential & examples of Boolean algebra.
CO4:	Graph theory, definition, examples & applications.
CO5:	Trees their types & Properties.

### THIRD PAPER:COMPLEX ANALYSIS

CO1:	Weierstrass factorization theorem, Runge's theorem, Mittag-Leffler's theorem, Monodromy theorem, Harnack's inequality theorem, Hadamard's, Bloch's, Picard theorems.
CO2:	Work with Riemann zeta function, Gamma functions, Analytic continuity.
CO3:	Solve problem of Dirichlet Green's function, Jensen's & Jensen's Poisson formula.

### FOURTH PAPER :LEBESGUE MEASURE & INTEGRATION

CO1:	Lebesgue outer measure, measurable & non-measurable sets.
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CO2:	Solve Riemann lebesgue integrals, integrate non-negative functions, general integral & series.
CO3:	Knowledge of four derivatives & functions of bounded variation, complex functions & p spaces.
CO4:	Apply Jensen's inequality, Holders & Minkowski's inequality.
CO5:	Understand the concept of dual space, convergence, uniform & almost uniform convergence.

**FIFTH PAPER (OPTIONAL): FUZZY SET AND THEIR APPLICATION**

CO1:	Students would be familiar with various fuzzy sets, membership functions and their representations.
CO2:	Properties and operations of fuzzy sets
CO3:	Application of knowledge of fuzzy sets in various real life problems and situations.

**FIFTH PAPER (OPTIONAL): ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS**

CO1:	Students would be able to solve exact differential equations, find their adjoints, Sturm Liouville differential equations & apply Lagrange's method of variation of parameters.
CO2:	Construct PDE & Green's functions solve differential equation by Charpit's method.
CO3:	Find the power series solutions of 1 <sup>st</sup> & 2 <sup>nd</sup> order linear equation & find singular & regular pts.
CO4:	Find the Laplace transforms & inverse Laplace transforms, derivation & integrals of Laplace theorem & apply convolution theorem.

Course      *On completion of this course, successfully students will be able to:*

outcome    ***Title of the paper***

**FIRST PAPER : LINEAR PROGRAMMING**

<b>CO1:</b>	Students would be able to formulate & solve linear Programming problems using graphical, simplex, two phase & Big M method.
<b>CO2:</b>	Find the dual of any L.P.P.
<b>CO3:</b>	Solve assignment transportation & Job sequencing problem & find the optimal Solutions.

**SECOND PAPER :MATHEMATICAL STATISTICS**

<b>CO1:</b>	Calculation of measures of central tendency dispersion, based on mutual Differences &skewness.
<b>CO2:</b>	Probability theory & problems.
<b>CO3:</b>	Univariate theoretical & normal distributions.
<b>CO4:</b>	Beivariate distribution, multivariate distribution & their applications.
<b>CO5:</b>	Testing of hypothesis, measures of association, test for goodness of fit and homogeneity test.

**THIRD PAPER :ADVANCED SPECIAL FUNCTION**

<b>CO1:</b>	Solution & application of Gamma & Beta functions.
<b>CO2:</b>	Application of Gauss multiplication theorem.
<b>CO3:</b>	Solution of problems based on hypergeometric& generalized hypergeometric functions.
<b>CO4:</b>	Contiguous function relations, hypergeometric differential equations.
<b>CO5:</b>	Kummer's and Ramanujan's theorem, elementary series manipulation & simple transformation.

**FOURTH PAPER :APPLIED FUNCTIONAL ANALYSIS**

<b>CO1:</b>	Students would be familiar with Hilbert spaces convex sets & projections.
<b>CO2:</b>	Weak convergence weak compactness & weak semi continuity.
<b>CO3:</b>	Convey programming & support functional, support plane & support mapping.
<b>CO4:</b>	Functions transformations & operators.
<b>CO5:</b>	Spectral theory of operators.

**FIFTH PAPER : INTEGRAL TRANSFORMS**

CO1:	Applications of Laplace transforms in differential equations.
CO2:	Laplace equations.
CO3:	Laplace wave equations.
CO4:	Application of Laplace transforms in integral equations.
CO5:	Heat conduction equations.



## M.SC. FOURTH SEMESTER

*Course*      *On completion of this course, successfully students will be able to:*

*outcome*    ***Title of the paper***

### **FIRST PAPER : OPERATIONS RESEARCH**

<b>CO1:</b>	Operations Research its scope, origin, development, characteristic models, uses & limitations.
<b>CO2:</b>	Solve problems of inventory theory, Various models.
<b>CO3:</b>	Find solution of replacement problems.
<b>CO4:</b>	Apply network analysis & its constraints, calculate PERT.
<b>CO5:</b>	Game theory, solution of games with saddle point & without saddle point, graphical solution

### **SECOND PAPER : SPLINE THEORY**

#### **KNOWLEDGE OF –**

<b>CO1:</b>	Polynomial interpolation & limitations of polynomial approximation.
<b>CO2:</b>	Piecewise linear approximation.
<b>CO3:</b>	Piecewise cubic interpolation.
<b>CO4:</b>	Parabolic spline interpolation.
<b>CO5:</b>	Piecewise polynomial representation, basis splines.

### **THIRD PAPER : PROGRAMMING IN C**

<b>CO1:</b>	The students would be able to write programs in C language & know the basics of C programming.
<b>CO2:</b>	Use of various operators in programming.
<b>CO3:</b>	Write programs using control statements.
<b>CO4:</b>	Write programs using variables & functions.
<b>CO5:</b>	Write programs using pointers.

### **FOURTH PAPER: ADVANCE SPECIAL FUNCTIONS – II**

<b>CO1:</b>	Legendre polynomials, generating functions, Christoffels, Murphy & Rodrigues formula & generating relations.
<b>CO2:</b>	Solve & apply Legendre differential equations.
<b>CO3:</b>	Bessel's function, Bessel's differential equations & orthogonality of Bessel's functions.
<b>CO4:</b>	Hermite & Lagurre polynomials & generating functions.



**FIFTH PAPER :INTEGRAL TRANSFORMS II**

<b>CO1:</b>	Applications of Laplace transforms.
<b>CO2:</b>	Would be able to Solve electric circuit problems.
<b>CO3:</b>	Solve complex Fourier transforms.
<b>CO4:</b>	Properties of Fourier transforms & their derivatives.





## Course Outcome

Department of Mathematics and Computer

### Computer Application

#### B. Sc. First Year

##### MAJOR PAPER 1

##### FIRST PAPER - PROGRAMMING IN C LANGUAGE

CO1:	<ul style="list-style-type: none"><li>To explore basics of C programming languages.</li></ul>
CO2:	<ul style="list-style-type: none"><li>To approach the programming tasks using techniques learned and write pseudo-code.</li></ul>
CO3:	<ul style="list-style-type: none"><li>To choose the right data representation formats based on the requirements of the problem.</li></ul>
CO4:	<ul style="list-style-type: none"><li>To use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.</li></ul>
CO5:	<ul style="list-style-type: none"><li>To identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.</li></ul>

##### PROGRAMMING IN C LANGUAGE (PRATICAL)

1	<ul style="list-style-type: none"><li>To understand how computer works and will be able to understand and visualize the inner working of computer.</li></ul>
2	<ul style="list-style-type: none"><li>To understand the syntax and semantics of the C language.</li></ul>
3	<ul style="list-style-type: none"><li>To recognize how to develop and implement a program in the C language.</li></ul>
4	<ul style="list-style-type: none"><li>To recollect various programming constructs and to develop C program.</li></ul>

**MAJOR PAPER 2/MINOR/ ELECTIVE**

**SECOND PAPER -DATA PROCESSING SOFTWARE**

CO1:	<ul style="list-style-type: none"><li>To understand the basic concept of various Applications of software.</li></ul>
CO 2.	<ul style="list-style-type: none"><li>To gain knowledge of MS Word, Excel, Access and Power point.</li></ul>
CO 3.	<ul style="list-style-type: none"><li>To apply acquired knowledge in office automation tasks.</li></ul>
CO 4.	<ul style="list-style-type: none"><li>To study various methods of formatting of documentation and use of spreadsheets.</li></ul>
CO 5.	<ul style="list-style-type: none"><li>To develop and enhance presentation skills using power point.</li></ul>

**B. Sc. Second Year**

Course outcome      *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

**MAJOR PAPER 1**

**MAJOR-1 DATABASE MANAGEMENT SYSTEM**

CO1:	To understand database concepts, applications, structure, need and database terminologies.
CO2:	To know about fundamentals of Relational Algebra and recovery & backup.
CO3:	To gain skills to create logical design of databases, including the E R method and normalization approach.
CO4:	To explore issues of transaction processing and concurrency control.
CO5:	To acquire knowledge of back-end project management skills.
CO6:	To get knowledge of Database and create own Database.
CO7:	For implementation of different security features to secure the database

**MAJOR PAPER 2/MINOR/ELECTIVE**

**SECOND PAPER -INTRODUCTION TO ASP.NET&C#**

CO1:	To learn fundamentals of. net framework
CO2:	To enrich knowledge about Windows Forms, Controls and ASP.NET based applications.

<b>CO3:</b>	To gain proficiency in C# by building stand-alone applications in the .NET framework using C#.
<b>CO4:</b>	To build data-driven applications using the .NET Framework, C#, and ADO.NET
<b>CO5:</b>	To acquire skills to create web-based applications and Reports using.net technologies

### **INTRODUCTION TO ASP.NET&C# (PRACTICAL)**

<b>1</b>	To learn fundamentals of. net framework
<b>2</b>	To enrich knowledge about Windows Forms, Controls and ASP.NET based applications.
<b>3</b>	To gain proficiency in C# by building stand-alone applications in the.NET framework using C#.
<b>4</b>	To build data-driven applications using the .NET Framework, C#, and ADO.NET
<b>5</b>	To acquire skills to create web-based applications and reports using.NET technologies

## **B. Sc.Third Year**

Course  
outcome

*On completion of this course, successfully students will be able to learn:*

***Title of the paper***

**MAJOR GROUP A**

### **OPERATING SYSTEM (THEORY)**

<b>CO1:</b>	<ul style="list-style-type: none"> <li>To understand to analyze the structure and basic architectural components involved in OS.</li> </ul>
<b>CO2:</b>	<ul style="list-style-type: none"> <li>To display competence in recognizing and using operating system features.</li> </ul>
<b>CO3:</b>	<ul style="list-style-type: none"> <li>To gain knowledge of implementation of different operating systems aspect.</li> </ul>
<b>CO4:</b>	<ul style="list-style-type: none"> <li>To apply knowledge of different operating system algorithms.</li> </ul>
<b>CO5:</b>	<ul style="list-style-type: none"> <li>To contribute and make enhancements in the features of operating systems.</li> </ul>
<b>CO6:</b>	<ul style="list-style-type: none"> <li>To create own android OS based application (Apps) and implement or install in smart phone.</li> </ul>
<b>CO7:</b>	<ul style="list-style-type: none"> <li>To create new apps for business point of view.</li> </ul>

GROUP A PAPER II (DSE- 1 PAPER 2)

**COMPUTER NETWORKS (THEORY)**

At the end of course the learner will be -

CO1:	To learn the basic taxonomy and terminology of computer networking area.
CO2:	To enrich various concepts of Protocol Hierarchies, Design Issues, Interfaces and Services including Connection Oriented and Connection less Services.
CO3:	To study about OSI Layers, LAN, MAN, WAN Internet and IEEE Standards.
CO4:	To build network topologies and use appropriate network tools
CO5:	To gain skills of implementation of Network Security and Socket Programming

**MINOR/ELECTIVE INTERNET AND ITS APPLICATION (THEORY)**

ON SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS WILL BE ABLE TO:

CO1:	Understand the features and applications of Internet.
CO2:	To trouble shoot day to day problems with internet.
CO3:	to Understand basics of networking and web designing to use internet effectively for official and domestic applications.
CO4:	to structure a web page and its content.
CO5:	to build ecommerce websites.

**INTERNET AND ITS APPLICATION (PRACTICALS)**

ON SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS WILL BE ABLE TO:

CO1:	<ul style="list-style-type: none"><li>• Understand the features and applications of Internet</li></ul>
CO2:	<ul style="list-style-type: none"><li>• To trouble shoot day to day problems with internet</li></ul>
CO3:	<ul style="list-style-type: none"><li>• To Understand basics of networking and web designing to use effectively internet for official and domestic applications</li></ul>



## Course Outcome

### Department of Mathematics and Computer

#### Computer Science

#### B. Sc. First Year

#### MAJOR PAPER 1

#### FIRST PAPER - COMPUTER SYSTEM ARCHITECTURE

#### ON COMPLETION OF THIS COURSE, LEARNERS WILL BE ABLE TO:

CO1:	<ul style="list-style-type: none"><li>Understand the basic structure, operation and characteristics of digital computer.</li></ul>
CO2:	<ul style="list-style-type: none"><li>Be able to design simple combinational digital circuits</li></ul>
CO3:	<ul style="list-style-type: none"><li>based on given parameters.</li></ul>
CO4:	<ul style="list-style-type: none"><li>Familiarity with working of arithmetic and logic unit as well as the concept of pipelining.</li></ul>
CO5:	<ul style="list-style-type: none"><li>Know about hierarchical memory system including cache memories and virtual memory.</li><li>Understand concept and advantages of parallelism, threading, multiprocessors and multicore processors.</li><li>Know the contributions of Indians in the field of computer architecture and related technologies.</li></ul>

#### COMPUTER ARCHITECTURE LAB (PRATICAL)

#### ON COMPLETION OF THIS COURSE, LEARNERS WILL BE ABLE TO:

1	<ul style="list-style-type: none"><li>Realization of the basic logic and universal gates.</li></ul>
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- |   |  |
|---|--|
| 2 | <ul style="list-style-type: none"> <li>• Verify the behavior of logic gates using truth tables.</li> </ul>     |
| 3 | <ul style="list-style-type: none"> <li>• Implement Binary-to-Gray, Gray-to -Binary code conversions</li> </ul> |
| 4 | <ul style="list-style-type: none"> <li>• Design half and full adder circuit using basic gates.</li> </ul>      |

### MAJOR PAPER 2/MINOR/ ELECTIVE

### SECOND PAPER -PROGRAMMING METHODOLOGIES & DATA STRUCTURES

ON COMPLETION OF THIS COURSE, LEARNERS WILL BE ABLE TO:

- |       |  |
|-------|--|
| CO1:  | <ul style="list-style-type: none"> <li>• Develop simple algorithms and flow charts to solve a problem with programming using top down design principles.</li> </ul>  |
| CO 2. | <ul style="list-style-type: none"> <li>• Writing efficient and well-structured computer algorithms/programs.</li> </ul>  |
| CO 3. | <ul style="list-style-type: none"> <li>• Learn to formulate iterative solutions and array processing algorithms for problems.</li> </ul>   |
| CO 4. | <ul style="list-style-type: none"> <li>• Use recursive techniques, pointers and searching methods in programming.</li> </ul>   |
| CO5.  | <ul style="list-style-type: none"> <li>• Will be familiar with fundamental data structures, their implementation; become accustomed to the description of algorithms in both functional and procedural styles</li> </ul> |
| CO6   | <ul style="list-style-type: none"> <li>• Have knowledge of complexity of basic operations like insert, delete, search on these data structures.</li> </ul>   |
| CO7   | <ul style="list-style-type: none"> <li>• Possess ability to choose a data structure to suitably model any data used in computer applications.</li> </ul>   |
| CO8   | <ul style="list-style-type: none"> <li>• Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc.</li> </ul>   |
| CO9   | <ul style="list-style-type: none"> <li>• Assess efficiency tradeoffs among different data structure implementations.</li> </ul>  |
| CO10  | <ul style="list-style-type: none"> <li>• Implement and know the applications of algorithms for searching and sorting etc.</li> </ul>   |
| CO11  | <ul style="list-style-type: none"> <li>• Know the contributions of Indians in the field of programming and data structures.</li> </ul>   |

### OFFICE TOOLS & PROGRAMMING METHODOLOGY LAB

ON COMPLETION OF THIS COURSE, LEARNERS WILL BE ABLE TO:

- |      |   |
|------|---|
| CO1: | <ul style="list-style-type: none"> <li>• Develop simple algorithms and flow charts to solve a problem with programming using top down design principles.</li> </ul> |
| CO2. | <ul style="list-style-type: none"> <li>• Writing efficient and well-structured computer algorithms/programs.</li> </ul>   |
| CO3. | <ul style="list-style-type: none"> <li>• Learn to formulate iterative solutions and array processing algorithms for problems.</li> </ul>                            |
| CO4. | <ul style="list-style-type: none"> <li>• Use recursive techniques, pointers and searching methods in programming.</li> </ul>  |
| CO5. | <ul style="list-style-type: none"> <li>• Possess ability to choose a data structure to suitably model any data used</li> </ul>                                      |

CO6	<p>in computer applications.</p> <ul style="list-style-type: none"> <li>Implementation of algorithms for searching and sorting.</li> </ul>
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## B. Sc. Second Year

Course outcome      ***After completing this course student will be able to:***  
*Title of the paper*

### **MAJOR PAPER 1**

#### **MAJOR-1 COMPUTER NETWORKS & INFORMATION SECURITY**

CO1:	<ul style="list-style-type: none"> <li>Define and describe the components of Data Communications System such as various protocols, OSI Model, data transmission in analog and digital format.</li> </ul>
CO2:	<ul style="list-style-type: none"> <li>Identify and differentiate among the network devices and drivers</li> </ul>
CO3:	<ul style="list-style-type: none"> <li>Learn and describe various error detection and correction methods. Define the various terminologies used in Network and Application layers.</li> </ul>
CO4:	<ul style="list-style-type: none"> <li>Compare the various network technologies and can decide the suitable technology installation as per requirement and environment at any work place.</li> </ul>
CO5:	<ul style="list-style-type: none"> <li>Describe the various protocols and can identify the application areas of each protocol.</li> </ul>
CO6:	<ul style="list-style-type: none"> <li>Know the fundamentals of network and information security issues, laws, and various security technologies which can be applied on work place.</li> </ul>

#### **COMPUTER NETWORK LAB**

**After completing this lab course, students will be able to:**

	<ul style="list-style-type: none"> <li>Learn and identify various cables used in the networking.</li> <li>Learn, identify various connectors used to connect different cables.</li> <li>Use the various tools for preparing the connectors for cables.</li> <li>Configure and manage various local area networks sat home and at work place.</li> </ul>
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### **MAJOR PAPER 2/MINOR/ELECTIVE**

#### **SECOND PAPER -OBJECT ORIENTED PROGRAMMING WITH JAVA**

**After the completion of this course, a successful student will be able to do the following:**

CO1:	<ul style="list-style-type: none"> <li>Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic</li> </ul>
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	building activity.
CO2:	<ul style="list-style-type: none"> <li>Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem.</li> </ul>
CO3:	<ul style="list-style-type: none"> <li>Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.</li> </ul>
CO4:	<ul style="list-style-type: none"> <li>Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development.</li> </ul>
CO5:	<ul style="list-style-type: none"> <li>Identify and describe common abstract user interface components to design GUI in Java using Applet &amp; AWT along with response to events.</li> </ul>
CO6:	<ul style="list-style-type: none"> <li>Identify, Design &amp; Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.</li> </ul>

### JAVA PROGRAMMING LAB

After the completion of this course, a successful student will be able to do the following:

1	<ul style="list-style-type: none"> <li>Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.</li> </ul>
2	<ul style="list-style-type: none"> <li>Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to a specific problem.</li> </ul>
3	<ul style="list-style-type: none"> <li>Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.</li> </ul>
4	<ul style="list-style-type: none"> <li>Demonstrate understanding and use of different exception handling mechanisms and concepts of multi-threading for robust faster and efficient application development.</li> </ul>
5	<ul style="list-style-type: none"> <li>Identify and describe common abstract user interface components to design GUI in Java using Applet &amp; AWT along with response to events.</li> </ul>
6	<ul style="list-style-type: none"> <li>Identify, Design &amp; Develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.</li> </ul>

## B. Sc.Third Year

Course  
outcome

*On completion of this course, successfully students will be able to learn:*

***Title of the paper***

MAJOR GROUP A

### OPERATING SYSTEM

After the completion of this course, a student shall be able to do the following:

CO1:	<ul style="list-style-type: none"> <li>Describe the importance of computer system resources and the role of</li> </ul>
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	operating system in their management policies and algorithms.
CO2:	<ul style="list-style-type: none"> <li>Specify objectives of modern operating systems and describe how operating systems have evolved over time.</li> </ul>
CO3:	<ul style="list-style-type: none"> <li>Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks.</li> </ul>
CO4:	<ul style="list-style-type: none"> <li>Describe the concepts of multithreading and memory management techniques.</li> </ul>
CO5:	<ul style="list-style-type: none"> <li>Identify the best suited memory management technique for any process.</li> </ul>
CO6:	<ul style="list-style-type: none"> <li>Describe various file operations, file allocation methods and disk space management.</li> </ul>
CO7:	<ul style="list-style-type: none"> <li>To understand and identify potential threats to operating systems and the security features design to guard against them.</li> </ul>
CO8:	<ul style="list-style-type: none"> <li>Learn to operate the Linux system, along with its administration and Shell programming.</li> </ul>
CO9:	<ul style="list-style-type: none"> <li>Getting to know the Android OS and its application framework.</li> </ul>

**OPERATING SYSTEM (GROUP A-PAPER I ) (PRACTICAL)**

**After the completion of this course, a student shall be able to do the following:**

- Operate the Linux system, along with its administration and Shell programming.
- Understand and be familiar with the Linux environment.
- Learn and run the various Linux commands.
- Use vi editor for programming.
- Learn and run the shell scripting programs.

**GROUP A PAPER II (DSE- 1 PAPER 2)**

**PROGRAMMING WITH PYTHON**

**After studying this subject, students shall be able to:-**

CO1:	<ul style="list-style-type: none"> <li>Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.</li> </ul>
CO2:	<ul style="list-style-type: none"> <li>Express proficiency in the handling of strings, functions and file handling.</li> </ul>
CO3:	<ul style="list-style-type: none"> <li>Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.</li> </ul>
CO4:	<ul style="list-style-type: none"> <li>Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python with class, modules and packages.</li> </ul>
CO5:	<ul style="list-style-type: none"> <li>Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming.</li> </ul>

**PYTHON PROGRAMMING LAB (GROUP A-PAPER II) (PRACTICAL)**

**After studying this subject, students shall be able to -**

- Understand the python environment and its text editor.
- Code and run the programs.
- Debug the program.
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming.

**MINOR/ELECTIVE DATA ANALYSIS AND VISUALIZATION WITH PYTHON (THEORY)**

**After studying this subject, students shall be able to -**

- CO1:** • Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- CO2:** • Express proficiency in the handling of strings, functions and file handling.
- CO3:** • Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- CO4:** • Develop proficiency in using NumPy for data manipulation.
- CO5:** • Create a variety of data visualizations using Matplotlib.
- CO6:** • Apply NumPy and Matplotlib to analyze and visualize real-world datasets.
- CO7:** • Complete a hands-on project involving data manipulation and visualization.

**DATA ANALYSIS AND VISUALIZATION WITH PYTHON (PRACTICAL)**

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

- CO1:** • Discover how the web works, what makes web sites work.
- CO2:** • Implement simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs.
- CO3:** • Use Server Side Scripting.
- CO4:** • Implement concept of data persistence.
- CO5:** • Apply skills to program logic using PHP and handle data using MySQL.
- CO6:** • Develop dynamic websites using PHP & MySQL.



*Course Outcome*  
Department of Zoology

**B. Sc. First Year**

**MAJOR PAPER 1**

**FIRST PAPER -ANIMAL DIVERSITY: NON-CHORDATA**

<b>CO1:</b>	Learn about the importance of systemic, taxonomy and phylogeny to get a concrete idea of evolution of non-chordate phyla.
<b>CO2:</b>	Understand the various morphological, anatomical structures and functions of animals of different phyla.
<b>CO3:</b>	Get the knowledge about economic, ecological and medical significance of various animals in human welfare.

**MAJOR PAPER 2/MINOR/ ELECTIVE**

**SECOND PAPER -CELL BIOLOGY, REPRODUCTIVE BIOLOGY AND DEVELOPMENTAL BIOLOGY**

<b>CO1:</b>	Develop deeper understanding of what life is and how it functions at cellular level
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<b>CO 2.</b>	Understand the nature and basic concepts of Cell biology, Reproductive and Developmental biology
<b>CO 3.</b>	Understand structure and functions of cell membrane and cellular organelles
<b>CO 4.</b>	Understand the importance of latest reproductive
<b>CO 5.</b>	Understand the general patterns and sequential developmental
<b>CO 6.</b>	Understand about the evolutionary development of various animals.

## **B. Sc. Second Year**

Course outcome      *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

### **MAJOR PAPER 1**

#### **Diversity of chordates and comparative anatomy**

<b>CO1:</b>	1. Understand chordate of animals and their taxonomic position
<b>CO2:</b>	2. Identify the morphological and anatomical features and basis of chordate classification
<b>CO3:</b>	3. Know economic importance and present status that will develop positive attitude towards conservation of; biodiversity.
<b>CO4:</b>	4. Differentiate the organism belonging to different taxa by studying comparative anatomy.
<b>CO5:</b>	5. The project, assignment will give them a flavor of research in studying biodiversity, taxonomy besides improving their writing skills and lay foundation of career in Zoology

### **MAJOR PAPER 2/MINOR/ELECTIVE**

#### **SECOND PAPER -PHYSIOLOGY AND BIOCHEMISTRY**

**By the end of this course students will learn the following aspects of chemistry:**

<b>CO1:</b>	Understand how organs function at different levels i.e. from cellular to system levels.
<b>CO2:</b>	Examine internal harmony of different body systems by learning
<b>CO3:</b>	Understand functions of biomolecules & their role in metabolism by studying biochemistry.
<b>CO4:</b>	Develop a strong foundation for research & employability skills
<b>CO5:</b>	Improve the student's perspective of health biology through deep study of physiology

## B. Sc.Third Year

Course On completion of this course, successfully students will be able to learn:

outcom **Title of the paper**

e MAJOR GROUP A

### MAJOR PAPER I- AQUACULTURE

**CO1:** Identify Aquaculture and its scope in India.

**CO2:** Recognize the different economically important fishes and other culturable fauna.

**CO3:** Identify the details of different steps involved in Aquaculture.

**CO4:** Identify the profitability of the culture and identify the fields of Aquaculture which generate self employment.

### GROUP A PAPER II (DSE- 1 PAPER 2)

#### WILD LIFE CONSERVATION & MANAGEMENT

**At the end of course the learner will be -**

**CO1:** Identify and realize the values of wild animals, forests and the rare, threatened and endangered species of wildlife.

**CO2:** 2. Gain knowledge of conservation of forest and wild animals (Ex situ and In situ)

**CO3:** 3. Identify the role of local and tribal communities in protected areas.

**CO4:** 4. Know the opportunities of employment in the field of wildlife.

**CO5:** 5. Develop an understanding for wise use and management of natural resources

### MINOR/ELECTIVE

#### GENETICS

**After successfully completing this course module students will be able to-**

<b>CO1:</b>	Gain knowledge of basic principles of inheritance and variations, DNA, RNA and their function.
<b>CO2:</b>	Deeper understanding of linkage, Sex determination, Chromosomes, Mutations and mutagens.
<b>CO3:</b>	Gain knowledge of human karyotype, Genome project, Inheritance
<b>CO4:</b>	Demonstrate, gene therapy, PCR, DNA fingerprinting techniques and their application.
<b>CO5:</b>	Find Job Opportunities in Hospitals, Pharmaceutical Companies and other health services, Forensic Science Research Associates, Genetic Counselor, Clinical Research Associate, Animal Breeder, Genetic Laboratory Technician





## Course Outcome

### Department of Microbiology

#### B. SC. I YEAR

##### MAJOR PAPER-I

##### COURSE TITLE- GENERAL MICROBIOLOGY AND CELL STRUCTURE

1. Indian traditional knowledge and historical background of Microbiology.
2. Structure and transmission of Viruses.
3. Cell structure and cell organization of bacteria.
4. Different kinds of unicellular prokaryotic and eukaryotic microorganisms based on specific characteristics.
5. General characteristics of important Eubacteria.

##### MAJOR PAPER-II/ MINOR / ELECTIVE

##### COURSE TITLE- MICROBIAL TECHNIQUES

1. Recall the basic lab glassware to be used in the laboratory.
2. Summarize different methods of sterilization and isolation of pure cultures.
3. Understand the working of different kinds of instruments and microscopes.
4. Apply serial dilution technique to isolate the bacteria.
5. Practice different methods to culture bacteria in the laboratory.
6. Illustrate a method to differentiate between Gram positive and Gram negative bacteria.



**B. SC. II YEAR**

**MAJOR PAPER-I**

**COURSE TITLE-MICROBIAL PHYSIOLOGY AND METABOLISM**

1. Students will learn basic properties of carbohydrate protein and lipid.
2. They will learn about enzymes and its application.
3. They will get knowledge about mathematical expression of growth and factors which affect growth of microbes.
4. Student will get knowledge of bioenergetics.
5. They will learn about utilization of energy.
6. They will get knowledge about Electron Transport Chain.

**MAJOR PAPER-II/ MINOR / ELECTIVE**

**COURSE TITLE-MICROBIAL DIVERSITY AND GROWTH**

1. They will learn about Classification of bacteria into groups, and their salient characteristics.
2. Student will learn about then nutritional requirement of bacteria for growth.
3. They will learn about viruses and viral diseases.
4. Know about diversities in fungi and Algae.

**B. SC. III YEAR**

**MAJOR (GROUP-A) PAPER-I**

**COURSE TITLE-INDUSTRIAL MICROBIOLOGY**

1. Students will learn to work on fermenter, medium formulations and sterilization.

2.	They will learn to formulate strategies of strain improvement of microorganisms for increasing production.
3.	They will explore avenues of Industrial Microbiology.
4.	Appreciation of how microbiology is applied in manufacturing of day to day industrial products like alcohols, organic acids, solvents, antibiotics, paper and textiles.

**MAJOR (GROUP-B) PAPER-II**

**COURSE TITLE-MICROBES AS PATHOGEN**

1.	Student will have acquainted themselves with the terminology and scientific nomenclature used in describing disease causation as pathogenic features of microbial agents of disease.
2.	They will gain in-depth knowledge about the spectrum of diseases caused by bacterial and viral pathogens and an understanding of the course of disease development and accompanying symptoms.
3.	They will acquire knowledge on the causation of fungal and protozoan disease and methods of prevention and control.
4.	They will get an idea about some important plant pathogens and diseases caused by them.

**MINOR / ELECTIVE**

**COURSE TITLE- ENVIRONMENTAL MICROBIOLOGY**

1.	Have knowledge of inter-relationship of microbes and environment.
2.	Get an idea of role on microbes in bioremediation.
3.	Have knowledge of applications of microbes in solving environmental pollution related issues and quality control of water.
4.	Acquire knowledge on vital role of microbes in environmental management through production of sustainable energy and biofuels from waste materials.
5.	Get an idea on working of pollution sensing devices based on biosensors.

**M. SC. (MICROBIOLOGY)**

**M. SC. I SEMESTER**

**COURSE NO. I/ PAPER- I**

**COURSE TITLE- BACTERIOLOGY**

1.	They will learn about bacterial structure.
2.	They will learn about classification of bacteria.
3.	They will learn how to identify bacteria by staining techniques.
4.	They will learn about extremophiles bacteria and its importance.

**COURSE NO. II/ PAPER- II**  
**COURSE TITLE- MYCOLOGY**

1.	They will learn about fungal morphology and physiology along with its taxonomy.
2.	They will learn about life cycle and different life stages of all the fungi.
3.	They will learn about economic importance of fungi.

**COURSE NO. III/ PAPER- III**  
**COURSE TITLE- VIROLOGY**

1.	They will learn about structure and different types of viruses.
2.	They will learn about all viral diseases of plants, animals and human beings.
3.	They will learn about serological techniques and viral vaccines.

**COURSE NO. IV/ PAPER- IV**  
**COURSE TITLE- MICROBIAL BIOCHEMISTRY**

1.	They will learn about all macromolecules like carbohydrates, lipids and proteins.
2.	They will learn about signal transduction and membrane structures.
3.	They will get knowledge of various techniques like chromatography, electrophoresis, spectroscopy along with some advanced techniques like HPLC, SDS PAGE, MASS Spectroscopy, GC MS etc.

