

**ST. JOSEPH'S COLLEGE (AUTONOMOUS)
DEVAGIRI, CALICUT**



UNDER GRADUATE PROGRAMMES

**CHOICE BASED CREDIT SEMESTER SYSTEM
(CBCSSUG)**

Programme Specific Outcome

AND

Course Outcome

(2019Admn Onwards)

B.Sc. Chemistry
(CORE, OPEN & COMPLEMENTARY COURSES)

Programme Specific Outcome

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	To achieve the knowledge about the rich history and role of chemistry in moulding the present world.
PSO2	To study the fundamentals of all the branches of chemistry
PSO3	To understand basic facts and concepts in chemistry.
PSO4	To apply the basic theoretical principles of chemistry.
PSO5	To appreciate the achievements in chemistry and to know the role of chemistry in nature and in society.
PSO6	To familiarize with the emerging areas of chemistry and their applications in various spheres of chemical sciences and to apprise the students of its relevance in future studies
PSO7	To develop skills in the proper and safe handling of instruments and chemicals.
PSO8	To familiarize with the different processes used in industries and their applications.
PSO9	To develop an eco-friendly attitude by creating a sense of environmental awareness
PSO10	To be conversant with the applications of chemistry in day-to-day life.
PSO11	To create interest in research in various field of chemistry.
PSO12	To make the student competent to clear various entrance examination for higher study such as CSIR-UGC, NET (LS) exams
PSO13	To develop the spirit of team work and effective communication skill.
PSO14	To enable the students to achieve the success through systematic planning and hard work.
PSO15	To create awareness among students regarding the future challenges before the scientific community.

COURSE OUTCOMES – CORE COURSES

SEMESTER I

GCHE1B01T – Theoretical and Inorganic Chemistry- I

COs	COURSE OUTCOMES
CO1	To study the methodology of scientific research.
CO2	To understand the principles behind volumetry
CO3	To compare the characteristics of different elements
CO4	To study molecular structure and bonding.
CO5	To study and compare the properties of the compounds of some s and p block elements.
CO6	To understand nuclear reactions and radioactivity.

SEMESTER II

GCHE2B02T – Theoretical and Inorganic Chemistry- II

COs	COURSE OUTCOMES
CO1	To realize the importance and the impact of quantum revolution in science.
CO2	To understand and apply the concept that the wave functions of hydrogen atom are nothing but atomic orbitals.
CO3	To realize that chemical bonding is the mixing of wave functions of the two combining atoms.
CO4	To understand the concept of hybridization as linear combination of orbitals of the same atom.
CO5	To inculcate an atomic/molecular level philosophy in the mind.

SEMESTER III
GCHE3B03T – PHYSICAL CHEMISTRY-I

COs	COURSE OUTCOMES
CO1	To understand the properties of gases, Collision theory and how it links to thermodynamic systems
CO2	To understand the fundamental concepts of thermodynamics, apply thermochemical principles to chemical reaction and the significance of entropy and free energy
CO3	To analyse the concepts of chemical potential, probability and partition function
CO4	To comprehend the concepts of law of mass action and chemical equilibria
CO5	To apply symmetry operations to categorize different molecules

SEMESTER IV
GCHE4B04T – ORGANIC CHEMISTRY – I

COs	COURSE OUTCOMES
CO1	To apply the concept of stereochemistry to different compounds
CO2	To understand the basic concepts of reaction mechanism
CO3	To understand the mechanism of a chemical reaction
CO4	To analyse the stability and reactivity of different aromatic systems

SEMESTER IV
GCHE4B05P – INORGANIC CHEMISTRY PRACTICAL – I

COs	COURSE OUTCOMES
CO1	To enable the students to develop skills in quantitative analysis and preparing inorganic complexes.
CO2	To understand the principles behind quantitative analysis
CO3	To apply appropriate techniques of volumetric quantitative analysis in estimations
CO4	To analyze the strength of different solutions

SEMESTER V
GCHE5B06T – INORGANIC CHEMISTRY – III

COs	COURSE OUTCOMES
CO1	To understand the principles behind qualitative and Gravimetric analysis
CO2	To understand basic processes of metallurgy and to analyse the merit of different alloys
CO3	To understand the applications of different inorganic polymers
CO4	To analyse different polluting agents
CO5	To apply the principles of solid waste management

