SCIENCE FACULTIES

PROGRAM OUTCOME

Program (B. Sc.) Outcomes

- Knowledge: Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- Programming Skills: Serve as the Programmers or the Software Engineers with the sound knowledge of practical and theoretical concepts for developing software.
- Instrumentation: Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments.
- Ability to design, implement and evaluate computer-based system, process, component.
- Capability to design and conduct experiments, as well as analyze and interpret data
- Examine the impact of electronic solutions in global and environmental contexts and utilize the knowledge for sustained development.
- Ability to use and apply the techniques & skills in modern engineering practice.
- It helps to develop scientific temper and thus can prove to be more beneficial for the society as the scientific developments can make a nation or society to grow at a rapid pace.
- After the completion of this course students have the option to go for higher studies i.e. M. Sc and then do some research for the welfare of mankind.
- After higher studies students can join as scientist and can even look for professional joboriented courses.
- Ability to perform various experiments, handle laboratory instruments and use the knowledge for further studies.
- Ability to understand the experiments, design new methods, good working hand, observing skills , analyzing and interpreting the data.
- This helps to develop research interests, industrial approach and helps them to get motivated for higher studies.

PROGRAM SPECIFIC OUTCOME

Program (B. Sc.) Specific Outcomes

- The benefits of participating in this degree program include becoming qualified for rewarding careers working with electronics, mechanical systems, and all related systems.
- Graduates also enjoy the attention of qualified instructors, hands-on opportunities to put their developing skills to use, and exposure to the most current theories and practices used in the industry.
- After graduation, individuals can expect to find career opportunities in the automotive industry, the world of computers, and more specific fields such as digital signal processing, optoelectronics, and mobile electronics.
- This course also offers opportunities for serving in Indian Army, Indian Navy, Indian Air Force as officers.
- Students after this course have the option to join Indian Civil Services as IAS, IFS etc.
- Science graduates can go to serve in industries or may opt for establishing their own industrial unit.
- After the completion of the B. Sc. degree there are various other options available for the science students.

- Apart from the research jobs, students can also work or get jobs in Marketing, Business & Other technical fields.
- Science graduates also recruited in the bank sector to work as customer service executives.
- Students can also find employment in government sectors.
- Students are also eligible to work in institutions like BARC, DRDO,ONGC, IISC, IICT and civil services.

COURSE OUTCOME

DEPARTMENT OF ZOOLOGY

Sem - I

Paper: I - Nonchordate - Protozoa to Annelida (Core Paper - I)

Objective: Broad understanding of animal diversity including scientific classification and evolutionary relationships.

Desired Outcome: Understanding of complexity in animal structure develops from lower invertebrates to higher invertebrates.

Paper: II - Cell biology(Core Paper - II)

Objective: Broad understanding of cell structure and function.

Desired Outcome: Learners will understand the basics of structure and functioning of cell.

Sem - II

Paper : I - Nonchordate - Arthopoda to Hemichordate(Core Paper - III)

Objective: Broad understanding of animal diversity including scientific classification and evolutionary relationships.

Desired Outcome: understanding of complexity in animal structure develops from lower invertebrates to higher invertebrates.

Paper : II- Genetics & Evolution (Core Paper - IV)

Objective: To create curiosity of study of Genetics and evolution and how genetics and evolution are related.

Desired Outcome: Learners will understand genetics and evolution and how genetics has expanded beyond inheritance to study the function and behavior of genes.

Sem- III

SEC Paper I: Chordata (Core Paper – V)

Objective: To develop understanding of chordate animals and ignite curiosity about chordates and their evolution.

Desired outcome: Learners will understand chordate diversity and their role in ecosystem and how they evolve over the period of time scale.

Paper II: Embryology (Core Paper - VI)

Objective: To study developmental biology and embryonic processes

Desired Outcome: Learners will have clear understanding of basic developmental processes in animals like Gametogenesis, Fertilization, and Embryogenesis.

Sem IV

Paper I: Physiology (Core Paper - VII)

Objective: To learn important physiological processes

Desired Outcome: Learners will understand general functioning of body organs and their systems.

Paper: II Biochemistry(Core Paper -VIII)

Objective: To learn biochemical processes take place in body of organisms.

Desired Outcome: Learners will understand mechanisms of biochemical processes.

Sem V

DSE Paper I: Applied Zoology

Objective: To learn applications of zoology in fisheries, agriculture, poultry farming and dairy farming.

Desired Outcome: Learners will acquire useful skills of applied zoology.

DSE Paper II: Aquatic Biology

Objective: To learn freshwater and marine ecosystems.

Desired Outcome: Learners will understand different aquatic ecosystems like freshwater ecosystem, marine ecosystem, water pollution and lake biology.

Skill Enhancement Course (SEC): Apiculture

Objective: To learn Apiculture and techniques of beekeeping.

Desired Outcome: Learners will acquire skills of beekeeping and its different techniques.

SEM VI

DSE Paper I: Immunology

Objective: To study immunology and its processes.

Desired Outcome: Learners will understand basics of immunology, functions of immune system and various organs involving in immune system.

DSE Paper II: Micro-technique, Bioinformatics and Biostatistics

Objective: To study microscopy, microtomy, general bioinformatics and biostatistics.

Desired Outcome: Learners will acquire skills of micro-techniques, gain knowledge of basics of bioinformatics and biostatistics.

DEPARTMENT OF PHYSICS

Sem-I-Gravitation, Oscillation and Properties of Matter

The students will:

CO1: be able to understand the concept of Gravitation.

CO2: be able to understand the phenomenon of Oscillation and its application.

CO3: be able to understand the concepts of Elasticity and its applications in Industry.

CO4: be able to understand the principle behind the Viscosity.

CO5: be able to understand the concept of Surface tension.

Sem-I-Vector Analysis and electrostatics

The students will:

CO1: be able to understand the concept of Vector Analysis and its application in Physics.

CO2: be able to understand the concept of electric field and its application in devices.

CO3: be able to understand the concepts of Electric potential.

CO4: be able to understand the concept of electric field in dielectric and its applications.

Sem-II- Magnetostatics & Electromagnetic waves

The students will:

CO1: be able to understand the concept of Magnetostatics and its application in Physics.

CO2: be able to understand the phenomenon of Electromagnetic Induction and its applications in devices.

CO3: be able to understand various Maxwell's equations and propagation of Electromagnetic waves.

CO4: be able to understand the concept of steady electric current and its applications.

CO5: be able to understand the concept of Alternating electric current and its applications in devices.

Sem-III-USPHT05- Thermal Physics (Paper-I)

The students will:

CO1: be able to understand the concept of Kinetic Theory of Gases and its application in Physics.

CO2: be able to understand the transport phenomenon & Viscosity of gases.

CO3: be able to understand the concept and applications of Thermodynamics.

CO4: be able to understand the Law of Thermodynamics and its applications.

CO5: be able to understand the Thermodynamic functions and its applications.

SEM-III-USPHT06- Radiation and Statistical Physics (Paper-II)

The students will:

CO1: be able to understand the Radiation theories and its applications.

CO2: be able to understand the concepts of statistics used in Thermodynamics.

CO3: be able to understand the concept and applications of M-B statistics in Physics.

CO4: be able to understand the concept and applications of B-E and F-D statistics in Physics.

SEM-IV-USPHT07- Waves, Accoustics& LASERS (Paper-I)

The students will:

CO1: be able to understand the Concept of waves, Superposition of waves and Harmonic Oscillations and its applications.

CO2: be able to understand the various concepts of wave motion and its analysis with the help of Fourier's theorem.

CO3: be able to understand the concept and applications of Ultrasonic in Physics.

CO4: be able to understand the concept and applications of Acoustics in Physics.

CO5: be able to understand the principle behind the working of LASERS.

SEM-IV-USPHT08- OPTICAL PHYSICS (Paper-II)

The students will:

CO1: be able to understand the phenomenon of interference in thin films and its various applications.

CO2: be able to understand the applications of Newton's ring and Michelson's Interferometer.

CO3: be able to understand and apply the concepts of Diffraction to find the wavelength of monochromatic beam of light.

CO4: be able to understand and apply the concepts of Polarization in optics.

SEM-V-USDSEPHT09- ELEMENTS OF MODERN PHYSICS

The students will:

CO1: be able to understand the concept of Quantum theory and its various applications.

CO2: be able to understand the applications of Schrödinger's wave equations in Quantum Mechanics and its various applications to solve the problems associated with micro particles.

CO3: be able to understand the concepts related to Nucleus and its stability.

CO4: be able to understand the concepts of Radioactivity and its applications.

CO5: be able to understand the concepts of β-ray and γ-ray emissions its applications.

CO6: be able to understand the concepts of Fission and Fusion.

SEM-V-USDSEPHT10- SOLID STATE PHYSICS

The students will:

CO1: be able to understand the various concepts related to Crystal Structure.

CO2: be able to understand the Magnetic properties of matter and its applications in devices.

CO3: be able to understand the Dielectric properties of matter and its applications in devices.

CO4: be able to understand the concepts of Band theory and its applications in conductor, semiconductor and insulators.

CO5: be able to understand the concepts of Superconductivity its applications.

SEM-VI-USDSEPHT13- NUCLEAR AND PARTICLE PHYSICS

The students will:

CO1: be able to understand the general properties of Nuclei.

CO2: be able to understand the Nuclear models and its applications in devices.

CO3: be able to understand the Nuclear Reactions and its applications in devices.

CO4: be able to understand the concepts of Nuclear Reactions and its interactions with matter.

CO5: be able to understand the concepts of Detectors of Nuclear Reactions.

CO5: be able to understand the principle and working of Particle Accelerators.

SEM-VI-USDSEPHT14- DIGITAL AND ANALOG CIRCUITS AND INSTRUMENTATIONS

The students will:

CO1: be able to understand the general concepts related to digital and analog circuits.

CO2: be able to understand the working of Semiconductor devices and its applications in Electronics.

CO3: be able to understand the Designing and functioning of Power Supply.

CO4: be able to understand the concepts related to BJT and its applications as an amplifier.

CO5: be able to understand the concepts of Operational Amplifiers and its applications in Electronics.

DEPARTMENT OF ELECTRONICS

B. Sc. I (CBCS) SEM - I

Paper I (Network Analysis & Digital Fundamentals)

Student will be able to understand

- Concept of energy sources and its applications.
- Concept of network, its analysis methods and network theorems
- Basic concept of number system, its type and its usefulness in digital electronics.
- Basic concept of logic gates and their utilities in implementing digital circuit.

Paper II (Semiconductor Diodes and Analog Electronics)

Student will be able to understand

- The basic of semiconductor diode and its applications.
- The basic of rectifiers and its applications for constructing DC power supplies.
- The Basic concept and working of transistor and it uses in the circuit.
- The Basic concept of amplifiers and its analysis.

B. Sc. I (CBCS) SEM - II

Paper I (Unipolar Device and Linear Integrated Circuit)

Student will be able to understand

- The basic concept and working of unipolar semiconductor component and its application.
- Classification of amplifiers.
- Need of Coupling of amplifier and how to couple one amplifier to other amplifier.
- Feedback concept, its types and effect in the amplifier circuit.
- Basic concept of oscillator circuit, different type of oscillator circuits and use of oscillator in different application.
- Operational amplifier and its applications.

Paper II (Digital Integrated Circuit)

Student will be able to understand

- Logic analysis and design of combinational circuit.
- Basic concept of clock, timer circuit & flip-flop and its applications.
- The concept of counter, its types and uses.
- The concept of Shift register and its applications.
-

B. Sc. II (CBCS) SEM - III

Paper I (Power Amplifier, Oscillators and Power Supplies)

Student will be able to understand

- Basic concept of power amplifier and its types.

- The concept of oscillators and its types.
- The concept of DC regulated power supply, its types and constructions.

Paper II (Microprocessor)

Student will be able to understand

- The concept of Input/Output Devices, Data storages (Memories), Memory organization and addressing.
- 8085 Microprocessor Architecture and it s features.
- Addressing modes of 8085µP and its instruction set.
- Programming of 8085µP.
- 8086 Microprocessor Architecture and it s features.

B. Sc. II (CBCS) SEM - IV

Paper I (Communication Electronics)

Student will be able to understand

- Basic concept of Electronic communication: Block diagram, electromagnetic communication spectrum, band designations and usages, channels and base-band signals
- The concept of analog modulation ant its types.
- Qualitative idea of super heterodyne receiver.
- Modulation and detection technique for PAM.
- Multiplexing.
- Digital pulse modulation: ASK, FSK &PSK.
- Satellite communications.
- Mobile telephony system.

Paper II (Interfacing, PPI and Microcontroller)

Student will be able to understand

- The concept of interfacing.
- Interfacing devices and its features.
- Basic concept of microcontroller.
    - 8051 microcontroller architecture and its programming.

B. Sc. III (CBCS) SEM - V

Paper I ()

Student will be able to understand

Paper II (C-Programming - I)

On completion of the course, students are able to:

- Develop their programming skills.
- Be familiar with programming environment with C Program structure.
- Declaration of variables and constants.
- Understand operators, expressions and preprocessors.
- Understand arrays, its declaration and uses.

B. Sc. III (CBCS) SEM - VI

Paper I ()

Students are able to understand

- I

Paper II (C-Programming - II)

On completion of the course, students are able to:

- Design programs using Functions, Pointers, Structures and Unions in C language.
- Write a program using File Handling.
- Writing programs for drawing different graphical shapes.

Develop programs using C to meet real world needs at primary level. This course provides platform to enhance student's basic skills required for advan

DEPARTMENT OF CHEMISTRY

B.Sc. (CBCS) Sem-I

PAPER-I (Inorganic chemistry)

Basics of Atomic Structure

- After completing the paper-I, Students are able to understand the basic concepts of atomic structure.
- Such as Quantum numbers, electronic configuration, quantum mechanical principles and equations, size of atoms and ions.
- It helps to describe their individual physical and chemical properties, reactivity and stability of atoms, nature of bonding, shape, size and geometry of molecules and molecular ions, molecular orbital theory, formation of homo nuclear and hetero nuclear molecules.

Physical and Chemical properties of s and p block elements

- This chapter helps to understand electronic configuration, atomic and ionic radii,ionization potential, electron affinities, ionization potentials, electronegativity, reducing, oxidation states, formation of hydrides, oxides and halides and oxyacids of '**s**' and **p**' block elements.

Significance of solvent systems and volumetric analysis.

- Nature of hydrogen bonding.
- Physical properties of solvent systems, nature of non-aqueous solvents and their general characteristics.
- Acid-base concept, choice of indicators, theories related to acid-base titrations, redox titrations, complexometric titrations, external and internal indicators.

PAPER- II (organic chemistry)

Formation of molecules and their physical and chemical properties and Steriochemistry

- Formation of molecule on the basis of hybridization concept, shape, size and geometry.

- Electronic effects such as inductive effect, resonance effect, electromeric effect, hyperconjugation effect, and tautomerism.
- Nature of reagents, reactive intermediates, energy profile diagram, types of reactions and strength of acids and bases.
- Basic concept of isomerism, structural isomerism, geometrical isomerism, optical isomerism and conformational isomerism.
- Formulaes, molecular projections- Newman , Sawhorse, Fischer projections. Concept of chirality, R-S and E-Z nomenclature, Conformations of ethane, propane and cyclohexane

Aliphatic and aromatic hydrocarbons

- Definition, Nomenclature, Classification, Preparation methods, chemical and physical properties and uses. Orientation, effects in case of aromatic compounds.

B.Sc. (CBCS) Sem-II

PAPER-I (Organic chemistry)

Aliphatic and Aromatic halides

- Definition, Nomenclature, Classification, Preparation methods, chemical and physical propertie.
- Chemical Reactions- Eliminations, substitutions and aromatic nucleophilic substitutions and some name reactions- Sandmayer, Gattermann, Benzyne mechanism, uses.

Preparation and properties of various functional groups.

- Definition, classification, nomenclature, structure of functional groups (alcohols, ethers, phenols, aldehydes, ketones, acids and esters), preparation methods such as Oxidation, Reduction, Substitution (electrophilic and nucleophilic) , physical properties.
- Chemical reactions with respect to acids, base, metal, non-metals, oxidizing agents, reducing agents and external factors like pressure, temperature, heat and light.

Paper-II (Physical Chemistry)

Mathematical concepts

- Logarithmic relations, graphs, derivatives, integrations, permutations and combinations, concept of units(CGS and SI).

Ionic equilibria

- Basic concepts- nature of electrolytes, degree of ionization, ionization constant, ionic product, pH concept, Buffer solutions, solubility product.

Thermodynamics

- Basic concepts- system, surrounding, energy, enthalpy, entropy, variable functions and variable states, concept of heat and work, thermodynamic laws and thermodynamic scale of temperature.
- Thermochemistry, heat of reactions, standard states, hess's law, calculation of bond dissociation energy, Kirchoff's equation.

States of matter

- Gaseous state-Kinetic theory of gases, Gas equations, Maxwell- Boltzman distribution law, types of molecular velocities, different types of collisions, differentiation between and ideal and real gases.

- Van der waals equation, Critical phenomenon, reduced equation of state. Liquids state- surface tension, viscosity, methods of determination, effect of temperature.
- Solid state- laws of crystallography,some fundamental parameters of crystals such as unit cell, space lattice, miller indices, Bragg's equation, determination of crystal structure.

B.Sc. (CBCS) Sem-III

PAPER-I (Inorganic chemistry)

Chemistry of Boron, Sulphur and Silicates

- Classification, structure and bonding, preparations and properties. Basic properties of Iodine and Interhalogen compounds (preparations, structure and classification)

Ionic solids

- Ionic structure, radius ratio effect, coordination number and lattice energy, Born-Haber cycle, polarizing power and Fajan's rule.
- Metallic bonding- Free electron theory, properties of metal, valence bond theory, band theory to explain conductors, insulators and semiconductors.
- Acids and bases- Bronsted lowry concept, lux flood solvent system and lewis concept

d-block elements

- Properties of elements with respect to their electronic configuration, atomic and ionic radii, ionization potential, variable oxidation states, colors, complex formation, catalytic activities, comparative treatment with 3d analogue with respect to oxidation state, magnetic behavior and stereochemistry

Chemistry of lanthanides and actinides

- Position in periodic table, electronic configuration, atomic and ionic radii, lanthanide contraction, complex formation tendency, occurrence, isolation of lanthanides.

PAPER-II (Physical chemistry)

Phase equilibria

- Phase rule and its applications, degree of freedom, clausiusclapeyron equation and its applications.
- Ideal liquid mixtures, raoults law, henrys law, non ideal systems and azeotropes, partial miscible liquids and immiscible liquids, Nernst distribution law.

Thermodynamics II

- Second law of thermodynamics, concept of entropy, free energies of system, effect of temperature on free energy and its applications, system of variable compositions, partial molar quantities, chemical potential, standard free energy.

Chemical kinetics

- Rate of reaction and factors affecting it, derivation of specific rate constant of zero, first and second order reactions and their characteristics, half life, mean life, order of reaction and its determination, conductometry, polarimetry, Arhenius equation, collision theory, transition state theory, catalysis and catalysed reactions.

Solution and colligative properties

- Different modes of concentrations, raoults law of relative lowering of vapour pressure, osmosis, osmotic pressure an its measurement, elevation of boiling point, depression of freezing point, determination of molecular mass from lowering of vapour pressure, elevation of boiling point, osmotic pressure and depression of freezing point, vanthoff factor, degrees of dissociation and association.
- Magnetic properties- Electron spin angular momentum, spin quantum number, electron as magnetic dipole, magnetic moment of electron, Bohr magneton, diamagnetism, paramagnetism, ferromagnetism, determination of magnetic susceptibility and its application.

B.Sc. (CBCS) Sem-IV

PAPER-I (Inorganic chemistry)

Coordination compounds

- Simple salts, double salts, coordination compounds, werners coordination theory, EAN rule, nomenclature, classification of chelates and their applications, valence bond theory of transition metal complexes, isomerisms.

Hard and Soft, acids and bases

- Classification, Pearson's SHAB concept and its applications, Acid-Base strength of hardness and softness, symbiosis.
- Oxidation and Reduction- Use of redox potential data: analysis of redox cycle, Redox stability in water (Froast, latimer and pourbax diagram) , Principle involved in extraction of element.

Metal complexes:

- Limitation of Valence bond theory, Cristal field theory, Crystal field stabilization energy of octahedral and tetrahedral complexes.
- Factors affecting magnitude of 10Dq. Jahn Teller effect, selection rules, Hole formalism principle, electronic spectrum of some metal complexes. Thermodynamic and kinetic stability of metal complexes, stepwise and overall stability constant and their relationship, Factors affecting stability of complex.

Colorimetry and spectrophotometry

- Principles of photometry, Beer-Lambert's law and its derivation.
- Types of colorimeter and spectrophotometer and their applications in quantitative analysis.

PAPER-II (Organic chemistry)

Nitrogen containing compounds

- Nomenclature, classification, structure, preparations , physical properties- (basic), chemical reactions and mechanisms of nitoalkanes, nitroarenes, amines and diazonium salts.
- Factors affecting basicity of amines

Organometallic compounds

- Synthesis structure and chemical reactions of organo magnesium, zinc, sulphur and lithium compounds.
- Heterocyclic compounds- MO picture and aromaticity of Furan, Thiophene, Pyrrole and Pyridine and its reactions, condensed 5 and 6 membered heterocycles.

Amino acids, peptides, and proteins.

- Nomenclature, classification, preparations and reactions of amino acids, Zwitterion, Isoelectric point and electrophoresis.
- Classification of proteins and synthesis of simple peptides. Quantitative analysis- Estimation of C, H, N, S and X by Kjeldahl's and carius method, Calculation of empirical molecular formula.

Carbohydrates, Dyes and Drugs

- Classification and general properties of glucose and fructose. Determination of configuration of monosaccharides, absolute configuration, mutarotation. Structure of disaccharides and polysaccharides.
- Synthetic dyes- color and constitution, classification, synthesis And uses of methyl orange, congored, Phenolphthalein, indigo dye and Alizarin.
- Drug-Definition and qualities of ideal drugs, basic concepts, synthesis, applications and side effects of drugs. Composition and uses of detol, Chloramin-T, Calmpose, classification of antibiotics with examples.

B.Sc. (CBCS) Sem-V

PAPER-I (Organic chemistry)

Spectroscopy

- Principle of NMR, equivalent and nonequivalent proton, shielding and deshielding effect, coupling constant, chemical shift value, splitting of signals, intensity of signals and elucidation of structure of organic molecule

Organic synthesis via enolates

- Compounds having active methylene group (aceto-acetic ester), acidic protons and its utilization in organic synthesis

Polymers

- Introduction and classification, reactions (hydrolysis, hydrogenation, addition and substitution), cross linking polymers, natural and synthetic fibers.

Green chemistry and Technology for sustainable development

- Basic principle of green chemistry and application of new methodologies.

PAPER-II (Physical chemistry)

Electrochemistry-I

- Electrical transport (conduction of electricity), conductance, its measurement and factors affecting it, application of kohlrausch's law and conductance, Arrhenius theory and Debye-Huckel theory

Electrochemistry-II

- Reversible and irreversible cells, cell EMF and its measurement, thermodynamic quantities of cell reactions, electrodes, mobility of ions, transport and transference number,

Electrodes

- Types of electrodes, cell reactions, Nernst equation, electrode potential,cells, cell EMF and its measurement,

Quantum Mechanics

- Foundation of quantum mechanics and its applications,

B.Sc. (CBCS) Sem-VI

PAPER-I (Inorganic chemistry)

Qualitative and quantitative aspects of analysis and Photometry

- Sampling, evaluation of data and its analysis, data statistics, basic concept of flame photometry, instrumentation and its limitations and applications.

Separation techniques, Fertilizers and Soil chemistry

- Classification, principle and applications of Chromatographic techniques, classification, advantage, disadvantages of chemical fertilizers, manures and compost, soil, its types, chemical analysis of soil.

Organometallic chemistry and Nano materials

- Foundation of organometallic compounds and its applications as a nucleophilic reagent and catalyst, foundation of nano material, and preparation of some nano materials.

Water pollution

- Eco system, water resources, hydrological cycle and techniques to measure water pollution, different water purification methods and industrial waste management.