**M. SC. II SEMESTER**

**COURSE NO. V/ PAPER- I**  
**COURSE TITLE- MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY**

1.	They will learn about structure of DNA and RNA along with their replication.
2.	They will learn about structure of DNA and RNA along with their replication.
3.	They will learn about mechanism of mutation and mutagens along with types.

4	They will learn about operon system.
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**COURSE NO. VI/ PAPER- II**  
**COURSE TITLE-BIOSTATISTICS & COMPUTER APPLICATION**

1.	They will learn about mean, mode, median and other statistical methodology.
2.	They will learn about t - test, f - test and central tendency for data analysis.
3.	They will learn about computer applications and bioinformatics.

**COURSE NO. VII/ PAPER- III**  
**COURSE TITLE- MICROBIAL GENETICS**

1.	They will learn about gene transfer and genetic mapping.
2.	They will learn about DNA repair system.
3.	They will get knowledge of production of proteins, hormones and design of vaccines.

**COURSE NO. VIII/ PAPER- IV**  
**COURSE TITLE- MICROBIAL PHYSIOLOGY AND METABOLISM**

1.	They will learn about metabolism and physiology of bacteria.
2.	They will learn about growth patterns in bacteria.
3.	They will learn about advantages of bacteria.

**M. SC. III SEMESTER**

**COURSE NO. IX/ PAPER- I**  
**COURSE TITLE- ENVIRONMENTAL MICROBIOLOGY**

1.	They will learn about interaction between microbes and environment.
2.	They will learn about waste water treatment by microbes.
3.	They will learn how to purify water.
4.	They will learn about biological nitrogen fixation.

**COURSE NO. X/ PAPER- II**  
**COURSE TITLE-INDUSTRIAL AND FOOD MICROBIOLOGY**

1.	They will learn about fermentation technology.
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2.	They will learn about production of alcohol, enzymes, antibiotics, vitamins at industrial level.
3.	They will learn about food and dairy microbiology with food borne diseases.

**Course No. XI/ Paper- III**  
**Course title- Medical Microbiology**

1.	They will learn about normal microflora of human beings.
2.	They will learn about various bacterial, viral and fungal diseases.
3.	They will learn about antigens, antibodies and serological techniques.
4.	They will get knowledge of various diagnostic methods and prophylaxis of different diseases.

**COURSE NO. XII/ PAPER- IV**  
**COURSE TITLE- AGRICULTURAL MICROBIOLOGY**

1.	They will learn about bio-fertilizers.
2.	They will learn about all techniques which help in farming, GMO, GMP.
3.	They will get knowledge of various plant diseases and their control measures.

**M. SC. IV SEMESTER (MICROBIOLOGY)**

**COURSE TITLE- DISSERTATION WORK**

1.	They will get experience about research work and their outcomes.
2.	They will get opportunity to work in various reputed research labs for their dissertation work.
3.	During dissertation they came into real scientific approach.
4.	They will learn scientific writing skills for the thesis, research papers etc.





## Course Outcome

### Department of Physics

#### B. Sc. First Year

##### MAJOR PAPER 1

##### FIRST PAPER - THERMODYNAMICS AND STATISTICAL PHYSICS

- |             |  |
|-------------|--|
| <b>CO1:</b> | The course would enable the students to understand the basic Physics of heat and temperature in relation to energy, work, radiation and matter.  |
| <b>CO2:</b> | The students are expected to learn that "how laws of thermodynamics are used in a heat engine to transform heat into work".                      |
| <b>CO3:</b> | This course will also develop an understanding of the various concepts of statistics and the methods to apply them in thermodynamics.            |
| <b>CO4:</b> | Students will understand the importance of studying statistical mechanics with the behavior of particles under classical and quantum conditions. |

##### FIRST PAPER :LAB (PRACTICAL)

- 1 The students would gain practical knowledge about heat and radiation by performing various experiments.
- 2 The students will acquire knowledge about the different forms of distribution of subatomic particles in the system using statistical methods.
- 3 The students will be able to use various thermodynamical instruments in daily life.

##### MAJOR PAPER 2/MINOR/ ELECTIVE

##### SECOND PAPER -MECHANICS AND GENERAL PROPERTIES OF MATTER

- |             |  |
|-------------|--|
| <b>CO1:</b> | The course would empower the students to develop the idea about the behavior of physical bodies. |
|-------------|--|

CO 2.	It will provide the basic concepts related to the motion of all the objects around us in daily life.
CO 3.	The students would be able to build foundation to various applied field in science and technology especially in the field of mechanical engineering.
CO 4.	The students will acquire the knowledge of basic mathematical methods to solve the various problem in physics.
CO 5.	The students will be able the understand the relativistic effect and the relation between energy and mass.

### SECOND PAPER : LAB-2(PRACTICAL)

1.	The students would acquire basic practical knowledge related to mechanics through the experiments.
2.	Students will be familiar with various measurement devices by which they can measure various physical quantities with accuracy.
3.	The students will develop the concept related to the mechanics and properties of matter

## B. Sc. Second Year

Course outcome *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

### MAJOR PAPER 1: WAVES AND OPTICS

CO1:	Develop an understanding of various aspects of harmonic oscillations and waves specially superposition of collinear and perpendicular harmonic oscillations.
CO2:	Explain several phenomena of daily life that can be explained as wave phenomena.
CO3:	Understand various optical phenomena, principles, workings and applications.
CO4:	Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.

### MAJOR PAPER 1: LAB1(PRACTICAL)

1.	Study waves and their superposition using cathode ray oscilloscope.
2.	Explain various optical properties like interference, diffraction and polarization.
3.	Use various optical instruments like telescope, grating, spectrometer, polarimeter etc. in daily life.



**MAJOR PAPER 2/MINOR/ELECTIVE**

**SECOND PAPER -ELECTRICITY MAGNETISM AND ELECTROMAGNETIC THEORY**

After the completion of the course, the student should be able to:

- |             |   |
|-------------|---|
| <b>CO1:</b> | Understand the basic concepts of electricity and magnetism and their applications.  |
| <b>CO2:</b> | Apply various network theorems and their applications in electronics, electrical circuit analysis, and electrical machines. |
| <b>CO3:</b> | Understand the construction and working of ballistic galvanometer and cathode ray oscilloscope.                             |
| <b>CO4:</b> | Understand the concept of electromagnetic waves and their reflection and refraction from a plane surface.                   |

**SECOND PAPER : LAB (PRACTICAL)**

At the end of the program student will gain knowledge of following aspects of chemistry-

- |           |   |
|-----------|---|
| <b>1:</b> | Verify various laws in electricity and magnetism such as Lenz's law, Faraday's law. |
| <b>2:</b> | Understand the construction, working and uses of various measuring instruments.     |
| <b>3:</b> | Verify various network theorems, using simple electric circuits.                    |

**B. Sc.Third Year**

Course  
outcome

*On completion of this course, successfully students will be able to learn:*

***Title of the paper***

**MAJOR GROUP A**

### QUANTUM ATOMIC AND MOLECULAR PHYSICS

To study this course, the student must have had physics as a subject in diploma.

On completion of the course, the students will be able to

CO1:	know the quantum mechanics and its applications
CO2:	explain the atomic structures and X-Rays.
CO3:	analysis the molecular spectra such as electronics,rotational and vibrational.
CO4:	identify the various materials using Raman spectroscopy techniques.

### LAB: PRACTICAL

1:	Develop practical knowledge for the determination of Planck's constant and Rydberg's constant using different methods.
2:	Understand the working of methods used to determine electronic charge and specific charge of electron.
3:	Determine the first excitation potential of gas (argon) by Franck Hertz experiment.
4:	Use of Constant deviation spectrograph, spectrometer and FabryParot Interferometer to determine different physical properties.
5:	Develop understanding for the use of G. M. counter for detection of radioactive source and determination of Stefan's constants.

### MAJOR-2/MINOR/ELECTIVE : SOLID STATE PHYSICS AND ELECTRONICS

CO1:	Understand the structures of solids, space lattices and bonding of atoms in crystals.
CO2:	Develop basic understanding of physical properties of matter such as specific heat, electrical conductivity and lattice vibrations in crystals.
CO3:	Understand the principles related to energy bands in solid-state devices, operation of diodes and their applications.
CO4:	Develop the theoretical understanding on operation of transistor, amplifiers and oscillators and their applications to electronic devices.
CO5:	Understand basic concepts of modulation and demodulation.

### SECOND PAPER - LAB: PRACTICAL

At the end of course the learner will be -

<b>CO1:</b>	Develop the practical knowledge about solid state physics and electronic devices.
<b>CO2:</b>	Draw the characteristic curves of different diodes and transistors.
<b>CO3:</b>	Understand the application of diodes as rectifiers and regulated power supplies.
<b>CO4:</b>	Understand the working principle of amplifiers and oscillators.
<b>CO5:</b>	Understand the concepts of modulation and demodulation.





**Course Outcome**  
**Department of Physics**  
**Electronics**

**B. Sc. First Year**

**MAJOR PAPER 1**

**FIRST PAPER - SEMICONDUCTOR DEVICES**

- |             |  |
|-------------|--|
| <b>CO1:</b> | Describe the behavior of semiconductor materials.  |
| <b>CO2:</b> | Reproduce the I-V characteristics of diode/BJT/MOSFET devices.   |
| <b>CO3:</b> | Apply standard device models to explain/calculate critical internal parameters of semiconductor devices. |
| <b>CO4:</b> | Explain the behavior and characteristics of power devices such as SCR/UJT etc.                           |

**FIRST PAPER : LAB (PRACTICAL) SEMICONDUCTOR DEVICES**

- |          |   |
|----------|---|
| <b>1</b> | Examine the characteristics of basic semiconductor devices.   |
| <b>2</b> | Perform experiments for studying the behavior of semiconductor devices for circuit design applications. |
| <b>3</b> | Calculate various device parameters values from their I-V characteristics.                              |
| <b>4</b> | Interpret the experimental data for better understanding the device behavior.                           |

**MAJOR PAPER 2/MINOR/ ELECTIVE**

**SECOND PAPER - BASIC CIRCUIT THEORY AND NETWORK ANALYSIS**

- |              |   |
|--------------|---|
| <b>CO1:</b>  | Study circuits in a systematic manner suitable for analysis and design.   |
| <b>CO 2.</b> | Understands how to formulate circuit analysis problems in a mathematically tractable way with an emphasis on solving linear systems of equations. |

<b>CO 3.</b>	Analyze the electric circuit using network theorems.
<b>CO 4.</b>	Determine Sinusoidal steady state response.
<b>CO 5.</b>	Understand the two-port network parameters with an ability to find out two-port network parameters & overall response for interconnection of two-port networks.

**SECOND PAPER : LAB-2(PRACTICAL)BASIC CIRCUIT THEORY AND NETWORK ANALYSIS**

1.	Verify the network theorems and operation of typical electrical and electronic circuits.
2.	Choose the appropriate equipment for measuring electrical quantities and verify the same different circuits.
3.	Prepare the technical report on the experiments carried.

**B. Sc. Second Year**

Course outcome      *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

**MAJOR PAPER 1: ELECTRONICS CIRCUITS**

<b>CO1:</b>	Illustrate about rectifiers, transistor and FET amplifiers and its biasing. Also compare the performances of its low frequency models.
<b>CO2:</b>	Describe the frequency response of MOSFET and BJT amplifiers.
<b>CO3:</b>	Explain the concepts of feedback and construct feedback amplifiers and oscillators.
<b>CO4:</b>	Summarizes the Performance parameters of amplifiers with and without feedback.

**MAJOR PAPER 1: LAB1(PRACTICAL)ELECTRONICS CIRCUITS**

1.	Understand and analyze electronic circuit.
2.	Choose the appropriate equipment for measuring electrical quantities and verify the same for different circuits.
3.	Ability to understand and apply circuit theorems and concepts in engineering applications.
4.	Prepare the technical report on the experiment carried.

**MAJOR PAPER 2/MINOR/ELECTIVE**

**SECOND PAPER : OPERATIONAL AMPLIFIERS AND APPLICATION**

After the completion of the course, the student should be able to:

CO1:	Infer the DC and AC Characteristics of operational amplifiers and its effect on output and their compensation techniques.
CO2:	Elucidate and design the linear and non linear application of an op-amp and special application ICs.

**SECOND PAPER : LAB (PRACTICAL) OPERATIONAL AMPLIFIERS AND APPLICATION**

At the end of the program student will gain knowledge of following aspects of chemistry-

1:	Interpret op – amp data sheets.
2:	Analyze and prepare the technical report on the experiments carried out.
3:	Design application oriented circuit using Op-amp and 555 timer ICs.
4:	Create and demonstrate live project using ICs.
5:	Prepare the technical report on the experiments carried.

## B. Sc.Third Year

Course  
outcome

On completion of this course, successfully students will be able to learn:

**Title of the paper**

MAJOR -FIRST PAPER:

**MICROPROCESSORS AND MICROCONTROLLERS**

On completion of the course, the students will be able to

CO1:	Understand the basic block of microcomputers i.e. CPU ,Memory, I/O and architecture of microprocessor's and microcontroller 's
CO2:	Apply knowledge and demonstrate proficiency of designing hardware interfaces for memory and I/O as well as write assembly language program for target microprocessor and microcontroller.
CO3:	Drive specifications of a system based on the requirement of the applications and select the appropriate microprocessor or microcontroller.

**LAB: PRACTICAL**

<b>1:</b>	Beproficient in use of IDE's for designing testing and debugging microprocessor and microcontroller based system.
<b>2:</b>	Interface various I/O device and design and evaluate system that will provide solutions to real world problem.
<b>3:</b>	Prepare the technical report on the experiments carried.

**MAJOR-2: ELECTROMAGNETIC TRANSMISSION LINES AND WAVEGUIDES**

<b>CO1:</b>	Understand the fundamentals of electrostatics and magnetostatics hence get the insight of the characteristics of materials and their interaction with electric and magnetic field.
<b>CO2:</b>	Understand the application of vector differentials and integral operators in electromagnetic theory.
<b>CO3:</b>	Calculate input impedance and reflection coefficient of an arbitrarily terminated transmissions line and can use smith charts to convert these quantities.
<b>CO4:</b>	Explain the phenomenon of transmissions line and its type.
<b>CO5:</b>	Perform calculation for finding out performance parameters of transmissions line like losses SWR.

**MINOR/ELECTIVE : ELECTRONIC COMMUNICATIONS**

After completion of this course,students will be able to

<b>CO1:</b>	design basic digital communication systems to solve a given communication problem and they become conversant with the requirements and the protocols implored in the fundamental component in a communication network.
<b>CO2:</b>	understand simple block forward error correction codes and basic dispersion compensation concept and also the concept of up/down conversion and modulation.
<b>CO3:</b>	determine the suitability of a particular communication system to a given problem.
<b>CO4:</b>	describe the concept of noise in analog and digital communication system in a given problem.

**SECOND PAPER - LAB: PRACTICALELECTRONIC COMMUNICATION**

**At the end of course the learner will be -**

<b>1:</b>	Understand basic element of a communication system.
<b>2:</b>	Analyse the baseband signals in time domain and infrequency domain.
<b>3:</b>	Build understanding of various analog and digital modulation and

demodulation techniques

4: Prepare the technical report on the experiment carried.







**Course Outcome**  
Department of Physics  
**Computer Maintenance**

**B. Sc. First Year**

**MAJOR PAPER 1**

**FIRST PAPER -COMPUTER FUNDAMENTALS AND SYSTEM DIAGNOSTICS**

- |             |  |
|-------------|--|
| <b>CO1:</b> | Understand the fundamentals of computer & system diagnostics.  |
| <b>CO2:</b> | Study and demonstrate the hardware components of computer.   |
| <b>CO3:</b> | Get proficiency in computer configuration activities.  |
| <b>CO4:</b> | Handle computer assembling as per customer requirements. 5. Know about hardware components, diagnostics & replacement. |
| <b>CO5:</b> | Get insight about interfaces & connectors between computers & peripherals.   |
| <b>CO6:</b> | Understand the fundamentals of computer & system diagnostics.  |

**FIRST PAPER :LAB (PRACTICAL)**

1. Demonstrate all the hardware components of computer.
2. Practice of diagnose, repair and maintenance the computer.
3. Practice on power supply, troubleshooting and repairing computer problems.
4. Hands on practice on computer configuration activity.
5. Gain knowledge of computer off-shelf components.