SEMESTER V
GCHE5B06T – ORGANIC CHEMISTRY – II

COs	COURSE OUTCOMES
CO1	To evaluate the various conditions for substitution reactions of organohalides
CO2	To understand the characteristic properties and reactions of alcohols, phenols, ethers and epoxides
CO3	To apply organometallic compounds in preparation of different functional groups
CO4	To apply different reagents for the inter conversion of aldehydes, carboxylic acids and acid derivatives
CO5	To apply active methylene compounds in organic preparations
CO6	To study the reactivity and reactions of organo nitrogen compounds

SEMESTER V
GCHE5B08T – PHYSICAL CHEMISTRY – II

COs	COURSE OUTCOMES
CO1	To apply the concept of kinetics, catalysis and photochemistry to various chemical and physical processes
CO2	To characterize different molecules using spectral methods
CO3	To understand various phase transitions and its applications

SEMESTER VI
GCHE6B09T – INORGANIC CHEMISTRY – IV

COs	COURSE OUTCOMES
CO1	To understand the principles behind different instrumental methods
CO2	To distinguish between lanthanides and actinides
CO3	To appreciate the importance of CFT
CO4	To understand the importance of metals in living systems
CO5	To distinguish geometries of coordination compounds

SEMESTER VI
GCHE6B10T – ORGANIC CHEMISTRY – III

COs	COURSE OUTCOMES
CO1	To elucidate structure of simple organic compounds using spectral techniques
CO2	To understand the basic structure and tests for carbohydrates
CO3	To understand the basic components and importance of DNA
CO4	To understand the basic structure and applications of alkaloids and terpenes
CO5	To distinguish different pericyclic reactions

SEMESTER VI
GCHE6B11T – PHYSICAL CHEMISTRY–III

COs	COURSE OUTCOMES
CO1	To apply the basic concepts of electrochemistry, Conductivity measurements and its applications
CO2	To realize the importance of colligative properties
CO3	To relate the properties of material/solids to the geometrical properties and chemical compositions

SEMESTER VI
GCHE6B12T – Advanced and Applied Chemistry

COs	COURSE OUTCOMES
CO1	To understand the importance of nanomaterial's
CO2	To appreciate the importance of green approach in chemistry
CO3	To review various methods used in computational Chemistry and their importance in molecular design
CO4	To realize the extent of chemistry in happiness index and life expectancy
CO5	To list various sources information for scientific writing and to practice scientific writing.

SEMESTER VI
GCHE6E01T – Elective 1. INDUSTRIAL CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand the importance of petrochemicals.
CO2	To appreciate the importance and to familiarise the opportunities of pharmaceutical, leather and sugar industries.
CO3	To analyse the role of catalysts in industrial processes.

SEMESTER VI
GCHE6E02T – Elective 2. POLYMER CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand various classification of polymers and types of polymerization methods.
CO2	To understand the important characteristics of polymers such as average molecular weight, glass transition temperature, viscoelasticity and degradation
CO3	To appreciate the importance of processing techniques
CO4	To familiarize different commercial polymers and to understand the significance of recycling

SEMESTER VI
GCHE6E03T – Elective 3. MEDICINAL AND ENVIRONMENTAL CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand the importance of drugs in human health.
CO2	To understand the facts about common diseases and treatment.
CO3	To identify the presence of toxic substances in atmosphere.
CO4	To apply chemistry in treatment of water and sewage.

SEMESTER VI
GCHE6B13P – PHYSICAL CHEMISTRY PRACTICAL

COs	COURSE OUTCOMES
CO1	To enable the students to develop analytical skills in determining the physical properties (Physical constants)
CO2	To develop skill in setting up a experimental methods to determine the physical properties
CO3	To understand the principles of Refractometry, Potentiometry and Conductometry

SEMESTER VI
GCHE6B14P – ORGANIC CHEMISTRY PRACTICAL

COs	COURSE OUTCOMES
CO1	To enable the students to develop analytical skills in organic qualitative analysis.
CO2	To develop talent in organic preparations to ensure maximum yield.
CO3	To apply the concept of melting or boiling points to check the purity of compounds.
CO4	To analyse and characterise simple organic functional groups.
CO5	To analyse individual amino acids from a mixture using chromatography.