B.Sc. (CBCS) Sem-VI

PAPER-II (Physical chemistry)

Photochemistry

- Foundation of photochemistry, applications of photochemical reactions, electrical dipole moment and its applications about molecular bond nature and geometry

Spectroscopy

- Foundation and applications of rotational spectroscopy and vibrational spectroscopy

Surface and colloidal chemistry

- Different types of adsorption processes, theories and their applications, types and classification of colloids, preparation and properties of colloidal particles, different phenomenon related to the colloidal particles

Nuclear Chemistry

- Foundation of nuclear chemistry, characteristic and measurement of radioactivities, its applications in different fields of chemical sciences

DEPARTMENT OF BOTANY

COURSE OUTCOMES **B.Sc. I SEM I (CBCS)**

Plant Diversity- I (Micro-organisms, Algae, Fungi and Plant Pathology)

UNIT I • Students learn general characteristics of life. • Students learn general characteristics & nature of viruses, understand structure of T4 and TMV , and lean economic importance. • Students understand structure Mycoplasama, pathogenicity • Students learn Bacteria, Classification of on the basis of Gram Staining Bacteria, and economic importance. • Students understand General character, ultrastructure and reproduction of Nostoc

UNIT II • Students understand concept of plant kingdom. • Students learn General characters, Classification (G.M. Smith, 1955) and Economic importance of algae • Students learn Life history of – Chlorophyceae e. g. Oedogonium • Students learn Life history of – Charophyceae e. g. Chara • Students learn Life history of- Xanthophyceae e. g.Vaucheria • Students learn life history of -Phaeophyceae e. g. Ectocarpus . • Students learn life history of – Rhodophyceae e. g. Batrachospermum

UNIT III • Students understand general characteristics Classification (G. C. Ainsworth, 1971) and economic importance. • Students learn Life history of- Mastigomycotina e. g. Albugo. • Students learn Life history of- Zygomycotina e. g. Mucor. • Students learn Life history of- Ascomycotina e. g. Penicillium. • Students learn Life history of- Basidiomycotina e. g. Puccinia • Students learn Life history of - Deuteromycotina e. g. Cercospora

UNIT IV • Students understand general characteristics, Types (Crustose, Foliose, Fruticose) and economic importance. • Students understand Plant Pathology, • Students understand viral Disease: Mosaic of Tobacco (TMV) • Students understand Red rot of Sugarcane (Colletotrichum fulcatum). • Students understand Brown spot of rice (Helminthosporiumoryzae) • Students understand loose smut of wheat (Ustilagohordei) • Students understand bacterial disease: Bacterial Blight of Cotton (Xanthomonascompestris

Plant Diversity- II (Bryophyta, Pteridophyta, Gymnosperm and Paleobotany)

UNIT I • Understand general characteristics, Classification (G. M. Smith) and Economic importanceof Bryophytes. • Learn life history of Hepaticopsida e. g. Riccia • Learn life history of Anthocerotopsida e. g. Anthoceros • Learn life history of Life Bryopsida e. g. Funaria

UNIT II • Students fascinate by gaining the knowledge the Pteridophyta, General characteristics, classification (G. M. Smith) and Economic importance • Understand telome theory and Types of stele. • Learn External Morphology and Reproduction of Psilophyta e. g. Rhynia, Lycophyta e. g. Selaginella, Arthophyta e. g .Equisetum, and Filicophyta e. g. Marsilea. • Students get idea about Concept of Heterospory and seed habit telome theory and Types of stele.

UNIT – III • Students learn general characteristic Gymnosperm, classification (Sporne, 1965) and Economic importance. • Students understand external Morphology and Reproduction of Cycadales e. g. (Cycas) and Coniferales (Pinus).

UNIT – IV • Students fascinate by gaining the knowledge Paleobotany and Geological time scale. • Understand the process of fossilization (Replacement theory, Infiltration theory) • Learn types of fossils (Impression, Compression and Petrification) • Students learn Fossil gymnosperm Glossopteris (Pteridospermatophyta) and Cycadeoidea (Cycadopsida).

(Semester II) Paper – I

(Morphology and Anatomy of Angiosperms)

UNIT – I • Learn vegetative morphology of Angiosperm, Mode of living Autotrophic • And Heterotrophic • Understand habiterect forms, weak forms. • Learn about normal root, modified root and its types. • Learn about stem and its modification. • Learn leaf, its parts and lamina (shape, margin, apex, base, surface, texture, venation). • Learn types of leaves, its modification and phyllotaxy.

UNIT – II • Understand definition and types Inflorescence • Understand flower is a modified shoot and types of flower. • Learn Parts of flower perianth, Calyx, Corolla, Androecium, Gynoecium. • Understand and acquired skill to write Floral formula and Floral diagram • Learn about fruit and its types.

UNIT – III • Understand terminology of Meristems and classification (based on origin and position) • Learn Newman Theory of Root apical Meristem • Learn Tunica-Carpus Theory of Shoot apical Meristem • Learn tissue and its types • Understand the arrangement of vascular Bundle and types. • Learns structure and function Xylem, Phloem, Cambium, Periderm.

UNIT – IV • Learn comparative study the primary structure of Dicot root (Sunflower) and monocot root (Maize). • Learn comparative study the primary structure of Dicot stem (Sunflower) and monocot root (Maize). • Learn comparative study the primary structure of Dicot leaf (Sunflower) and monocot root (Maize). • Understand secondary growth in Dicot stem e. g. Moringa • Understand anomalous secondary growth in stem Bignonia, Boerhaavia • Dracaena • Learn anomalous secondary structure in root Beta vulgaris (Beet).

Paper – II (Taxonomy & Diversity of Angiosperms)

UNIT – I • Learn origin of Angiosperms according to Bennettitalian theory • Learn primitive angiosperm – Magnolia. • Fascinated by gaining the knowledge of fossil Angiosperms (Flower Sahanianthus and fruit – Enigmocarpon). • Students enjoyed Botanical nomenclature (principles, rules, taxonomic ranks, typification). • Created interest by History of Theophrastus and Linnaeus taxonomic work.

UNIT – II • Learn classification of Angiosperms and types of classification (Artificial, Natural and Phyllogenetic). • Learn System proposed by Bentham and Hooker and its Merits & Demerits. • Understand skill of Herbarium Techniques.

UNIT – III • Learn diversity of flowering plants dicot families (Ranunculaceae, Malvaceae Fabaceae (Pappilionaceae), aesalpiniaceae, Mimosaceae, Solanaceae).

UNIT – IV • Learn diversity of Dicot families (Lamiaceae, Apocynaceae, Asclepiadaceae, Asteraceae, Euphorbiaceae). • Diversity of flowering plants Monocot families Liliaceae, Poaceae, Orchidaceae.

B. Sc. BOTANY CBCS (Semester III)

Paper – I (Reproductive Biology of Angiosperms, Plant Growth and Development)

UNIT – I • Students learn structure of Stamen, Microsporogenesis and Male gametophyte. • Understand the Structure of Pistil, Megasporogenesis and Polygonum type female gametophyte. • Learn the types of Embryo sac (Mono, bi and tetrasporic). • Learning the structure and types of Ovules. • Gain knowledge about Pollination types, contrivances of self and cross pollinations, also attractions and rewards.

UNIT – II • Students will learn the information about Double fertilization and Triple fusion • Get knowledge about Seed; Endosperm and its types; Embryo and its types. • Information about Development of Dicot embryo (Onagrad type). • Learn the Significance of seed: Ecological adaptations. • Learn Seed dormancy; Suspended animation; causes and role of dormancy. • Learn various methods to break seed dormancy and seed dispersal strategies.

UNIT – III • Students understand about growth and development and phases of growth. • Students get idea about plant regulators like Auxin, Cytokinin, Gibberelin, Abscisic acid and Ethylene • Understand Plant Movements.

UNIT – IV • Students learn the process of Photoperiodism. • Learn about Physiology of flowering and process of Vernalization. • Learn about phytochromes. • Get idea about senescence and abscission.

Paper – II (Plant Biochemistry and Physiology)

UNIT – I • Learn the definition, structure and classification of Carbohydrates. • Learn structure of Aldoses and Ketoses, monosaccharides (glucose), disaccharides (sucrose), polysaccharides (cellulose and starch). • Learn the definition and classification of lipids, fatty acids, oils and waxes, phospholipids, sphingolipids, sterols. • Understand structure of Protein, classification amino acids and peptide bond.

UNIT – II • Students understand terminology of Enzymology and about mechanism action. • Students understand nitrogen Metabolism. • Acquire knowledge of properties of water, process of diffusion, osmosis and plasmolysis. • Understand the Ascent of sap, Root pressure theory, • Understand the process of transpiration. Types of Stomata and their mechanism, guttation. • Learn about Phloem transport: Bulk flow theory (Munch hypothesis). • Understand the theories of absorption of solute in plants. • Learn active absorption, passive absorption.

UNIT – IV: • Learn the process of Photosynthesis, photosynthetic pigments, cyclic and Non- cyclic photophosphorylation. • Learn C3, C4 and CAM pathway, • Terminology respiration, its types, structure of ATP, respiratory substrates and respiratory quotient (R. Q.) • Understand glycolysis, citric acid cycle, ETS, oxidative phosphorylation, factors affecting respiration.

B.Sc. Semester – IV (CBCS)

Paper – I (Cell Biology, Genetics and Biotechnology)

UNIT – I • Students learn about all cell Biology and plant cell organelles (Cell wall, Plasma Membrane; General structure of Nucleus, Mitochondria, Plastids, Endoplasmic Reticulum, Golgi Complex, Vacuole, Lysosome, Peroxysome, Glyoxisome). • Students learn Mitosis, Meiosis with respect plant cells. • Learn about structure and replication of DNA. • Students get knowledge about Plant Tissue culture.

UNIT – II • Students learn Mendel History and his Laws of inheritance (Dominance, Segregation and Independent Assortment). • Understand Allelic and Non-allelic interaction of genes with reference to plants. • Understand cytoplasmic inheritance.

UNIT – III • Learn linkage and its types. • Understand crossing over. • Learn Variation in Chromosome number, Polyploidy and Aneuploidy • Learn chromosome abnormality (Deletion and Deficiency, Duplication, Inversion and Translocation). • Understand terminology Mutation and its types.

UNIT – IV • Learn various techniques of Genetic Engineering. • Tools and techniques of Recombinant DNA technology. • Learn process of Protein synthesis-transcription and translation. • Understand the Jumping genes in Maize. • Learn Regulation of gene action in Prokaryotes.

Paper – II (Plant Ecology)

UNIT – I • Students acquire knowledge of their environment. • Learn Ecology, branches of ecology and significance. • Learn climatic Factors and edaphic factors. • Learn interactions between plants and animals, community and soil organisms.

UNIT – II • Students understand structure and function of Ecosystem. • Learn Biotic and Abiotic components, food chains, food web, ecological pyramid. • Learn Biogeochemical Cycles (Water, Carbon, Nitrogen). • Learn Environmental Pollution (Air, Water) and its control.

UNIT – III • Learn terminology of Autecology and Synecology; understand community dynamics.

UNIT – IV • Understand Plant Succession, climax. • Fascinate about Phytogeography and also concept of continental drift • Get idea about Phytogeo graphical studies of Chandrapur and Gadchiroli districts. • Western Himalaya, Eastern Himalaya, Indus plane, Gangatic plane, Central India, Western coast, Deccan, Assam.

B. Sc.Semester V(CBCS) Discipline Specific Elective-I (DSE-I)

Paper-I (Molecular biology I)

UNIT – I Students learn nature and types of nucleic acid. Students understand history of nucleic acid and nucleic acid as carrier of genetic information.

UNIT-II Students learn Watson and Crick model of DNA. Students learn A,B,C,D & Z type of DNA. Understand concept of Cot curves. Students learn structure and types of RNAs.

UNIT-III Students learn chromosomal & plasmid DNA of prokaryotes Students learn organization of eukaryotic DNA. Students learn viral DNA.

UNIT-IV Students learn conservative, semiconservative & discontinuous type of replication. Students learn different models of replication like rolling circle, theta & ds linear DNA.

Discipline Specific Elective-I (DSE-I) Paper-II (Molecular biology II)

UNIT - I • Students learn adapter hypothesis and discovery of mRNA template • Students learn concept of genetic code and its salient features.

UNIT - II • Students learn process of prokaryotic and eukaryotic transcription. • Students learn lactose and tryptophan operon model. • Students learn about transcription factors, heat shock proteins, steroids and peptide hormones and gene silencing. • Students lean inhibitors and transcription.

UNIT - III • Students understand the concept of introns and exons. • Students learn eukaryotic mRNA processing.

UNIT - IV • Students understand ribosome structure and assembly. • Student learn charging of tRNA, amino acyl transfer RNA synthetases. • Students learn various steps of translation in prokaryotes and eukaryotes.

B.Sc. Sem VI Discipline specific elective I (DSE I)

Paper I Plant Biotechnology-I

Unit I Students understand introduction about plant tissue culture and their historical background. Students learn about the composition of media, nutrients and hormones. Students understand the various type of tissue culture media like M.S. , B5 and N6

Unit II Studentsunderstand about totipotency . Students understand dedifferentiation, redifferentiation, Regeneration , organogenesis and embryogenesis.

Unit III Students understand about various tissue culture techniques like micro propagation, virus elimination and protoplast isolation. Students understand about secondary metabolites production.

Unit IV Students understand about anther culture, pollen culture and ovary culture. Students understand about production of haploid, triploid and hybrid. Students learn about cryopreservation and germplasm conservation.

Paper II Plant Biotechnology – II

Unit I Students understand the method of gene transfer like electroporation, microinjection, micro projectile bombardment.

Unit II Studentslearn about agrobacterium mediated gene transfer, selected marker and reportable gene.

Unit III Students learn about application of plant biotechnology. Students learn about pest resistance plant, herbicide resistance plants, transgenic crops with improve quality trait.

Unit IV Students learn and understand about transgenic plant producing edible vaccine, biodegradable plastic, chloroplast transformation and biosafety measures.

DEPARTMENT OF MATHEMATICS

Course Outcomes (COs) of Mathematics = Student able to understand Application of Mathematics

Sem-I-

Differential and Integral Calculus

[1] to Solve Height and Distance Problems .,

[2] to Solve Problem of Quadrature.,

[3] to Solve Mensuration Problem .,

[4] to Solve Apolonius Theorem .,

[5] to Solve Kelvins Theorem , … etc.

Differential Calculus and Trigonometry .,

[1] to Solve Equation .,

[2] to find nth root of Complex Number .,

[3] to optimization Problem .,

[4] Physics .,

[5] Mean Value Theorem , … etc.

Sem-II-

Ordinary Differential Equation and Difference Equation .,

[1] to Solve Problem in Simple Harmonic Motion .,

[2] to solve Problem of Projectile.,

[3] to solve System of Ordinary Differential Equation .,

[4] To solve the Problem of Singularity .,

[5] to solve Fuchsion theory , … etc.

Partial Differential Equation .,

[1] to solve Problem in Acoustics .,

[2] to solve Problem in Fluid Dynamics .,

[3] to solve Problem in Electrodynamics .,

[4] to solve Problem in Heat Transfer , … etc.

Sem III

Set Theory and Laplace Transform .,

[1] to solve the problem in Differential and integral Calculus .,

[2] to solve the problem in Limit and Continuity .,

[3] to solve the problem in Boolean Algebra .,

[4] to solve the problem in Mathematical Analysis , Topology , Abstract Algebra , Discrete Mathematics , … etc .

[5] to solve the problem in Improper Integral , Nuclear Physics , Complex Impedance of Capacitor. … etc.

Real Analysis .,

[1] to solve the problem in Construction of Real Number.,

[2] to solve the problem in Order Property of real number .,

[3] to solve the problem in topological property of real number.,

[4] to solve the problem in Limit and Convergence.,

[5] to solve the problem in Compactness , … etc.

Sem-IV

Elementary Number Theory

[1] to solve the problem of Discrete Mathematics .,

[2] to solve the problem of Numerical Analysis.,

[3] to solve the problem of Cryptolography.,

[4] to solve the problem of Arithmetic.,

[5] to solve the problem of Computer Science, … etc .

Algebra

[1] to solve the Problem in Engineering , Science , Medicine , Economics.,

[2] to solve Specific Properties of linear equation , Vector Spaces , and Matrices , … etc .

Sem V

Probability

[1] To solve the problems in Assessment and Modeling , Insurance , Reliability Theory of Aging and longevity , Financial regulation , …etc.

Mathematical Modeling

[1] To solve the problems of Unknown World .,

[2] To solve the problems Natural Science , Engineering and Social Sciences .,

Linear Algebra

[1] Some application in Modern Presentation of Geomentry , Functional Analysis , Non linear Systems , First order Approximation , … etc.

Mechanics

[1] to solve the problem related to Behavior of Physical bodies .,

[2] Clasical Mechanics .,

[3] Quantum Mechanics .,

[4] Engg. Mechanics .,

[5] Biophysics , … etc.

Matrices and Theory of Equation

[1] to solve the problems of Optics , Electromagnetism , Quantum Electrodynamics , Clasical Mechanics , Quantum Mechanics .

Special Relativity I

[1] to attempt the problems related to Space and Time , Length Contraction , Time dilation , … etc.

Sem VI

Graph Theory

[1] To solve the Problem of Discrete Mathematics , Network Science , Computor Science , Linguistics , Physics and Chemistry

Boolean Algebra

[1] To solve the problems of Boolean Operations , Computers , Two valued logic , Solid Modeling etc.

Numerical Methods

[1] to solve the Problems of Computing Values of functions , Interpolation , Extrapolation , Regression , optimization , Differential Equation , evaluating Integrals etc.

Complex Analysis and Vector Calculus

[1] Algebraic Geometry , Number theory , Analytic combinatorics , Nuclear, aerospace , Mechanical and Electrical Engg.

Linear Programming and Transportation Problem

[1] Food and Agriculture , Transportation optimization , Military application , Production and Environmental Protection .

Special Relativity II .

[1] to attempt the problems related to Space and Time.

ARTS FACULTY

PROGRAM OUTCOMES

After completion of the programme the students should be able to.-

* Students will be able to understand the history, politics, sociology and economics of the world.
* Students will be able to enroll themselves in higher education.
* They will also be able to appear for competitive exams like UPSC, MPSC, staff selections, etc.

SPECIFIC OUTCOMES

* Work as teacher in schools, highs schools and colleges.
* For history Graduates, the option of public service is always open.
* History graduates can find employment with Archeological survey of India and muselogy or work as a Musiumcarator.
* Students can research in economics, tourism, archeological, world economics,etc.
* They can work in NGO's , social activities, encourage people for social awareness,etc.

COURSE OUTCOME

DEPARTMENT OF POLITICAL SCIENCE

B.A. I SEM I

Subject: Indian Democracy

Gondwana University constituted a syllabus on Indian Democracy, which achieves following objective.

1. Awareness about the structure of Indian Democracy like
   a) Legislature b) Executive c) Judiciary
2. Role of people they played in Indian political system.
3. A good and responsible citizen's can develop through this syllabus.
4. To achieve constrictive work from society.
5. Study of Indian Democracy proves very useful for competitive Examinations.

B.A. I SEM II

Subject: Local Self Government

1. It explains Democracy means participation of people of various bodies of Government.
2. To understand local self Government.
3. To encourage participation at local level to national level.
4. To enhance political participation.
5. In 4th units of the syllabus focus on Human Rights which valuable for human being.it also teaches how to protect them.
6. There is another chapter about Right to Information Act-2005 in 4th unit which is also showing transparency in governmental bodies is necessity of Democracy.
7. Decentralization helps in proper inculcation of Democracy and democratic values.
8.

B.A. II SEM III

Subject- political Theory

1. It helps to understand basic of Political Science.
2. It teaches theories like Origin of State, Sovereignty, Social Change

B.A. II SEM IV

Subject -Political Analysis

It is also useful understand the basic concept of Political system. Like Power law, rights, Authority, legitimacy. It help student understand the basic of political science and to understand the actual meaning of various concept which we use generally having depth meaning behind in it

B.A. III SEM V

Having Indian political thoughts

1. To Know beot of political thought for related to India.
2. To enrich moral values among student by giving devoted thoughts of devoted thinker.
3. To create a patriotic thinking among students.

B.A. III SEM VI

Western political thoughts

To aware, motivates student to read the thoughts of western thinker which responsible to revolution in many countries. Like karl Marx, Lenin, Mill, Betham

DEPARTMENT OF ENGLISH

B. A. SEM I and II (2019-20 onwards)

Name of the Course: Compulsory English

Prescribed Text book: Roots – A Course in English Language and Literature

Course Outcomes

1. The course will train the would-be graduates in various levels of communication skills in English – listening skills, speech skills, reading skills, writing skills and other related skills.
2. The carefully selected poems and prose passages will not only serve the purpose of studying language skills and building vocabulary but will also provide enjoyment and application
3. The grammar exercises and the drills of linguistic skills will raise their level of proficiency in using certain patterns of expression.
4. The selected situational communication samples will make students aware of the speaking and writing skills necessary for communicating fluently in English in social, academic and profession situations, both in written and spoken modes.
5. Besides, being a broad based subject, it also aims at developing the personality of the young under-graduates and turn them into self-sufficient and self-reliant individuals.

B. A. SEM I and II (2019-20 onwards)

Name of the Course : English Literature

Prescribed Text book: Footprints

Course Outcomes

1. Students will get acquainted with the major English and Indian poets writing in English.
2. Students will learn the nuances of vocabulary and linguistic expressions through the study of poems spanning over a period of about four hundred years.
3. They will be acquainted with the various poetic devices used in the prescribed poems, as also the values and philosophy embedded in them.
4. Students will gain knowledge of the major poetic trends and movements in English literature as well as in India and Africa; and they will also know the diversity of literary and social voices within and outside those movements.
5. Students will develop an ability to read texts in relation to their historical and cultural context, in order to gain a richer understanding of both text and context.
6. Students will learn various poetic types, stanza forms and literary terms to enhancetheir ability of close analysis of the prescribed poetic texts.
7. Students will develop a taste for literature and language.
8. Students will appreciate literature's ability to evoke feelings, cultivate imagination and initiate philosophical discourse.

B.A. SEM III and IV (2019-20 onwards)

Subject: Compulsory English

Prescribed book: **New Dawn** (**An Anthology of Prose and poetry**)

Course Outcomes

1. The course will train the would-be graduates in various levels of communication skills in English – listening skills, speech skills, reading skills, writing skills and other related skills.
2. The carefully selected poems and prose passages will not only serve the purpose of studying language skills and building vocabulary but will also provide enjoyment and application
3. The grammar exercises and the drills of linguistic skills will raise their level of proficiency in using certain patterns of expression.
4. The selected situational communication samples will make students aware of the speaking and writing skills necessary for communicating fluently in English in social, academic and profession situations, both in written and spoken modes.
5. Besides, being a broad based subject, it also aims at developing the personality of the young under-graduates and turn them into self-sufficient and self-reliant individuals.
6. Will encourage the students to read various types of texts on their own and discussthem among peers.

B. A. SEM III and IV (2019-20 onwards)

Name of the Course : English Literature

Prescribed Text book: Creative Minds

Course Outcomes

1. Students will get acquainted with two genres of the prose form in English Literature viz. Novel and Essay, and will experience the flavour of prose from Indian and British writers of novels, essays, biographies, autobiographies, and short stories.
2. Students will learn the nuances of vocabulary and linguistic expressions through the study of prose written by English and Indian authors.
3. They will be acquainted with the various pose styles, as also the values and thoughts expressed in the prescribed prose pieces.
4. Students will gain knowledge of the historical development and growth of the English novel, essay, short story, biography and autobiography; and their technical specifications.
5. Students will learn various technicalities involved in writing prose and the literary terms used for them, to enhance the ability of close analysis of the prose texts.
6. Students will understand the life-values put forward in the prescribed texts and develop a taste for literature and language.
7. Students will appreciate literature's ability to evoke feelings, cultivate imagination and initiate philosophical discourse.

B.A. SEM V and VI (2019-20 onwards)

Subject: Communicative English

Prescribedbook: **Synergy: Communication in English and Study Skills**

Course Outcomes

1. The course will enhance the communicative abilities of the learners.
2. Will broaden the knowledge of English language of the learners.
3. Will make the students self-expessive.
4. Will develop writing skills among the learners.
5. Will enable the learners to acquire linguistic and soft skills necessary for dealing with interviews, presentations, speechhes and other such public communications.
6. Will expand the learners' ability of using correct and appropriate expressions.