**MAJOR PAPER 2/MINOR/ ELECTIVE**

**SECOND PAPER -SYSTEM ADMINISTRATION**

CO1:	Understand the operating system concepts and commands.
CO 2.	Get knowledge of various operating systems and their modules.
CO 3.	Demonstrate the Windows Operating System, important controls and commands
CO 4.	Practice various commands of DOS.
CO 5.	Demonstrate the Linus operating system commands.

### **SECOND PAPER : LAB-2(PRACTICAL)SYSTEM ADMINISTRATION**

1.	Install various operating systems.
2.	Understand the important operating system controls commands.
3.	Practice Session the Disk operating system (DOS) commands.
4.	Learn various Windows operating system commands.
5.	Practice session the Linux operating system commands

## **B. Sc. Second Year**

Course outcome *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

### **MAJOR PAPER 1: PERIPHERAL MAINTENANCE**

CO1:	Get understand system calls and detailed booting process.
CO2:	Get skills for assembling, repairing of laptop.
CO3:	Deal with problems related to mouse, keyboard, printer.
CO4:	Install a network and repairing of monitor.
CO5:	Get exposure to work with various system tools..

### **MAJOR PAPER 2/MINOR/ELECTIVE**

#### **SECOND PAPER : NETWORK MANAGEMENT**

**After the completion of the course, the student should be able to:**

CO1:	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO2:	Specify and identify deficiencies in existing protocols and then go onto formulate new and better protocols.
CO3:	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.
CO4:	Explain the types of transmission media with real time applications.

<b>CO5:</b>	Obtain fundamentals of network security importance in computer network
<b>SECOND PAPER : LAB (PRACTICAL)NETWORK MAINTENANCE</b>	
<b>At the end of the program student will gain knowledge of following aspects of chemistry-</b>	
<b>1:</b>	Enable students aware about various types of cables used in guided media like coaxial cable, optical fiber cable and twisted pair cables.
<b>2:</b>	Use the packet tracer to simulate various networks.
<b>3:</b>	Describe how routing protocols work.
<b>4:</b>	Decide routing entries given a simple example of network topology.
<b>5:</b>	Know the fundamental of network security issues.

## B. Sc.Third Year

Course outcome      *On completion of this course, successfully students will be able to learn:*  
***Title of the paper***

### **ADVANCED NETWORK MANAGEMENT (GROUP A, PAPER I)**

**On completion of the course, the students will be able to**

<b>CO1:</b>	Gain in depth theoretical and practical knowledge of network management.
<b>CO2:</b>	Demonstrate the understanding of networking hardware and connecting devices.
<b>CO3:</b>	Know various types of wireless networks and their management.
<b>CO4:</b>	Understand the concept of network system, network operating services.
<b>CO5:</b>	Learn network services and network administration.
<b>CO6:</b>	Configure and troubleshoot networking devices.

### **LAB: PRACTICAL**

<b>1:</b>	Gain practical knowledge of network management.
<b>2:</b>	Identify various networking hardware and connecting devices.
<b>3:</b>	Implement various types of wireless networks and their management.

4	Implement and configure network system, network operating services.
5	Administer a network and troubleshoot the network problems.
6	Configure and troubleshoot CISCO routers.

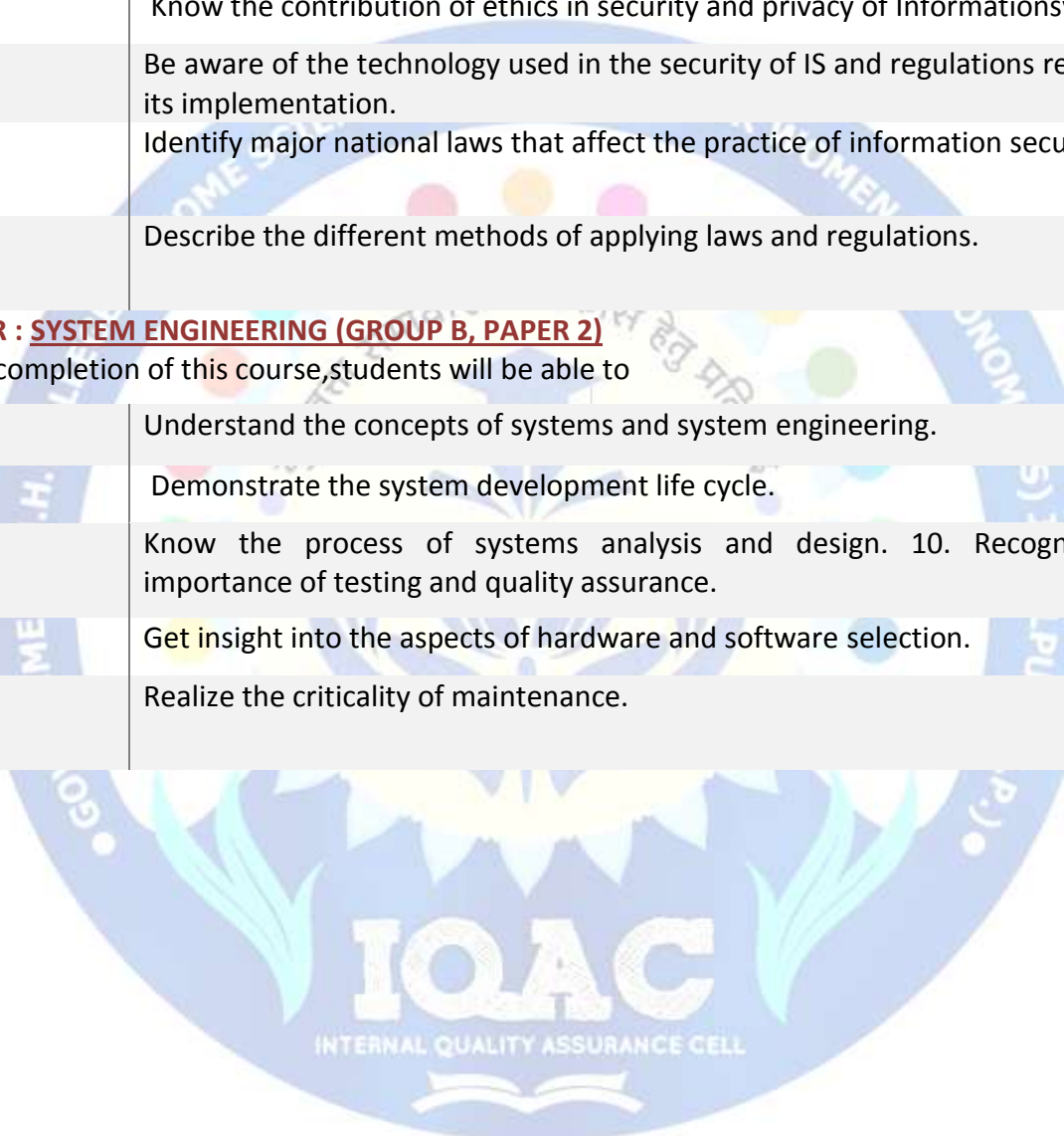
**TITLE : ETHICS IN INFORMATION TECHNOLOGY (GROUP A, PAPER 2)**

CO1:	Understand the basic concepts of ethics.
CO2:	Explain the role of culture as it applies to ethics in information security.
CO3:	Know the contribution of ethics in security and privacy of Information system.
CO4:	Be aware of the technology used in the security of IS and regulations related to its implementation.
CO5:	Identify major national laws that affect the practice of information security.
CO6:	Describe the different methods of applying laws and regulations.

**PAPER : SYSTEM ENGINEERING (GROUP B, PAPER 2)**

After completion of this course, students will be able to

CO1:	Understand the concepts of systems and system engineering.
CO2:	Demonstrate the system development life cycle.
CO3:	Know the process of systems analysis and design. 10. Recognize the importance of testing and quality assurance.
CO4:	Get insight into the aspects of hardware and software selection.
CO5:	Realize the criticality of maintenance.





## *Course Outcome* Department of Botany

### **B. SC. I YEAR**

#### **MAJOR BOTANY PAPER-I**

##### **COURSE TITLE- APPLIED BOTANY**

1. Understood the significance and role of botany
2. Learnt the basic aspects of applied botany
3. Gained knowledge about employment opportunities in the field of botany
4. Gained knowledge about start-up opportunities in the field of botany
5. Learnt about opportunities of social services
6. Gain knowledge about best health practices

### **B. SC. I YEAR**

#### **MAJOR BOTANY PAPER-II/ MINOR BOTANY/ ELECTIVE BOTANY**

##### **COURSE TITLE- BASIC BOTANY**

1. This course will help the student to understand the diversity of plants and evolutionary process in plant kingdoms
2. It gives an account of plant adaptations from aquatic condition to colonize terrestrial habitat
3. The changes in morphological, anatomical and reproductive structures that propel plant evolution can be investigated
4. The economic importance and significance of plants in nature will be understood

5. They will be acquainted with locally prevalent microbial diseases of plants and humans

## **B. SC. I YEAR**

### **VOCATIONAL BOTANY**

#### **COURSE TITLE- ORGANIC FARMING**

1. Prepare media for protected cultivation
2. Demonstrate irrigation and fustigation, green house operations, irrigation and fustigation, care and maintenance of protected structure
3. Demonstrate special horticultural practices in protected cultivation
4. Identify and control of insect-pest and diseases, harvest and postharvest practices

## **B. SC. II YEAR**

### **MAJOR BOTANY PAPER-I**

#### **COURSE TITLE- PLANT ANATOMY AND EMBRYOLOGY**

1. Students will learn the internal structure of plants. It will enhance the basic understanding of organization of plant body by cells and tissues
2. Students will understand the dynamic mechanism of plant pollination, fertilization and development
3. They will have hands on training on section cutting, preparation of slides, study of pollen and ovules

## **B. SC. II YEAR**

### **MAJOR BOTANY PAPER-II/ MINOR BOTANY/ ELECTIVE BOTANY**

#### **COURSE TITLE- INDUSTRIAL BOTANY**

1. This course will provide knowledge on plants and their parts used in various industries.
2. Students will get an idea to establish plant based natural product industry.
3. This course will make the students self-reliant.

**B. SC. II YEAR**

**VOCATIONAL BOTANY**

**COURSE TITLE- PROCESS OF ORGANIC FARMING**

1.	Compare chemical and organic fertilizers.
2.	Know about plant nutrient requirements.
3.	Develop skill for production of organic manures.
4.	Develop skill for production of biofertilizer.
5.	Develop the organic form.

**B. SC. III YEAR**

**MAJOR BOTANY (GROUP-A) PAPER-I**

**COURSE TITLE-PANT PHYSIOLOGY AND METABOLISM**

1.	This course provides learning opportunities in the field of plant physiology, metabolism and biochemical aspects.
2.	It gives knowledge about significance of vegetation for sustaining life on earth by learning interesting physiological functions of plants.
3.	Students can know the valuable contribution of plants for mankind and society with the help of this course.
4.	The practical application of different aspects will be possible for entrepreneurship development

**B. SC. III YEAR**

**MAJOR BOTANY (GROUP-A) PAPER-II**

**COURSE TITLE-ECOLOGY AND FORESTRY**

1.	Observing the forested landscape
2.	Analyzing data
3.	Critiquing
4.	Synthesizing
5.	Communicating
6.	Identification of forest types
7.	Role and importance of forests in human life

**B. SC. III YEAR**

**MINOR BOTANY/ ELECTIVE BOTANY**

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**COURSE TITLE- ETHNOBOTANY**

1.	Understand the importance of plants and their relationship with Human being.
2.	Explain how plants are a part of culture and traditions
3.	How traditional medicine can cure various diseases

**B. SC. III YEAR**

**VOCATIONAL BOTANY**

**COURSE TITLE- APPLIED ORGANIC FARMING**

1.	Analyse the benefits of organic farming.
2.	Apply the knowledge for the production of organic and healthy fruits, vegetables and ornamental plants.
3.	Apply the skill for entrepreneurship, establishing startups and increased employability potential.
4.	Understand market potential of organic farming.

**B. SC. IV YEAR (HONOURS)**

**CORE COURSE-I**

**COURSE TITLE-DIVERSITY OF PLANTS**

1.	Understand the classification and description of plants.
2.	Acquire knowledge about plants and their utilization.
3.	Identify the economic importance of plants.
4.	Recognize basic distribution patterns and structural organization of plants.
5.	Comprehend concepts in the evolution of plants.

**B. SC. IV YEAR (HONOURS)**

**CORE COURSE-II**

**COURSE TITLE-PLANT SYSTEMATICS**

1.	Classify plant systematics and recognize the importance of herbarium and digital herbarium
2.	Evaluate the important herbaria and botanical gardens
3.	Interpret the rules of ICN in botanical nomenclature
4.	Assess terms and concepts related to phylogenetic systematics
5.	Generalize the characters of the families according to Bentham & Hooker's system of classification



**B. SC. IV YEAR (HONOURS)**

**(GROUP-A) DISCIPLINE SPECIFIC ELECTIVE-I**

**COURSE TITLE- ANCIENT INDIAN TRADITIONAL AND VEDIC BOTANY**

1.	Acquire knowledge of botany of ancient India.
2.	Familiarize basic aspects of Vedic botany.
3.	Get employment opportunities in field of medicinal botany and Ayurveda.
4.	Find career opportunities for startup in the field of botany.
5.	Accomplish social services.
6.	Pursue research in the field of naturopathy.
7.	Perform best health practices.

**B. SC. IV YEAR (HONOURS)**

**(GROUP-A) DISCIPLINE SPECIFIC ELECTIVE-II**

**COURSE TITLE- PLANT TISSUE CULTURE AND BIOTECHNOLOGY**

1.	Understand the techniques of biotechnology and tissue culture and its applications.
2.	Learn various aspects of IPR
3.	Have insights into the various biotransformation processes and development of useful strains.
4.	Know recombinant DNA technology and its use in the production of transgenic plants.
5.	Get deep knowledge about cloning vehicles, phages, restriction endonucleases and blotting techniques

**B. SC. IV YEAR (HONOURS)**

**(GROUP-B) DISCIPLINE SPECIFIC ELECTIVE-I**

**COURSE TITLE- MYCOLOGY AND PLANT PATHOLOGY**

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1. Describe the introduction, definition of different terms, and basic concepts of Mycology.
2. Explain the morphology and characters of different groups of fungi
3. Acquire knowledge about the natural benefits and harmful effects of Fungi.
4. Know about organisms and causal factors responsible for
5. Plant diseases comprehend the mechanism of transmission, cause and control measures of the plant diseases.

## **B. SC. IV YEAR (HONOURS)**

### **(GROUP-B) DISCIPLINE SPECIFIC ELECTIVE-II**

#### **COURSE TITLE- INDUSTRIAL MICROBIOLOGY**

1. Familiarize with the scope of industrial microbiology and fermentation technology.
2. Familiarize with industrially important microorganisms and acquire practical knowledge about their applications for human welfare
3. Study about the production of important microbial products such as antibiotics, enzymes, vitamins, SCPs, Bio fertilizers
4. Visualized the latest microbial applications in the production of fermented foods and dairy products.
5. Understand the use of microbes in bioremediation and pesticide development

## **M. SC. I SEMESTER (BOTANY)**

### **COURSE NO. I/ PAPER- I**

#### **COURSE TITLE- BIOLOGY & DIVERSITY OF VIRUSES, BACTERIA AND ALGAE**

1. They will understand the ultra-structure of Bacteria and its biological importance.
2. They will know about the viruses, and its transmission.
3. They will learn and understand the classification of algae into different divisions and the life history of different members.
4. They will know about the association of Algae in different field like Fishries, soil forestry etc.

## **M. SC. I SEMESTER**

### **COURSE NO. II/ PAPER- II**

#### **COURSE TITLE- BIOLOGICAL DIVERSITY OF BRYOPHYTES, PTERIDOPHYTES & GYMNOSPERMS**

1. They will learn and understand the classification of Bryophyta, Pteridophyta and

	Gymnosperms.
2.	They will understand the morphological structure of Bryophytes, Pteridophytes and Gymnosperms.
3.	They will know about the anatomical structure of Bryophytes, Pteridophytes and Gymnosperms.