SEMESTER VI
GCHE6B15P – INORGANIC CHEMISTRY PRACTCAL-II

COs	COURSE OUTCOMES
CO1	To enable the students to develop analytical skills in inorganic quantitative analysis.
CO2	To understand the principles behind gravimetry and to apply it in quantitative analysis.
CO3	To understand the principles behind colorimetry and to apply it in quantitative analysis.

SEMESTER VI
GCHE6B16P – INORGANIC CHEMISTRY PRACTCAL-III

COs	COURSE OUTCOMES
CO1	To enable the students to develop skills in inorganic qualitative analysis.
CO2	To understand the principles behind inorganic mixture analysis and to apply it in qualitative analysis.
CO3	To analyse systematically mixtures containing two cations and two anions.

SEMESTER VI
GCHE6B17D – PROJECT WORK

COs	COURSE OUTCOMES
CO1	To understand the scientific methods of research project.
CO2	To apply the scientific method in life situations.
CO3	To analyse scientific problems systematically.

COURSE OUTCOMES – COMPLIMENTARY COURSES

SEMESTER I

GCHE1C01T – GENERAL CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand and to apply the theories of quantitative and qualitative analysis.
CO2	To understand the theories of chemical bonding.
CO3	To appreciate the uses of radioactive isotopes.
CO4	To understand the importance of metals in biological systems.

SEMESTER II

GCHE2C02T – PHYSICAL CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand the importance of free energy in defining spontaneity
CO2	To realize the theories behind different states of matter and their implication
CO3	To understand the basic principles of electrochemistry

SEMESTER III

GCHE3C03T – ORGANIC CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand the basic concepts involved in reaction intermediates.
CO2	To realise the importance of optical activity and chirality.
CO3	To appreciate the importance of functional groups and aromatic stability.
CO4	To understand the basic structure and importance of carbohydrates, nucleic acids, alkaloids and terpenes.

SEMESTER IV
GCHE4C04T – PHYSICAL AND APPLIED CHEMISTRY

COs	COURSE OUTCOMES
CO1	To understand the basic concepts behind colloidal state and nanochemistry.
CO2	To understand the importance of green chemistry and pollution prevention.
CO3	To appreciate the importance of different separation methods and spectral techniques.
CO4	To understand the extent of chemistry in daily life.

SEMESTER IV
GCHE4C05P – CHEMISTRY PRACTICAL

COs	COURSE OUTCOMES
CO1	To understand the basic concepts of inter group separation.
CO2	To enable the students to develop analytical and preparation skills.

COURSE OUTCOMES – OPEN COURSES

SEMESTER V

GCHE5D01T – ENVIRONMENTAL CHEMISTRY

COs	COURSE OUTCOMES
CO1	Recall the technical/scientific terms involved in pollution.
CO2	Understand the causes and effects of air pollution.
CO3	Understand the sources, types and effects of water pollution.
CO4	Describe water quality parameters.
CO5	Know soil, noise, thermal and radioactive pollutions and their effects.
CO6	Study various pollution control measures.
CO7	Understand the basics of green chemistry.

SEMESTER V

GCHE5D02T – CHEMISTRY IN DAILY LIFE

COs	COURSE OUTCOMES
CO1	Understand the basics of polymer chemistry.
CO2	Explain the functions of biomolecules, vitamins, enzymes, hormones and nucleic acid.
CO3	Describe food additives and food habits.
CO4	Explain the uses of pesticides and fertilizers and their impacts on the environment.
CO5	Understand advantages and disadvantages of cleansing agents and cosmetics.
CO6	Recognize the common classes of drugs in pharmaceutical industry and their application.
CO7	Understand the basic concepts and processes in petroleum industry.

SEMESTER V
GCHE5D03T – FOOD SCIENCE AND MEDICINAL
CHEMISTRY

COs	COURSE OUTCOMES
CO1	Understand food adulteration and preservation methods.
CO2	Understand food additives.
CO3	Compare modern food with natural food.
CO4	Describe the harmful effects of alcohol and modern food habits.
CO5	Exhibit a broad and coherent body of knowledge on the biomolecules, vitamins, enzymes, hormones and nucleic acids.
CO6	Recognize the uses of Indian medicinal plants and plant extracts.
CO7	Recall the chemical, generic and trade names of drugs and their uses.
CO8	Describe the treatment methods used in medical field.
CO9	Illustrate first aids and the safety steps to be taken for common illnesses.