B.A. SEM V & SEM VI (2019-20 onwards)

Name of the Course : English Literature

Names of the Books Prescribed:

i) King Lear (for Sem. V) by William Shakespeare & Dance like A Man (for Sem VI) by Mahesh Dattani (For Detailed Study)

ii) Tughlaq (for Sem V) by Girish Karnad&Ghashiram Kotwal by Vijay Tendulkar (for Sem VI) (For Non-Detailed study)

iii) Background to the Study of English Literature by B.Prasad

iv) Literary Terms by M.H.Abram

v) Poetics (Character and Plot) by Aristotle

vi) Classical Indian Drama: Theory and Practice

Course Outcomes

1) Students will get acquainted with the life and dramatic art of William Skakespeare, Girish Karnad, Mahesh Dattani and Vijay Tendular.
2) They will learn about the technical structure of drama and the various dramatic types, in English literature.
3) They will also know about various dramatic devices and literary terms connected with drama writing.
4) Students will gain knowledge of the theory of dramatic art as propounded by Aristotle in the West, and that we find in Classical Indian Drama.
5) Students will know about the philosophy put forward by the English dramatist William Shakespeare and those of the Indian dramatists like Girish Karnad, Mahesh Dattani and Vijay Tendulkar.
6) Students will understand the life-values put forward in the prescribed texts and develop a taste for literature and language.

B.Com. SEM I and II (2019-20 to Onwards)

Subject: **Compulsory English**

Prescribedtextbook: **Prelude**

Course Outcomes

1. The course will inspire the students to read various types of texts and discuss among them about the great achievers in the social, political and corporate field.
2. Reading of poetry will instil in them the life –values of sincerity, honesty, self-control, patriotism and family relations.
3. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.
4. Will equip students with the practical business communication skills and develop among them the ability to communicate effectively in English.
5. Will inspire students to learn various soft skills necessary for thriving in the competitive business world.
6. Students will acquire the skills of writing effectively for a variety of professional and social settings.

B.Com. SEM I and II (2019-20 to Onwards)

Subject: **Supplemetary English**

Prescribedtextbook: **Literary Landscapes: An Anthology of Prose and Poetry**

Course Outcomes

1. The course will inspire the students to read various types of texts, enrich vocabulary and understand men and manners.
2. Reading of poetry will instil among them the poetic sense.
3. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.
4. Will provide an opportunity to learn language elements and their application in practice.

B.Com SEM III and IV (2019-20 onwards)

Subject: Compulsory English

Name of the book: Overture: A textbook for College Students

Course Outcomes

1. Students will be acquainted with the success stories of stalwarts in business industries.
2. Life-values will be inculcated in the students.
3. Will develop communicative competency in English, among the students.
4. Will inspire the students to adopt various soft skills in order to better their communication and develop their personality.
5. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.

B.Com. SEM III and IV (2019-20 to Onwards)

Subject: Supplementary English

Prescribed textbook: A Pathway to Success

Course Outcomes

1. The course will inspire the students to read various types of texts, enrich vocabulary and understand men and manners.
2. Reading of poetry will insist among them the poetic sense.
3. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.
4. Will provide an opportunity to learn language elements and their application in practice.
5. Will equip students with the practical business communication skills and develop among them the ability to communicate effectively in English.
6. Will inspire students to learn various soft skills necessary for thriving in the competitive business world.

B.Sc. SEM I and II (2019-20 to Onwards)

Subject: Compulsory English

Prescribed textbook: Prelude

Course Outcomes

1. The course will inspire the students to read various types of texts and discuss among them about the great achievers in the social, political and corporate field.
2. Reading of poetry will instil in them the life –values of sincerity, honesty, self-control, patriotism and family relations.
3. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.
4. Will equip students with the practical business communication skills and develop among them the ability to communicate effectively in English.
5. Will inspire students to learn various soft skills necessary for thriving in the competitive business world.
6. Students will acquire the skills of writing effectively for a variety of professional and social settings.

B.Sc. SEM I and II (2019-20 to Onwards)

Subject: Supplemetary English

Prescribed textbook: Literary Landscapes: An Anthology of Prose and Poetry

Course Outcomes

7. The course will inspire the students to read various types of texts, enrich vocabulary and understand men and manners.
8. Reading of poetry will instil among them the poetic sense.
9. Will upgrade students' grammatical sense and help master the basic the basic grammatical aspects of English language.
10. Will provide an opportunity to learn language elements and their application in practice.

DEPARTMENT OF HISTORY

Course outcomes

Semester – I

Indian History (Earliest times to 1351 A.D)

* Ancient Indian History is very important for UPSC Examination.
* Students got knowledge of sources of the ancient Indian History.
* When students doing study of Ancient Indian History that time they know about original culture, religion, society and polity.

* Student capable for discuss any related issue.

Semester II

Indian History [1526 to 1761]

* Students got knowledge of mughal history and culture.
* Students got knowledge 0f rise of Martha Power in Maharashtra.
* Maratha History is very important in MPSC Examination.
* Students got knowledge of Chatrapati Shivaji his administration and his contribution in making of modern Maharashtra.
* Students got knowledge of Sambhaji Rajaram, Tarabai and Contributions of Peshwas.

Semester III

Modern India (1757 to 1920)

* History of modern India is very important for competitive examinations.
* Students got knowledge of rise and establishement of british power in India and their policies.
* Student understand the Impact of british rule in India especially on our culture, society, economy and our political system.
* Student understand How to rise of Indian Nationalism and its impact.

Semester IV

Modern India [1920-1971]

* Student got knowledge of freedom movement in India and Indian independence and constitution of India.
* Student understand post independence major events and issues.

Semester V

Modern World.

* Students got knowledge of modern political revolutions and foreign policies of major European Nations.

Semester VI

Modern World [1920 to 2000]

* Students got knowledge of concept in world History.
* World trend of thinking, Nationalism, Marxism, Racism, Nazism , Fascism, Globalisation, Communication and Information Technology, etc. introduced is students.
* Students got knowledge of modern world.

DEPARTMENT OF SOCIOLOGY

B.A.I	Sem-I	Introduction to Sociology	Compulsory
	Sem-II	Introduction to Sociology	Compulsory
B.A.II	Sem-III	Indian Society: The Structural Issues	Compulsory
	Sem-IV	Social Problems in Contemporary India	Compulsory
B.A.III	Sem-V	Sociology of Tribal Society	Compulsory
	Sem-VI	Sociology of Tribal Society	Compulsory

Program Name	**Course code**	**Name of the course**	**Course objectives**
B.A.I		Introduction to Sociology	1 .Students are Intruded the basic concepts in Sociology. 2. Students are familiarized with the theoretical aspect of different concepts. 3. Students understand the scope and importance of Sociology, which increase their interest in Sociology. 4. Students will understand the relationship of Sociology with other social Sciences. 5.The study of all basic concepts develops the sociological approach in the students.
B.A.Sem-III		Indian Society: The Structural Issues	1. Students are awarded towards contemporary issues. 2 .Students inculcate responsibilities and promote equality. 3. Students familiar with the problems of Poverty and Unemployment. 4. Students will understand Structural issues and problems like Inequality on the basis of Caste, also Understand the discrimination on the basis of Socio, Economic, Cultural and Religious factor. 5. Students will understand the correlation of various problems with the population issue. they also get knowledge about population policy, Family planning , and importance of

			population education for development.
B.A.Sem-IV		Social Problems in Contemporary India	1. Students will know the meaning of social problems, and real common causes of various social problems. So they get insight about reality of Indian society. 2. Students understand the complexities and multifaceted contemporary issues and problems of Indian Society. 3. Students prepare for various competitive examinations, Major role of this syllabus in various important examination, improve their interest in Study.
B.A. B.A.Sem-V & VI	Sociology of Tribal Society		1. Students will aware about the reality of Tribal society. so they will be more conscious about tribal society. 2. Students understand the major problems of Tribal society in India, and try to find out the remedies on these problems, which develop diagnostic approach in them. 3. Students familiar with the Social Mobility and change in tribal society. 4. Students familiar with the major tribes in India. 5. Students will understand the nature and functions of various Tribal social institutions like Family, Marriage and Kinship.

Subject Wise Course Outcomes (Arts)
Department of Marathi
Course Outcomes

अभ्यासक्रमाचाउद्देश

बी. ए. भाग 1

साहित्य सरिताभाग 1 (आवश्यक मराठी)

- विद्यार्थ्यांनाभाषा व साहित्य याची ओळख होते
- मानवीमूल्यांचीजपणूकअभ्यासक्रमातूनहोते
- राष्ट्रप्रेम वाढीस लागते.
- पर्यावरणाचीजपणूकहोते.

बी. ए. भाग 2

साहित्य सरिताभाग 2 (आवश्यक मराठी)

- सर्व धर्मसमभावाचीशिकवणमिळते, यातूनलिकोपसमाजनिर्मितीहोते.
- स्वयंउद्योगप्रेरणामिळते.
- वैज्ञानिकदृष्टिकोण वाढीस लागतो.
- लोकसाहित्याचीओळख होते.
- सेवाभावाचीप्रेरणामिळते.

बी. ए. भाग 3

साहित्य सरिताभाग 3 (आवश्यक मराठी)

- प्रसारमाध्यमांमध्ये वार्ताहरनिवेदकम्हणूनकामकरण्याची संधी.
- लेखनकौशल्य वाढीस लागते.
- व्यावहारिकजीवनाताउदरनिर्वाहासाठीअभ्यासक्रमाचाउपयोग
- बातमीलेखनसंपादनमुद्रीत शोधन यामध्ये संधी.

Subject Wise Course Outcomes (Arts)
Department of Marathi
Course Outcomes

अभ्यासक्रमाचाउद्देश

बी. ए. भाग 1

मराठी वाङमय भाग 1 (कथा, कादंबरीवसमिक्षा)

- अभ्यासक्रमातूनविविध वाङमय प्रकारांचीओळख होते.
- समिक्षेचेआकलनहोते.
- कथा, कादंबरीचाअभ्यासहोतो.
- विशिष्टभुप्रदेश, त्यांचीबोलीभाषा, परंपरा व संस्कृतीचीओळख होते.

बी. ए. भाग 2

मराठी वाङ्मयभाग2 (नाटक आणिआधुनिक कविता)

नाटक : नटसम्राट, मी जिंकलो मी हरलो

- नाटय निर्मिती क्षे.. ज्ञातअभिनय,लेखन, संवाद, दिग्दर्शन, नेपथ्य व संगीत इ. क्षेत्रात संधी
- नवसमाजनिर्मितीचीप्रेरणामिळते.
- नाटय परंपरेचीमाहितीमिळते.
- आदिवासींचेलोकजीवन, संस्कृती व परंपरा यांची ओळख होते.
- राष्ट्रप्रेम वाढीस लागते.

बी. ए. भाग 3

मराठी वाङ्मयभाग 3 (प्राचीन मराठी वाङ्मयाचा इतिहास)

प्रवासवर्णन: अपूर्वाई

- संतसाहित्य, पंडितीकाव्य, शाहिरी व बखर वाङ्मय यांचीओळख होते
- तत्कालीनसामाजिक जीवन, भाषा, संस्कृती, धर्मपरंपरावमूल्य यांचीओळख होते
- वाङ्मयाची वाचनाचीआवडनिर्माणहोते.
- साहित्य लेखनालाप्रेरणामिळते.
- संशोधनालाचालनामिळते.

Subject Wise Course Outcomes (Arts)
Department of Marathi
Course Outcomes

अभ्यासक्रमाचाउद्देश
बी.कॉम/बी.एस्सीभाग 1

- अभ्यासक्रमातूनमातृभाषेसोबतचप्रमाणभाषेचेआकलनहोते.
- लोकशाहीमूल्याचेओळख होते.
- लेखन, वाचन व भाषिककौशल्यात वाढहोते.
-

बी.कॉमभाग 2

- वेज्ञानिकदृष्टिकोण वाढीस लागतो.
- व्यावहारीकमराठीचीओळख होते.
- मराठीभाषेविषयीआवडनिर्माणहोते.

Department of Economics

Course Outcomes

बी. ए.

अर्थशास्त्र अभ्यासक्रमाचेमहत्व

सेम १

- अर्थशास्त्र हाविषय दैनदिंनव्यवहारातप्रत्यक्ष वापरकरता येतो.सेम १ चा अभ्यासक्रमविद्यार्थ्याच्याजिवनातमहत्वाचेआहे.
- मागणीचानियम,पुरवठानियम,उपभोक्तावर्ग,भांडवलदारवर्ग याच्यादुष्टीनेअभ्यासक्रममहत्वाचावाटतो.

सेम २

- विद्यार्थ्यानाबाजारपेठ,मक्तेदारी,बाजारातील स्पर्धा यांचेज्ञानप्राप्तहोते.
- बाजाराचीओळख पटते.
- सांख्यीकीचीतोडंओळख होते.
- नफाकसामिळवायचा

सेम ३

- अर्थव्यवस्थेमध्ये तेजी,मंदी,निर्देशांक,बेरोजगारी,गुंतवणूक,रोजगारइत्यादीबददलमाहीतीविद्यार्थ्यानाहोते.
- रोजगारकसामिळवावाआणिकसारोजगारनिर्माणहोतो याचीकल्पना येते.
- शेअरबाजाराचीकल्पना येते.

सेम ४

- वेगवेगळेकराचेप्रकार,बचत,राजकोषीय धोरण याचाअभ्यासहोतो.
- मौद्रीक धोरण,सांख्यीकीइत्यादीमाहीतीविद्यार्थ्यानाहोते.

- अधिकोषाबददलपुर्णमाहीतीविदयार्थ्यानाहोते.
- सरकारचे धोरण

सेम ५

- विकसनशीलअर्थव्यवस्था,विकसीतअर्थव्यवस्था,अल्पविकसीत यांची कल्पना येते.
- लोकसंख्या वाढ,गरीबी, बेरोजगारीइत्यादीअभ्यासहोतो.
- आर्थिकविषमता, शेतक.याच्याआत्महत्याइत्यादीज्वलंतसमस्यावरती अध्ययन विद्यार्थीकरतात.

सेम ६

- जागतिकीकरण,खाजगीकरण,उदारीकरण यांची माहीतीहोते.
- शेतीचीउत्पादकता,हरितक्रांती याबददलउपाययोजना व माहीतीहोते.
- पंचवार्षिक योजना,श्रमींकाचीसौदाशक्ती,उद्योगाचीभरभराटइंत्यादी घटकांचीविद्यार्थ्यानामाहीतीहोते.

अर्थशास्त्र या विषयाचाप्रत्यक्ष जिवनातफायदा

१. जिवनजगण्याची कलानिर्माणहोते.
२. वेगवेगळयापदावरविराजमानहोता येते.
३. कौटूबिंकअदाजपत्रक तयारकरता येते.
४. उत्पन्नात वाढकशीकरता येईल यांची कलाअवगतहोते.
५. रोजगारप्राप्तकरता येते.
६. बचतकरण्याची वेगवेगळेउपाय निर्माणहोतात.
७. अर्थव्यवस्थेतवस्तुचीकिंमतकशीठरते यांचाअभ्यासकरता येतो.
८. स्वयंउद्योगप्रेरणामिळते.

FACULTY OF COMMERCE

Department of Commerce

Course outcum

Sr no.	Class	Subject	Name of Teacher	No of units	Teaching aids	Course out-come
		STATISTICAL TECHNIQUE & BUSINESS MATHEMATICS	Prof. Sandip Tajne	Unit I to IV		The students learn how to arrange data in tabulation form with use of Statistics and Business mathematics They learn averages. Correlation test, chi square test They also learn profit loss calculation and simple and compound interest.
		BUSINESS ECONOMICS	Prof. Mrs. K. K. Kale	Unit I to IV		The students understand the rules of demand and supply Student learns various type of market competition. Student learns basic knowledge of Economics. Students understand theory of rent students

						understand theory of cost.
1	B.COM - I	Marketing Management	Prof. M. R. Chaudhari	Unit I to IV	Black Board,Chalks,Charts Short Notes and sometime PPT	student Acquired the basic knowledge of marketing. Students aware about the modern trends in marketing. Student aware with the basic concepts of principles of marketing. They know about distribution channels, Functions of saleing agencies,
		FINANCIAL ACCOUNT	Prof. M. R. Chaudhari	Unit I to IV		Students have acquired knowledge about accounting terminology. They learnedhow to maintain financial records. They have developed financial approaches. They have obtained the knowledge of accounting rules. They learned various books of accounts.
		PRINCIPAL OF MANAGEMENT	Prof. C. K. Jiwane	Unit I to IV		The students learn discipline they learn management. They learn social responsibility, and motivation factors and its principle Importance of disaster managemen

Anand Niketan College of Arts Science and Commerce
Department of Commerce
Course out-cum

Sr no.	Class	Subject	Name of Teacher	No of units	Teaching aids	Course out-come
2	B.COM - II	COMPANY LAW & SECRETARIAL PRATICE	Prof. C. K. Jiwane	Unit I to IV	Black Board,Chalks,Charts Short Notes and sometime PPT	The students learn how to communicate with public as a company secretary, and they learn various types of company laws.Formation of company, raise in capital, types of company, function of directors. Function of secretary. Qualification of secretary. Types of company meeting. Agenda' motion and resolution.
		MONETARY ECONOMICS	Prof. C. K. Jiwane	Unit I to IV		It provides a frame work for analyzing money in its function as a medium of exchange. They learn types of money, currency, qualityand quantity monetary technique by RBI. They learn statutory liquidity ratio. Cash reserve ratio.
		Marketing Management (Sales and Distribution Management	Prof. Mrs. K. K. Kale	Unit I to IV		The student understood the conceptual framework of marketing ,and its application in decision making under various environmental constraints. They learn marketing skills and consumer behavior. They know about selling and distribution techniques of Marketing.They know importance communication in Marketing
		CORPORATE ACCOUNT	Prof. M. R. Chaudhari	Unit I to IV		Students have learned accounting knowledge about corporate. Students have obtained knowledge about banking institution Students obtained knowledgeabout capital formation in the industryStudents learned accounting about shares and liquidation of the companyStudents have obtained knowledge about promoting of company
		COST ACCOUNT &	Prof. Mrs. K. K. Kale	Unit I to IV		The students understand elements of cost in production and also

		MANAGEMENT ACCOUNT				calculating the profit in cost sheet, process costing, contract costing. And also understand take the decision of financial assessment on the basis of no loss no profit. And sources of fund and its application.

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Course out-cum

Sr no.	Class	Subject	Name of Teacher	No of units	Teaching aids	Course out-come
3	B.COM - III	AUDITING & INCOME TAX	Prof. Sandip Tajne	Unit I to IV	Black Board,Chalks,Charts Short Notes and sometime PPT	Students learn fundamental principles of auditing students understand Types of auditing students understand Auditing procedure students understand direct taxation theory Students learn how to calculate Income Tax from salary, Income from house property, Students learn calculate Income from other sources etc
		URBAN ECONOMICS & RURAL ECONOMICS	Prof M.R. Chaudhari	Unit I to IV		Students learn Indian economy policies, scope of agriculture, rural finance, role of enterprises, scope of international economics, protection policy, structure of balance of payment & importance of foreign exchange.
		INDUSTRIAL & SERVICE MARKETING	Prof. C. K. Jiwane	Unit I to IV		Students learn importance of service sector, scope of services in India, consumer rights. They learn marketing skills and consumer behavior.They learn about banking services, insurances services, and transportation. Communication industry services.
		ADVANCE ACCOUNTING	Prof. Mrs. K. K. Kale	Unit I to IV		Students learn how to maintain financial records. . And they learn various types of accounts. They learn Amalgamation .Absorption and external reconstruction.
		COMMERCIAL LAW/CORPORATE LAW	Prof. M. R. Chaudhari/ Prof. Mrs. K. K. Kale	Unit I to IV		Students learn various Indian commercial law as well as corporate law. In various corporate sector. They learn factory act 1948, labour welfareCompensation, leave, minimum wages rate Contract Act, etc.

DEPARTMENT OF ELECTRONICS

Program (B. Sc.: Physics, Electronics & Mathematics) Outcomes:

PO1: Knowledge: Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.

PO2: Programming Skills: Serve as the Programmers or the Software Engineers with the sound knowledge of practical and theoretical concepts for developing software.

PO3: Instrumentation: Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments.

PO4: Ability to design, implement and evaluate computer-based system, process, component.

PO5: Capability to design and conduct experiments, as well as analyze and interpret data.

PO6: Examine the impact of electronic solutions in global and environmental contexts and utilize the knowledge for sustained development.

PO7: Ability to use and apply the techniques & skills in modern engineering practice.

PO8: It helps to develop scientific temper and thus can prove to be more beneficial for the society as the scientific developments can make a nation or society to grow at a rapid pace.

PO9: After the completion of this course students have the option to go for higher studies i.e., M. Sc. and then do some research for the welfare of mankind.

PO10: After higher studies students can join as scientist and can even look for professional job-oriented courses.

Program (B. Sc.: Physics, Electronics & Mathematics) Specific Outcomes:

PSO1: The benefits of participating in this degree program include becoming qualified for rewarding careers working with electronics, mechanical systems, and all related systems.

PSO2: Graduates also enjoy the attention of qualified instructors, hands-on opportunities to put their developing skills to use, and exposure to the most current theories and practices used in the industry.

PSO3: After graduation, individuals can expect to find career opportunities in the automotive industry, the world of computers, and more specific fields such as digital signal processing, optoelectronics, and mobile electronics.

PSO4: This course also offers opportunities for serving in Indian Army, Indian Navy, Indian Air Force as officers.

PSO5: Students after this course have the option to join Indian Civil Services as IAS, IFS etc.

PSO6: Science graduates can go to serve in industries or may opt for establishing their own industrial unit.

PSO7: After the completion of the B. Sc. degree there are various other options available for the science students.

PSO8: Apart from the research jobs, students can also work or get jobs in Marketing, Business & Other technical fields.

PSO9: Science graduates also recruited in the bank sector to work as customer service executives.

PSO10: Students can also find employment in government sectors.

COURSE OUTCOMES

B. Sc. I (CBCS) SEM - I

Paper I (Network Analysis & Digital Fundamentals)

Student will be able to understand

CO1: Concept of energy sources and its applications.

CO2: Concept of network, its analysis methods and network theorems

CO3: Basic concept of number system, its type and its usefulness in digital electronics.

CO4: Basic concept of logic gates and their utilities in implementing digital circuit.

Paper II (Semiconductor Diodes and Analog Electronics)

Student will be able to understand

CO1: The basic of semiconductor diode and its applications.

CO2: The basic of rectifiers and its applications for constructing DC power supplies.

CO3: The Basic concept and working of transistor and it uses in the circuit.

CO4: The Basic concept of amplifiers and its analysis.

B. Sc. I (CBCS) SEM - II

Paper I (Unipolar Device and Linear Integrated Circuit)

Student will be able to understand

CO1: The basic concept and working of unipolar semiconductor component and its application.

CO2: Classification of amplifiers.

CO3: Need of Coupling of amplifier and how to couple one amplifier to other amplifier.

CO4: Feedback concept, its types and effect in the amplifier circuit.

CO5: Basic concept of oscillator circuit, different type of oscillator circuits and use of oscillator in different application.

CO6: Operational amplifier and its applications.

Paper II (Digital Integrated Circuit)

Student will be able to understand

CO1: Logic analysis and design of combinational circuit.

CO2: Basic concept of clock, timer circuit & flip-flop and its applications.

CO3: The concept of counter, its types and uses.

CO4: The concept of Shift registers and its applications.

B. Sc. II (CBCS) SEM - III

Paper I (Power Amplifier, Oscillators and Power Supplies)

Student will be able to understand

CO1: Basic concept of power amplifier and its types.
CO2: The concept of oscillators and its types.
CO3: The concept of DC regulated power supply, its types and constructions.

Paper II (Microprocessor)

Student will be able to understand

CO1: The concept of Input/Output Devices, Data storages (Memories), Memory organization and addressing.
CO2: 8085 Microprocessor Architecture and it s features.
CO3: Addressing modes of 8085µP and its instruction set.
CO4: Programming of 8085µP.
CO5: 8086 Microprocessor Architecture and its features.