**M. SC. I SEMESTER (BOTANY)**

**COURSE NO. III/ PAPER- III**

**COURSE TITLE- BASIC ECOLOGY**

1.	They will understand and learn about the ecosystem and their types.
2.	They will understand about the community analysis.
3.	They will learn about the soil structure and their characteristics.
4.	They will understand and know about the global biogeochemical cycles.

**M. SC. I SEMESTER (BOTANY)**

**COURSE NO. IV/ PAPER- IV**

**COURSE TITLE- BIOLOGY AND DIVERSITY OF FUNGI**

1.	They will understand the ultra-structure of Fungi and its biological importance.
2.	They will know about the transmission of fungi.
3.	They will learn and understand the classification of Fungi into different divisions and the life history of different members.
4.	They will know about the diseases caused by fungi.

**M. SC. II SEMESTER (BOTANY)**

**COURSE NO. V/ PAPER- I**

**COURSE TITLE- TAXONOMY OF ANGIOSPERMS**

1.	They will know about the classification and nomenclature of plant and its systematic position.
2.	They can take knowledge of Principles of Biodiversity & its conservation.
3.	They will understand the modern trends in Taxonomy especially numerical taxonomy.
4.	They will understand and learn about the plant used for fuel, fiber, oil and timber etc.
5.	Students gets knowledge about angiosperm families in details. (Comparative studies)

6. They get knowledge about economic and medicinal importance of plants and their products.
7. They will know about the Herbarium and Botanical gardens of India and world.

**M. SC. II SEMESTER (BOTANY)**

**COURSE NO. VI/ PAPER- II**

**COURSE TITLE- RESOURCE UTILIZATION AND CONSERVATION**

1. They will learn about the major biomes of the world.
2. They will know and learn about the biodiversity and threats to quality and quantity of Resources due to overexploitation.
3. They will know and learn about the conservation of resources.
4. They will know and learn about the air, water and soil pollution, ozone layer and ozone hole.
5. They will understand and learn about the remote sensing and its application in ecology.

**M. SC. II SEMESTER (BOTANY)**

**COURSE NO. VII/ PAPER- III**

**COURSE TITLE- BIOCHEMISTRY**

1. The students will be able to impart an insight into the various biochemical studies.
2. They will understand the mechanism of various phyto-chemicals studies in plants.
3. They will know about the different biochemical techniques in lab.
4. These studies are helpful in research work.

**M. SC. II SEMESTER (BOTANY)**

**COURSE NO. VIII/ PAPER- IV**

**COURSE TITLE- BIOSTATISTICS AND COMPUTER APPLICATIONS**

1. They will understand and learn about how biostatistics is useful in different fields.
2. They will understand the different methods of comparison and analysis of data.

3. They understand different techniques of calculation which are useful in research such as ANOVA, chi square and 't' test and how to interpreted their results.
4. They learn about the uses and application of computer, internet and how to use different software.

**M. SC. III SEMESTER (BOTANY)**

**COURSE NO. IX/ PAPER- I**

**COURSE TITLE- PLANT PHYSIOLOGY**

1. The students will be able to impart an insight into the various plant water relations.
2. They will understand the mechanism of various metabolic processes in plants such as photosynthesis & Reparation.
3. They will know about the growth hormones, growth regulators and secondary plant metabolites.

**M. SC. III SEMESTER (BOTANY)**

**COURSE NO. X/ PAPER- II**

**COURSE TITLE- GENETICS & MOLECULAR BIOLOGY**

1. They will learn about genetic material DNA structure various types and cot curve.
2. They will learn about restriction mapping, and in-situ hybridization techniques.
3. They will learn and understand about mechanism and factors which are responsible for mutation.
4. They will learn about DNA damage and repair mechanisms.
5. They will learn about different methods of recombination and its mechanisms.
6. They will understand independent assortment, linkage and crossing over.
7. They will learn about mechanism of DNA replication, and transcription process including splicing.
8. They will learn about translation process and protein synthesis inhibitors.
9. They will learn about gene expression in prokaryotes and eukaryotes.

**M. SC. III SEMESTER (BOTANY)**

**COURSE NO. XI/ PAPER- III**

**COURSE TITLE- PLANT REPRODUCTION AND DEVELOPMENT**

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1. Students will understand the tissue differentiation.
2. They will learn and understand about the structure of root and stem and study in detail about their meristematic tissues.
3. They will understand about the root and shoot apex organization.
4. They will know about the structure of leaves.
5. They will learn about the microsporogenesis, megasporogenesis, endosperm development and Embryo.
6. Students will know about the fertilization, double fertilization, seed germination and seed dormancy.

### **M. SC. III SEMESTER (BOTANY)**

#### **COURSE NO. XII/ PAPER- IV**

#### **COURSE TITLE- BIOTECHNOLOGY**

1. They will know about the scope and history of Biotechnology.
2. Genetic Engineering procedure will be learned by students.
3. They will learn about the culturing of microorganism for production of biomass.
4. Strains are improved procedure and its used in different things will be learned.

### **M. SC. IV SEMESTER (BOTANY)**

#### **COURSE NO. XIII/ PAPER- I**

#### **COURSE TITLE- PLANT CELL TISSUE AND ORGAN CULTURE**

1. They will understand the detailed aspects of invitro culture technique.
2. They will know about the various techniques of tissue culture such as organ culture, somatic embryogenesis and somatic hybridization.
3. They will learn about the scope of plant tissue culture technology.
4. They will understand the process of cryopreservation and germplasm storage.

**M. SC. IV SEMESTER (BOTANY)**

**COURSE NO. XIV/ PAPER- II**

**COURSE TITLE- BIOTECHNOLOGY & GENETIC ENGINEERING**

1.	Students will learn about the concepts of Biotechnology and Genetic Engineering.
2.	Principles and techniques of recombinant DNA technology will be understood by the students.
3.	They will know about the microbial genetic manipulation.
4.	They will learn about protein profiling and its significance.

**M. SC. IV SEMESTER (BOTANY)**

**COURSE NO. XV-A/ PAPER- III**

**COURSE TITLE- ETHNOBOTANY**

1.	They will learn and understand about the ethnobotanical importance of plants.
2.	They will know about the medicinal value of plants and how to cure various diseases.
3.	They will learn about the various tribal group of plants and their mythological value such as taboos and totems in relation to plants, folklore and folktales, wild life protection in tribal plants.
4.	They will know about the role of ethnobotany in the development of society.
5.	They will understand about the presentation of genetic diversity, plants used in various system of medicines such as ayurvedic, Unani, homeopathic and allopathic systems.

**M. SC. IV SEMESTER (BOTANY)**

**COURSE NO. XVI-B/ PAPER- IV**

**COURSE TITLE- PLANT PROTECTION**

1.	Students will understand the basic concept of plant protection.
2.	They will learn and understand about causal organism, symptoms and disease cycles of fungal diseases.
3.	They will know about causal organism, symptoms and disease cycle of bacterial diseases viral diseases, disease caused by mycoplasma, and nematodes.
4.	They will understand and learn about chemical, cultural and biological methods of plant protection.
5.	They will learn about legislative methods of plant protection and plant quarantine.
6.	They will be able to write about the remote sensing and integrated pest management.

**B. SC. I YEAR**

**VOCATIONAL COURSE-PERSONALITY DEVELOPMENT**

1. To learn the process of goal setting and SWOT analysis
2. To understand the importance of time and stress management
3. To Develop core skills for employability
4. To develop effective communications skills
5. To realise the role of technology in personality development

**B. SC. I YEAR (HOME SCIENCE)**

**INTRODUCTION TO EXTENSION AND COMMUNICATION**

1. To acquire knowledge of the need and importance of communication in each field of communication.
2. To develop knowledge skill related to Extension Education and Communication
3. Analyze the need for communication and effective use of media.
4. To understand the importance of extension education and communication
5. To acquire knowledge of various teaching materials and their use.

**B. SC. I YEAR (HOME SCIENCE)**

**LIFE SPAN DEVELOPMENT -I**

1. Life Span Development explores how we change and grow from conception to death in a scientific way. After studying this course , the student will be able to-
2. Identify the different stages of human life span development and their developmental tasks
3. Understand the impact of specific cultural practices family and community in Child's life
4. Understand Child's behaviour and their developmental domains occurring in infancy and Childhood.



**B. SC. II YEAR (HOME SCIENCE)**

**EARLY CHILDHOOD CARE AND CHILDHOOD EDUCATION**

1.	characteristics and developmental task of early and late childhood.
2.	Physical, motor, social, emotional development of early childhood
3.	Importance of play.
4.	Personality development child rearing practices
5.	Significance and objectives of early childhood education

**B. SC. II YEAR (HOME SCIENCE)**

**JOB ORIENTED COURSE :- PRE SCHOOL EDUCATION**

1.	Aims, objectives and history of pre school education
2.	Planning, budget and curriculum of nursery school
3.	Concept formation
4.	Role of National and International agencies
5.	Play materials and types of play and play equipment's

**B. SC. III YEAR (HOME SCIENCE)**

**ADOLESCENT AND ADULTHOOD**

1.	Physical changes in puberty and its effect
2.	Problems of adolescence
3.	Adjustment during adolescence and problem in family
4.	Theories of sex role development
5.	Middle and late adulthood problems and adjustment

**B. SC. III YEAR (HOME SCIENCE)**

**JOB-ORIENTED COURSE:- GUIDANCE AND COUNSELING**

1.	Techniques/method of guidance and counseling.
2.	Role of Parents and teacher in guidance and counseling
3.	Counseling for adolescence, parenthood, marital and old age
4.	Guidance programme for behavioural problem child
5.	Counseling for gifted and mentally retarded children

**B. SC. I YEAR (HOME SCIENCE)**

**EXTENSION EDUCATION**

**INTRODUCTION TO EXTENSION EDUCATION**

1.	Need, objective and principles of home science extension education.
2.	Job opportunities in home science
3.	Classification, scope and use of teaching aids.
4.	Role of national and international agencies in extension.
5.	Women issues.

**B. SC. II YEAR (HOME SCIENCE)**

**EXTENSION EDUCATION**

**RURAL DEVELOPMENT**

1.	Meaning and characteristics of rural leadership
2.	Scope and importance of community development programme.
3.	Role of community organizer in govt and non govt organization.
4.	Planning and evaluation of community development programme.

**B. SC. III YEAR (HOME SCIENCE)**

**EXTENSION EDUCATION**

**COMMUNICATION AND EXTENSION**

1.	Analysis of family as a social unit.
2.	Empowerment of women
3.	Personal growth and personality development
4.	Conflicts and stress – Coping strategies
5.	The role of home science education for personal growth and professional development.

**M. SC. I SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - I**

**HISTORY AND THEORIES OF HUMAN DEVELOPMENT**

1.	Early theories and ethological theories
2.	Psychoanalytic theory neo freudians theories and learning theory.
3.	Cognitive development theory and cross cultural relevance current status.
4.	Social learning and social cognition theories, theories of self
5.	Humanistic psychology, developmental theory.

**M. SC. I SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - II**

**METHODS OF STUDYING HUMAN DEVELOPMENT**

1.	Understand the self methods of study human development observation, Interview questionnaire
2.	Psychometric methods
3.	Understand family as a component of socio-cultural milieu and context
4.	Approaches and theories in family studies family and societal exchange, influences
5.	Contemporary issues and concerns family violence

**M. SC. I SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - II**

**EARLY CHILDHOOD CARE AND EDUCATION**

1.	Principles need and scope of early childhood care and education
2.	Historical Trends (Overview) Contribution of the following thinkers of ECCE pestalozzi, Rousseau Frobel, Maria montessorie, Jhon Dewey, m.k Gandhi, ravindranathtagore.
3.	Programmes of ECCE in india ICCW,IAPE,NCERT,ICDS,UNICEF,NCTE.
4.	Record and report, planning setting goals and objectives of plans.
5.	Activities for ECCE Language, Art and craft, Music mathematics, science, social studies

**M. SC. I SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - IV**

**RESEARCH METHODS AND STATISTICS**

1.	Meaning , objectives and significance of research role of statistics and research in home science discipline
2.	sampling methods types of sampling
3.	Definition and identification of a research problem selection justification and limitation of research problem.
4.	Tabulation of data graphic presentation average of position in individual discrete and continuous series
5.	Hypothesis, concept testing of hypothesis type I and type II errors, non parametric methods

**M. SC. II SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE – I**

**ADVANCED STUDY IN HUMAN DEVELOPMENT**

1.	Principles and concepts of growth and development
2.	Pre natal development genetic environmental factors, Indian practices during pregnancy, Infancy, Birth to 2 years
3.	Transition form infancy to childhood. All round development

- 4 | Late childhood(7-11 years) Physical ,motor, cognitive, moral, language and social development
5. | Adolescence (11-18 years) Transition from childhood to sexual maturity role of family, peers,community and ethnic group health, sexuality, mental health, delinquency, conformity

## **M. SC. II SEMESTER (HUMAN DEVELOPMENT)**

### **PAPER / COURSE - II**

#### **INFANT DEVELOPMENT AND STIMULATION**

1. | New born behaviour capacities early interaction
2. | Language development, developmental assement need and reason for infant assessment intervention and stimulation programmes, activities
3. | Parenting, task of parenting. Being a competent parent individual parenting role. The mothering role the fathering role.
- 4 | Developmental interaction in early childhood years. Family relation and communication, learning social role and interactions with others, meeting children's needs
5. | Techniques of parent education in preschool setting informal meetings, parent library workshop, Individual meeting.

## **M. SC. II SEMESTER (HUMAN DEVELOPMENT)**

### **PAPER / COURSE - III**

#### **ADOLESCENCE AND YOUTH**

1. | Adolescence stage, developmental tasks, theoretical perspectives
2. | Physical and sexual development cognitive development
3. | 3 Identity formation, developmental of self, social and emotional development,family, peer and friendship,conflict with authority.
- 4 | school college work and career education and formal training
5. | Marriage and family relation. Delinquency and disturbance. Juvenile delinquency psychological disturbances

**M. SC. II SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - IV**

**STATISTICS & COMPUTER APPLICATIONS**

1.	Normal distribution, measures of variability.
2.	Quantitative research method, socio metric scale, questionnaire and schedule. Meaning concept and types of co-relation.
3.	Qualitative research, Case study, Interview, observation
4.	Research design-meaning, feature, concept and purpose of research design.
5.	Meaning, nature, types and selection of variables experimental designs. Analysis of variance.

**M. SC. III SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - I**

**ADVANCED STUDY IN HUMAN DEVELOPMENT-I**

1.	Biological and developmental perspectives on youth and adulthood.
2.	Developmental task in middle age
3.	Physical and psychological change in women and in men.
4.	Women's health problems after menopause
5.	Types and management of stress

**M. SC. III SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - II**

**PERSON WITH SPECIAL NEEDS-I (COMPULSORY)**

1.	Various approaches in defining and understanding disability.
2.	Attitudes of people towards disability
3.	Classification of impairment.
4.	Meaning, Identification, Causes, Classification and educational provisions of orthopedic locomotive, visual, hearing, speech impairment.
5.	Problems of hearing and speech impairment

**M. SC. III SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - III**

**PRINCIPLES OF GUIDANCE & COUNSELLING-I (COMPULSORY)**

1.	Need, objectives and principles of guidance and counseling.
2.	Fundamental elements and types of guidance models
3.	Individual, group and family counseling
4.	Counsellor-counselee relationship, skills of a counsellor
5.	Process and techniques of counseling.

**M. SC. III SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - IV**

**MENTAL HEALTH AND PSYCHOPATHOLOGY-I (COMPULSORY)**

1.	Importance of mental health
2.	Stress and adjustment disorders
3.	Behaviour disorder of childhood and adolescence
4.	Psychosocial, psychodynamic, behavioral and cognitive model of psychopathology.
5.	Different types of psychotherapies

**M. SC. IV SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - I**

**ADVANCED STUDY IN HUMAN DEVELOPMENT-II**

1.	Developmental tasks, physical aspect and cognitive abilities of old age.
2.	Grand parenthood- intergenerational relations, types of adjustment in old age.
3.	Atchley's views of retirement and stages of retirement
4.	Mental and behavioural problems in late adulthood
5.	Death and Bereavement.