B.Sc. PHYSICS
(CORE, OPEN & COMPLEMENTARY COURSES)

Programme Specific Outcome

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	Understand the basic concepts of methodology of science and the fundamentals of mechanics, properties of matter and electrodynamics
PSO2	Understand the theoretical basis of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics and thermodynamics
PSO3	Understand and apply the concepts of electronics in the designing of different analog and digital circuits
PSO4	Understand the basics of computer programming and numerical analysis
PSO5	Apply and verify theoretical concepts through laboratory experiments

COURSE OUTCOMES – CORE COURSES

SEMESTER I

GPHY1B01T – METHODOLOGY OF SCIENCE AND BASIC MECHANICS

COs	COURSE OUTCOMES
CO1	Understand the features, methods and limitations of science
CO2	Understand and apply the basic concepts of Newtonian Mechanics to physical systems
CO3	Understand and apply the basic idea of work-energy theorem to physical systems
CO4	Understand and apply the rotational dynamics of rigid bodies
CO5	Understand the basic ideas of elasticity

SEMESTER II

GPHY2B02T – MECHANICS

COs	COURSE OUTCOMES
CO1	Understand the features of non-inertial systems and fictitious forces
CO2	Understand and analyse the features of central forces with respect to planetary motion.
CO3	Understand the basics ideas of harmonic oscillations
CO4	Understand and analyse the basics concepts of wave motion

SEMESTER III
GPHY3B03T – ELECTRODYNAMICS I

COs	COURSE OUTCOMES
CO1	Understand and apply the fundamentals of vector calculus
CO2	Understand and analyse the electrostatic properties of physical system
CO3	Understand the mechanism of electric field in matter.
CO4	Understand and analyse the magnetic properties of physical systems
CO5	Understand the mechanism of magnetic field in matter.

SEMESTER IV
GPHY4B04T – ELECTRODYNAMICS II

COs	COURSE OUTCOMES
CO1	Understand the basic concepts of electrodynamics
CO2	Understand and analyse the properties of electromagnetic waves
CO3	Understand the behaviour of transient currents
CO4	Understand the basic aspects of ac circuits
CO5	Understand and apply electrical network theorems

SEMESTER V
GPHY5B06T – COMPUTATIONAL PHYSICS

COs	COURSE OUTCOMES
CO1	Understand the Basics of Python programming.
CO2	Understand the applications of Python modules
CO3	Understand the basic techniques of numerical analysis
CO4	Understand and apply computational techniques to physical problems

SEMESTER V
GPHY5B07T – QUANTUM MECHANICS

COs	COURSE OUTCOMES
CO1	Understand the particle properties of electromagnetic radiation
CO2	Describe Rutherford – Bohr model of the atom
CO3	Understand the wavelike properties of particles
CO4	Understand and apply the Schrödinger equation to simple physical systems
CO5	Apply the principles of wave mechanics to the Hydrogen atom

SEMESTER V
GPHY5B08T – OPTICS

COs	COURSE OUTCOMES
CO1	Understand the fundamentals of Fermat's principles and geometrical optics
CO2	Understand and apply the basic ideas of interference of light
CO3	Understand and apply the basic ideas of diffraction of light
CO4	Understand the basics ideas of polarization of light
CO5	Describe the basic principles of holography and fibre optics

SEMESTER V
GPHY5B09T – ELECTRONICS (ANALOG & DIGITAL)

COs	COURSE OUTCOMES
CO1	Understand the basic principles of rectifiers and dc power supplies
CO2	Understand the principles of transistor
CO3	Understand the working and designing of transistor amplifiers and oscillators
CO4	Understand the basic operation of Op –Amp and its applications
CO5	Understand the basics of digital electronics

SEMESTER VI
GPHY6B10T – THERMODYNAMICS

COs	COURSE OUTCOMES
CO1	Understand the zero and first laws of thermodynamics
CO2	Understand the thermodynamics description of the ideal gas
CO3	Understand the second law of thermodynamics and its applications
CO4	Understand the basic ideas of entropy
CO5	Understand the concepts of thermodynamic potentials and phase transitions