B. Sc. II (CBCS) SEM - IV

Paper I (Communication Electronics)

Student will be able to understand

CO1: Basic concept of electronic communication: Block diagram, electromagnetic communication spectrum, band designations and usages, channels, and base-band signals
CO2: The concept of analog modulation ant its types.
CO3: Qualitative idea of super heterodyne receiver.
CO4: Modulation and detection technique for PAM.
CO5: Multiplexing.
CO6: Digital pulse modulation: ASK, FSK &PSK.
CO7: Satellite communications.
CO8: Mobile telephony system.

Paper II (Interfacing, PPI, and Microcontroller)

Student will be able to understand

CO1: The concept of interfacing.
CO2: Interfacing devices and its features.
CO3: Basic concept of microcontroller.
CO4: 8051 microcontroller architecture and its programming.

B. Sc. III (CBCS) SEM - V

Paper-I (USELT09-DSE-1A) (Compulsory) (Electronic Instrumentation)

Student will be able to

CO1: Develop skill to use instruments for the measurement of electrical quantities

CO2: Understand working principle of CRO and its applications for the measurement of voltage, frequency, and phase.

CO3: Understand basic principle of PLL and its applications.

CO4: Understand working of signal generators.

CO5: Understand working of different types of transducers.

Paper II (Elective I) (USELT10-DSE-1B) (C-Programming - I)

On completion of the course, students can:

CO1: Develop their programming skills.

CO2: Be familiar with programming environment with C Program structure.

CO3: Declaration of variables and constants.

CO4: Understand operators, expressions, and preprocessors.

CO5: Understand arrays, its declaration and uses.

Skill Enhancement Course

Electrical Circuits and Network Skills (SEC-1)

Student will be able to

CO1: Understand basic electricity principles.

CO2: Familiarize with multimeter, voltmeter, and ammeter.

CO3: Analyze electrical circuits.

CO4: Understand electrical drawing.

CO5: Understand working of generators and transformers.

CO6: Understand working of electric motors

CO7: Understand working of solid-state devices

CO8: Know about electrical protection devices

CO9: Know about electrical wiring

B. Sc. III (CBCS) SEM - VI

Paper-I (USELT09-DSE-1A) (Compulsory) (Electronic Instrumentation)

Student will be able to

CO1: Understand working principle of different types of photonic devices

CO2: Understand working principle of different types of semiconductor power devices

CO3: Understand applications of semiconductor power devices

CO4: Understand working principle of different types of power inverters

Paper II (USELT14) (Elective I) (C-Programming - II)

On completion of the course, students can:

CO1: Design programs using Functions, Pointers, Structures and Unions in C language.

CO2: Write a program using File Handling.

CO3: Writing programs for drawing different graphical shapes.

CO4: Develop programs using C to meet real world needs at primary level. This course provides platform to enhance student's basic skills required for advanced programming

Skill Enhancement Course

Renewable Energy and Energy Harvesting (SEC-3)

Student will be able to

CO1: Understand about fossil fuels and Alternate Sources of energy

CO2: Understand about solar energy and its different applications

CO3: Understand Wind Energy and Ocean Energy and their applications

CO4: Understand about Geothermal Energy and Hydro Energy and their applications

CO5: Understand about Piezoelectric Energy harvesting

CO6: Understand about Electromagnetic Energy Harvesting

M. SC. (PG) ELECTRONICS

Program Outcomes (PO):

PO1: At the time of completion of the programme, the student will be able to develop extensive knowledge in various areas of Electronics.

PO2: Understand solutions for electronic and allied systems and design system modules or processes that meet the specified needs with appropriate societal consideration.

PO3: Choose and apply appropriate modern tools/frameworks/platforms, software simulators, techniques, resources, and modern engineering and IT tools for solving engineering problems with an understanding of the limitations.

PO4: The course of the M.Sc. in Electronics has both national as well as foreign-based opportunities. Students after the completion of the course can get high profile jobs in Electronics companies, IT sector, universities, and colleges, etc.

PO5: After completing course of M. Sc. Electronics, students can go for higher studies such as M. Tech., M. E., Ph. D., etc.

Program Specific Outcomes (PSO):

PSO1: To enhance the knowledge in multidisciplinary approach in the field of Basic Technologies in electronics, Embedded Systems, microwaves, network analysis and synthesis, MEMs, nanoelectronics, control systems, ASIC and FPGA.

PSO2: To promote scientific and educational activities towards the advancement of the theory, projects and practice of Electronics fields and related arts and sciences.

PSO3: A postgraduate of the M. Sc. Electronics Program will demonstrate an ability to understand the basic concepts in Electronics & Communication Engineering and to apply them to various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of systems.

PSO4: A postgraduate of the M. Sc. Electronics Program can develop programming skill to be applied to develop various application programs, operating systems, interpreters, compilers, etc.

Course Outcomes (PSO):

M. Sc. I (CBCS) SEM-I

P-I (PSCELET01): Fundamentals of Semiconductor Devices

Student will be able to

CO1: Understand Valence bond model of semiconductor and working principles and characteristics of various types of semiconductor diodes.

CO2: Understand Bi-polar Junction Transistors' working principles in different configurations and their applications as microwave and switching transistors.

CO3: Understand working principles and characteristics of various types of unipolar devices.

CO4: Understand working principles and characteristics of various types of Optoelectronic Devices.

Paper-II ((PSCELET03): Advanced Microprocessors

Student will be able to

CO1: Understand Combinational Logic Design and their working

CO2: Understand to Analysis and Design of Sequential circuits

CO3: Understand VHDL: Implementation of Logic circuits

CO4: Understand VHDL Architecture

Paper-III (PSCELET02): Digital Design and Applications

Student will be able to

CO1: Understand Microprocessor Architecture of 16-bit microprocessors

CO2: Do Assembly Language Programming

CO3: Understand and implement Interfacing of Peripherals

CO4: Understand Architectures of 80x86 processors

Paper-IV (PSCELET04): Programming in C

Student will be able to

CO1: Understand Data types and storage classes in C programming language

CO2: Understand Control structure in C programming language

CO3: Understand Arrays, functions, Structures and Unions in C programming language

CO4: Understand Pointers and file handling in C programming language

M. Sc. I (CBCS) SEM-II

Paper-I (PSCELET05): Embedded Systems and Applications

Student will be able to

CO1: Understand architecture, features, and programming of 8051 microcontroller

CO2: Understand and implement Interfacing of peripherals to 8051 microcontrollers

CO3: General architecture and limitations of, 16-bit micro-controllers, ATMEGA, PIC and ARM processors

CO4: Understand development tools: ATMEL assembler and simulator, ATMEL AVR studio; robotic control applications

CO5: Understand architecture, programming, and applications of PLC (Programmable Logic Controller)

Paper-II (PSCELET06): Biomedical Instrumentation

Student will be able to

CO1: Understand Basic Principles of Biomedical Electronics

CO2: Understand working of Recording Systems

CO3: Understand about Patient Safety and imaging techniques

CO4: Understand working of various Biomedical Instruments

Paper-III (PSCELET07): Computer Organization and Interfacing

Student will be able to

CO1: Know Computer Organization

CO2: Know about Reduced Instruction Set Computers

CO3: Know about Data Acquisition Systems (DAQ)

CO4: Know Hardware Organization and PC interfacing

Paper-IV (PSCELET08): Virtual Instrumentation

Student will be able to

CO1: Know about Virtual Instrument (VI)

CO2: Know about VI Programming Techniques

CO3: Know about Instrument Control

CO4: Know about Processing and Analysis tool kits

M. Sc. II (CBCS) SEM-III

Paper I (PSELT301-Core 9) Network Analysis and Synthesis

Student will be able to

CO1: Know about Network Analysis

CO2: Know about Network Theorems and Applications

CO3: Know about Laplace Transform and Properties

CO4: Know about Network Functions and synthesis Techniques

Paper II (PSELT302-Core 10) Fuzzy Logic and Artificial Neural Networks

Student will be able to

CO1: Know about Fuzzy sets and Membership functions

CO2: Know about fuzzy principles, rules, and applications

CO3: Know about Fundamental concepts of ANN

CO4: Know about Associative memories and self-organizing networks

Paper III (PSELT303-DSE 1) Digital signal Processing

Student will be able to

CO1: Know about Discrete-time Signals and Systems

CO2: Know about Transform methods

CO3: Know about Digital Filter Design

CO4: Know about DSP Chips and Applications

Paper III (PSELT303-DSE 2) Digital Image Processing

Student will be able to

CO1: Understand about Digital Image Processing

CO2: Understand about Image Enhancement, Filtering, and restoration

CO3: Understand about Color Image Processing and Image Segmentation

CO4: Understand about Image compression and Digital Image Watermarking

Paper IV (PSELT304-SEC 1) Basic Electronics

Student will be able to

CO1: Know about Circuit Variables and network theorems

CO2: Know about Semiconductor devices

CO3: Know about Digital Electronics

CO4: Know about Op-amp and Special ICs

Paper IV (PSELT304-SEC 2) Mechatronics

Student will be able to

CO1: Know about Basic Elements of a mechatronic system

CO2: Know about Basic System Models

CO3: Know about System transfer Functions

CO4: Know about Closed-loop controllers

M. Sc. II (CBCS) SEM-IV

Paper I (PSELT401-Core 11) Electromagnetic Fields and Antennas

Student will be able to

CO1: Know about Electromagnetic waves

CO2: Know about Antenna Basics

CO3: Know about Antenna types

CO4: Know about Antennas for mobile communications and antenna measurements

Paper II (PSELT402-Core 12) Digital Communication
Student will be able to
CO1: Know about Signals and spectra
CO2: Know about Digital Communication system
CO3: Know about Digital Modulation Techniques
CO4: Know about Information Coding

Paper III (PSELT403-DSE 3) Microwave and Optical Communication
Student will be able to
CO1: Know about Microwave Generators and wave guides
CO2: Know about Microwave components and Measurements
CO3: Know about Fiber optics
CO4: Know about Manufacture and Measurements of fibers

Paper III (PSELT403-DSE 4) Computer Communication
Student will be able to
CO1: Know about computer network
CO2: Know about the Physical Layer Transmission and Switching
CO3: Know about the Medium Access Sub-layer
CO4: Know about the Network Layer

Paper IV (PSELT404-SEC 3) PC and PC Interfacing
Student will be able to
CO1: Know about Personal Computers
CO2: Know about Standard Peripheral Devices
CO3: Know about Data Acquisition
CO4: Know about I/O Buses and Ports

Paper IV (PSELT404-SEC 4) Mobile and Satellite Communication
Student will be able to
CO1: Know about Cellular Concepts and Equalization
CO2: Know about Diversity, channel coding and GSM system for Mobile
CO3: Know about Satellite Communication
CO4: Know about Multiple Access Techniques

Anand Niketan College, Warora

Department of Mathematics
M.Sc. Mathematics

Program Outcomes (PO's), Programme Specific Outcomes (PSO's), and Course Outcomes (CO's)

Programme Outcome:

- Inculated critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
- Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields.
- Imbibe effective scientific and/or technical communication in both oral and writing.
- Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.

- Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.
- Demonstrate basic manipulative skills in algebra, geometry, trigonometry and beginning calculus.
- Apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them.
- Demonstrate proficiency in writing proofs.
- Communicate mathematical ideas both orally and in writing.
- Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric or graphical methods.

Programme Specific Outcoms

Course Objectives	Program Specific Outcome
1. A student should be able to understand the proof techniques in Mathematics and the importance of theorems for sorting out typical examples. 2. A student should acquire sufficient technical competence to solve problems of varying difficulty levels and high notational complexity. 3. A student should be able to make observations, experimentation, and pattern recognition, which stimulate the research potential. 4. A student should acquire the communication skill to present technical Mathematics at various levels including schools, colleges, universities, etc.	1. Strengthening the understanding of the students and substantiating the conceptual framework of the Graduates in Mathematics for furthering their potential and capabilities in the subject. 2. Introducing advanced theories in the subject in an orderly manner with a clearly defined path of interdependence. 3. Introducing the specializations in different areas of Mathematics and at the same time emphasizing the underlying interconnections in different branches of Mathematics. 4. Generating more interest in the subject and motivating students for self-learning beyond the realm of syllabi and examinations. 5. Inculcating the spirit of inquiry among the students and preparing them to take up the research in Mathematics. 6. Exhibiting the wide range of applications of Mathematics and preparing students to apply their knowledge in diverse areas such as Physics, Astronomy, Biology, Social Science, etc.

COURSE OUTCOMES

Class	course	Course outcomes
M.Sc. Mathematics Part – I (sem – 01)	MTH-01 Group Theory and Ring Theory	A student who has studied and learned the material should be able to: 1. Incorporate equivalence relations into group-theoretic structures, particularly factor groups. 2. Determine subgroups and determine whether given subsets of a group are subgroups. 3. Use the Fundamental Theorem of Cyclic Groups to classify and determine the subgroup structure of non-cyclic groups. 4. Construct and manipulate group homomorphisms and isomorphisms. 5. Recognize and interpret theorems to prove properties about specific algebraic structures. 6. Use the skills of proof by contradiction, proof by contraposition, proof of set equality, and proof using both forms of mathematical induction. 7. Define and test a potential isomorphism for being well-defined, a homomorphism, one-to-one, and onto. 8. Use definitions of one-to-one, onto, well-defined, homomorphism, isomorphism, and others to characterize a given map. 9. Create factor groups using normal subgroups or the First Isomorphism Theorem and interpret elements of factor groups accurately. 10. Demonstrate understanding of permutations and symmetries in a group-theoretic context–articularly the significance of Cayley's Theorem. 11. Recognize and use the Sylow Theorems to characterize certain finite groups.

	MTH 02: Real analysis	Upon successful completion of this course, students will be able to : 1. To gain an understanding of abstract measure theory, definitions, and properties of integrations 2. To construct Lebesque measure on the real line and in n-dimensional Euclidean space. 3. Explain the concept of length, area, the volume of subsets of n-dimensional spaces. 4. Understand how to integrate functions having uncountable discontinuity. 5. Explains topological manifolds, compatible charts, smooth function on a manifolds, and examples of smooth manifolds. 6. Know the concept of diffeomorphisms, smoothness in terms of components, examples on smooth maps, partial derivaties, etc.
	MTH 03: Topology	Upon successful completion of this course, students will be able to: 1. Understand topics Topological spaces and continuous functions: Topological spaces, Basis for topology. The order topology, subspace topology, closed sets and limit points, continuous functions, The product topology, Continuous functions, Metric topology, The quotient topology. 2. Compute the Connectedness and compactness: Connected spaces, connected sets in the real line, components and path components, local connectedness compact spaces, Limit point compactness. 3. Learns dealing with Countability and separation axioms: The countability axioms, The separation axioms, The Urysohn Lemma, Urysohn Metrization theorem. 4. Use The Tychonoff Theorem, Completely regular spaces.

	MTH 04: Linear Algebra	Upon successful completion of this course, students will be able : 1. understand vector space, linear combinations and system of linear equations, linear independence and dependence. 2. For checking the irreducibility of Jordan and Rational canonical forms. 3. To solve linear transformations, null space, composition of linear transformation. 4. Understand diagonalization, eigen values and vectors, The caylew –hamilton theorem. 5To study inner product space & norms, normal and self adjoint operators, unitary and orthogonal operators and their matrices.
	MTH 05: Numerical Analysis	Upon successful completion of this course, students will be able : 1. Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems. 2. Apply numerical methods such as Bisection, Secant, Regula-Falsi, Mullers, etc to obtain approximate solutions to mathematical problems. 3. Derive numerical methods for various mathematical problems. Interpolation, differentiation, integration, the solution of linear and non-linear equations. 4. Analyze and solve several errors and approximations by trapezoidal rule, Simpson's rule, Newton cotes integration formulas, Gaussian Quadrature. 5. Apply several methods to solve curve fitting & Interpolation questions and their related techniques. 6. Understand theorem like Weirestrass and Taylor's theorem.

MSc. Mathematics Part – I Sem-02	MTH 06 : Field Theory	Upon successful completion of this course, students will be able to: 1. Understand the fundamental concepts of field extensions and Galois theory and their role in modern mathematics and applied contexts 2. Understand accurate and efficient use of field extensions and Galois theory 3. Understand capacity for mathematical reasoning through analyzing, proving, and explaining concepts from field extensions and Galois theory. 4. Apply problem- insightful solutions to several classical problems, of which the most notable is the problem of solvability by radicals: which polynomial equation in one variable can be solved using radicals, i.e. via root extraction in addition to the usual rational operations of addition, subtraction, multiplication, and division. 5. Understand why geometric constructions: squaring a circle, doubling a cube, and trisecting angle are impossible by using compass and scale.
	MTH 07 : Lebesgue Measure Theory	On completion of this unit successful students will be able to: 1. The Concepts Abstract Measure Space: Measures and outer measure, Extension of a measure, Uniqueness of extension, Completion of a measure, Measure spaces, Integration w.r.t. a measure. 2. Study the theorems on Integration and Lp-spaces: The Lp-spaces, Convex functions, Jensen's inequality, the inequalities of Holders and Minkowski. Completeness of Lp (μ) (Reisz Fisher Theorem) 3. Solving examples based on Convergence: Convergence in measure, almost uniform convergence, Egoroffs theorem, Lusin's theorem, Convergence diagram, Counterexamples. 4. solving examples on Signed measure and their derivatives: Signed measures and The Hahn Decomposition, The Jordan Decomposition, The Radon-Nikodym theorem, Some applications of the radon theorem, bounded linear functional on Lp.

	MTH 08 : Advance Topics in Topology	On completion of this unit successful students will be able to: 1. Define the concept of completely norm space, completely regular space, metric space as Topological spaces, Topological properties. 2. Define complete metric space, product space and prove the related theorems. 3. Understand theorems like The Tichonov theorem, Urysohn's metrization theorem. 4. Define and illustrate the concept of quotient topology, paracompact space. 5. Understand the concepts such as Nets and filters.
	MTH 09 : Classical Mechanics	On completion of this unit successful students will be able to: 1. Understand Hamilton's Principle, some techniques of calculus of variations. Extension of principle to Non-holonomic systems. 2. Can derive Lagrange's equation from Hamilton's principle. They also know conservation theorems and symmetry properties. 3. Understand Legende transformation and Hamilton equation of motion, cyclic coordinates, and conservation theorems. 4. They also know Routh's procedure and oscillations about steady motion. 5. They know the Hamiltonian formulation of relativistic mechanics and the principle of least action. 6. Understand the concept of canonical transformation, equations, and examples of canonical transformation. 7. Understand the concept of Poisson Brackets and other canonical invariants. 8. Understand the Infinitesimal canonical transformation, equation of motion. 9. Can explain the angular momentum brackets relations. 10. Understand symmetry groups of mechanical systems and Liouville's theorem.

	MTH 10: Differential Geometry	Upon successful completion of this course students will be able to : 1. Use geometric quantities such as length, curvature, etc. 2. Understand the concept of the first fundamental form and local intrinsic properties of a surface. 3. Understand the concept of Godesics on the surface. 4. understand the second fundamental form and local non-intrinsic properties of a surface. 5. Understand the fundamental equation of surface theory.

Anand Niketan College, Warora

Department of Mathematics

M.Sc. Mathematics

Programme Outcomes (PO's), Programme Specific Outcomes (PSO's) and Course Outcomes (CO's)

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- Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
- Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields.
- Imbibe effective scientific and/or technical communication in both oral and writing.
- Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
- Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

- Demonstrate basic manipulative skills in algebra, geometry, trigonometry and beginning calculus.
- Apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them.
- Demonstrate proficiency in writing proofs.
- Communicate mathematical ideas both orally and in writing.
- Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric or graphical methods.

Programme Specific Outcoms

Course Objectives	Programme Specific Outcome
1. A student should be able to understand the proof techniques in Mathematics and importance of theorems for sorting out typical examples. 2. A student should acquire sufficient technical competence to solve the problems of varying difficulty levels and high notational complexity. 3. A student should be able to make observations, experimentation and pattern recognition, which stimulate the research potential. 4. A student should acquire the communication skill to present technical Mathematics at various levels including schools, colleges, universitites, etc.	1. Strengthening the understanding of the students and substantiating the conceptual framework of the Graduates in Mathematics for furthering their potential and capabilities in the subject. 2. Introducing advanced theories in the subject in an orderly manner with a clearly defined path of interdependence. 3. Introducing the specializations in different areas of Mathematics and at the same time emphasizing the underlying interconnections in different branches of Mathematics. 4. Generating more interest in the subject and motivating students for self-learning beyond the realm of syllabi and examinations. 5. Inculcating the spirit of inquiry among the students and preparing them to take up the research in a Mathematics. 6. Exhibiting the wide range of applications of Mathematics and preparing students to apply their

	knowledge in diverse areas such as Physics, Astronomy, Biology, Social Science, etc.

Course outcomes

Class	Course	Course outcomes
M.Sc. Mathematics Part – II (sem – 03)	MTH-11 Complex Analysis	On completion of this unit successful students will be able to: 1. Understand the significance of differentiability for complex functions and be familiar with the Cautchy-Riemann equations; 2. Evaluate integrals along a path in the complex plane and understand the statement of Cauchy's Theorem; 3. Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues; 4. Use the Cauchy Residue Theorem to evaluate integrals and sum series.
	MTH-12 Functional Analysis	Upon successful completion of this course: 1. It increase the logical thinking of the students. 2. It teaches how to reason and model combinatorically. 3. Students are able to use generating functions to solve a variety of combinatorial problems. 4. Students are able to use addition and multiplication principle. 5. Students can understand the logical structure of programs. 6. It develops proficiency in solving discrete math problems
	MTH-13 Mathematical Methods	Upon successful completion of this course, students: 1. Students are able to Construct mathematical proofs of statements and Fourier transforms: The Fourier Integral, complex form of Fourier Integral and Fourier Interal theorem; Fourier

		transforms; properties, Fourier Cosine and Sine Transforms, finite Fourier transforms, 2. Students are able to understand convolution theorem, 3. Students understand the Parsvals Identity and relationship between Fourier transforms and Laplace transforms. 4. Students also understand concept of Laplace transform. 5. Students are able to understand Melline transform. 6. Students are able to understand Hankel transform.
	MTH-14 Fluid Dynamics – I	After completion this course, students will be able to 1. Understand the definitions of Real fluids and Ideal fluids, velocity of fluid at a point, stream lines and path lines, steady and unsteady flows, velocity potential, vorticity vector. 2. The students also understand the equation of continuity, Euler's equation of motion and Bernoullis equation. 3. Now the student know the concept about the sources, sinks and Doublets and also the Two-Dimensional irrotational Incompressible flow. 4. Student understand the first law of thermodynamic, Maxwell's Thermodynamic Relations. 5. Understand the speed of sound in a gas and student know the concept about the sonic, subsonic and supersonic flow.
	MTH-15 Operations Research - I	Upon successful completion of this course, students: 1. Will have to understand the concept of LPP and skill to solve LPP. 2. Will know the various methods to solve the LPP such as simplex method, Two-phase method, Big M-method or penulty method, Duality, Dual simplex method. 3. Will understand the concept of transportation problem and method to solve them. The methods are Northwest

		corner rule, Row minima method, Column minima method, Matrix minima method, Vogal Approximation method etc. 4. Can understand the concept of Assignment problem and the Hungarian method. 5. Can understand the concept of Game theory. Various type of games and methods to solve the problem. 6. Can understand the conversion of game problem to LPP. 7. Will understand the concept of Dynamical programming and various methods to solve the problems of Dynamical programming.
M.Sc. Mathematics Part – II (Sem – 04)	MTH-16 Dynamical Systems	Upon successful completion of this course, students: 1. Understand the concept of dynamical systems and vector fields. The fundamental theorem and existence and uniqueness of dynamical systems. 2. Know the continuity of solutions in initial conditions, Global solution of extending solution, the flow of a DE. 3. Understand the concept of nonlinear sinks, stability, Liapunov function, Gradient systems, Gradients and inner product. 4. Understand limit sets, local sections and flow boxes, monotone sequence in planar dynamical system. 5. Understand Poincare Bendixson theorem and its applications, one species, Predator and prey, competing species. 6. Know the concept of asymptotic stabitity of closed orbits, Discrete dynamical systems, stability and closed orbits. 7. Understand non autonomous DE; existence, uniqueness and continuity for non-autonomous DE. 8. Understand the differentiability of the flow of the autonomous equation, persistence of equilibria, persistence of closed orbits and structural stability.