**M. SC. IV SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - II**

**PERSON WITH SPECIAL NEEDS-II (COMPULSORY)**

1.	Meaning and concept of mental retardation.
2.	Meaning, concept, causes, identification and education provisions of learning disability.
3.	Gifted children- concept, classification identification and educational provisions.
4.	Use of assistive devices
5.	Persons with disability act (PWDAct), vocational and occupational rehabilitation provisions

**M. SC. IV SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - III**

**PRINCIPLES OF GUIDANCE & COUNSELLING-II (COMPULSORY)**

1.	Special areas of counseling- Adolescents, old age and drug abusers.
2.	Counseling for child with behaviour problem, maladjusted, delinquent and mentally retarded child
3.	Need of placement services
4.	Aims, types and method of follow up services
5.	Personal, pre and post marital and family counseling

**M. SC. IV SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - IV**

**MENTAL HEALTH AND PSYCHOPATHOLOGY-II (COMPULSORY)**

1.	Concept and causes of abnormal behavior.
2.	Different types of anxiety disorder
3.	Schizophrenia, Mood disorders and Bipolar disorders, their symptoms and treatment
4.	Somatoform disorder – types and treatment.
5.	Perspective on Prevention- Primary , secondary and tertiary



**M. SC. IV SEMESTER (HUMAN DEVELOPMENT)**

**PAPER / COURSE - IV**

**MASS COMMUNICATION**

1. Concept, element, process and functions of communication
2. Types of communication
3. Print media- origin, development and characteristics
4. Origin, development and characteristics of Radio, Television, folk media.
5. Socio cultural effects of mass media.





**Course Outcome**  
**Department of Clothing & Textile**

**B. SC. I YEAR**

**MAJOR BOTANY PAPER-I COURSE CODE: H1-HSCA2T**

**COURSE TITLE – FUNDAMENTALS OF TEXTILE (PAPER2)-THEORY**

CO 1.	Understands and define the key textile terms.
CO 2.	Describe textile fibres in terms of their production and properties.
CO 3.	Understand production techniques and properties of yarns.
CO 4	Explain various methods of fabric construction and relate them to specific uses
CO 5.	keeping in mind fabric properties.
CO 6	Recall various dyeing, printing and finishing techniques.

**COURSE CODE: H1-HSCA2P**

**COURSE TITLE – FUNDAMENTALS OF TEXTILE (PAPER2)-PRACTICAL**

CO1.	Develop the skills for identification of fibers and fabrics.
CO2	Understands the fabric construction techniques by preparing samples of various types of weaves.
CO3	.Learn the methods of dyeing and printing of fabrics.

**COURSE CODE: H1-HSCA2G**  
**COURSE TITLE – DYEING AND PRINTING -THEORY**  
**COURSE TYPE – ELECTIVE**

<b>CO1</b>	.Describe the basics of dyeing, printing and finishing.
<b>CO2</b>	Examine the knowledge of auxiliaries and chemicals used for dyeing and printing.
<b>CO3</b>	Explain the relation between the dyes, pigments and fabrics.
<b>CO4</b>	Recommend the finishing for textiles.
<b>CO5</b>	Dye and print textiles.
<b>CO6</b>	Reproduce the required shade from batch to batch.

**COURSE CODE: H1-HSCA2R**  
**COURSE TITLE – DYEING AND PRINTING -PRACTICAL**  
**COURSE TYPE – ELECTIVE**

<b>CO1</b>	Knowledge of fabric preparation before dyeing and printing.
<b>CO2</b>	Develop the skills in making blocks, screens and stencils used for fabric printing.
<b>CO3</b>	Develop the skills in doing dyeing and printing of textiles.
<b>CO4</b>	Application of various types of printings on garments and other products.

**B. H. SC. 2<sup>ND</sup> YEAR**  
**COURSE CODE: H2-HSCA2T**

**COURSE TITLE – FUNDAMENTALS OF CLOTHING CONSTRUCTION (PAPER 2)-THEORY**

<b>CO1.</b>	To understand basic sewing concepts and sewing equipment.
<b>CO2.</b>	To develop skill in basic sewing techniques.
<b>CO3.</b>	Identify the common fabrics used for clothing construction.
<b>CO4.</b>	Utilize design components in garment construction.
<b>CO5.</b>	Gain an insight of various sewing machines and other sewing equipment available in the market, their functioning & common problems faced while usage.

CO6 Understands various garment construction process.

**COURSE CODE: H2-HSCA2P**

**COURSE TITLE – FUNDAMENTALS OF CLOTHING CONSTRUCTION (PAPER 2)- PRACTICAL**

CO1. To impart the basic sewing techniques of various components of the garment.

CO2 To understand the basics of garment making.

CO3 Learns to construct articles.

CO4 Develop skill in coordinating fabrics, patterns and supportive materials

**B. H. SC. 3<sup>RD</sup> YEAR**

**COURSE CODE: H3-HSCA2T**

**COURSE TITLE – APPAREL CONSTRUCTION**

**COURSE TYPE – MINOR/ELECTIVE**

CO1 Know the requirements for apparel construction.

CO2. Explain drafting and pattern making method.

CO3. Explore the skills of apparel construction.

CO4. Adapt basic block to different designs.

CO5. Evaluate fitting of the garment.

**B. H. SC. 3<sup>RD</sup> YEAR**

**COURSE CODE: H3-HSCA2P**

**COURSE TITLE – APPAREL CONSTRUCTION**

**COURSE TYPE – MINOR/ELECTIVE**

CO1. Enhance the Understanding of drafting and Pattern making.

CO2. Acquire skills of apparel construction.

CO3. Understand fitting of the garment.

**COURSE CODE: H3-HSCA3D**

**COURSE TITLE – TEXTILE CRAFT SUB GROUP- B (PAPER -1) THEORY**

**COURSE TYPE – DISCIPLINE SPECIFIC ELECTIVE (DSE)**

CO1. List the specific regions of the country having a concentration of artisans

	practicing different types of traditional textile crafts.
CO2.	Explain briefly origin, history, specialty and popularity of various traditional textile crafts.
CO3.	Describe the traditional tools, skills, design and colour used in the different types of traditional textile crafts.
CO4	Discuss the impact of modernization and contemporary status of traditional textile crafts
CO5.	Use the various types of traditional needle crafts, dyeing, painting and printing

**COURSE CODE: H3-HSCA3Q**

**COURSE TITLE – TEXTILE CRAFT SUB GROUP- B (PAPER -1) PRACTICAL**

**COURSE TYPE – DISCIPLINE SPECIFIC ELECTIVE (DSE)**

CO1.	Create an understanding and appreciation of the various traditional Indian textile crafts such as embroideries, dyeing and printing techniques, and woven textiles.
CO2.	Impart knowledge about the places/regions in the country known for different types of textile crafts and also about the traditional skills of the artisans and the tools used by them.
CO3.	Facilitate awareness with respect to the contemporary status of the textile crafts

**COURSE CODE: H3-HSCA4D**

**COURSE TITLE – TEXTILE DESIGN AND ILLUSTRATION SUB GROUP- B (PAPER -2)**

**COURSE TYPE – DISCIPLINE SPECIFIC ELECTIVE (DSE)**

CO1.	Define the principles and elements of design.
CO2.	Applies the principles and elements of design in textiles and fashion design.
CO3.	Design and create visual compositions in fashion illustration.
CO4	Analyze fabrics and their tactile/visual qualities to render them appropriately.
CO5.	Explains fashion apparel construction when illustrating garments.
CO6.	Apply basic traditional media methods to develop creative and customized fashion

**COURSE CODE: H3-HSCA4Q**

**COURSE TITLE – TEXTILE DESIGN AND ILLUSTRATION SUB GROUP- B (PAPER -2) PRACTICAL**

**COURSE TYPE – DISCIPLINE SPECIFIC ELECTIVE (DSE)**

CO1	Apply the principles and elements of design in textiles and fashion design.
CO2	Explore and learn sketching and drawing techniques to represent styles and fabrics in fashion.
CO3	Learns basic traditional media methods to develop creative and customized fashion illustrations.

C04. Design apparels and accessories for men, women and children.

**M.SC.SEMESTER-I**

**PAPER-I**

**TEXTILE CHEMISTRY**

**C01:** Understand the polymers and polymerization process of textile Fibers.

**C02:** Understand the system of molecular arrangement to determine the fibre properties.

**C03:** Understand the processes, chemical properties of cellulosic, Protein, manmade, synthetic fibres.

**C04:** Understand different dye class and applied on various types of historic and modified fibres.

**C05:** Understand the basic, chemical and special finishing.

**C06:** Gain knowledge of modified and special Purpose fibres.

**PRACTICAL: TEXTILE CHEMISTRY**

**C01:** Analyse to fibre properties, dyeing Procedures of natural dyes, quantitative analysis of blends

**PAPER-II**

**FABRIC CONSTRUCTION AND WOVEN FABRIC ANALYSIS**

**C01:** Understand the contemporary and new spinning system.

**C02:** Understand the modern yarn production technology.

**C03:** Understand different weave designs details and know the various fabric structures according to their construction techniques.

**C04:** Understand the Various looms and weaving operations.

**C05:** Understand principles of colour and design in weaving.

**PRACTICAL: FABRIC CONSTRUCTION AND WOVEN FABRIC ANALYSIS**

**C01:** Construct fabrics through different fabric construction techniques.

**C02:** Identify different fabrics according to weave and texture.

**PAPER-III**

**APPAREL DESIGN & ADVANCED APPAREL CONSTRUCTION**

**C01:** Use industry terminology and equipments used for apparel construction techniques in appropriate ways.

**C02:** Understand different apparel making techniques and their implementation as designer.

<b>CO3:</b>	Understand the fitting sessions for best fitted garments.Improve fitting techniques.
<b>CO4:</b>	Understand the buying criteria of different types of fabrics.
<b>CO5:</b>	Identify the components and evaluate quality of apparel.

**PARCTICAL: APPAREL DESIGN AND ADVANCE APPAREL CONSTRUCTION**

<b>1</b>	Construct garment details in modified way.
<b>2.</b>	Construct tailored garments, in correct sequence of operations.

**PAPER-IV**

**RESEARCH METHODS AND STATISTICS**

<b>CO1</b>	Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
<b>CO2.</b>	Have basic knowledge on qualitative research techniques.
<b>CO3.</b>	Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis.
<b>CO4.</b>	Have basic awareness of data analysis-and hypothesis testing procedures.

**SEMESTER-I I**

**PAPER-I**

**TEXTILE TESTING AND QUALITY CONTROL**

<b>CO1:</b>	Apply statistical tools in textile that is able to testing.
<b>CO2:</b>	Test significance of textile testing
<b>CO3:</b>	Sample selection technique for textile testing.
<b>CO4:</b>	Able to perform measurements and evaluation of fibres, yarn and fabric properties.
<b>CO5:</b>	Perform the measurement and evaluation of fabric colour fastness properties.

**PRACTICAL:TEXTILE TESTING AND QUALITY CONTROL**

<b>CO1:</b>	Employ various sampling techniques in textile testing.
<b>CO2:</b>	Test different types of textile fibers using the relevant instrument.
<b>CO3:</b>	Measure yarn count, twist and irregularity using the relevant instrument.
<b>CO4:</b>	Test fabric based on different quality parameters using the relevant instruments.

**CO5:** Test tensile strength of fibers and fabrics using the relevant instrument

**PAPER-II**

**HISTORIC TEXTILES**

**CO1:** Understand the historical development and products achieved in historical perspective.

**CO2:** Analyze different traditional Indian and world embroideries.

**CO3:** Understand the development process of dyeing and printing.

**CO4:** Analyze and identify fabric structure, material content, and method of manufacture of historic textiles for purposes of either conservation work or for descriptive analytical reports;

**CO5:** Interpret the historic context of textiles to a specific intended audience through published papers, exhibitions, and public presentations.

**PAPER-III**

**FASHION DESIGN**

**CO1:** Apply knowledge of design elements and principles.

**CO2:** Understand the application of fashion components in the field of fashion.

**CO3:** Understand the fashion forecasting process for become a fashion designer.

**CO4:** Sketch fashion figure and applying various components of garment details for the purpose of making fashionable or designer garments.

**PRACTICAL: HISTORIC TEXTILES, FASHION DESIGN & FASHION ILLUSTRATION**

**CO1:** Understand the traditional textile designs through process of designing on sheet.

**CO2:** Students will be able to illustrate garment details and developing a line of garment on theme.

**CO3:** Students will be able to develop a library of fashion croquis/templates.

**PAPER-IV**

**STATISTICS & COMPUTER APPLICATIONS**

**CO1** Summarize data visually and numerically.

**CO2:** Understand the statistical techniques and application of computer in the field of subjective research.

**CO3:** Students will execute statistical analyses with professional software.



**SEMESTER-III**

**PAPER-I**

**KNITTING TECHNOLOGY**

<b>CO1:</b>	Demonstrate basic skills in knitting techniques and knitting theory,
<b>CO2:</b>	Describe types, characteristics and structure of knitted products,
<b>CO3:</b>	Understand the Principle of knitting by different types of knitting machines
<b>CO4:</b>	Demonstrate basic skills in knitting techniques by knitting on a hand knitting machine and a circular knitting machine.

**SEMESTER-III**

**PAPER-II**

**HISTORIC COSTUME**

**Course Outcomes:**

*Students will be able to-*

- CO1. Identify costumes and style features of selected historical periods of the Western world from the time of the Egyptians to the 1990s.
- CO2. Understand costume as an expression of the cultures of various historical periods. • Relate historical costume design to contemporary dress.
- CO3. Describe, define, and/or identify clothing forms associated with various ancient civilizations and time periods of selected Western civilizations.
- CO4. Recognize similarities and differences in clothing forms used by selected civilizations and the effect of technological and natural resources on the development of clothing patterns and jewellery.
- CO5. Address historical periods and clothing as they are utilized in creating costume design, and understand the social and artistic movements which shaped the era.
- CO6. Compile research in costume history, placing it in an historical, social and geographical context.
- CO7. analyze and identify fabric structure, material content, and method of manufacture of historic costume and textiles for purposes of either conservation work or for descriptive analytical reports;
- CO8. employ practiced methodologies for the protection and longevity of historic costume and textiles in collections; and interpret the historic context of costume and textiles to a specific intended audience through published papers, exhibitions, and public presentations.

**SEMESTER-III**

**PAPER-III**

**Social and Psychological aspects of Clothing**

**Course Outcomes-**

*Students will be able to-*

- CO1. Understand the development of clothing from original stage to present era.
- CO2. know different personality theories
- CO3. Understand the psychological aspects of clothing with reference to different criteria.

**SEMESTER-III**

**PAPER-IV**

**FASHION COMMUNICATION**

**Course Outcomes-**

Students will be able to-

- CO1. Understand the communication processes
- CO2. give examples of various types of fashion shows and outline the fashion show plan.
- CO3. construct a visual merchandising display with specified criteria.
- CO4. write and present a report about the various types of retail organizations.
- CO5. knowledge of opportunities and problems as regards the communication of clothing and fashion.
- CO6. critically evaluate the fashion design work of others and provide constructive criticism for ongoing work.
- CO7. deconstruct and reconstruct alternative collection developments from existing work.

**SEMESTER- III**

**PRACTICAL- I: DRAPING**

**Course Outcomes-**

Students will be able to -

- CO1. Drape new apparel designs on the dress form within a given time frame.
- CO2. construct tailored garments, in correct sequence of operations.

**SEMESTER- III**

**PRACTICAL- II: TEXTILE DESIGN (STRUCTURE)**

**Course Outcomes-**

Students will be able to:

- CO1. Apply comprehensive textile design skills to design textiles through painting, weaving, screen printing, and demonstrate basic skills in drawing, repeat creation, and color application;
- CO2. Learn about various techniques and process of designing textiles
- CO3. Identify various creative textile techniques.
- CO4. Apply fundamental computer skills to complement traditional design skills and develop original designs using CAD as a tool including basic technical preparation of designs for production.

**SEMESTER-IV**

**PAPER-I**

**DYEING AND PRINTING**

*Course Outcomes:*

Students should be able to:

- CO1. Explain the effect of dyes and chemicals on the properties of textile materials, in both aesthetic and functional terms.
- CO2. Independently carry out different types of dyeing, printing and processing of textile materials.
- CO3. Describe the methods and styles of printing.