SEMESTER VI
**GPHY6B11T – STATISTICAL PHYSICS, SOLID STATE
PHYSICS, SPECTROSCOPY & PHOTONICS**

COs	COURSE OUTCOMES
CO1	Understand the basic principles of statistical physics and its applications
CO2	Understand the basic aspects of crystallography in solid state physics
CO3	Understand the basic elements of spectroscopy
CO4	Understand the basics ideas of microwave and infra-red spectroscopy
CO5	Understand the fundamental ideas of photonics

SEMESTER VI
GPHY6B12T – NUCLEAR PHYSICS AND PARTICLE PHYSICS

COs	COURSE OUTCOMES
CO1	Understand the basic aspects of nuclear structure and fundamentals of radioactivity
CO2	Describe the different types of nuclear reactions and their applications
CO3	Understand the principle and working of particle detectors
CO4	Describe the principle and working of particle accelerators
CO5	Understand the basic principles of elementary particle physics

SEMESTER VI
GPHY6B13T – RELATIVISTIC MECHANICS AND ASTROPHYSICS

COs	COURSE OUTCOMES
CO1	Understand the fundamental ideas of special relativity
CO2	Understand the basic concepts of general relativity and cosmology
CO3	Understand the basic techniques used in astronomy
CO4	Describe the evolution and death of stars
CO5	Describe the structure and classification of galaxies

SEMESTER VI

GPHY6B14T – Elective 1. BIOMEDICAL PHYSICS

COs	COURSE OUTCOMES
CO1	Understand the basic principles of biophysics.
CO2	Understand the fundamentals of medical instrumentation
CO3	Understand the principles of ultrasound and x-ray imaging
CO4	Understand the basic principles of NMR
CO5	Describe the applications of lasers in medicine

SEMESTER VI

GPHY6B14T – Elective 2. NANOSCIENCE AND TECHNOLOGY

COs	COURSE OUTCOMES
CO1	Understand the elementary concepts of nanoscience
CO2	Understand the electrical transport mechanisms in nanostructures
CO3	Understand the applications of quantum mechanics in nanoscience
CO4	Understand the fabrication and characterization techniques of nanomaterials
CO5	Enumerate the different applications of nanotechnology

SEMESTER VI

GPHY6B14T – Elective 3. MATERIALS SCIENCE

COs	COURSE OUTCOMES
CO1	Understand the basic ideas of bonding in materials
CO2	Describe crystalline and non-crystalline materials
CO3	Understand the types of imperfections and diffusion mechanisms in solids
CO4	Describe the different properties of ceramics and polymers
CO5	Describe the different types of material analysis techniques

SEMESTER I TO VI
GPHY4B05P – PRACTICAL I

COs	COURSE OUTCOMES
CO1	Apply and illustrate the concepts of properties of matter through experiments
CO2	Apply and illustrate the concepts of electricity and magnetism through experiments
CO3	Apply and illustrate the concepts of optics through experiments
CO4	Apply and illustrate the principles of electronics through experiments

SEMESTER V & VI
GPHY6B15P – PRACTICAL II

COs	COURSE OUTCOMES
CO1	Apply and illustrate the concepts of properties of matter through experiments
CO2	Apply and illustrate the concepts of electricity and magnetism through experiments
CO3	Apply and illustrate the concepts of optics and spectroscopy through experiments
CO4	Apply and illustrate the principles of heat through experiments

SEMESTER V & VI
GPHY6B16P – PRACTICAL III

COs	COURSE OUTCOMES
CO1	Apply and illustrate the principles of semiconductor diode and transistor through experiments.
CO2	Apply and illustrate the principles of transistor amplifier and oscillator through experiments
CO3	Apply and illustrate the principles of digital electronics through experiments
CO4	Analyse and apply computational techniques in Python programming

SEMESTER V & VI
GPHY6B17R – PROJECT

COs	COURSE OUTCOMES
CO1	Understand research methodology
CO2	Understand and formulate a research project
CO3	Design and implement a research project
CO4	Identify and enumerate the scope and limitations of a research project

SEMESTER V & VI
**APHY6B17(R) – RESEARCH METHODOLOGY (In lieu of
Project)**

COs	COURSE OUTCOMES
CO1	Understand research methodology
CO2	Understand the concept of measurement in research
CO3	Understand the significance and limitations of experimentation in research
CO4	Understand and formulate a research project, ethics and responsibility of scientific research