	MTH-17 Partial Differential Equations	Upon successful completion of this course, students: 1. Understand the concept of 1st order and 2nd order PDE's. 2. Understand genesis of first order PDE, classification of integrals, Pfaffian DE Compatible systems, charpits method and Jacobi method, etc. 3. Understand the integral surfaces through a given curve, concept of Quasi linear equation and non-linear first order PDE. 4. Understand the second order PDE and classification of second order PDE, genesis of second order PDE, the one dimensional wave equation and its solutions. 5. Understand the Laplace equation, Heat conduction problem, Duhamel's principal, classification of PDE in case of n-variables, families of equipotential surfaces.
	MTH-18 Integral Equations	Upon successful completion of this course, students: 1. Solve and understand the concept of kernels. Eigen values and Eigen function, Differential equation, Initial value problems Boundary value problems 2. Solve Homogeneous Fredholm Integral equation of second kind with separable or Degenerate kernel. 3. Understand the concept of Hirbert-Schmidt theory involving complex Hilbert space, Gram-schmidh Orthonormalizaion process, Hilbert-schmidh theory. 4. Illustrate the solution of fredholm Integral Equation of first kind, schmidth's solution of the non homogeneous fredholm integral equation of second kind. 5. Solve the iterate kernel and Resolvent kernel of volterra, fredholm intergral equation. 6. Solve linear voltera and fredholm integral equation using appropriate methods.

		7. Understand the concept of solution of Integral Equation of second kind including successive Approximations and substitution methods. 8. Solve voltera integral equation by successive approximation which involve Neumann series.
	MTH-19 Fluid Dynamics – II	Upon successful completion of this course, students: 1. Understand the Navier-stoke equations of motion of a viscous fluid. 2. Now students are able to differentiate between stress and strain. 3. Students know the magnetic Reynold's number and Maxwell electromagnetic field equations. 4. Students understand the theory of Prandtl's boundary layer. 5. Students understand the definition of turbulence and introductory concepts and also the double correlations between turbulence velocity components.
	MTH-20 Operations Research - II	Upon successful completion of this course, students: 1. Will understand the concept of Integer programming proble. 2. Will understand Gomory technique to solve Integer programming problem. 3. Will able to compute job sequences performed on various machines. 4. Will understand the concept of Queuind various queuing models. 5. Can understand the concept of on-linear programming, Quadratic programming, Wolfe's method, Beals method etc. 6. Can understand the concept of Goal programming, Fractional programming etc.

Programme outcome, programme specific outcome and course outcome
Department of botany

After successful completion of two year degree program in (M.Sc. Botany) a student should be able to:

Sr. No.	**Programme Outcome (PO)**
1.	Students have developed the scientific temperament after completion of the program.
2.	Students have developed skill to preparing temporarily and permanent slide
3.	Students have developed the skills to identify different types of plants.
4.	Students have developed the skills to do laboratory work from different equipment.
5.	Students have developed the skills related to scientific research in the area of Botany.
6.	Students are ready to transform the society and can explain the importance of different plants to human beings.

Programme Specific Outcome (PSO)

1. Describe the evolution, anatomy, morphology, systematic, genetics, physiology and ecology of plants
2. The ecological and evolutionary features of the flora and fauna in environment
3. Use modern technology in education and scientific research in botany
4. To have knowledge about various plant groups from lower to higher groups.
5. To make the students aware about biodiversity conservation and sustainable use of plants.
6. Develop skills in practical work experiments, equipments and laboratory use along with collection and interpretation of biological materials and data.

Course Outcome

Semester I (M.Sc. Botany)

After completion these course students should be able to understand;		
Sr.No	Course	Outcome
1	Course code- PSCBOTT01 Microbiology, Algae and Fungi	1. History and contribution of Scientist in microbiology. 2. Structure of bacteria and viruses. 3. Algae- morphology, classification and habitat. 4. Comparative study, classification and evolutionary trends in fungi. 5. Symptomology, histopathology, etiology and identification of disease.
2	Course code : PSCBOTT02 Bryophytes and pteridophytes	1. General Character, distribution, classification, ecology of bryophytes. 2. General Character, distribution, classification, evolution of stele, heterospory and seed habit. 3. Important contribution of Indian pteridologist.
3	Course code ; PSCBOTT03 Gymnosperm and Paleo botany	1. Plant fossils - Preservation, preparation, age determination, geological time scale. 2. General Character, distribution, classification, economic important of gymnosperm. 3. Comparative morphology and evolutionary tendencies of gymnosperm.
4	Course code : PSCBOTT04 Cytology and Genetics	1. Mendel's law of inheritance. 2. Chromatin organization 3. Structure and numerical changes in chromosome. 4. Mutation and genetics

Semester II (M.Sc. Botany)

After completion these course students should be able to understand ;		
Sr. No.	Course	Outcome
1	Course code : PSCBOTT05 Plant Physiology and Biochemistry	1. The scope of plant physiology 2. Photosynthesis 3. Respiration 4. Carbohydrate metabolism, Lipid Metabolism 5. Lipid metabolism
2	Course code : PSCBOTT06 Plant development and reproduction	1. plant growth, kinetics and pattern of growth. 2. leaf, shoot, root and flower development, male and female gametophyte development. 3. pollen pistil interaction Seed Development and fruit growth, germination of seed and PCD
3	Course code : PSCBOTT07 Cell and molecular biology -I	1. about cell wall, plasmambrane, plasmodesmata. 2. cellular organelles, cell shape and motility. 3. DNA replication in prokaryotes and eukaryotes. 4. molecular biology of stress responses.
4	Course code : PSCBOTT08 Angiosperm - I	1. angiosperm morphology , angiosperm taxonomy, taxonomic evidence and taxonomic tools. 2. Students learn about biosystematics.

Semester III (M.Sc. Botany)

After completion these course students should be able to understand;		
Sr. No.	Course	Outcome
1	Course code- PSCBOTT09 Plant Ecology	1. vegetative organization and vegetative development. 2. ecosystem organization and biogeochemical cycle. 3. air, water and soil pollution and climate change. 4. Ecosystem stability.
2	Course code- PSCBOTT10 Cell and molecular biology - II	1. Ribosome structure and function, translation in prokaryotes and eukaryotes. 2. Gene structure and expression, protein sorting. 3. Genome organization in prokayoteic and eukaryotic organells. 4. Genetic recombination and mapping 5. Cell cycle and apoptosis, signal transduction. 6. Technique in cell biology.
3	Course code- PSDBOTT11 (DSE-I) Molecular biology and plant biotechnology - I	1. DNA replication, DNA damage and repair, repair system. 2. Isolation of gene and nucleotide sequence. 3. Molecular probing. 4. Splicing of foreign DNA into cloning vector, introduction of foreign DNA into host cell, isolation of genes or protein products from clones. 5. Sequence alignment and phylogenetic tree. 6. Genomics and proteomics
4	Course code- PSSBOTT12 (SEC-I) Basic botany	1. Diversity of cryptogams and phenorogams. 2. Morphology of angiosperm and anatomy of angiosperm.

Semester IV (M.Sc. Botany)

After completion these course students should be able to understand;		
Sr. No.	Course	outcome
1	Course code- PSCBOTT13 Plant biotechnology	1. Recombinant DNA technology, genetic engineering of plant. 2. Microbial genetic manipulation. 3. Plant tissue culture, transgenic production. 4. Bioinfomatics, database, data analysis, prediction and submission tool and their uses.
2	Course code- PSCBOTT14 Angiosperm - II	1. General account, distinguish characters, floral variation and evolution affinity of primitive family of angiosperms. 2. Probable ancestor of angiosperm, primitive living angiosperm. 3. Biological diversity concept
3	Course code- PSDBOTT15 (DSE-II) Molecular biology and plant biotechnology - II	1. Trans genesis- method for gene transfer. 2. Application of transformation. 3. Metabolic engineering through transgenic plants. 4. Plant tissue culture. 5. DNA fingerprinting and marker assisted breeding
4	Course code- PSSBOTT16 (SEC-II) Basic botany	1. Plant physiology- plant water relation, plant growth, movement and reproduction. 2. Ecology and evolution of plant. 3. Economic botany and paleobotany.

Program outcomes (PO), Program specific outcomes (PSO) And Course outcomes(CO) of Zoology (C.B.C.S)

Program outcomes	• Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms • Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms. • Analyze complex interactions among the various animals of different phyla, their distribution and their relationship with the environment • Understands the complex evolutionary processes and behaviour of animals • understand the physiological processes of animals and relationship of organ systems • Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, and vermin-compost preparation. • Understands about various concepts of genetics, molecular biology and its importance in human health • Understand the physiological aspects of human and other vertebrates
Program specific outcomes	• Understand the nature and basic concepts of cell biology, genetics, molecular biology, taxonomy, physiology, ecology, diseases, disease spreading agents and applied Zoology • Understand the relationships among animals, plants and microbes • Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, molecular Biology, Immunology, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology and research methodology • Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine • Gains knowledge about research methodologies, effective communication and skills of problem solving methods

Course Outcomes (CO) M.Sc. Zoology

Semester	Title	Course specific outcomes
I	STRUCTURE AND FUNCTION OF INVERTEBRATES	• Course will provide knowledge regarding the various Invertebrates species • Students gain knowledge in the areas of Systematic position, general organization and affinities of invertebrates • The students will be well equipped to become very competent in research or teaching fields after completion of this course
	GENERAL PHYSIOLOGY	• Compare the functioning of organ systems across the animal world. • Learn more about animal physiology and anatomy.
	CELL BIOLOGY AND GENETICS	• Understanding on the details of the basic unit of life at the molecular level. • Explain the fine structure and functions of cell organelles. • Introduce the new developments in genetics and its implications in human welfare. • Expose the learners to the basics of genetics, genetic diseases.
	ADVANCED REPRODUCTIVE BIOLOGY	• In this course, students will learn the biological processes of reproduction, including the endocrinology and physiology of male and female reproduction. • They will gain an understanding of the determinants of fertility and infertility, and how reproductive biotechnology is used to overcome poor fertility. • This course will also include a focus on the biology of normal and disordered pregnancy. • Students will explore how reproductive biology impacts other aspects of health, exploring implications of early life exposures for later health and of the biology of reproductive cancers. • Social and ethical implications of reproductive technologies and research will be discussed within appropriate topics.
	PRACTICAL	BASED ON THEORY PAPER 1 AND 2
	PRACTICAL	BASED ON THEORY PAPER 3 AND 4
	SEMINAR 1	• Build effective communication, interactive and presentation skill to meet global competencies

II	STRUCTURE AND FUNCTION OF VERTEBRATES	• Course will provide knowledge regarding the various vertebrates species • Students gain knowledge in the areas of Systematic position, general organization and affinities of vertebrates • The students will be well equipped to become very competent in research or teaching fields after completion of this course
	COMPARATIVE ENDOCRINOLOGY	• Students understand how the endocrine system is functioning. • They will understand the structures and molecular modes of action of a large variety of vertebrate and invertebrate hormones • Students will understand how hormones can regulate animal behavior. • They will acquire understanding of the physiological importance of hormones, as well as on their possible use and abuse in animals and humans
	MOLECULAR BIOLOGY AND BIOTECHNOLOGY	• It gives insight into various cell/tissues culture techniques • Understanding of in vitro culturing of organisms and production of transgenic animals. • Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms • Gains skills in medical, environmental biotechnology, biopesticides, Biotechnology of aquaculture and use of animals as bioreactors • This insight allows students to take into consideration about ethical issues involved in production transgenic animals and BT products.
	ADVANCED DEVELOPMENTAL BIOLOGY	• Students will learn development of animal from egg to adult and also learn the processes of blastula, gastrulation • Will learn fundamental molecular and cellular mechanisms contribute during development process. • Will learn how these different mechanisms integrate at the level of whole tissues,

		organs and organisms, and how they are functionally adapted in distinct developmental contexts.
	PRACTICAL	• Practical based on paper 5 and 6
	PRACTICAL	• Practical based on paper 7 and 8
	SEMINAR 2	• Improve the presentation skill
III	PARASITOLOGY AND IMMUNOLOGY	• Provides basics knowledge about immune system and parasites • Types of immunity, antigens-antibodies and their properties • Complement system, MHC's and immune responses • Understanding of types of hypersensitivity reactions and auto immune diseases • Ability to understand concepts of tumor immunology and transplantation immunology • Study of diverse ecto and endoparasites • Understanding of fundamental complement of numerous diseases which have significant impact on human health • Understanding of Insect vector host interactions of many important diseases like Malaria, Filaria, Dengue etc.
	SPECIAL GROUP-AQUACULTURE-I	• Understand the basic principles, status and importance of aquaculture and role of plankton in fisheries • Acquire Knowledge of pond ecosystem, water analysis, construction of fish farm • Develop ability to identify carps, biology, reproductive system and breeding behaviors • Learn about collection fish seed, concept of bundhs, hypophysation and Hatching techniques
	SPECIAL GROUP-AQUACULTURE-II	• Acquire knowledge about zooplankton, culture and breeding method of Prawn, Crabs, Oyster and Pearl culture • Understand development and advancement of aquaculture in India • Learn about economic principles and applications, Rural development of aquaculture, FFDA development and Fishery extension techniques in relation to aquaculture • Get familiar with socio-economic status of fisherman, co-operative society and role of various law in fishery development

	FOUNDATION I- BASIC ENTOMOLOGY	• Acquire knowledge about insects, their systemic position – classification , anatomical features and metamorphosis • Understand the insect physiology viz sound, light and reproduction • Details concept about insects communication • Detailed study of major order viz Lepidoptera, Odonata, Coleoptera and Hymenoptera at species level

		•
	BASED ON THEORY PAPER 9	• Practical based on paper 9
	BASED ON THEORY PAPER SPECIAL GROUP 1 AND 2	• Practical based on paper 10 and 11
	SEMINAR 3	• Improve the presentation skill
IV	BIOTECHNIQUE, BIOSTATISTICS, ETHOLOGY, TOXICOLOGY AND BIOINFORMATICS	• Students gain knowledge about various tools & techniques used in biological systems and gives them insight about their use in research. • Biostatistics teaches them to use the best data analysis methods in their research projects • Students gains knowledge about statistical methods like measures of central tendencies, Probability • Learns about hypothesis testing and inferential statistics • Learns the problem-solving methods • Learns various aspects of bioinformatics
	SPECIAL GROUP- AQUACULTURE III (AQUACULTURE AND MANAGEMENT)	• Course provides students comprehensive understanding about pond preparation and its management • Understand nutritional requirement, supplementary feeding, growth hormones and transporting of live fish (Brood and seed) • Learnt about polyculture and integrated aquaculture • Able to understand use of waste water and fish culture
	SPECIAL GROUP- AQUACULTURE IV (FISH PATHOLOGY AND FISH GENETICS)	• Acquire knowledge about biochemical composition, Nutritional values various fish preservation methods • Understand the process of decomposition, rigor mortis,spoilage and demerits of fish food • Acquire Fish and fish product information • Understand about various diseases of fish farm • Understand the concept of hybridization , transgenic fish and fish genetic resources
	FOUNDATION II (APPLIED AND INDUSTRIAL	• Students will applied value of fisheries • Learn about rearing and maintenance of mulberry sericulture (*Bombyx mori)*,

	ENTOMOLOGY)	historical perspectives, Mulberry plantation, life cycle and processing techniques • Understand about Tasar silk rearing , biology, life cycle, silk harvesting, host plants and their predators • Learn about Eri silk rearing, biology , life cycle, silk harvesting, Diseases and Economic importance • Understand concept of Forensic entomology • Learned in details about apiculture, Bee keeping techniques, economic importance and apiary products
	PRACTICAL BASED ON THEORY PAPER SPECIAL GROUP 3 AND 4	• Practical based on paper 14 and 15
	PROJECT	• Make research proposal • Construct tool of data collection • Learn fieldwork modalities • Understand the process of data analysis • Writing research report.
	SEMINAR 4	• Improve the presentation skill

Program Outcomes,
Program Specific Outcomes and
Course Outcomes

PROGRAMME : M.Sc. ORGANIC CHEMISTRY

PROGRAMME OUTCOME (PO)

After successful completion of three year degree program in Chemistry a student should be able to;

Programme Outcomes	PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry. PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion. PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions. PO-4. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community. PO-5. Find out the green route for chemical reaction for sustainable development. PO-6. To inculcate the scientific temperament in the students and outside the scientific community. PO-7. Use modern techniques, decent equipments and Chemistry software"s
Specific Outcomes	PSO-1. Gain the knowledge of Chemistry through theory and practical"s. PSO-2. To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions. PSO-3. Identify chemical formulae and solve numerical problems. PSO-4. Use modern chemical tools, Models, Chem-draw, Charts and Equipments. PSO-5. Know structure-activity relationship. PSO-6. Understand good laboratory practices and safety. PSO-7. Develop research oriented skills. PSO-8.make aware and handle the sophisticated instruments/equipments.

Programme Outcomes: M. Sc Organic Chemistry
Department of Chemistry

After successful completion of two year degree program in chemistry a student should be able to;

Programme Outcomes

.

PO-1. Determine molecular structure by using UV, IR and NMR.
PO-2. Study of medicinal chemistry for lead compound.
PO-3. Improve the Skill of student in organic research area.
PO-4.Synthesis of Natural products and drugs by using proper mechanisms.
PO-5. Study of Asymmetric synthesis.
PO-6. Determine the aromaticity of different compounds.
PO-7. Solve the reaction mechanisms and assign the final product.

Programme Specific Outcomes (PSO)

PSO-1. Know the structure and bonding in molecules/ ions and predict the Structure of molecule/ions.

PSO-2. Understand the various type of aliphatic, aromatic, nucleophilic substitution reaction.

PSO-3. Understand and apply principles of Organic Chemistry for understanding the scientific phenomenon in Reaction mechanisms.

PSO-4. Learn the Familiar name reactions and their reaction mechanisms.

PSO-5. Understand good laboratory practices and safety.

PSO-6.Study of organometallic reactions.

PSO-7. Study of free radical,bycyclic compound, conjugate addition of Enolates and pericyclic reactions.

PSO-8.Study of biological mechanisms using amino acids.

Course Outcomes (CO)
M. Sc Organic Chemistry
Semester-I
Course Outcomes

After completion of these courses students should be able to;

Physical Chemistry

CO-1. Realize the terms ionic strength, activity coefficient, DHO equation.

CO-2. Know the Eigen function, Eigen value, operator and postulates of quantum mechanics.

CO-3. Learn two and three dimensional box, mechanics of particle.

CO-4. Understand the adsorption of gases by solid type of isotherms

CO-5. Recognized the Fricke and cerricsulphate Dosimeter.

CO-6. Learn parent-daughter relationship, application of radioactivity,NAA, IDA. Effect of radiation and units of radiation.

Inorganic Chemistry

CO-1 Determine and Learn about Dipole moment and bond order of the inorganic molecule.

CO-2. Learn about geometry and shape of the molecule.

CO-3. Known the preparation and properties of transition metal carbonyls

CO-4. To understand the 18 electron rule and its application.

CO-5. Find out the point group of inorganic molecules.

CO-6. Learn molecular orbital and its orientation.

CO-7. Learn concept of symmetry elements in molecules.

Organic Chemistry

CO-1. Learn SN1, SN2 and SNi Mechanism and stereochemistry.

CO-2. Learn classical and non-classical carbocation, NGP by pi and sigma bonds.

CO-3. Solve the elimination problems.

CO-4. Distinguish between type of addition, elimination and substitution reaction.

CO-5. Learn E and Z nomenclature inC,N,S,P containing compound , Stereo chemical principal, enantiomeric relationship R and S.

Semester-II

Physical Chemistry

CO-1. Learn the thermodynamic description of exact, inexact differential and state function.

CO-2. Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure.

CO-3. Know the statistical thermodynamics and various partition functions.

CO-4. Study the steady state approximation michaelis- menten mechanism, lindemann-hinshelwood mechanism, chain reaction, Rate determining stapes and consecutive elementary reactions.

CO-5. Learn the molecular spectroscopy, R.Raman, Electronic

Inorganic Chemistry

CO-1. Understand the mechanism in transition metal complexes, Born Haber cycle to calculate lattices energy.

CO-2. Learn the use of catalyst, radius ratio rule of coordination number 3,4.

CO-3. Study the structure of atom, Hunds rule, term symbol, calculationofmicrostate and selection rule.

CO-4. Understand the metal complexes in biological system.

Organic Chemistry and spectroscopy

CO-1`. Study the various name reaction with examples.

CO-2. Learn the mechanism of rearrangement reaction, use synthetic reagent of oxidation and reduction for solving the problems.

CO-3. Understand the factors affecting UV-absorption spectra, Interpret IRspectra on basic values of IR-frequencies.

CO-4. Discuss the problem of UV, IR and NMR.

Physical chemistry

CO-1. Calculate molar and normal solution of various concentrations.

CO-2. Determine specific rotations and percentage of to optically active substances by polorimetrically.

CO-3. Study the energy of activation and second order reaction.

CO-4. Study the stability of complex ion and stranded free energy change and equilibrium constant by potentiometry.
CO-5. Find out the acidity, Basicity and PKa Value on pH meter.

Inorganic chemistry practicals

CO-1. Study the gravimetric and volumetric analysis of ores and alloy.

CO-2. Prepare a various inorganic complexes and determine its % purity.

CO-3.Preparation of nonmaterial.

CO-4.To understand the chromatographic techniques.

Organic chemistry practicals

CO-1. Perform the ternary mixtures.

CO-2.Preparation of organic compounds, their purifications and run TLC.

CO-3. Determination of physical constant: Melting point, Boiling point.

CO-4.Different separation techniques.

Semester-III

Organic reaction mechanism

CO-1.Study of carbanion-formation, stability and related name reaction, enemies and its applications.

CO-2. Understand the NGP.

CO-3. Learn the carbines and nitrenes.

CO-4. Study of free radicals: generation of radicals, Nucleophilic electrophilic radicals, inter and intra molecular C-C bond formation via mercuric hydride.

CO-5.Study of oxidative coupling and SNAr reaction.

Spectroscopic methods in structure determination

CO-1. Study 1H NMR Spectroscopy: Chemical Shift, deshielding, correlation for protons bonded to carbon and other nuclei.

CO-2. Study of 13C NMR spectroscopy: FT- NMR, type of 13C NMR spectra, proton decoupled , off resonance, APT, INEPT, DEPT, Chemical shift, nuclear and hetero nuclear coupling constant

CO-3. 2D NMR techniques: COSY, homo and hetero nuclear 2D resorts spectroscopy, NOESY and the applications

CO-4. Study of mass spectrometry: Instrumentation, various methods of ionization, SIMS, FAB, MALDI. Different detectors rules of fragmentations of different functional groups.

Organic stereochemistry

CO-1.Study of stereochemistry of six member ring.

CO-2. Learn the stereochemistry of rings other than six members.

CO-3. Understand fused bridge and Caged rings.

CO-4. Learn resolution of racemic modification, stereochemistry of organic compound using NMR.

CO-5. Determine geometrical isomerism and stereochemistry of olefins.

Photochemistry, Pericyclic reaction and heterocyclic chemistry.

CO-1. Study of photochemistry: Carbonyl compounds, alkenes, dienes, polyenes and aromatic compounds.
CO-2. Study photo rearrangement Barton reaction, application of photochemical reaction.
CO-3. Learn Pericyclic reaction: Electro cyclic, Cycloaddition, and Ene Reaction, analysis by correlation diagram, FMO approach and ATS concept.
CO-4. Study of heterocyclic chemistry: Five and six member heterocyclic with one or two hetero atoms.

CO-5. Understand condensed five and six member"s heterocyclic.

CO-6. Study the synthesis, reactivity, aromatic character and importance of heterocyclic compounds.

Semester-IV

Chemistry of natural product

CO-1. Study structure and stereochemistry of hardwickiic acid, camptothecin andpodothyllotoxin.
CO-2. Study the synthesis of taxol, estorne and mefepristone, fredericamycinA.
CO-3. Learn biogenesis terpenoides, alkaloids and shikimmte pathway.

CO-1.Study of transition metal complexes in organic synthesis. Advance synthetic organic chemistry.
CO-2. Learn C=C formation reaction, multi compound reaction, ring formation reaction.
CO-3. Study of sharplessazidesCycloaddition, use of boron and silicon in organic synthesis.