**SEMESTER-IV**

**PAPER-II**

**GARMENT PRODUCTION TECHNOLOGY**

**Course Outcomes:**

Students will be able to-

- CO1. Knowledge of garment industry, structure and functioning.
- CO2. Knowledge related to processes before, during and after production.
- CO3. Familiarity with various machines, tools and equipment used in garment industry.
- CO4. Understand various materials and components of garment production.

**SEMESTER-IV**

**PAPER-III**

**Fashion Retailing and Merchandising**

**Course Outcomes:**

Students will be able to-

- CO1. Knowledge of merchandising activities in a retail setup
- CO2. Manage stakeholders involved in retailing
- CO3. Understanding the use and characteristics of various tools of promotion
- CO4. Understanding the concept of store design, store layout and visual merchandising

**SEMESTER-IV**

**PAPER-IV**

**Textile Industry In India**

**Course outcomes-**

Students will be able to-

- CO1. An understanding of the textile supply chain, associated sustainability issues and the effect of industrial revolution on current fashion scenario
- CO2. Understand the National textile policy and foreign trade policy.
- CO3. Understand the textile and clothing industry in relation to various aspects.

**Semester - IV**

**Optional IV Paper**

**Mass Communication**

**Course Outcomes:**

Students will be able to-

- CO1. Evaluate mass communication theories and assess their use.
- CO2. Introduce different types of media their characteristics, merits and demerits
- CO3. Understand news values and qualities of reporters.
- CO4. Introduce students to basics of advertising and its role in society.
- CO5. Understand the scope, functioning of Public relations
- CO6. Understand the complex relationship between communication/media theories and a diverse set of individual, social, and professional practices.

**Semester - IV**

**Optional IV Paper**

## Dissertation

### Course Outcomes:

Student will be able to –

- CO1. Know the practical aspects of, collecting data/ project work
- CO2. Evaluate, select and use appropriate strategies for reduction, analysis and presentation of data collected during research process/ project work
- CO3. Suitably illustrate data/ insights using various graphical and other methods.
- CO4. Prepare a dissertation document/ project report based on research process/ project work done.

## SEMESTER- IV

### PRACTICAL I : Dyeing and Printing

#### Course Outcomes:

Students will be able to-

- CO1. Understand the different styles and methods involved in Dyeing & printing Textiles.
- CO2. Identify the correct method and style for printing Textiles.
- CO3. Recognize the difference between different kinds of prints.
- CO4. To get an overview of printing methods.

## SEMESTER- IV

### PRACTICAL II : PATTERN MAKING & GRADING

#### Course Outcomes:

Students will be able to-

- CO1. Proficiency in pattern making for girls garments
- CO2. Gain ability to use pattern making for creating new girls garments designs
- CO3. Understand different types of paper pattern
- CO4. Competent to lay the pattern on the fabric
- CO5. outline the different pattern adaptation techniques used to fit the different figure shapes and garment sizes.



## Course Outcome

Department of Food and Nutrition

### B. Sc.(Home science) Subject -Food & Nutrition Course Outcome

This programme is designed with an objective to cover all important topics so that students will be able to use this knowledge in advancement of their career.

#### B. Sc. First Year

Course Outcome Title of the Paper	On completion of this Course, successfully students will be able to :
<b><u>Group A – Major Paper - Basic Nutrition</u></b>	
Nutritional components of food .Their interaction to maintain positive health and ward off disease .Nutrients in food ,its chemical nature ,sources metabolism ,requirements, deficiencies.	
<b><u>Group C – Major Paper - Human Physiology</u></b>	
The study of human body at various levels of organization i.e organs and tissue cells .Their structural components & functions .The process of ingestion	

,Digestion, Absorption, Transportation, Respiration, Excretion are studies which involve in the innumerable regulatory activities.

### **B. Sc. Second Year (Home Science )**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>Group A- Major Paper – Biochemistry</u></b>	
Biochemistry is a branch of science which deals with the chemistry of living organism and their biological processes Home science subject this helps the learners to comprehend the chemical composition genetic disease and hereditary outcomes	

### **B. Sc. Third Year (Home Science )**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>First Paper – Normal and Therapeutic Nutrition</u></b>	
The paper enables the learner to modify the normal diet to therapeutic diet in the family cycle and different disease related to diets.	
<b><u>Paper III –Job Orientation (Advance Bakery and Packaging)</u></b>	
Bakery is an expanding professional job oriented course ,which helps the candidate to study the packing material used for bakery products and its importance ,Bakery industry is an important part of the economic & social structure .	

### **B. Sc.(Clinical Nutrition)** **Course Outcome**

This programme is designed with an objective to cover all important topics so that students will be able to use this knowledge in advancement of their career.

**B. Sc. First Year**

Course Outcome Title of the Paper	On completion of this Course, successfully students will be able to :
<b><u>Major Paper I –Introduction to Food</u></b>	
Diet has a powerful complex effect on health. It enables the learner to study the nutrient content of different food groups, different proportions, choice and customize it according to needs.	
<b><u>Major Paper II - Basic Nutrition</u></b>	
Enables the students to study the functions and role of nutrients and their requirements. It will help the learners to calculate energy requirement and the Recommended Dietary Allowances.	

**B. Sc. Second Year**

Course Outcome Title of the Paper	On completion of this Course, successfully students will be able to :
<b><u>Major Paper I – Human Biochemistry</u></b>	
The paper enables the students to learn the importance of Balanced diet, Meal planning at different phases of life. It also teaches the tools of Nutritional assessment, screening and the role of different nutritional agencies for the upliftment of health.	
<b><u>Major Paper II – Human Physiology</u></b>	
This paper will help the students to learn about different organ system ,their function and help to correlate human physiology with various diseases and their pathogenesis.	

**B. Sc. Third Year**

Course Outcome Title of the Paper	On completion of this Course, successfully students will be able to :
<b><u>Paper I – Advance Clinical Nutrition &amp; Dietetics</u></b>	



The paper enables the students to learn the importance of Balanced diet, Meal planning at different phases of life. It also teaches the tools of Nutritional assessment, screening and the role of different nutritional agencies for the upliftment of health.
<b><u>Paper II – Food Microbiology Sanitation &amp; Hygiene</u></b>
Student will learn about the microorganisms in human environment and to understand the importance of Microorganisms in foods technology. The paper

## **M. Sc. Food & Nutrition** **Course Outcome**

This programme is designed with an objective to cover all important topics so that students will be able to use this knowledge in advancement of their career.

### **M. Sc. First Semester**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>Paper I - Applied Physiology</u></b>	
This course offers our insight into the functioning of the different parts of the body. It unfolds the mysteries and design of the human body and makes the learner aware of the sequences of events in the body, subject reveals the pathophysiological conditions.	
<b><u>Paper II – Advanced Nutritional Biochemistry</u></b>	
Nutritional Biochemistry deals with the study of Biochemical structure of nutrients their activities within the cell, and their metabolism as an individual and inter dependent ways the students are made aware of the cause of degenerative diseases, and the effect of medicines its control to overcome the problem.	
<b><u>Paper III – Public Nutrition</u></b>	
The scope of Public Nutrition for learners which provides awareness regarding Nutritional Problems their nature, causes, consequences and	

prevention advocacy and linkage with the population. It also helps in the planning, and implementation of Nutrition Education Programs, for the community focusing on Vulnerable groups.

**Paper IV – Research Methods and Statistics**

The learner is focused on the scientific and systematic steps in Research. The different methods of research have well defined steps which are followed. Research designs with technical writing skills are introduced.

**M. Sc. Second Semester**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>Paper I – Advances in Food Microbiology</u></b>	
Students study the fascinating diversity of microbial life, role and importance of microbes in daily lives emphasizes of microbes in chemical and industrial situations.	
<b><u>Paper II – Applied Biochemistry &amp; Techniques</u></b>	
Applied Biochemistry helps the learner to co-relate the biochemical activities in the living organisms to the cause of the biological processes and clinical diagnosis by various techniques.	
<b><u>Paper III – Nutrition &amp; Health Problems</u></b>	
It covers the concept of nutritional status as a reflection of eating habits, pharmacological and nutritional treatments and resources in the community like communicable and non-communicable disease.	
<b><u>Paper IV – Statistics and Computer Application</u></b>	
It enables the students to use proper methods to collect the data, employ correct analysis and effectively present the result. It helps in critical thinking and analytical skills.	

**M. Sc. Third Semester**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>Paper I – Advanced Nutrition</u></b>	
Nutrition is the prime need for survival. Sustaining physical and mental health. Nutritional needs at various stages of life.	
<b><u>Paper II – Clinical and Therapeutic Nutrition</u></b>	
Therapeutic diet its application and knowledge to plan a diet for patients of various degenerative diseases. It enables the students to learn the concept of Nutritional care adopted by the profession of dietetics.	
<b><u>Paper III – Food Science and Current Trends</u></b>	
It deals and helps the learner to study the facts of chemistry involved in the physical, chemical and biological science of food. The influence of cooking, processing and preservation on the quality of food.	
<b><u>Paper IV – Issues Related To Women’s Health</u></b>	
For the development of the nation the wellbeing of women is important as they constitute half of the population, which includes physical, mental, social, psychological, economical and spiritual health. It enables the learner to study about gender sensitization, schemes and policies, law and rights laid in the constitution.	

**M.Sc. Fourth Semester**

<b>Course Outcome Title of the Paper</b>	<b>On completion of this Course, successfully students will be able to :</b>
<b><u>Paper I – Health &amp; Fitness</u></b>	
Health is primary for all the organisms to exist including human beings. The students learn to make use of non-nutritive and hidden health benefits of food for fighting at various disease and other conditions like sports, bone and dental health.	
<b><u>Paper II – Clinical and Therapeutic Nutrition</u></b>	
Therapeutic diets are planned to maintain and restore good nutrition in patients at various disease states like Diabetes, Heart Disease, Kidney Disease, Ulcers, and Liver Disease.	
<b><u>Paper III – Food Science and Current Trends</u></b>	
It helps the learners to know the quality of food. Nutritional factors and functional foods and its mechanism of action.	
<b><u>Paper IV – Nutrition &amp; Health of Mother Child &amp; Elderly</u></b>	
To enable the students to learn about adequate nutrition during pregnancy this has a greater potential for long term health. Maternal health is complex and is influenced by genetic, social, economic factors. Emphasis in old age which is not a disease but a biological process.	



## *Course Outcome*

### Department of Resource Management

**B.Sc I Year.**

**Course Code:H1-HSCB2T**

**Course Title- Family Resource Management**

**Course type- Core Course**

**Course Outcome :-**Understanding of Management process, decision making, resources, values and goal setting is very essential for happy and healthy family and society. This course would empower the students to develop a clear vision about Resource Management. The student will acquire the knowledge of-

1. The concept of Family Resource Management.
2. The process of management in the scientific manner for the use of resources.
3. Imbibing nuances of Human Values and standards in successful management and decision making.
4. Effective management of time, energy, money and Work simplification.

**Course Code:H1-HSCC1G**

**Course Title- Housekeeping & Hospitality Management**

**Course type- Elective**

**Course Outcome :-**This course will be able to give an idea about the need of maintenance and cleaning facilities required in any hospitality related organization. This course will

empower the student in the field of Housekeeping and hospitality management. The student will be able to-

1. Understand the techniques and operational procedure related to the maintenance and cleaning of any organization.
2. Developing professional competencies and practices to prepare for working successfully in hospitality.
3. Appreciate the need for maintenance of facilities and services in housekeeping and hospitality management.

**Course Code:V1-DRA-HNDT**

**Course Title- Handicraft**

**Course type- Vocational**

**Course Outcome:-**After studying this course the student will be able to:-

1. Get acquainted with craft traditions of India and Get practical Knowledge.
2. Describe various craft materials.
3. Understand different craft process and techniques.
4. Design new products for craft revival and income generation.
5. Contribute towards restoring lost cultural handicrafts of Madhya Pradesh.
6. To develop a sense of personal identity and self esteem through practical achievement in the expressive, communicative and functional modes of crafts.

## **B.Sc. II Year**

- CO1. Understand the concept of Decoration.
- CO2. Understand the elements of Art , principle of designs and their application in Interior decoration.
- CO3. Understand the application of Colours.
- CO4. Understand the basic of Housing, House plans ,their principles and building byelaws.
- CO5. Allocation of space for different activities of home and their furnishing.
- CO6. Get basic of Planning of Landscaping

**B Sc II Job Oriented \_Soft Furnishing**

- CO1. Understand basic of soft furnishing .
- CO2. Get basic Knowledge of Sewing tools and Machine.
- CO3. Making of different types of Cushion, Curtain , covers, lamps and Screens

B. Sc III Yr.

- CO4. Evaluate the characteristics and performance of Base and Furnishing materials of Household Equipment.
- CO5. Basic of different household equipment.
- CO6. Understand the classification of Furniture and Furniture Finishes.
- CO7. Understand the Lighting,Fixtures application in Inteior.

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**B. Sc. III Yr. Job Orientation-Interior Decoration**

- CO1. Basics of Interior .
- CO2. Different types and material of Flower Arrangement.
- CO3. Use and types of Accessories

**MSc.I Sem Paper-I**

**THEORY OF MANAGEMENT**

Student after complete their master degree they are able to

- CO1. understand the significance of management in the micro and macro level organization.
- CO2. know the conceptual, human and scientific aspects of management functions.
- CO3. Develop the ability to evaluate the management efficiency and

effectiveness in the family and other organizations.

- CO4. Enhance the understanding of the similarities among all areas of management education and research, the dissemination of the professional knowledge, skills and attitudes.
- CO5. They can manage special Resource
- CO6. They can manage Different Events.

## **SEMESTER- I**

### **PAPER-II**

#### **ENVIRONMENT MANAGEMENT**

- CO1. To be aware of the holistic ecological approaches to environment.
- CO2. To be aware of the environmental problem, hazards and risks.
- CO3. To understand the aspects of environmental pollution and waste management.
- CO4. To be aware of the environmental policies, movements and ethics.
- CO5. They become a responsible citizen and play their better role in Environment Management.

## **SEMESTER- I**

### **PAPER-III**

#### **LANDSCAPING**

- CO1. To Study and to understand the landscape designing and its appropriate application.
- CO2. To get familiar with the various materials related to landscaping.

## **1ST SEMESTER**

### **PAPER -IV**

#### **RESEARCH METHODS AND STATISTIC**



- CO1. To understand the significance of statistics and research **methodology** in Home Science research.
- CO2. To understand stand the types tools, methods of research **and develop the** ability to construct data gathering instrument appropriate to the **research** design.
- CO3. To understand and apply the appropriate statistical technique for **the** measurement and design.

## IIND SEMESTER

### PAPER- I

#### HOUSING FOR FAMILY LIVING

- CO1. To enable the students to
- CO2. Recognize the role of housing for national development
- CO3. Be aware of the housing, problems in India and the measures for alleviating the problems.
- CO4. Understand and apply the principles of design in housing.
- CO5. Understand the New Materials and Technology used in housing.

## M.Sc. - IIND SEMESTER

### PAPER –II CONSUMER IN THE MARKET

- CO1. To familiarize the students with the changing economic environment and therising consumerism.
- CO2. To enhance the understanding of the marketing system and the marketing strategies.
- CO3. To have an overview of the consumer behavior and the consumer
- CO4. movement
- CO5. To help then to become wise consumers for judicial use of resources in the "present market systems and environment.

**M.Sc. - IIND SEMESTER**

**PAPER- III- CONSUMER EDUCATION**

- CO1. To sensitise the student with the need for consumer education.
- CO2. To develop and understanding of market environment and business strategies.
- CO3.
- CO4. To strengthen the consumer knowledge and to equip them to face challenge in the market situation.

**M.Sc. - IIND SEMESTER**

**PAPER- IV STATISTICS&COMPUTER APPLICATION**

- CO1. To understand the role of statistics and computer applications in research.
- CO2. To apply statistical techniques to research data for analyzing and interpreting data meaningfully.

**M.Sc. - IIIIRD SEMESTER**

**PAPER-I ENTREPRENEURSHIP MANAGEMENT**

To provide conceptual in outs regarding entrepreneurship management.