COURSE OUTCOMES – COMPLIMENTARY COURSES

SEMESTER I

GPHY1C01T – PROPERTIES OF MATTER & THERMODYNAMICS

COs	COURSE OUTCOMES
CO1	Understand the basic principles of elasticity
CO2	Understand the concepts of surface tension
CO3	Understand the aspects of viscosity
CO4	Understand the basic principles of thermodynamics

SEMESTER II

GPHY2C02T – OPTICS, LASER & ELECTRONICS

COs	COURSE OUTCOMES
CO1	Understand the basic concepts of interference and diffraction
CO2	Understand the concepts of polarization
CO3	Understand the fundamentals of electronics
CO4	Understand the important principles of laser physics

SEMESTER III
GPHY3C03T – MECHANICS, RELATIVITY, WAVES AND OSCILLATIONS

COs	COURSE OUTCOMES
CO1	Understand the basic ideas of frames of reference and the principles of conservation of energy and momentum
CO2	Understand the concepts of relativity
CO3	Understand the basic ideas of oscillations and waves
CO4	Understand the basic ideas of modern physics.

SEMESTER IV
GPHY4C04T – ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

COs	COURSE OUTCOMES
CO1	Understand the basic ideas of static and current electricity
CO2	Understand the concepts of magnetism
CO3	Describe the fundamental concepts of nuclear physics
CO4	Understand the basic ideas of cosmic rays and elementary particles

SEMESTER I TO IV
GPHY4C05P – PRACTICALS I

COs	COURSE OUTCOMES
CO1	Apply and illustrate the concepts of properties of matter through experiments
CO2	Apply and illustrate the concepts of electricity and magnetism through experiments
CO3	Apply and illustrate the concepts of optics through experiments
CO4	Apply and illustrate the principles of electronics through experiments

COURSE OUTCOMES – OPEN COURSES

SEMESTER V

GPHY5D01T – NON CONVENTIONAL ENERGY SOURCES

COs	COURSE OUTCOMES
CO1	Understand the importance of non-conventional energy sources
CO2	Understand basic aspects of solar energy
CO3	Understand basic principles of wind energy conversion
CO4	Understand the basic ideas of geothermal and biomass energy and recognize their merits and demerits
CO5	Understand the basic ideas of oceans and chemical energy resources and recognize their merits and demerits

SEMESTER V

GPHY5D02T – AMATEUR ASTRONOMY AND ASTROPHYSICS

COs	COURSE OUTCOMES
CO1	Describe the history and nature of astronomy as a science
CO2	Understand the motion of earth in space and the cause of seasons
CO3	Understand the basic elements of solar system
CO4	Understand the elementary concepts of solar system

SEMESTER V
GPHY5D03T – ELEMENTARY MEDICAL PHYSICS

COs	COURSE OUTCOMES
CO1	Understand the basic aspects of physics of nuclear medicine.
CO2	Recognize different bioelectric signals and their instrumentation
CO3	Understand the basic elements of X-ray imaging
CO4	Understand the basic elements of ultrasound imaging and its advantages and disadvantages

B.Sc. BOTANY
(CORE, COMPLEMENTARY & OPEN COURSES)

Programme Specific Outcome

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	Understand scope and importance of Botany in every field especially in dealing with societal and environmental issues, agriculture, ethics and healthcare.
PSO2	Understand the and the role of plants in sustaining life on earth and the interrelationship between human beings and nature, create awareness on natural resources and their importance in sustainable development, analyse the importance of biodiversity conservation, estimate biodiversity loss and develop conservation strategies.
PSO3	Develop scientific temper and undertake scientific projects.
PSO4	Identify and classify plants according to the principles of plant systematics, apply techniques like plant propagation methods, organic farming, mushroom cultivation, preparation of bio fertilizers, bio pesticides etc.
PSO5	Understand plant life processes, biomolecules, basic hereditary and evolutionary principles.

COURSE OUTCOMES – CORE COURSES

SEMESTER I

GBOT1B01T – ANGIOSPERM ANATOMY & MICROTECHNIQUE

COs	COURSE OUTCOMES
CO1	Demonstrate the ability to differentiate plant organs by observing anatomical features.
CO2	Understand the non-living inclusions of plants and their significance
CO3	Differentiate tissues and their functions
CO4	Illustrate primary and secondary (normal and anomalous) structures of plant organs.
CO5	Explain various developmental details of angiosperms.
CO5	Realize the significance and applications of micro technique

SEMESTER II

GBOT2B02T – MICROBIOLOGY, MYCOLOGY, LICHENOLOGY AND PLANT PATHOLOGY

COs	COURSE OUTCOMES
CO1	Understand basics of microbial life and their economic importance.
CO2	Develop general awareness on the diversity of microorganisms, fungi and lichens.
CO3	Analyse the ecological role played by bacteria, fungi and lichens
CO4	Identify plant diseases and find out control measures.
CO5	Realize the significance of plant diseases as far as crop production is concerned.