Carbohydrate and chiral approach, chiral drugs and Medicinal chemistry.

CO-1. Study of carbohydrates: Introduction of sugar, structure of triose tetrosa, panctose, hexoes, stereochemistry of glucose.
CO-2. Understand the chiral approach, concept of chiral templates, and utilization of the basic concept for reterosynthetic strategy.
CO-3.Study of chiral drug.
CO-4. Learn medicinal chemistry, the action and discovery.
CO-5. Study the structure activity and drug targets.
CO-6. Study of antimicrobial drugs, antibacterial, antifungal, antiviral, antimalerial etc.

Designing organic synthesis and asymmetric synthesis.

CO-1. Study the design of organic synthesis, protection deprotation of hydroxyl, amino carboxyl, ketones and aldehyde.

CO-2. Learn retrosynthesis.
CO-3. Understand the principle and application of asymmetric synthesis.
CO-4. Study of cram"s rule, felkin-Anh rule, Cram"s chelate model asymmetric synthesis using chiral reagent.

Single stage preparations

CO-1.Spectral analysis best on instrumental techniques.
CO-2.Preparation of organic compounds, their purifications and run TLC.
CO-3. Determination of physical constant: Melting point, Boiling point.
CO-4.Different separation techniques.

Two stage preparation

CO-1. Spectral analysis best on instrumental techniques
CO-2.Preparation of organic compounds, their purifications and run TLC.
CO-3. Determination of physical constant: Melting point, Boiling point.
CO-4.Different separation techniques.

Single stage preparations by

CO-1.Spectral analysis best on instrumental techniques.
CO-2.Preparation of organic compounds, their purifications and run TLC.
CO-3. Determination of physical constant: Melting point, Boiling point.
Green synthesis.CO-4.Different separation techniques.

Programme Outcomes: M. Sc Analytical Chemistry Department of Chemistry

After successful completion of two year degree programme in chemistry a student should be able to;

Programme Outcomes

.
PO-1.Demonstrate, solve and an understanding of major concepts in all

disciplines of Chemistry.
PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.
PO-3. Create an awareness of the impact of chemistry on the society, and development outside the scientific community.
PO-4. Become professionally trained in the area of Industry, material science, lasers and Nano-Technology.
PO-5. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of Chemistry experiments.
PO-6. To inculcate the scientific temperament in the students and outside the scientific community.
PO-7. Apply modern methods of analysis to chemical systems in a laboratory setting.

Programme Specific Outcomes

PSO-1. Learn about the potential uses of analytical industrial chemistry.
PSO-2. Carry out experiments in the area of organic analysis, estimation, separation, derivation process, conduct metric and potentiometric analysis.
PSO-3. Learn the classical status of thermodynamics.
PSO-4. Gathers attention about the physical aspects of atomic structure, various energy transformation, molecular assembly in nanolevel and significance of electrochemistry.
PSO-5. Understand good laboratory practices and safety.
PSO-6. Introduce advanced techniques and ideas required in developing area of Chemistry.
PSO-7. Make aware and handle the sophisticated instruments/equipments.
PSO-8. Enhance students" ability to develop mathematical models for physical systems.

Course Outcomes M. Sc Analytical Chemistry
Semester-I
Course Outcomes

After completion of these courses students should be able to;

Physical Chemistry

CO-1. Realize the terms ionic strength, activity coefficient, DHO equation.
CO-2. Know the Eigen function, Eigen value, operator and postulates of quantum mechanics.

CO-3. Learn two and three dimensional box, mechanics of particle.
CO-4. Understand the adsorption of gases by solid type of isotherms
CO-5.Recognized the Fricke and cerricsulphate Dosimeter.
CO-6. Learn parent-daughter relationship, application of radioactivity, NAA, IDA. Effect of radiation and units of radiation.

Inorganic Chemistry

CO-1 Determine and Learn about Dipole moment and bond order of the inorganic molecule.
CO-2. Learn about geometry and shape of the molecule.
CO-3. Known the preparation and properties of transition metal carbonyls
CO-4.To understand the 18 electron rule and its application.
CO-5. Find out the point group of inorganic molecules.
CO-6. Learn molecular orbital and its orientation.
CO-7. Learn concept of symmetry elements in molecules.

Organic Chemistry

CO-1. Learn SN1, SN2 and SNi Mechanism and stereochemistry.
CO-2. Learn classical and non-classical carbocation, NGP by pi and sigma bonds.
CO-3. Solve the elimination problems.
CO-4. Distinguish between type of addition, elimination and substitution reaction.
CO-5. Learn E and Z nomenclature inC,N,S,P containing compound ,Stereo chemical principal, enantiomeric relationship R and S.

General Chemistry

CO-1.Study the importance of safety and security, responsibility types of hazards and risk in chemical laboratory.
CO-2. Understand the use of personal protective and other safety equipments, handling of chemical in laboratory.
CO-3. Understand the route of explores for toxic chemicals.
CO-4. Learn good laboratory practices and its applications.

Semester-II
Physical Chemistry

CO-1. Learn the thermodynamic description of exact, inexact differential and state function.
CO-2. Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure.
CO-3. Know the statistical thermodynamics and various partition functions.
CO-4. Study the steady state approximation michaelis- menten mechanism, lindemann-hinshelwood mechanism, chain reaction, Rate determining stapes and consecutive elementary reactions.
CO-5. Learn the molecular spectroscopy, R.Raman, Electronic and Mossbauer and its application.

Inorganic Chemistry

CO-1. Understand the mechanism in transition metal complexes, Born Haber cycle to calculate lattices energy.
CO-2. Learn the use of catalyst, radius ratio rule of coordination number 3, 4.
CO-3. Study the structure of atom, Hunds rule, term symbol, calculation of

microstate and selection rule.
CO-4. Understand the metal complexes in biological system.

Name reaction, synthetic Organic Chemistry and Spectroscopy

CO-1`. Study the various name reaction with examples.
CO-2. Learn the mechanism of rearrangement reaction, use synthetic reagent of oxidation and reduction for solving the problems.
CO-3. Understand the factors affecting UV-absorption spectra, Interpret IRspectra on basic values of IR-frequencies.
CO-4. Discuss the problem of UV, IR and NMR.

General Chemistry

CO-1.Study the instrumentation, sample injection system, columns for HPLC and GC, Solvent treatment system and choice of mobile phase.
CO-2. Learn instrumentation of mass spectrometry, fragmentation, structure determination.
CO-3. Solve mean and standard deviation problems.
CO-4. Understand the accuracy and precision and classification error.
CO-5. Learn distillation, solvent extraction, crystallization, and otherseparation techniques.

Physical chemistry practicals

CO-1. Calculate molar and normal solution of various concentrations.
CO-2. Determine specific rotations and percentage of to optically active substances by polorimetrically.
CO-3. Study the energy of activation and second order reaction.
CO-4. Study the stability of complex ion and stranded free energy change and equilibrium constant by potentiometry.
CO-5. Find out the acidity, Basicity and PKa Value on pH meter.

Inorganic chemistry practicals

CO-1. Study the gravimetric and volumetric analysis of ores and alloy.
CO-2. Prepare a various inorganic complexes and determine its % purity.
CO-3.Preparation of nonmaterial.

CO-4.To understand the chromatographic techniques.

Organic chemistry practicals

CO-1. Perform the ternary mixtures.
CO-2.Preparation of organic compounds, their purifications and run TLC.
CO-3. Determination of physical constant: Melting point, Boiling point.
CO-4.Different separation techniques.

Semester-III

CHA-390 CO-1. Study of colorimeter, Faraday 1st law, Faraday 2nd law.
Electro analytical CO-2. Study of voltametry and paleographic method of analysis,
and radio analytical heterodynamicvoltametry, plus paleography and cyclic voltametry.
methods of CO-3. Study of ampherometry and their applications.
analysis. CO-4. Learn radio analytical methods of analysis, activation analysis,
isotope dilution analysis, radio metric titration.
CO-5. Understand thermal methods of analysis TGA, DTA, DSC.

Pharmaceutical analysis.

CO-1. Study of apparatus for test and assay, cleaning of glassware, role of
FDA in pharmaceutical industry.
CO-2. Learn biological test and assay, microbiological test and assay,
physical test, determination, limit test sterilization.
CO-3. Analysis of vegetable drug, sources of impurities in pharmaceutical
row materials and finished products.
CO-4. Learn standardization and quality control of different row materials.

Advanced analytical techniques.

CO-1. Study the classical approach for aqueous extraction, solid phase
extraction, micro extraction and SFE.
CO-2. Learn: AAS, FES, ICPAES, and DCP.
CO-3. Study atomic fluorescence, resonant ionization and LASER based
enhanced ionization.
CO-4.Study of different detectors and their applications.

Geochemical and alloy analysis and analytical method Development and validation.

CO-1.To understand assay validation and inter laboratory transfer.
CO-2. Study the statistical analysis and analytical figure.
CO-3. Learn the analysis of geological materials and alloys.
CO-4.Study the analysis of soil, sampling, chemical analysis as a measure of soil fertility

Semester-IV
Analytical spectroscopy

CO-1.Study of ESCA, Detectors and their applications.
CO-2. Learn X-ray method of analysis, numerical problems.
CO-3. Understand an introduction to microscopy, its applications.
CO-4.Study of chemiluminescences, Fluorescence and phosphorescence.
CO-5.Study of NMR spectroscopy.

Analytical methods for analysis of fertilizer detergent, water and polymer,

CO-1. Study of analysis of fertilizer, sampling and sample preparation, kjeldal"s method.
CO-2. Understand the analysis of soap and detergents, UV-spectroscopic analysis of detergent.
CO-3. Study of water pollution and analysis of polluted water paint and pigments. CO-4. Learn the polymer chemistry, analysis and testing of polymer, measurement of molecular weight and size.
CO-5. Understand paint and pigment analysis.

Pollution monitoring and control and analysis of body fluid.

CO-1. Study of pollution monitoring, removal of heavy toxic metals Cr, Hg, Cd, Pb, As.
CO-2. Learn the removal of particulate matters, SO2 AndNOx.
CO-3. Study the collection of specimen blood, urine, faeces.
CO-4. Learn the analysis of blood and urine, Vitamin in body fluid.
CO-5. Study the liver function and kidney function test.

Analytical toxicology and food analysis..

CO-1.Study of acute poisoning, clinical toxicology.
CO-2. Learn the isolation, identification and determination of narcotics, stimulants and depressants.
CO-3. Study the classification function, analysis of carbohydrate, Protein, lipid.
CO-4. Study the food preservatives, identification determination, and composition.

Analysis of materials

CO-1. Study the gravimetric and volumetric analysis of ores and alloy.
CO-2. Prepare a various inorganic complexes and determine its % purity.
CO-3.Preparation of nonmaterial.
CO-4.To understand the chromatographic techniques.
CO-5. Estimation of Iron By Various methods.

Instrumental Analysis.

CO-1. Spectral analysis best on instrumental techniques
CO-2.Photometric determination.
CO-3.Study of Conductometer, FES, Polarography.
CO-4.Analysis of riboflavin by photoflurometry.
CO-5.To Study the spectroscopic techniques.
CO-6.To study the terbidometry and Neflometry.

Single stage preparations by Green synthesis.

CO-1. Study the dissolution of tablet.
CO-2. Learn the spectroscopic techniques.
CO-3. Study Volumetric and gravimetric estimation.
CO-4.Analysis of Quinine sulphate by photoflurometry.
CO-5. Study of folin Wu metho

ANAND NIKETAN COLLEGE, ANANDWAN, WARORA
DEPARTMENT OF PHYSICS
Post Graduate (PG)

Programme Outcomes (PO)

1. To promote a culture of research and produce quality human resource in the field of Physics.
2. To teach students a solid foundation of physical, mathematical, and relevant scientific as well as technological knowledge
3. To developing the intellectual skills essential for prosperity and success in their careers.
4. To encourage a culture of research in students and inspire them towards a career of innovation
5. To enhance research capabilities by doing a comprehensive literature survey and reading advanced texts.

Program Specific Outcomes (PSO)

1. For understanding of basics to students which would benefit them with knowledge of core subjects like Mathematical Physics, Classical Mechanics, Electrodynamics, and Electronics, Solid state Physics, Quantum Mechanics, Statistical Physics, Spectroscopy and Nuclear Physics.
2. Students get a professional learning experience through vigorous work that is deliberated with the application of daily life phenomenon.
3. To apply mathematical techniques for describing and deeper understanding of physical systems and to analyze problems based on physics as well as mathematical principles by utilizing their skills and physics tools.
4. To apply principles of Quantum mechanics for understanding the physical systems in quantum realm.
5. To apply statistical methods for describing the classical and quantum particles in various physical systems and processes.
6. To apply inter-disciplinary concepts and computational skills for understanding and describing the natural phenomenon.
7. To get exposure in various specializations of Physics (Solid State Physics/Nuclear Physics/Particle Physics/Material Science etc).
8. Engage in research and life-long learning to adapt to changing environment and prepare for many competitive exams like NET SET GATE.
9. They are able to use theoretical knowledge to implement practical solutions

Course Outcomes

M.Sc. Semester I

Core 1 paper 1 (PSCPHYT01) Mathematical Physics
Core 2 paper 2 (PSCPHYT02) Complex Analysis and Numerical MethodsCore 3
paper 3 (PSCPHYT03) Electronics
Core 4 paper 4 (PSCPHYT04) Electrodynamics I
Practical Core 1 and 2 (PSCPHYP01 & P02) Practical I (Paper 1 & 2)
Practical Core 3 and 4 (PSCPHYP03 & P04) Practical II (Paper 3 & 4)Seminar I

PSCPHYT01: Mathematical Physics

Course Outcomes

1. The students will have confidence and understand in solving and applying the mathematical skills to solve quantitative problems in the study of physics.
2. To understand and apply Cartesian (X, Y, Z), Spherical polar (r,θ,φ) and Cylindrical (ρ,φ,z)co-ordinate systems and their transformation equations.
3. To understand expression for gradient, divergence, curl and Laplacian incurvilinear, spherical polar and cylindrical co-ordinate systems.
4. Students will understand the applications of vector space, matrix algebra and special functions.
5. Demonstrate a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics
6. Demonstrate specialized analytical skills and techniques necessary to carry out advanced calculations in a range of advanced topics in physics.
7. Approach and solve new problems in a range of advanced topics in physics
8. Use mathematical formulations, analyses and models to obtain insight inspecialized areas of Physics.
9. Identify different special mathematical functions.
10. Solve partial differential equations with appropriate initial or boundary conditionswith Green function techniques.

(PSCPHYT02) Complex Analysis and Numerical Methods

Course Outcomes

1. To understand and apply Complex number (Addition, Subtraction, Multiplication, Division,Complex conjugate).
2. To understand and apply Exponential form of complex number.
3. To understand and apply vector algebra to interpret angulardisplacement, angular velocity and angular acceleration.
4. To understand, apply and solve problems using Euler's formula.
5. To state de-Moivere's theorem and to Trigonometric functions Application ofexponential form for power and roots of complex numbers.

6. To solve relevant theoretical problems using numerical methods.
7. To solve partial differentiation.
8. To understand Vector Algebra including Scalar and Vector product Scalar tripleproduct and its geometrical interpretation, Vector triple product and apply it.
9. Application of vector analysis such as vector operator, Gradient, Divergence, Curlof a vector to solve the problems of Physics.

(PSCPHYT03) Electronics

Course Outcomes

1. To distinguish between P-N diode, Zener diode, LED and Photodiode.
2. To understand Half wave, full wave and bridge rectifiers and filters: capacitancefilter, inductor filter and π filter.
3. To learn logic gates and to design R-S, clocked R-S, D, JK and T flip flops usinglogic gates.
4. To state De Morgan's theorems and understand symbols, Boolean expression and truth tables for gates.
5. To demonstrate voltage regulation using Zener diode.
6. To understand basic construction and operation of bipolar transistors (NPN andPNP)
7. To distinguish between transistor circuit configurations (CB, CE, CC), currentgains (α, and β) and their inter-relationship.
8. To solve problems of electronics using decimal and hexadecimal number system.

PSCPHYT04: Electrodynamics I

Course Outcomes

1. Describe the nature of electromagnetic wave and its propagation through different media and interfaces involved in different situations.
2. Simplify charged particle dynamics and radiation from localized time varying electromagnetic sources.
3. To evaluate fields and forces in Electrodynamics and Magneto dynamics using basic scientific method.
4. To provide concepts of relativistic electrodynamics and its applications in branches of Physical Sciences
5. To state Gauss law and its application to obtain electric field for different cases.
6. Describe and explain the relationship between the electric field and the electrostaticpotential.
7. Be able to solve relevant theoretical problem and use their conceptualunderstanding of the electromagnetic laws in order to qualitatively describe the behavior of the solution to the problem
8. Understand origin of Maxwell's equations in magnetic and dielectric media
9. To derive continuity conditions on electromagnetic fields at boundaries
10. To Show laws of geometric optics originate with Maxwell's equations at dielectric boundaries calculate reflection and transmission coefficients for waves at dielectric boundaries.

PSCPHYP01 & P02: Practical I (Paper 1 & 2)

Course Outcomes

1. To write a program to find the largest or smallest of a given set of numbers and execute
2. To write a program for Bubble sort and execute.
3. To write a program for Matrix multiplication and execute
4. To write a program for Lagrange Interpolation method.
5. To write a program for Newton-Raphson Method.

PSCPHYP03 & P04: Practical II (Paper 3 & 4)Seminar I

Course Outcomes

1. To design a regulated power supply
2. To design Basic, TTL, NAND and NOR gates.
3. To design and study Combinational logic gates
4. To design and study Flip-Flops.
5. To design and study Astable, Monostable and Bistable multivibrator.

M.Sc. Semester II

Core 5 paper 5 (PSCPHYT05) Quantum Mechanics ICore 6
paper 6 (PSCPHYT06) Statistical Physics Core 7 paper 7
(PSCPHYT07) Classical Mechanics Core 8 paper 8
(PSCPHYT08) Electrodynamics II
Practical Core 5 and 6 (PSCPHYP05 & P06) Practical 3 (Paper 5 & 6)
Practical Core 7 and 8 (PSCPHYP07 & P08) Practical 4(Paper 7 & 8)

PSCPHYT05: Quantum Mechanics

Course Outcomes

1. The students will be able to grasp the concepts of spin and angular momentum, as well as their quantization and addition rules.
2. To understand historical aspects of development of quantum mechanics.
3. To understand and explain the differences between classical and quantum mechanics.
4. To develop a knowledge and understanding of the concept that quantum states live in a vector space.
5. To formulate Schrödinger equation-time dependent and time independent forms.
6. To formulate the Schrödinger wave equation in terms of spherical polar coordinates for its application to solve Hydrogen atom problem.
7. To derive energy Eigen value and eigen functions particle in a box and 1-D Harmonic oscillator.
8. To understand Postulate of quantum mechanics, operators and use of commutation and commutative algebra of operators to solve quantum mechanics problem.

PSCPHYT06: Statistical Mechanics

Course Outcomes

1. Students have understood the concept of phase space and its volume.
2. They can easily distinguish between different types of particles and statistics and can easily distribute bosons, fermions and classical particles among energy levels.
3. The students will be able to work out equations of state and thermodynamic potentials for elementary systems of particles
4. To understand basic concepts of probability and probability distribution.
5. To solve Random walk problem in one dimension and Gaussian probabilitydistribution.
6. To understand specification of the state of the system.
7. To state Basic postulate of equal a priori probability,
8. To understand Statistical Ensembles and Calculation of microstates of an idealmonatomic gas.
9. To understand Distribution of energy between systems in equilibrium.
10. To state Boltzmann relation for entropy and to perform Statistical calculations ofthermodynamic quantities.
11. To state Equipartition theorem and its application to mean K.E. of a molecule in agas and to Harmonic oscillator.
12. To derive Maxwell's equations from thermodynamic potentials
13. To state TdS and energy equation.

PSCPHYT07: Classical Mechanics

Course Outcomes

1. The students will be able to apply the Variation principles to real physical problems
2. Define and understand basic mechanical concepts related to advanced problems involving the dynamic motion of classical mechanical systems.
3. Describe and understand the motion of a mechanical system using Lagrange, Hamilton formalism.
4. Describe and understand the motion of the forces in non inertial systems.
5. Apply the basic laws of physics in the areas of classical mechanics, Newtonian gravitation, Types of forces: Forces of Gravitation, Lorentz force, Hooks Force, Frictional Force, and Fundamental Forces of Nature.
6. Recognize how observation, experiment and theory work together to continue to expand the frontiers of knowledge of the physical universe.
7. Apply basic mathematical tools commonly used in physics, including elementary probability theory, differential and integral calculus, vector calculus, ordinary differential equations, partial differential equations, and linear algebra.
8. To solve Lagrange's equation, Properties and simple application of Lagrange's equation .
9. To solve Hamiltonian, Hamilton's canonical equation of motion, and to understand Physical significance Advantages and Applications of Hamilton's equations of motion .
10. To understand Central force, Reduction of two body problem into equivalent one body problem, Motion in inverse square law force field and to state Kepler's laws.
11. To apply Rotating coordinates system and to Derive the Corioli's force from Lagrangian formulation

PSCPHYT08: Electrodynamics II

Course Outcomes

1. Understand Scalar waves, Vector waves and their properties.
2. Understand Symmetries of Maxwell equations and Lorentz transformations and application of Lagrangian for EM field.
3. Understand Motion of a charge in EM fields.
4. Understand Wave guides and their types, Bremsstarhlung and its application insynchrotron

PSCPHYP05 & P06: Practical 3 (Paper 5 & 6)

Course Outcomes

1. **CO1:** Determination of e/m by Thomson method
2. **CO2**: Determination of Plank's constant.
3. **CO3**: Determination of Stephan's constant
4. **CO4**: Construction and determination of dielectric constant.
5. **CO5**: Study of B-H Curve.

PSCPHYP07 & P08: Practical 4(Paper 7 & 8) Seminar 2

Course Outcomes

1. Thickness of thin wire with lasers
2. Measurement of wavelength of He-ne laser light using ruler.
3. Ultrasonic velocity of liquid mixtures- Interferometer
4. Determination of wavelength of monochromatic source using MICHELSON Interferometer.
5. Study of Hall Effect in semiconductors.

M.Sc. Semester III

Core 9 paper 9 (PSCPHYT09) Quantum Mechanics II
Core 10 paper 10 (PSCPHYT10) Solid state Physics and Spectroscopy
Core Elective I paper 11 (PSCPHYT11) Applied Electronics I
Foundation Course I paper 12 (PSCPHYT12) Fundamentals of Nanoscience and Nanotechnology
Practical 5 (Based on Core 9 and 10)
Practical 6 (Based on Elective I)Seminar 3

PSCPHYT09: Quantum Mechanics II

Course Outcomes

1. Understand time independent perturbation theory in Quantum mechanics and it'sapplications.
2. To understand Time dependent perturbation theory and WKB approximation.
3. Understand identical particles and Born Oppenheimer Approximation.
4. Understand the interaction picture, S-matrix, and Wick's Theorem.
5. Understand Scattering theory and its importance
6. Understand Relativistic wave equations, Klein Gorden equations and Dirac'srelativistic equations.

PSCPHYT10: Solid state Physics and Spectroscopy

Course Outcomes

1. Be able to account for interatomic forces and bonds
2. Have a basic knowledge of crystal systems and spatial symmetries
3. Be able to account for how crystalline materials are studied using diffraction, including concepts like the Edwald's sphere, form factor, structure factor, and scattering amplitude.
4. Be able to perform structure determination of simple structures
5. Understand the concept of reciprocal space and be able to use it as a tool to know the significance of Brillouin zones
6. Know what phonons are, and be able to perform estimates of their dispersive and thermal properties
7. Be able to calculate thermal and electrical properties in the free-electron model and know Bloch's theorem and energy band and distinction between metals, semiconductors and insulators
8. Be able to estimate the charge carrier mobility and density.
9. Be able to account for what the Fermi surface is and how it can be measured.
10. To understand Lattice heat capacity and to compare Classical theory, Einstein'stheory, Debye's theory of specific heat of solids.
11. To apply techniques of X-Ray Diffraction and UV Spectroscopy to study crystals.