- CO1. To sensitive and motivate the students towards entrepreneurship
- CO2. Management.
- CO3. To Orient and impact knowledge towards identify and implementing entrepreneur-ship opportunities.
- CO4. To develop management skill for entrepreneurship management.

**M.Sc. - III<sup>RD</sup> SEMESTER**

**PAPER- II HOSPITALITYADMINISTRATION**

- CO1. To orient the students with the functions of front office department in the hospitality industry.
- CO2. To acquaint the students with the housekeeping department and its
- CO3. Administration.
- CO4. To enable the students to manage resources in the housekeeping department of fulfill the hospitality function.

**M.Sc. - III<sup>RD</sup> SEMESTER**

**PAPER- IIIADVERTISING AND MARKETING**

- CO1. To become aware of different market organization in our Economy.
- CO2. To understand the different marketing-functions and thedistribution system in our economy.
- CO3. The familliarics with the marketing strategies and market research
- CO4. To understand the role of advertising in sales promotion.

**M.Sc. - III SEMESTER**

**PAPER- IV**

**SCIENTIFIC WRITING & COMMUNICATION TECHNOLOGY**

- CO1. To be able to appreciate and understand importance of writing
- CO2. Scientifically
- CO3. o develops competence in writing and abstracting skills.
- CO4. To write either a draft research proposal or a chapter of dissertation

**SCIENTIFIC WRITING & COMMUNICATION TECHNOLOGY**

**PRACTICAL:**

- To develop underlining regarding the vital aspects of communication and Behaviors Audio and Visual Media and their use.
- The develop understanding regarding the new communication technologies and their use.
- To develop skills in developing using different c communication technology for various presentations.

**M.Sc.–IV TH SEMESTER**

**PAPER- I FINANCIAL MANAGEMENT**

- CO1. To become aware of socio economic environment of the families
- CO2. To understand some of the problems and objectives involved in accumulation, control and use of saving.
- CO3. To understand cost of living studies and price index.

- CO4. To become aware of the aspects of Financial management
- CO5. To become familiar with the techniques of financial management.

**M.Sc.–IV TH SEMESTER**

**PAPER- II RESIDENTIAL SPACE DESIGN**

- CO1. To understand the factors influencing space design organization for optimum comfort and functionalism.
- CO2. To provide adequate facility for work, relaxation rest, comfort, privacy, care, esthetes etc. through interior space designing.
- CO3. . To study the fittings and fixtures used in residential interiors
- CO4. To develop skills of drawing the working details.

**M.Sc. – IV SEMESTER**

**PAPER III CONSUMER ECONOMICS**

- CO1. To familiarize the students with the changing economic environment and the rising consumerism.
- CO2. To develop an understanding of the marketing system and marketing strategies keeping in view of consumers.
- CO3. To know the techniques of consumer decision making and the aids for wise decision making.

**M.Sc. – IV TH SEMESTER**

**PAPER- IV (OPTIONAL)**

**CONSUMER INFORMATION AND REDRESSAL**

- CO1. To equip and impart knowledge on consumer related facts and issues.
- CO2. To provide an understanding of the significance of consumer information.
- CO3. To develop and acquire skills in consumerism and utilizing the provisions in Redressal mechanism.

**MSc. (Home Science)**  
**H.D./F.N./C&T/R.M./Ext.Edu.**  
**Semester - IV**  
**Optional IV Paper**  
**Mass Communication**

- CO1. To understand the importance of communication.
- CO2. To develop skill for communication ability.
- CO3. Importance of audio visual aids in communication.



## Course Outcome

### Department of Language

#### B. Sc. First Year

#### **B.SC./BHSC I YEAR**

#### **F.C. GROUP-I PAPER-I**

#### **हिन्दी भाषा और नैतिक मूल्य**

<b>CO1:</b>	उत्कृष्ट साहित्यिक पाठों के अध्ययन से रुचि का विकास करना।
<b>CO2:</b>	सांस्कृतिक चेतना और राष्ट्रीय भावना का विकास करना।
<b>CO3:</b>	भाषा-ज्ञान
<b>CO4:</b>	सामान्य शब्दावली और विशेष शब्दावली के अध्ययन द्वारा भाषा एवं संस्कृति बोध का विकास करना।
<b>CO5:</b>	विशिष्ट शब्दावली (बीज शब्द/की वर्ड) से परिचित करवाते हुये बोध के स्तर को विकसित करना।
<b>CO6:</b>	प्रतियोगी परीक्षाओं हेतु तैयार करना।

#### **B.SC./BHSC II YEAR**

#### **F.C. GROUP-I PAPER-I**

#### **हिन्दी भाषा और नैतिक मूल्य**

<b>CO1:</b>	भारतीय ज्ञान परंपरा से विद्यार्थियों को अवगत एवं लाभांवित करना।
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CO 2.	उत्कृष्ट साहित्यिक पाठों के अध्ययन से रुचि का विकास करना।
CO 3.	सांस्कृतिक चेतना और राष्ट्रीय भावना का विकास करना।
CO 4.	भाषा-ज्ञान
CO 5.	सामान्य शब्दावली और विशेष शब्दावली के अध्ययन द्वारा भाषा एवं संस्कृति बोध का विकास करना।
CO 6.	विशिष्ट शब्दावली (बीज शब्द/की वर्ड) से परिचित करवाते हुये बोध के स्तर को विकसित करना।

## B.SC./BHSC III YEAR

### F.C. GROUP-I PAPER-I

#### हिन्दी भाषा और नैतिक मूल्य

CO1:	इस पाठ्यक्रम के अध्ययन से विद्यार्थी हिन्दी के प्रसिद्ध रचनाकार एवं उनकी रचनाओं से परिचित हो सकेंगे।
CO2:	पठित रचनाओं के माध्यम से विद्यार्थी देश की सभ्यता एवं संस्कृति से परिचित हो सकेंगे।
CO3:	पाठ्यक्रम के अध्ययन से विद्यार्थियों के व्यक्तित्व का बहुमुखी विकास होगा एवं रोजगार के अवसर उपलब्ध होंगे।
CO4:	विशिष्ट शब्दावली (बीज शब्द/की वर्ड) से परिचित करवाते हुये बोध के स्तर को विकसित करना।

## B.SC./BHSC I YEAR

### F.C. GROUP –I PAPER-II

#### ENGLISH LANGUAGE

CO1:	Prepare for various competitive exams by developing their English language competence.
CO2:	Promote their comprehension skills by being exposed to a variety of texts and their interpretations.
CO3:	Build and enhance their vocabulary.
CO4:	Develop their communication skills by strengthening grammar and usages.
CO5:	Inculcate values which make them aware of national heritage and environmental issues, making them responsible citizens
CO6:	

## B.SC./BHSC II YEAR



## F.C. GROUP –I PAPER-II

### ENGLISH LANGUAGE

CO1:	Strengthen their grammar and vocabulary.
CO2:	Acquire and develop LSRW (Listening, Speaking, Reading and Writing) skills.
CO3:	Learn to think creatively and critically.
CO4:	After the completion of the course, students are expected to gain competency and proficiency in English language to perform at examinations at State and National level.

## B.SC./BHSC III YEAR

### F.C. GROUP –I PAPER-II

#### ENGLISH LANGUAGE

CO1:	Prepare for various competitive exams by developing their English language competence.
CO2:	Promote their comprehension skills by being exposed to a variety of texts and their interpretations.
CO3:	Build and enhance their language competence through regular Practice.
CO4:	Develop their knowledge of English Grammar and usages in a practical manner.
CO5:	Compete in national and state level examinations for various competitions after the completion of the course.
CO6:	Seek a good job and to settle down in self employment or their own business of profession.

## B.Sc./BHSC I Year

F.C. Group –II Paper-I

**Environmental Education**

<b>CO1:</b>	<b>To understand various aspects of life forms, ecological processes, and the impacts on them by the human during Anthropocene era.</b>
<b>CO2:</b>	To build capabilities to identify relevant environmental issues, analyze the various underlying causes, evaluate the practices and policies, and develop framework to make inform decisions.
<b>CO3:</b>	To develop empathy for all life forms, awareness, and responsibility towards environmental protection and nature preservation.
<b>CO4:</b>	To develop the critical thinking for shaping strategies such as; scientific, social, economic, administrative & legal, environmental protection, conservation of biodiversity, environmental equity and sustainable development.
<b>CO5:</b>	To prepare for the competitive exams

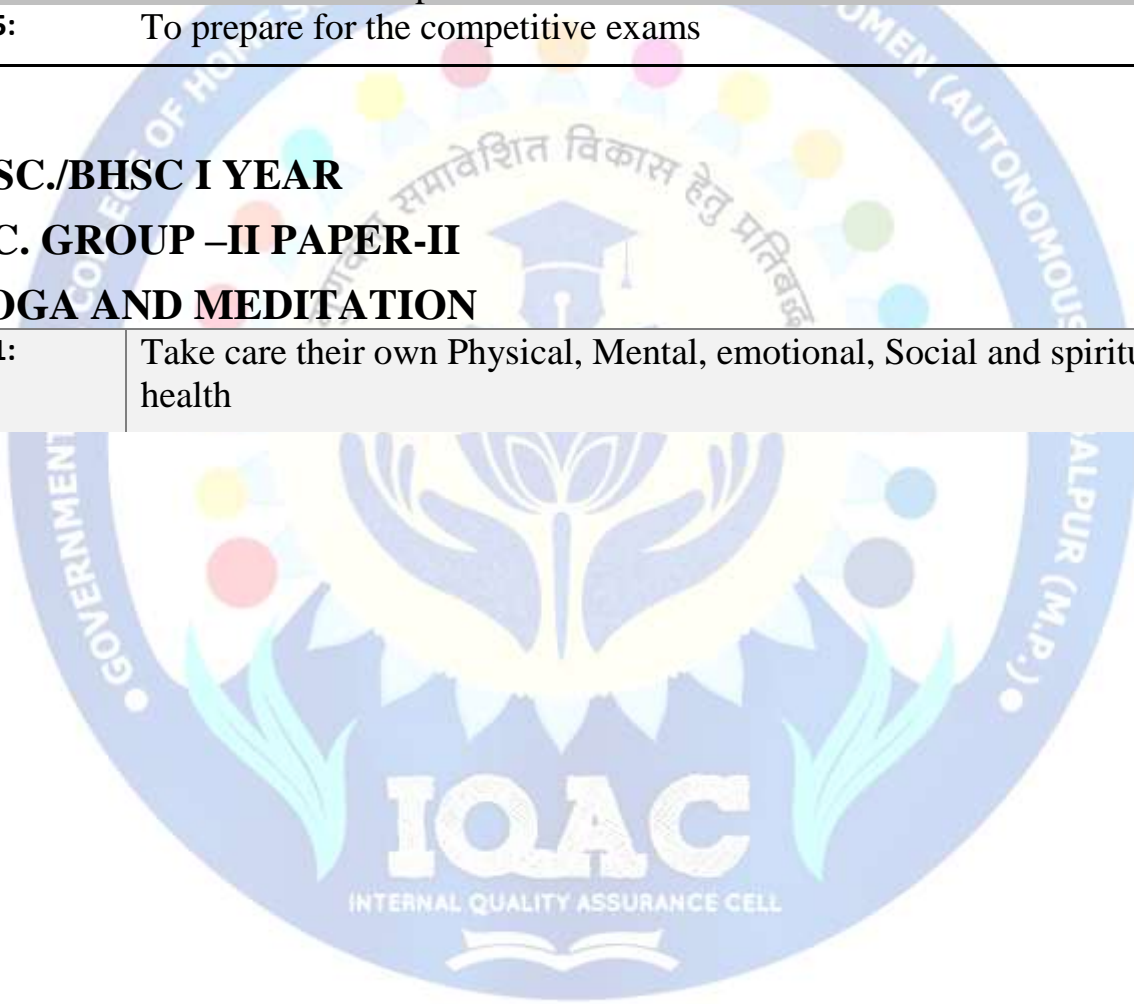
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**B.SC./BHSC I YEAR**

**F.C. GROUP –II PAPER-II**

**YOGA AND MEDITATION**

<b>CO1:</b>	Take care their own Physical, Mental, emotional, Social and spiritual health
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B.Sc./BHSC II Year

F.C. Group –II Paper-I

### Entrepreneurship Development

**CO1: Entrepreneurship Development is the third paper of Foundation Course for II<sup>st</sup> year which is to the business knowledge.**

**CO2:** This course introduces the students to the basics of entrepreneurship and small business management. Students gain an understanding of how to establish and manage a small business.

**CO3:** Helps in building the skills, framework and knowledge of entrepreneurship and new venture creation.

**CO4:** Helps the students in understand the importance of the planning process and learn how to develop, write and present an effective business plans for a new venture.

### B.SC./BHSC II YEAR

### F.C. GROUP –II PAPER-II

### WOMEN EMPOWERMENT

**CO1:** Understand the history

**CO2:** Will be able to understand the constitutional provisions

**CO3:** Get knowledge of various issues

**CO4:** Present study related to women empowerment will provide employment opportunities to the students in government

B.Sc./BHSC III Year

F.C. Group –II Paper-I

### Digital Awareness & Cyber Security

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**CO1:** Make optimum use of web browsers, search engines and Chatbots

**CO2:** Creating e-mail account, sending, receiving and managing emails.

**CO3:** Describe reporting procedure of phishing emails.

**CO4:** Identify email phishing attack and preventive measures.

**CO5:** Configure security settings in Mobile Wallets and UPIs.

**CO6:** Practice safe, legal and ethical means of using Information Technology.

**CO7:** Practice and use the various online financial and government services of day-to-day use.

**CO8:** Understand the basic concepts related to E-Commerce and digital payments.

**CO9:** Discuss cyber security aspects, RBI guidelines and preventive measures against digital payment frauds.

**CO10:** Explore and learn the online available courses of his/her interest.

**CO11:** Use the Digilocker and Academic Bank of Credit.

**CO12:** Describe the concept of Cyber security and issues and challenges associated with it. .

**CO13:** Explain the process of reporting cyber crime at Cyber crime Police Station/ at online platform.

**CO14:** Appreciate various privacy and security concerns on online Social media.

**CO15:** Guide through the reporting procedure of inappropriate content.

**CO16:** Perform privacy and security settings for popular Social media platforms

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### B.SC./BHSC I YEAR

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## VOCATIONAL COURSE

### TOURISM, TRANSPORT AND TRAVEL SERVICES

CO1:	Understand the core concept of tourism, travel and transport service.
CO2:	Practically perform passport and visa formalities.
CO3:	Manage airport ground handling.
CO4:	Independently escort the tourist group and guide these group and individual tour also.
CO5:	Understand and practically know the procedure and functioning of travel agency

## B.SC./BHSC II YEAR

### VOCATIONAL COURSE

#### TOURISM PRODUCT AND RESOURCES

CO1:	The ability to understand concepts of tourism products and resources, and classifications.
CO2:	The ability to explain the process of architectural glory of India.
CO3:	The ability to comprehend the cultural diversity of India and its significance in the country's tourism.
CO4:	The ability to understand the performing arts of India with their base and development.
CO5:	The ability to elaborate on Indian paintings and understanding of the live heritage of India
CO6:	The ability to explain the natural attractions of India

## B.SC./BHSC III YEAR

### VOCATIONAL COURSE

## TOUR GUIDING AND INTERPRETATION

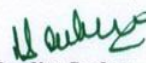
CO1:	Understand the concept, history and responsibility of tourguides.
CO2:	Know the importance of effective communication skills for a tour guide.
CO3:	Have the conceptual understanding of visitor interpretation and nature interpretation.
CO4:	Have knowledge of emergencies to be handled and skills required by guides to deal with emergencies.

## B.SC./BHSC III YEAR

## VOCATIONAL COURSE

## WEB DEIGNING TECHNIQUES

CO1:	Create different types of design formats.
CO2:	Using different fonts, grids and layouts for Creating Designs in Canva.
CO3:	Build Single Page Applications using AngularJS
CO4:	Integrate forms with AngularJS
CO5:	Organize code using modules and Configuring routes
CO6:	Define business logic using controllers
CO7:	Provide new behaviors to HTML using AngularJS directives
CO8:	Extend AngularJS with custom directives, filters and services
CO9:	Enhance the UI using animations and Bootstrap



Dr. Nandita Sarkar  
PRINCIPAL

Govt. M.H. College of Home Science and Science for Women, Jabalpur (M.P.)