SEMESTER III
**GBOT3B03T – PHYCOLOGY, BRYOLOGY,
PTERIDOLOGY & GYMNOSPERMS**

COs	COURSE OUTCOMES
CO1	Appreciate the diversity and evolutionary significance of lower plant groups.
CO2	Classify algae, bryophytes and pteridophytes
CO3	Understand the economic and ecological importance of lower plant groups.
CO4	Understand the role of gymnosperms as a connecting link between pteridophytes and angiosperms

SEMESTER IV
**GBOT4B04T – RESEARCH METHODOLOGY, REPRODUCTIVE
BOTANY & PALYNOLOGY**

COs	COURSE OUTCOMES
CO1	Develop scientific temper
CO2	Undertake scientific projects and prepare project reports
CO3	Analyse statistical data and derive conclusions
CO4	Prepare permanent slides, applying the histochemical techniques
CO5	Explain various developmental details of angiosperms.
CO6	Realize the significance and applications of palynology.

SEMESTER V
**GBOT5B06T – CELL BIOLOGY, PALAEOBOTANY,
PHYTOGEOGRAPHY & EVOLUTION**

COs	COURSE OUTCOMES
CO1	Appreciate the ultra-structure of a plant cell.
CO2	Enumerate the functions of each cell organelle.
CO3	Appreciate the process of organic evolution.
CO4	Realize the importance of fossil study.
CO5	Understand the climatic conditions of the past and realize the changes happened
CO6	Recognize the phytogeography zones of India.

SEMESTER V
**GBOT5B07T – ANGIOSPERM MORPHOLOGY &
SYSTEMATICS**

COs	COURSE OUTCOMES
CO1	Appreciate the diverse morphology of angiosperms.
CO2	Identify and classify plants based on taxonomic principles.
CO3	Make scientific illustrations of vegetative and reproductive structures of plants.
CO4	Develop the skill of scientific imaging of plants.
CO5	Realize the importance of field study.
CO6	Change their attitude towards over exploitation of rare/endemic plants.

SEMESTER V
**GBOT5B08T – TISSUE CULTURE, HORTICULTURE,
ECONOMIC BOTANY & ETHNOBOTANY**

COs	COURSE OUTCOMES
CO1	Critically evaluate the advantages of tissue culture and horticulture over conventional methods of propagation.
CO2	Apply various horticultural practices in the field.
CO3	Experiment on the subject and try to become entrepreneurs.
CO4	Identify the economically important plants.

SEMESTER V
GBOT6B12T – PLANT PHYSIOLOGY

COs	COURSE OUTCOMES
CO1	Identify the physiological responses of plants.
CO2	Analyse the role of external factors in controlling the physiology of plants.

SEMESTER VI
GBOT6B10T – GENETICS & PLANT BREEDING

COs	COURSE OUTCOMES
CO1	Appreciate the facts behind heredity and variations.
CO2	Understand the basic principles of inheritance.
CO3	Solve problems related to classical genetics.
CO4	Predict the pattern of inheritance.
CO5	Understand various plant breeding techniques.
CO6	Realize the role of plant breeding in increasing crop productivity.

SEMESTER VI
**GBOT6B11T – BIOTECHNOLOGY, MOLECULAR
BIOLOGY & BIOINFORMATICS**

COs	COURSE OUTCOMES
CO1	Analyse the role of biotechnology in daily life.
CO2	Understand the basic aspects of bioinformatics.
CO3	Explain the concepts in molecular biology.

SEMESTER VI
GBOT6B12T – PLANT BIOCHEMISTRY

COs	COURSE OUTCOMES
CO1	Draw and explain the structure of biomolecules.
CO2	Explain the metabolic processes taking place in each cell.
CO3	Appreciate the energy fixing and energy releasing processes taking place in cells.