PSCPHYT11: Applied Electronics

Course Outcomes

1. Classify different types of FETs and demonstrate feedback amplifiers, OP-AMPs, and oscillator circuits.
2. Compute and characterization of feedback amplifiers, OP-AMPs, and oscillator circuits.
3. Design, develop and analyze the various applications using operational amplifiers and timer IC 8085 & IC 8086
4. Operate and understand standard electronic equipment such as breadboard, pulse generator, digital multi-meters, power supplies and digital ICs to analyze, test and implement the digital circuits.
5. Understand the generalized architecture of 8085 microprocessor.
6. Demonstrate programming proficiency using the various addressing modes and data transfer instructions of the microprocessor.
7. Understand an in-depth analysis of the addressing modes, timing diagram, time delay and interrupts for executing programs efficiently.
8. Design and develop 8085 electronic instrumentation systems using external peripherals and I/O devices by understanding the concept of interfacing with peripherals.
9. Discriminate different types of computer architecture and develop the concept of pipelining and multiprocessing system

PSCPHYT12: Fundamentals of Nanoscience and Nanotechnology

Course Outcomes

1. To understand the nanomaterials and their necessity.
2. To study the various methods for synthesis of Nanomaterials

3. To study the Synthesis of metal nanocomposites and their use.
4. To study the different Characterization techniques of Nanomaterials and their use in different technology.

Practical 5 (Based on Core 9 and 10)

Course Outcomes

1. Measure wavelength in the emission spectra of iron (Iron arc).
2. Determine Rydberg‟s constant.
3. Determine Planck's constant
4. Understand and design crystal structure.
5. Measure wavelength and different properties of LASER

Practical 6 (Based on Elective I)

Course Outcomes

1. Analyze the fluorescence spectrum of a sample.
2. Determine E/m of electron.
3. To measure the ultrasonic velocity in unknown liquid
4. Understand and design experiments with He-Ne Laser
5. Measure and study the polarization of LASER Light

M.Sc. Semester IV

Core 11 Paper 13 (PSCPHYT13) Nuclear and Particle Physics
Core 12 Paper 14 (PSCPHYT14) Solid State Physics
Core Elective II Paper 15 (PSCPHYT15) Applied Electronics II
Foundation Course II paper 16 (PSCPHYT16) Optics and Optical Instruments
Practical 7 (Practical 7 Based on Core 11, 12 and elective II)
Project

PSCPHYT13: Nuclear and Particle Physics

Course Outcomes

1. To understand nuclear compositions and Elementary particles, charge symmetryand independence, spin dependence of nuclear force.
2. To state Law of radioactive decay and its application.
3. To distinguish between Types of nuclear models: Single particle shell model andLiquid drop model.
4. To understand nuclear reactions and conservation laws.
5. To understand nuclear fission on the basis of liquid drop model and nuclear fusion.
6. To understand basic principles and classification of Nuclear Reactor.
7. To learn types of detectors and classification of accelerators.

PSCPHYT14: Solid State Physics

Course Outcomes

1. Understand Free electron theory of metals and Seebeck effect, thermoelectricpower of metals.
2. Understand magnetic properties of materials and quantum theory of paramagnetism.
3. Understand Band theory and its applications.
4. Understand Lattice dynamics, Theories of lattice specific heat, Dulong and Petit‟slaw, and Einstein and Debye models for specific heat
5. Understand Superconductivity and Landau's theory of superconductivity.

PSCPHYT15: Applied Electronics II

Course Outcomes

1. Identify and select the various building blocks of a communication system and their functions.
2. Understand, analyze and design the different modulation techniques like AM, FM and Pulse Modulation etc.
3. Analyze the signal transformation using sampling theorem and understand the knowledge of PCM.
4. Study and explore the digital communication system and the various modulation techniques such as ASK, FSK and PSK etc.
5. Establish the performance and efficiency of the communication systems with information and coding techniques.
6. Recognize the various Telemetry systems, coding, and Time Division Multiplexing and Frequency Division Multiplexing techniques.
7. Interface a microprocessor or microcontroller to external input/output devices and perform input/output device programming in assembly language.
8. Demonstrate how different I/O devices can be interfaced to processor and will explore several techniques of interfacing.
9. Understand and apply the fundamentals of assembly level programming of advanced microprocessor (8086).
10. To know the Interfacing with RAMS & ROMS
11. To understand the Pin diagram of Intel 80386
12. To study the Architecture of Intel-8255
13. To study the Architecture of Intel-8254

PSCPHYT16: Optics and Optical Instruments

Course Outcomes

1. To understand various theories of light.
2. To acquire skills to identify and apply formulas of optics and wave physics.
3. To understand the properties of light like reflection, refraction, interference, diffraction etc.
4. To understand the applications of diffraction and polarization.
5. To understand the working of X-ray technique for image formation.
6. To understand the resolving power of different optical instruments.
7. To understand working of holography and their applications in various fields.
8. To acquire knowledge in optical fiber and their applications in communication.

9. To understand working principle of CT-scanning.

Practical 7 (Based on Core 11, 12 and elective II)

Course Outcomes

1. To measure resistivity of a semiconductor by four probe method at different temperaturesand determine band gap energy.
2. Using Hall coefficient of given semiconductor we can understand how to identify type of semiconductor andestimate charge carrier concentration.
3. To determine Dielectric constant
4. Understand and measure the Random decay of nuclear disintegration using dice

Project

Course Outcomes

1. Research and communicate scientific knowledge in the context of a topic related to material science.
2. To explain the significance and value of problem in physics, both scientifically and in the wider community.
3. Explore new areas of research in physics and allied fields of science and technology
4. To design and carry out scientific experiments as well as accurately record the results of experiments.
5. To evaluate experimental strategies, and decide which is most appropriate for answering specific questions.

Maharogi Sewa samiti,Warora

ANAND NIKETAN SCIENCE,ARTS AND COMMERCE COLLEGE. ANANDWAN, WARORA

DEPARTMENT OF SOCIOLOGY

Programme Outcomes (PO's) , Programme Specific Outcomes (PSO's) and Course Outcomes (CO's)

Programme Name – M.A.Sociology

PROGRAMME OUTCOMS :

Sociology seeks to understand all aspects of Society and human behavior. Sociology provides an intellectual background for students for considering Careers in the Professions or business.

After successful completion of two year degree program in Sociology a student should be able to;

PO1 - The Programe seeks to develop in students the Sociological knowledge of advance theories that will enable them to think critically and imaginatively about Society and Social issues The Programme seeks to develop in students the inputs to compare sociological theories and their relevance in Indian Society.

PO2 - The programme will develop research attitude and skills which create strong writing and Communication skills. for betterment of society through advocacy.

PO3 - The programme will develop better understanding of reality. which supports the ability to apply sociological knowledge in personal and social lives.

PO4 - The programme will develop analytical thinking with individual project field survey preparation of dissertation etc. and they will know the entire process of scientific research. PO5 : The programme will provide enough awareness of major social problems, gender issues, environment and health problems of inclusive groups etc.

PO6 - The programme will provide understanding, of tribal society urban society, culture status of women, development and change, modernization and globalization etc and also know the importance of various branches of sociology.

PO7 - The programme will develop strong foundation for their Career and profession.

PO8 - The programme will enhance their capacities for organizing various seminar, conferences which will help them for learning, thinking and evaluating phenomena of society.

PROGRAMME SPECIFIC OUTCOME :

The Curriculum of M.A is Multi disciplinary and interdisciplinary in nature.

PSO1 - Sociological knowledge-giving Students effective Sociological knowledge and skills to understand the Society, and Society issues in Scientific Way.

PSO2 - Development of critical thinking- from the sociological theories students will able to think critical and imaginatively about different society and social issues. They will also able to give their inputs to compare and contrast sociological theories and it's relevance for Indian society.

PSO3 - Research Skills and attitude. Research methodology will provide students to know the various methods and techniques which help them to

PSO4 - Training for social work and preparation for careers in teaching, research and administration in the field of education, social work, health, urban, rural and tribal administration, and other new avenues for corporate world. -Sociology of health, modernization and globalization, human resource management etc. the course is includes in discipline in sociology.

PSO5 - Skill development Developing skills for effective decisions, writing and management.

PSO6 : Gender Sensitization. The course of gender studies and Culture & Society provides solid back ground to create gender sensitization. It enhances citizenship with social concern will create awareness of issues and policies for women development.

PSO7 - Design research study To understand the role of qualitative and quantitative methods in sociology. It build sociological knowledge and attitude towards research. Practical project work, dissertation etc will help them to design research and finally they can assess more work in library and field work and published their reports.

PSO8 - Social Interaction The course will provide with solid work of social interaction. The sociology of practice will give this chance to interact with social institutions i.e. family, caste, old age home, renal society, orphanage home, NGOS etc.

PSO9 - Responsible and Effective Citizen The course explain self development and responsible citizenship. voluntary work with differently able a people, slum children, give them opportunity to become responsible citizens.

PSO10 - Develop attitude towards social work and counseling, The sociology of practice and gender related course will create more concern with social work and counseling. This will train them to work with NGOs, different peoples, village survey etc and counseling. research attitude.

COURSE OUTCOMES :

CO1 : Sociology is connected with everyday life and practice in the Society. The main out come of the course are as under.

CO2 : Students will be able to understand social realities, develop sociological view point and appreciate theoretical perspective of 'Sociology'. and it's relevance in Indian Society.

CO3 : Student will be sensitized towards scientific temper and appropriate techniques and methods for social research.

CO4 : Student will come to know about different perspectives of Indian Society.

CO5 : Students will be sensitized towards various marginalized sections of Society and Gender. CO6 : Student will become aware about culture, issues and basic problems of Society.

CO7 : The course will clarify the understanding of political Sociology and teach about governance as well as Political Power Structure in India.

CO8 : Students will obtain knowledge about the relations between society and environment and also create awareness aware about environmental issues

CO9 : Students will obtain proper knowledge about tribes and rural society.

CO10 : Students will be able to analyze the process of globalization and modernization

CO11 : Students will learn about the history of changes and social movements through this, they will also understand the expectation and needs of the members of the society. for better under standing of various institutions.

CO12 : Students will know the contemporary situation of education, health and it's development.

CO13 : Students will be trained and empowered for gender equality and work with NGOS and government policies.

CO14 : Students will develop effective communication, skill in all the way about Sociology.

Semester - I

Course- Classical Sociological Theory (Compulsory)

CO1- Students will aware with foundational process for emergence of Sociology.

CO2- They will equip with critical, logical and analytical thinking to understand complex social phenomenon.

CO3- Enabling students to link theories and cross cutting issues.

CO4- To understand the role of theory in sociology such that the student will be able to define theory, describe and illustrate its role in building sociologicalknowledge.

CO5: Analyse Life & Major Works of Karl Marx

CO6: Explain contributions of Emile Durkheim

CO7: Elaborate on contributions of Max Weber

Semester -I

Course- Methodology of Social Research – I (Compulsory)

CO1- Understand the Research and SocialResearch.

CO2- Unreportd the basic knowledge of SocialResearch.

CO3- Development the comparative understanding of technique ofresearch.

CO4- Understanding Sociology as a science, concepts and steps in research.

CO5- Differentiate between the Quantitative and Qualitative Research and understand different types of Research Design.

CO6: Understand the various techniques of Data Collection- Observation, Questionnaire, Interview Schedule; Case Study, Social Survey, Content Analysis

Semester – I

Course – Rural Society in India (Optional)

CO1- The main aim of the course is to introduce the contemporary countryside/rural area as a sociologically interesting space and to explain the principles and concepts of the modern rural development.

CO2- It also points out the milestones in social change of countryside during 20thcentury.

CO3- To understand the rural space in a wider societal-cultural-historicalcontext.

CO4- Acknowledge the specific dimensions that shape the ruralrealities.

CO5- To reference and discuss the sociological problems ofrurality.

CO6- Describe Social Structure of Rural Communities

CO7- Explain Village Governance during pre and post-independence; Panchayati Raj System: its impact on Rural India-Land Reforms – Liberalization

Semester – I

Course – Social Movements in India (Optional)

CO1 - Explain Social Movements and Types of Movements.

CO2 - Describe Reform Movements.

CO3 - Describe Radical/ Revolutionary Movements.

CO4 - Elaborate Regional Movements – Dalit Movement, Vidarbha movement, Naxal Movement.

CO5 - Understand Environmental and Women's Movements

CO6 - Explain the impact of Social Movements on Social Policy.

CO7 - Through this course, the students are aware about changes that have taken place in Indian society so far and also know the role of leadership in advancing the society that no social movement can be successful without goodleadership.

CO8 - This course teaches students that collective efforts and social organization are needed to bring change and relocation in human society, in the absence of which no society canprogress.

CO9 - Through the old movements like national, tribal, peasant and labor movements taking place in Indian society, students get knowledge about radical changes in the Indian frontiergroups.

CO10 - By new movements like Dalit, feminist and environmental movement, students aware about democratic and constitutional values that distribution of equal resources and equal opportunities is the necessary for the survival of marginal group and also for the idealsociety.

Semester-II

Course- Perspective On Indian Society (Compulsory)

CO1 Define sociological theory, understand its features and describe and illustrate the role of theory in building sociological knowledge.

CO2 Introduce themselves to the classical theories of Sociology and contributions of different thinkers in this regard.

CO3 Know the contributions of founding fathers of Sociology in developing sociology as an academic discipline.

CO4 Understand the concepts and contributions of Indian social thinkers Dr.Ghurye,Dr.Srinivas,A.R.Desai in the reform of Indian society as well as to enhance knowledge about society.

CO5 Know the contributions of Indian Sociologists in the development of sociological thought.

Semester-II

Course- Methodology of Social Research – II (Compulsory)

CO1- Describing various types of Sampling.

CO2- Elaborate on Data Processing and Data Analysis.

CO3- Writing research reports.

CO4- Students will understand the use of different theoretical perspective and ground level research skills.

CO5- Students will able to apply the research methods to practical issues.

CO6- Students can work as an independent researcher.

CO7- They will understand the Correlation between theory and application.

CO8- How they can link their own daily life experiences with their interest area of research.

CO9- They will able to understand the importance of scientific approach.

Semester – II

Course – Urban Society in India (Optional)

CO1 - Explain Nature and Scope of Urban Sociology; Differentiation and Continuum of urban.

CO2 - Understand relation between Urbanization and Industrialization.

CO3 - Describe Social Structure of Urban Communities.

CO4 - Analyse major theoretical Perspectives in Urban Sociology and Patterns of Urban Growth – Urban.

CO5 - Describe Urban economy in India-Urab Development Initiatives; Urbanization and Industrial growth.

CO6 - Explain the concept of City/Town Planning and Urban PProblem.

CO7 - Describe National Urbanization Policy in India.

Semester – II

Course – Sociology of Kinship Marriage and Family (Optional)

CO1 - To understand the basic institution of marriage with the different changing perspective with times .

CO2 - To know about the family system with its changing feature .

CO3 - To understand the kinship system in India.

CO4 - To analyze the different contemporary issue in society with emerging time .

Semester-III

Course- Theoretical Perspectives in Sociology – I (Compulsory)

CO1- Students shall aware of contemporary trends in social theory.

CO2- They can compare and contrast various theoretical viewpoints, to understand nuances of the society.

CO3- Understand the basic knowledge of advance Socialtheories.

CO4- Analyse the critical theories of advance socialtheories.

CO5- Explain the contributions of Anthony Giddens, Alfred Schutz, Harold Garfinkel, Husserl and Goffman Social Stratification.

Semester - III

Course – Sociology of Change and Development - I (Compulsory)

CO1 - Elaborating the concepts of Development and Underdevelopment.

CO2 - Describing the Concepts and Indicators of development; Human Development and Economic Growth; Concepts of Social Development, Economic Development, and Sustainable Development

CO3 - Explaining the theoretical Perspectives on Development and Contemporary critical perspectives on development.

CO4 - Understanding the role of International Institutions (World Bank, IMF, WTO, ILO, UNO, UNICEF) in Development Policies

CO5- Interface between Democracy and People's participation for development; Modernization, Globalization and Development.

CO6 - Describe Development, Migration and Displacement

CO7 - Elaborate on victims of development, Rehabilitation and Resettlement – Role of Civil society and NGOs. SEZs/AEZs and Development.

CO8 - Describe the concept Social and Economic Planning; Five Year Plans; Intervention Programmes for development.

Semester – III

Course – Political Sociology – I (Optional)

CO1 - Provides knowledge of major theoretical approaches in politicalsociology.

CO2 - Provides a broad introduction to the rich research about civil society, citizens, culture and behavior, how these fields have developed over time and where they standtoday.

CO3 - Acquire habits of socio-political information: finding, sorting and criticalexamining.

CO4 - Reflect on the utility of political sociology as a way to understand socialproblems.

Semesters- III

Course- Industry and Society in India – I (Optional)

CO1- Describe the Nature and Scope of Industrial Sociology; Growth of Industrialization, Industrial

Revolution and its impact on Society

CO2- Elaborating on Changing Structure of modern Industrial enterprises and principles of Organization Formal and Informal

CO3- Understand Scientific Management of F.W.Taylor, Human Relations Approach of Elton Mayo

CO4- Elaborate Human Relations in Industry; Fordism and Post- Fordism

CO5- Describe Trade Union Movement in India; Workers Participation in Management and Collective Bargaining.

CO6 - Explain Industrial Conflicts and means of Settlement of industrial Disputes

CO7- Understand Labor Problems – Absenteeism, Alcoholism and Alienation;

CO8- Identify Labor Welfare Schemes and role of ILO

CO9- Understand Impact of Globalization on Industry and Labour.

Semester- IV

Course- Theoretical Perspectives in Sociology - II (Compulsory)

CO1- Explain Functional and Structure functionalism Post-Structurism Robert Merton**.**

CO2- between the modern and post moderntheories Jean Francois lyotard.

CO3- Elaborate Mark's Conflict theory of Ralph Daharendorf.

CO4- Holistic understanding of Functional, Conflict and Symbolic Interactionist Perspective.

Semester - IV

Course – Sociology of Change and Development - II (Compulsory)

CO1 - To understand the process of social evolution ,social development ,social progress and different factor associated with social change .

CO2 - To analyze the different theory of social change.

CO3 - To understand different models of development.

CO4 - To analyze the different process of social change in Indian context .

Semester - IV

Course- Industry and Society in India – II (Optional)

CO1- Elaborate on Definition, Nature and Scope of Industrial Sociology

CO2- Explain Growth of Industrialisation, Industrial Revolution and its Impact on Society, Changing

Structure of Modern Industrial Enterprises, Principles of Organisation - Formal and Informal

CO3- Describe Sociological Theories related to Industry and Society

CO4- Write about Trade Union Movement in India

CO5- Explain Industrial Disputes and Settlements

CO6- Describe the Labour Problems; Role of ILO and Commitment and Motivation of Workers

Semester – IV

Course – Political Sociology – II (Optional)

CO1 - To understand concept of politics state nation and different theoretical approaches.

CO2 - know the totalitarian and democratic systems with contemporary challenges.

CO3 - To understand the significance of political culture, political socialization and the role of pressure groups.

CO4 - To know about the process of political participation and its different determinant.

ANAND NIKETAN COLLEGE ANANDWAN, WARORA.

NAME OF DEPARTMENT: HISTORY

NAME OF PROGRAMME: MASTER OF ARTS

Program Outcomes:

1. To acquaint students with the past and present of Indian ethos and reality through teachingand research in history.
2. To provide students with critical understanding of Indian society, economy, polity and Culture through a historical perspective.
3. To prepare students for a range of careers by teaching them courses which will impart themwith a set of transferable skills while studying history of India and the World as well asMuseology.
4. To stimulate intellectual curiosity and research attitude in the students through the study andresearch of local, regional, national and global history.
5. It introduces the students to major concepts, ideas and events which created the modernworld so that they will be able to place historical events in a larger context.
6. To acquaint the students with the various Indian and foreign traditions of history writing andthe debates generated about the nature of history as a discipline.

Program Specific Outcomes

1. Students will have knowledge of the chronology, narrative, major events, personalitiesand turning points of the history of the India and 20th Century Modern World
2. Students will learn to explain how and why important events happen and change overtime occurs.
3. Students will have a clear understanding of the nature of evidence collected fromprimary and secondary sources.
4. They will be able to analyse and evaluate the evidence in its historical and culturalContext and use that evidence to build and support an argument.
5. Students will demonstrate a critical understanding of the significance ofHistoriographical developments in the discipline.
6. They will have a comprehensive understanding of the historical method and itsdistinctiveness from the methods of other disciplines. They will know the influence ofmethods of other disciplines on the development of historical method.
7. The students will demonstrate an awareness of current historical debates.
8. Students will understand skills that historians use in research.
9. Students will develop an informed familiarity with multiple cultures and understand the value of diversity.

COURSE OUTCOMES:

PART – I SEMESTER – I		
COURSE CODE	**COURSE TITLE**	**COURSE OUTCOMES**
MAH101	**HISTORIOGRAPHY**	1 Understand the meaning, nature and scope history. 2. Apply the theory of historicism as a professional skill in various fields of intellect. 3. Criticallyanalyse the process of development of historiography since ancient times to modern time. 4. Comparatively understand the various traditions of historical writings emerged in Europe,Arab-Persia,China and India. 5. Describe and evaluate the various traditions and theories of Maratha historiography. 6. Explain the Modern European Traditions of History Writing like Positivist, Marxist and Annals traditions. 7. Knowledge about historical writing.
MAH103 [B]	**INDIA UNDER COMPANYS RULE 1757 – 1950**	1. Students will be able to learn to meaning and nature of colonialism. 2.understand the British political and economic policy toward India 3. Student can understand British Indian act for analyse their drain policy. 4. Student can develop thinking and research approach toward Britisheconomic, political and educational policy.
MAH104 [B]	**INDIAN NATIONAL MOVEMENT 1905 - 1947**	1. Understand the concept of Nationalism and variousapproaches adopted by historians to study Indiannationalism 2.Explain the contributions of the Extremists 3. Understand the vision of Mahatma Gandhi and theimportance of Gandhian movements 4. Know the contributions of other strands of National movement
MAH102	**MODERN WORLD 1914 - 1950**	1.Critically explain the legacy of 19th Century 2.Analyse the emergence of the World Order up to1919 3. Understand the nature and effects of World War I 4. Explain the developments in World

		History duringthe period between the two World Wars 5. Understand the impact of the Second World War
PART – I SEMESTER – II		
MAH201	**TRENDS AND THEORIES IN HISTORY**	1. Understand the recent developments in the conception of history 2. Know the relationship of history with its allied disciplines 3. Critically comprehend new approaches adopted by historians 4. Know the new tools used by historians to write history
MAH203 [B]	**INDIA UNDER BRITISH RULE : 1857-1905**	1. Student will be able to formulate basis of modern India through different concepts like modernity, Rule of Law etc. 2. Students will be able to analyse the process of rise modern India and its foundation made by Social reformer and freedom fighters. 3. Students will be able to categorize different school of thoughts about Modern India history. 4. Students will be able to analyse social background of Indian Nationalism. 5. Students will be able to illustrate rise and growth of Nationalism. 6.Evaluate the work of the Moderates and the Extremists
MAH204 [B]	**INDEPENDENT INDIA : 1947- 2000**	1. Student will be able to formulate basis and deeply knowledge of Indian constitution. 2. Students will be able to understand the economically development of independent India. 3. Critically examine the foreign policy of newly independent India. 4. Students will be able to analyse political background of our nation .by study about Indian national and regional political parties.
MAH202	**CONTEMPORARY WORLD 1950-2000**	1. Explain the concept of Cold war and its impact on the history of the world 2. Critically analyse and compare the movements for social justice in USA and Africa 3. Have informed opinion about the 20th century as a age of progress 4. Get knowledge of major developments after the end of the Cold War
PART – II SEMESTER – III		

MAH301	**EMERGENCE OF MARATHA POWER (17TH CENTURY)**	1. Understand the inspiration behind the establishment of swaraj. 2.able to explain Nature of Maratha Polity. and able to analysed Administrative Systems of Marathas. 2. Able to identify Strength & weakness of Maratha Administrative system Understood the Socio- Political power Structure of Maratha period 3. Explain the reason behind Chhatrapati Shivaji severely conflicted with the regional lords and the outsiders. 4. Understand the formation of welfare state during the Maratha rule. 4.understand the Sambhaji's relation to other states like Portuguese ,Mughal and siddhi's 5. understand the civil, military ,navel& judicial administration of Maratha 6. Get knowledge of Marathaindependence.
MAH302	**STATE IN ANCIENT AND MEDIEVAL INDIA**	1. Know the religious literary sources of the history of ancient and medieval India. 2. Understand the south Indian state's nature and structure. 3. Discuss the ancient Indian state's political economic and social appearance in India. 4. Explain the contribution of sultanas and Mughals towards making of kingship on Delhi. 5.study the advantages and limitations of using foreign sources.
PART – II SEMESTER – IV		
MAH303 [A]	**ECONOMIC HISTORY OF INDIA 1757-1857**	1.Understand the nature of Indian Economic history 2. Explain the 18th Century Debate 3. Understand the impact of Agrarian settlements of British on the peasants 4. Know the concept of De-industrialization 5. Understand the role of Colonial state 6. Examine the changing nature of Indian trade 7. Discuss the contemporary Economical issues in classroom and it's related to be history.

MAH304 [A]	**HISTORYOF MEDIEVAL VIDARBHA**	1. Understand the importance of regional and local history. 2. Explain the affluent history and culture of Gond kingship. 3.understand the importance of Bhosala Gharana and their political importance in Vidarbha 4. Discuss about Bhosala and British relation and decline of Maratha Power. And rethinking the British annexation policy toward Indian states.
MAH401	**EXPANSION OF MARATHA POWER 1707 - 1818**	1. Understand the importance of the Maratha history in 18th century. 2. Asses the circumstances under which rise of the Peshwas took place. 3. Understand the political scenario of the Maratha Power in the early 18th century. 4. Know the reason of political disintegration of the Marathas. 5. Understand the nature of Anglo – Maratha relations. 6. Understand the central and provincial administration of Marathas under the Peshwa.
MAH402	**STATE IN BRITISH INDIA**	1. Students will know the contemporary administration situations and status with the aspects like Law, Order, and Statute Apparatus. 2. The course elaborates about dominion state, Home Rule Movement, Complete Independence (Swarajya). 3. This will describe two-nation theory and its impact on Indian States. 4. Elaboration of British Policy towards Native States and the formation and due process of Indian Constitution in detail.
MAH403 [A]	**ECONOMIC HISTORY OF INDIA 1858 - 1947**	1 Student able to understand of various term, Key concept related to Economic History of India. 2 Student able to understand the change & continuity of Indian Economics system From Ancient to colonial period. 3 They discuss the contemporary Economical issues in classroom and it'srelated to be history. 4 They take interest to read various book related to British policy and ideology to ruling India. 5 They Understand importance of the term of Economy is very import Factor to Continued Historical Processes. 6 They write and present their own view Related topic on Economics history of

		India.
MAH404 [A]	**HISTORY OF MODERN VIDARBHA**	1. Student understood the Socio-economic, cultural and political background of Modern Vidarbha. 2. Student have understood process of rise of Modern Vidarbha. 3. Student have understood the contribution of Vidarbha in Indian National Movement. 4. Student have understood institutional experiments in socio-religious reformism. 5. Student understood the importance of Separate Vidarbha Movement, Dalit Movement and Samyukta Maharashtra Movement.

Maharogi Sewa Samiti,Warora's
ANAND NIKETAN COLLEGE, ANANDWAN, WARORA
(Affiliated of Gondwana University Gadchiroli,M.S.)
DEPARTMENT OF ECONOMICS
HOD: Shri.N.K.Patil , Cell: 9637279623, Email: narendra.anandwan@gmail.com

NAME OF PROGRAMME: MASTER OF ARTS

Program Outcomes:

1. The Department of Economics is offering M.A., programmers' at present. The Department is working with a vision of creating global academician and researchers.
2. The Department is having advanced infrastructural facility like library facility with huge collection of national and international books and journals. Further, department has eminent and skilled faculty members to train the students in accordance with the need of the job market.
3. The Department focuses mainly on advanced teaching and research. The curriculum is very comprehensive and job oriented.
4. The Department involves the students in seminars, conference and debates.
5. Exposure to social realities through study tours, data collection through fieldwork and regular interaction with experts in student seminars.
6. Better employability through skill building in quantitative research, computational packages; add on course and compulsory internship programme introduced in 2021.
7. Better writing skills through their engagement in dissertation writing , term papers and concurrent evaluation activities.

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Program Specific Outcomes

1. To provide students a well – founded educational base as well as well- resourced learning environment in economics.
2. To Provide structured curricula which support the academic development of students and to acquire know how on methodology of economics as a branch of social sciences.
3. To provide and adapt curricula that prepare the post graduate students for employment and further study as economists and apply methods and theories of social sciences to contemporary issues.
4. To provide the students with the opportunity to pursue courses that emphasizes quantitative and theoretical aspects of economics .
5. To provide the students with the opportunity to focus on applied economics and policy issues in economics with the understanding of various quantitative and qualitative economic models.
6. To provide programmes that allows the students to choose from a wide range of economic specialization and familiarize with different branches of economics.
7. To encourage students of economics for conducting socio-economic researches using mathematical and statistical tools.
8. To help the students of practice skills who are preparing for competitive examinations.
9. To help the students to find a career in Economics.

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COURSE OUTCOMES:

PART – I SEMESTER – I		
COURSE CODE	**COURSE TITLE**	**COURSE OUTCOMES**
EC-101	**Micro Economics-I**	1 Understand the meaning, nature and scope economics. 2. Apply mathematical tools and techniques to study behaviour of economic agents. 3. Understand the basic principles of General equilibrium theory. 4.Have an understanding of the basic reasoning of Economics and understand the consumption, production and cost concepts in an analytical way. .
EC-102	**Macro Economics -I**	1. Students will be able to learn to meaning and nature of Macroeconomics. 2. Apply the subject knowledge in understanding the working of the economy as well as the macroeconomic issues and policies. 3. Understand systemic facts and theoretical developments.
EO-103	**Agricultural Economics-I**	1. Deeper knowledge on different theories related to economic development and the agricultural sector. 2.Inxreased interest to undertake research activities related to aspects of agricultural sector in India.
EO-107	**Public Economics - I**	1.Have conceptual clarity on the theories of public goods, public expenditure, public revenue and public borrowing. 2. Apply the principals of public economics in analyzing various government policies.
PART – I SEMESTER – II		
EC-201	**Micro Economics -II**	1. Deeper knowledge on decision making under different market imperfections including oligopoly. 2. Deeper knowledge about the broad

		paradigm of neo-classical economics. 3. Deeper knowledge about distributional and welfare aspects of economic activities
EC-202	**Macro Economics-II**	1. Apply the subject knowledge in understanding the macroeconomic dynamics both in a closed and an open economy 2. Understand the function of a market economy and the ways and means to keep such an economy functioning properly.
EO-203	**Agricultural Economics - II**	1. To describe the various issues of farming systems and farm management. 2. To analyse the Economics of Agricultural production. 3. To describe the mathematical tools for analyzing agricultural production functions. 4. To enable students to analyse the economics of agricultural production.
EO-206	**Industrial Economics**	1. To examine the alternative theories of the firm as opposed to the traditional theories of the firm. 2. To analyse the structure, conduct and performance of the firm under different market conditions. 3. To categorise the different motives and measures of firm diversification, integration merger. 4. To interpret the pricing process and investment decision of firm, the sources of industrial finance, and the factors determining industrial location. 5. To examine the industrial economy of India.

PART – II SEMESTER – III		
EC-301	**Economics of Growth & Development -I**	1. To gain knowledge about recent development in growth and development. 2. In particular dynamic growth theories focusing, among other issues, on labour market distortions polluting and the cost benefit of projects to be undertaken.
EC-302	**International Trade & Finance -I**	1. Analyse and apply the trade theories and theories to tariff. 2. Apply and analyze the different policies for BOPs adjustments of developing countries like India. 3. Comment critically on and participate in current debates on international economic policy.
EO-304	**Indian Economy Policy – I**	1.To analyse the concept and evolution of the global economy and the key issues involved in the process. 2. To provide an insight into the economic history of India and place it in the global perspective. 3. To examine and analyse the process and outcome of India economic reforms. 4. The course is also intended to help students in their preparation for competitive exams.
EO-306	**Research Methodology – I**	1. Equip students inclined to do research with procedure and discipline of a research activity. 2. Studying various methods for conducting social science research. It deals with various approaches, methods, tools and techniques. 3. Basic knowledge on computer, data, and estimation of statistical tools by using software and analyzing the results of economic relationships, testing economic hypotheses and forecasting.

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PART – II SEMESTER – IV		
EC-401	**Economics of Growth & Development -II**	1. To understand the importance of endogenous growth theories which highlight on human capital as an essential component for a country like India. 2. To analyse the investment decisions through investment criterion along with its merits and demerits.
EC-402	**International Trade & Finance -II**	1. To provide strong theoretical background to the students on the subject of international trade. It also help understands the empirical aspects such as trade reforms and their impact on India economy. 2. To analyse the international trade theories changing pattern of international trade in view of development in trade environments. 3. Elaborate how different international trade polices undertaken by the trading nations.
EO-403	**Indian Economic Policy-II**	1. Explain and analyse the concepts of rural development. 2. Critically comment on and participate in current debates on rural development issues in India. 3. Policies and strategies for rural development.
EO-404	**Research Methodology -II**	1. 1 To become familiar with basic knowledge research methodology and sampling techniques 2. To become familiar with basic knowledge on computer, with statistical software, to draw distributive tables, graphs, trend lines. 3. To estimate the parameters of multiple regressions with the help of software and interpret

(2021-2022)

Poltical Science
Program Outcome

The Department is dedicated to promote teaching and research in diverse fields of political science including Indian politics, comparative politics, international relations and Public Administration while maintaining the scholarship in some of the conventional fields like political theory and political philosophy. Presently, the department is offering Master's programmes in Political Science. The learning outcomes of the programmes are as follows:

- To develop comprehensive understanding of the subject by teaching both conventional and new areas of relevance in the domain of political theory and thought, Indian politics, comparative politics, public administration and internationalpolitics.
- To develop comprehensive and interdisciplinary knowledge by emphasizing inter-linkages between various political, economic and social issues andchallenges.
- To generate socially-informed knowledge and cater to the educational upliftment of marginalized communities through papers like Human Rights, Political Ideas in Modern India and Women and Politics inIndia
- To develop theoretically rich and empirically groundedknowledge
- To motivate and inform students about the opportunities and future prospects in thefield.
- To develop the overall personality of students and prepare them to compete and succeed in theirendeavours.
- To provide a progressive, healthy and vibrant environment to its students as well as teachers for the purpose of developing a department known for its academic and intellectualpursuit.
- To inculcate the values of tolerance, progressiveness and fraternity that contributes towards the making of a healthy and prosperoussociety.

Programme Specific Outcome

The Department is running two programmes namely M.A. Courses in the master's programme have been designed in a manner so as provide a holistic approach to the study of political science. The core of the discipline is maintained with courses on political philosophy both western and Indian and key concepts of politics. These courses provide a solid grounding to the learners on the history of ideas and the larger issues of epistemology in social sciences. They also try to integrate the concepts with the practices of politics and government and to understand their relevance in totality. The second set of papers on Indian politics including study of constitution, institutions, processes and political economy entail a detailed study and analysis of morphology and anatomy of politics in India. While familiarizing the students with legal framework of government institutions, the courses tend to engage them with the undercurrents of political practice and developmental process. By learning the evolution of concepts and theories of Indian politics, the students are able to critically reflect on the contemporary developments. Courses on comparative politics and international relations provide an overview of political developments at the global level. Comparative analysis not only helps in understandingthepatternsofinstitutionalism,democratizationanddevelopmentinvariouspolities

but also provide a framework for explaining variations. In addition, specialized courses like human rights, peace and conflict studies and state politics introduces the students to certain new dimensions of politics. By doing these courses, students develop a solid footing over the vast field of knowledge in the discipline that also in a way encourages them to undertake future research in these unconventional areas of political science. Through them they also tend to develop an interdisciplinary focus without deviating from the core of thediscipline.

Course Outcome

M.A Political Science

First Semester

Course title: Key Concepts in Politics

Modern Indian Political Thought

Course code: PS 01

Course Outcome: This Course enables students to develop an understanding of the basic concepts in political thought and engage in critical analysis of the subject. It also gives an opportunity to the students to dwell upon contemporary theories and views of scholars creating a deeper understanding and gain knowledge.

Course Title:Politics of Maharashtra

Course Code- PS 02

Course Outcome: This course on the state politics in India will develop an understanding in the students about the historical and emerging trends in political process in the India states. The students will understand the federal process in India, the issues underlying political dynamics of regions, the changing power relations between centre and states over a period of time and the nature of party system and electoral politics at the state level

Course Title: Comparative Politics

Course Code: PS 03

Course Outcome: After completing the course students will develop a detailed understanding of theory and methods of comparative politics. They will be familiar with different models of political system and the way political dynamics have changed and shaped societies from time totime.

Course Title: Public Administration

Course code: PS 04

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

Second Semester

Course Title: International Relations
Course Code:PS 05

Course Outcome: By doing this course, students will have develop theoretical insights on international relations and global politics. This will help them undertaking academic assignments and research projects related with international issues which are becoming very salient in today's globalized world.

Course Title: Western Political Thought

Course Code-PS 06

Course Outcome: Upon its completion, the students will be able to know the importance of political philosophy in shaping and influencing the state and society at large. Students are expected to appreciate the ideas and thoughts which are rich and insightful.

Course Title : Political Sociology

Course Code: PS 07

Course Outcome:

Course Title: Research Methodology

Course Code: PS 08

Course Outcome: This paper trains the students to undertake research by familiarizing them with the basic and advance tools and techniques of field studies. So after competing it the students will be able to design research projects and programmes in diverse areas of political science.

Third Semester

Course Title:Indian Democracy and Political Process
Course Code- PS 09

Course Outcome: After completing this course students will be familiar with India's rich intellectual tradition and its relevance in today's time. It also helps us compare the perspectives of the prominent Indian political thinkers.

Course Title:Pressure Groups and Social Movements
Course Code: PS 10

Course Outcome: After completing this course students will develop a clear and comprehensive understanding of fundamental theories and dynamics of political economy in India. The paper serves to familiarize students with the contemporary issues and trends of political economy that could be further researched within an interdisciplinary conceptual framework.

Course Title: International Law

Course Code: PS11
Course Outcome:

Course Title:Diplomacy and Foreign Policy
Course Code- PS 12

Course Outcome:

Upon successful completion, students will have the knowledge and skills to:

- A sound grasp of the key elements of Indian traditions of thought about Diplomacy and foreignpolicy;
- An understanding of the fundamentals of foreign policy-making inIndia;
- An understanding of the foreign policy challenges facingIndia;
- A developed capacity to present strong arguments in their written and oral work and to deploy relevant key facts, concepts and theories (as developed through written assessments, in-class discussions and tutorial-basedactivities).

Fourth Semester

Course Title: Modern Political Idologis

Course Code: PS 15

Course Outcome: This paper trains the students to undertake research by familiarizing them with the basic and advance tools and techniques of field studies. So after competing it the students will be able to design research projects and programmer in diverse areas of political science.

Course Title: State Politics in India

Course Code- PS 16

Course Outcome: This course on the state politics in India will develop an understanding in the students about the historical and emerging trends in political process in the India states. The students will understand the federal process in India, the issues underlying political dynamics of regions, the changing power relations between centre and states over a period of time and the nature of party system and electoral politics at the state level.

CourseTitle:HumanRights:Problems and Prospects

Course Code: PS 17

Course Outcome: This course enables students to develop a theoretical understanding of the concept of Human Rights. It gives a historical and global perspective on human rights. The course outline also contains a detailed institutional framework set up to deal with human rights violations. The inclusion of an understanding of rights of various vulnerable sections of society gives within the human rights perspective provides a global testimony to importance of rights toall.

Course Title:Globalization and Its Impact on the

Political System

Course Code- PS 18

Course Outcome: After completing this course, MA. students will be familiar with the emerging research areas of international politics and the theoretical developments in the field. This will help them develop both empirical and theoretical insights on diverse issues of global politics.

ANAND NIKETAN COLLEGE OF SCIENCE ARTS AND COMMERCE, WARORA.
DEPARTMENT OF COMMERCE
P.G. IN COMMERCE (M.COM)

PROGRAMME OUTCOME (PO)

PO1: To attain eligibility for joining research work.

PO2: To attain eligibility for applying various Examinations like NET, SET, JRF etc.

PO3: To attain eligibility for joining Professional courses in teaching.

PO4: To attain eligibility for joining Various Professional courses like CA, CS, ICWA, MBA etc

PO5: To attain eligibility for applying various competitive Examinations like MPSC, UPSC, Indian Economics Services, Indian Statistical Services, and other recruitment for which basic qualification is post graduate.

PROGRAMME SPECIFIC OUTCOME (PSO)

1. Students will be able to demonstrate Progressive learning of various Tax issues and Tax forms related to individuals.
2. Students will be able to demonstrate knowledge in setting up a computerized set of accounting books.
3. Students will be able to demonstrate Progressive affective domain development of values, the role of accounting in society and business.
4. Students will learn relevant financial accounting career skills, applying both quantitative and qualitative knowledge to their future career in business.
5. Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future career in business.
6. Students will gain through systematic and subject skills within various disciplines of commerce, management, accounting, economics, finance, auditing and marketing.
7. Students will be able to recognize features and rolls of businessmen, entrepreneur, managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making.
8. Students will be able to prove proficiency with the ability to engage in competitive exams like CA, CS, ICWA, MBA, SET, NET and other exams.
9. Students will acquire the skills like effective communication, decision making, problem solving in day to day business affairs.
10. Students will involve in various co-curricular activities to demonstrate relevancy of foundational and theoretical knowledge of their academic major and to gain practical exposure.
11. Students can also acquire the practical skills to work as Tax consultant, audit assistant and other financial supporting services.

ANAND NIKETAN COLLEGE OF SCIENCE ARTS AND COMMERCE, WARORA.
DEPARTMENT OF COMMERCE
P.G. IN COMMERCE (M.COM)

COURSE OUTCOME (CO)

CLASS	COURSE/SUBJECT CODE	COURSE/SUBJECTS	OBJECTIVES
M.COM SEM-I	**PCC1C01**	**ADVANCED FINANCIAL ACCOUNTING**	CO1: Learners understand the provisions of AS-11 and the Translation of the Financial Statements of Foreign Branches. CO2: Learners understand the legal aspects of banking companies, format of final accounts, RBI guidelines, and preparation of final accounts of Banking Companies. CO3: Learners understand the Revenue Account, Profit & Loss Account and Balance Sheet of Insurance companies and Re-insurance accepted and ceded. CO4: Learners develop the knowledge about life insurance business and preparation of their Final Accounts.
	PCC1C02	**INDIAN FINANCIAL SYSTEM**	CO1: Learners understand the need, types and sources of finance, components of formal financial system. CO2: Learners are made aware of the importance of banking, portfolio management and its type, commercial banking system. CO3: Learners understand the insurance, types of insurance product, insurance policy system. CO4: Learners understand the concept of capital market and its importance, NSE, BSE, OTCEI, and SEBI.
	PCC1F03	**MANAGERIAL ECONOMICS**	CO1: Learners acquire the knowledge of basic tools and economic theory and practical application. CO2: Learners get familiarized with understanding of economic aspects of current affairs. CO3: Learners are able to analyze Market Behavior with economic way of thinking. CO4: Learners understand different economic principles in business decision.
	PCC1F04	**MARKETING MANAGEMENT**	CO1: Students understand the basics of Marketing Management, Marketing planning strategy CO2: Students understand the market analysis and selection of marketing environment CO3: Students get the information about product life cycle, product decision; product buying behavior, Marketing mix. CO4: Students get the knowledge about the pricing decision, factor affecting price determination

COURSE OUTCOME

CLASS	SUBJECT CODE	COURSE/SUBJECTS	OBJECTIVES
M.COM SEM-II	**PCC2C01**	**RESEARCH METHODOLOGY**	CO1: The students understand the basics of Research, its formulation and also get the knowledge about formation of hypothesis and sampling. CO2: Students learn about, how to collect primary and secondary data with the help of questionnaire. CO3: Students understand the importance of data analysis and learn hypotheses through various Parametric & Non-Parametric test. CO4: Students learn about the Research Reporting and Modern Practices in Research through the reference and citation methods.
	PCC2C02	**ADVANCE COST ACCOUNTING**	CO1: Students are able to interpret cost accounting statements and make them conversant with the basic vocabulary and mechanics of cost management. CO2: Students understand the concept and role of cost accounting in the business management of various manufacturing and non-manufacturing companies across countries through process costing, cost centre, profit center, revenue center etc. CO3: Students learn about cost accounting for cost management, planning and control through budgetary control and variance analysis through activity based costing. CO4: Students acquire decision making skill in cost accounting to the level where he or she can function effectively as a professional.
	PCC2F03	**CO-OPERATION AND RURAL DEVELOPMENT**	CO1: Students get the understanding of appropriate capital structure for organization, co-operation societies and bank. CO2: Students get the knowledge about various types of risk faced by organization, rural development. CO3: Students get the knowledge about non-governance organization, and rural development in India. CO4: Students understand of rural marketing and rural political economy.
	PCC2F04	**HUMAN RESOURCES MANAGEMENT**	CO1: Students get the knowledge about the basics of Human resource management, HRP and Recruitment and selection procedure. CO2: Students get the information about Human Resource Development through the knowledge of the training techniques and performance appraisal of the organizations. CO3: Students get to know the laws related to human resources through the information about the various acts and labor legislation. CO4: Students get the knowledge about the emerging trends like welfare of the employees in various areas. Students

			understand of the facilities given to the employees and their welfare.

COURSE OUTCOME

CLASS	SUBJECT CODE	COURSE/SUBJECTS	OBJECTIVES
M.COM SEM-III	**PCC3C01**	**STATASTICAL TECHNIQUES**	CO1: Students get knowledge Statistical problems. CO2: Students learn the statistical quality control. CO3: Students learn the interpolation and extrapolation of statistical technique. CO4: Students get practical sampling.
	PCC3C02	**TAX PROCEDUCRES AND PRACTICE**	CO1: Students understand the history of GST all over the world. CO2: Students understand the ways of computing GST and Input Tax Credit. CO3: Students learn how to decide the place of taxation. CO4: Students learn the ways and means of registration under the Law.
	PCC3F03	**COMPUTER APPLICATION IN COMMERCE**	CO1: Students acquire the knowledge of Computer introduction and generation of computer CO2: Students understand concepts window operating system CO3: Students learn about network analysis of computer and programming language. CO4: Students become aware about recent Microsoft office (MS WORD, EXCEL, PPT)
	PCC3F04	**SERVICE SECTOR MANAGEMENT**	CO1: Learners understand instruction of service sector. CO2: Learners understand the service sector in Indian economy. CO3: Learners understand service demand in India. CO4: Learners learn about the customer protection of service management.

COURSE OUTCOME

CLASS	SUBJECT CODE	COURSE/SUBJECTS	OBJECTIVES
M.COM SEM-IV	**PCC4C01**	**ADVANCE MANAGEMENT ACCOUNTING**	**CO1:** Students acquire the skills to interpret accounting standards **CO2:** Students understand the concept and role of cost accounting in valuation of the business and goodwill during amalgamation/ merger. **CO3:** Students learn and apply the basic principles, conventions and standards of financial accounting leading to the preparation of consolidated financial statements **CO4:** Students are able to interpret and analyze the Corporate Financial Reporting
	PCC4C02	**INTERNATIONAL BUSINESS ENVIORNMENT**	**CO1:** Students are learning about Business environment. **CO2:** Students understand the Economic Environment of Business. **CO3:** Students gain knowledge of various new concepts of business environment. **CO4:** Students learn about Political and Legal Environment a Business.
	PCC4F03	**ENTREPRENEURIAL DEVELOPMENT**	**CO1:** Learners understand the concepts of Entrepreneur Entrepreneurship. **CO2:** Learners understand basic of Entrepreneurship Trends. **CO3:** Learners learn about Opportunity scouting and idea generation. **CO4:** Learners understand Entrepreneurship Development in India Issues and Opportunities.
	PCC4F04	**PROJECT AND SEMINAR**	**CO1**: Student learn about the synopsis **CO2**: To understand about the collection of data. **CO3**: To manage the data processing and interpretation. **CO4**: Students learn project writing and bibliography .