SEMESTER VI
GBOT6B13T – ENVIRONMENTAL SCIENCE

COs	COURSE OUTCOMES
CO1	Realize the importance of ecological studies.
CO2	Develop environmental concern in all their actions and practise Reduce, Reuse and Recycle.
CO3	Try to reduce pollution and environmental hazards and change their attitude towards throwing away plastic wastes.
CO4	Spread awareness of the need of conservation of biodiversity and natural resources.
CO5	Analyse the reasons for climate change and find out ways to combat it.

SEMESTER VI
GBOT6B14T (E1) – ELECTIVE-1: GENETIC ENGINEERING

COs	COURSE OUTCOMES
CO1	Appreciate various techniques employed in genetic engineering.
CO2	Develop general awareness on genetically modified organisms.
CO3	Understand the ethical, social and legal issues associated with genetic engineering.

SEMESTER VI
GBOT6B14T (E2) – ELECTIVE-2: ADVANCED ANGIOSPERMSYSTEMATICS

COs	COURSE OUTCOMES
CO1	Develop deep knowledge in angiosperm systematics.
CO2	Demonstrate ability to identify and classify plants in a faster and better way.
CO3	Apply imaging technologies in plant systematics.

SEMESTER VI
GBOT6B14T (E3) – ELECTIVE-3: ADVANCES IN CROPIMPROVEMENT

COs	COURSE OUTCOMES
CO1	Understand various techniques employed for increasing crop productivity.
CO2	Identify diseases affecting crop plants.
CO3	Attain general awareness on various crop research stations of the country.

COURSE OUTCOMES – COMPLIMENTARY COURSES

SEMESTER I

GBOT1C01– ANGIOSPERM ANATOMY AND MICROTECHNIQUE

COs	COURSE OUTCOMES
CO1	Explain the types, structure and functions of plant tissues
CO2	Explain primary and secondary (normal and anomalous) structures of plant organs.
CO3	Identify plant organs by observing anatomical features.
CO4	Illustrate primary and secondary (normal and anomalous) structures of plant organs.
CO5	Apply the histochemical techniques in laboratory works

SEMESTER II

GBOT2C02– CRYPTOGAMS, GYMNOSPERMS AND PLANT PATHOLOGY

COs	COURSE OUTCOMES
CO1	Analyse the role of the lower plants in the process of evolution.
CO2	Explain the ecological significance of lower plants
CO3	Identify plant diseases and take remedial measures to control them.

SEMESTER III
**GBOT3C03– MORPHOLOGY, SYSTEMATIC BOTANY,
ECONOMIC BOTANY,
PLANT BREEDING AND HORTICULTURE**

COs	COURSE OUTCOMES
CO1	Appreciate the diverse morphology of angiosperms.
CO2	Identify and classify plants based on taxonomic principles
CO3	Make scientific illustrations of vegetative and reproductive structures of plants
CO4	Identify the economically important plants
CO5	Understand the basic principles of plant breeding
CO6	Apply various horticultural practices in the field.

SEMESTER IV
**GBOT4C04– PLANT PHYSIOLOGY, ECOLOGY AND
GENETICS**

COs	COURSE OUTCOMES
CO1	1. Explain the physiological processes in plants.
CO2	2. Understand the basic principles of heredity and variation.
CO3	3. Realize the importance of ecology.
CO4	4. Spread awareness of the necessity of conservation of biodiversity and natural resources
CO5	5. Solve problems related to classical genetics

COURSE OUTCOMES – OPEN COURSES

SEMESTER V

GBOT5D01– GENERAL BOTANY

COs	COURSE OUTCOMES
CO1	Have a general awareness on various branches of plant science
CO2	Develop environmental concern in all their activities.
CO3	Realize the importance of plants in everyday life.

SEMESTER V

GBOT5D02– APPLIED BOTANY

COs	COURSE OUTCOMES
CO1	Develop general awareness on applied aspects of Plant science
CO2	Realize the role of plants in everyday life.
CO3	Apply vegetative propagation methods in everyday life.
CO4	Realize the economic importance of plants

SEMESTER V

GBOT5D03 – BASIC TISSUE CULTURE

COs	COURSE OUTCOMES
CO1	Understand plant tissue culture as a rapid propagation method.
CO2	Explain the steps involved in tissue culture.
CO3	Realize the applications of plant tissue culture