

***S.U.S. GOVERNMENT COLLEGE SUNAM***  
***PROGRAMME OUTCOMES, COURSE OUTCOMES***

Mechanism of Communication: The following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.

- Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students.
- Learning Outcomes of the Programmes and Courses are displayed on the notice boards of each department.
- The students are also made aware of the same through Tutorial classes.

***B.Sc. Med/ Non Med***  
***Program Outcomes***

Bachelor of Science (BSc) offers theoretical as well as practical knowledge about different subject areas. These subject areas include Physics, Chemistry, Mathematics and Biology and other fields depending on the specialization a student opts.

This programme course is most beneficial for students who have a strong interest and background in Science and Mathematics. The course is also beneficial for students who wish to pursue multi and inter-disciplinary science careers in future. Following are the various programme outcomes:

1. This course forms the basis of science and comprises of the subjects like physics, chemistry, biology, zoology and mathematics.
2. 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.
3. 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.
4. After higher studies students can join as scientist and can even look for professional job oriented courses.

5. This course also offers opportunities for serving in Indian Army, Indian Navy, Indian Air Force as officers.
6. Students after this course have the option to join Indian Civil Services as IAS, IFS etc..
7. Science graduates can go to serve in industries or may opt for establishing their own industrial unit.
8. After the completion of the B.Sc. degree there are various other options available for the science students. Often, in some reputed universities or colleges in India and abroad the students are recruited directly by big MNC's after their completion of the course.
9. 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.

### ***Program Specific outcomes:***

#### ***B.Sc. Medical/Non-Medical***

##### **a) B.Sc. Medical**

1. B.Sc. Medical student is able to acquire knowledge regarding Botany, Zoology, Chemistry, Biotechnology.
2. Medical Students will be able to define and explain major concepts in the biological sciences.
3. They are able to correctly use biological instrumentation and proper laboratory techniques.
4. Students will be able to communicate biological knowledge in oral and written form.
5. Students will be able to recognize the relationship between structure and function at all levels: molecular, cellular, and organismal.
6. They can go for Indian Forest Service and other competitive examinations.
7. They can opt for higher studies in Botany, Zoology, Chemistry, Biotechnology and Fisheries.
8. Biotechnology is another fast growing field which is more applicable in Industries and

Hospitals.

**b) B.Sc.Non.Medical**

1. B.Sc. Non-Medical student is able to concentrate on Chemistry, Physics, and Mathematics.
2. A non-medical student will demonstrate a scientific knowledge of the core physics principles in Mechanics, Electromagnetism, Modern Physics, and Optics.
3. He is able to demonstrate basic manipulative skills in algebra, geometry, trigonometry, and beginning calculus.
4. The student will determine the appropriate level of technology for use in:  
a) experimental design and implementation, b) analysis of experimental data, and c) numerical and mathematical methods in problem solutions.
5. He will be able to apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them.
6. He can 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.
7. The student will acquire knowledge of Chemical Thermodynamics, Kinetics, Electrochemistry, Atomic Structure, Organic Chemistry, Spectroscopy and Skill in Industrial Chemistry.
8. A non-medical student can join Indian Air Force, Indian Navy and can also go for other competitive exams. He can go for higher studies in Mathematics, Chemistry and Physics.
9. He can join as a scientist in research institutes of immense knowledge having a great scope for growth and development. He can prove to be an asset for the society by producing something more innovative.
10. Banking sector is another good option for non-medical students.

## *Department of Botany*

### *Programme Outcomes*

Botany covers a wide range of scientific disciplines concerned with the study of plants, algae and fungi, including structure, growth, reproduction, metabolism, development, diseases, chemical properties and evolutionary relationships among taxonomic groups. The course structure of this course is designed while keeping in mind the market demand for skilled and efficient professional who can effectively cater to the demands of growing botanical industry. Job opportunities are also wide as research organisations, herbal products companies, farm management organizations; biotechnology firms always require the services of botany students. After the degree course, botany students can work in the state departments, botanical survey of India and environmental protection agency. The department aims to provide the students an up to date level of understanding of plant science and allows them to develop an aptitude towards science and nature. Along with it the students are equipped with the basic skills in identifying and labeling different plants.

A holistic development and academic excellence to contribute effectively to the understanding of the subject along with sensitizing the students towards the need for keeping the environment clean and conserve our natural resources is the prime motive of the department.

<b>Course Name</b>	<b>Course Out Comes</b>
SEM-I : Diversity of Microbes & Cryptogams	Microbial diversity is taught to enhance learning of important concepts in micro biology, improve microbiology skill & create students interest towards natural life science. The students will know the economic importance of fungi, Algae, Bacteria, Viruses and Bryophytes.
SEM-II Cell Biology and Genetics	The objective of this course is to have an insight into mechanism of gene expression and its regulation in prokaryotes and eukaryotes. This course helps the students to develop a firm foundation in the fundamentals of cell biology and cytogenetics.
SEM-III Diversity of seed plants and their systematics	Plant systematic develop evolutionary relationship among different group of plants. Studing the diversity of seed plants can

	help in understanding the development of defense mechanism in plants. Seed plants are also foundation of human diet in across the world.
SEM-IV Structure, Development and reproduction in flowering	This course has been designed to impart an insight into the internal structure and reproduction of the most evolved group of plants, the angiosperms. The students are made to identify the role of anatomy in solving the taxonomic and phylogenetic problems. Structural adaptations in plants growing in different environments are also taught.
SEM-V Plants Physiology, Bio Chemistry and Bio technology	Plants Physiology has shown immense importance for crop improvement and technological improvement in agricultural and horticulture. Bio chemistry determines the various methods and ways to develop nutritious food. Bio technology study has develop various application in the field of energy advancement such as biofuels, and medicinal drugs in drug industry.
SEM-VI Plant Ecology	Plants Ecology is very important for students who want to develop their career in the study of relationship between plants and their physical and biotic environment concept of sustainability improves the mind of young generation to conserve the natural resources for present and future generation. Plants utilization study has vast application in field of medicine, food and beverage industry. One can open to all of the career choices in those industry
Practical Botany SEM-I	Students study genera included under algae and fungi indicating their systematic position through slides and materials under microscope. Students also study morphology, reproductive structure and anatomy through section cutting of examples cited in the theory under Bryophyta and pterdophyta. Students also observe disease symptoms in the hosts infected by bacteria,

	viruses .Students also study lichen,thalli.
SEM-II	Students examine electron micrograph,various stages of mitosis and meiosis using appropriate material. Students study special type of chromosomes from slides or photographs. Students work out the laws of inheritance using seed mixture.
SEM-III	Students study the anatomy (section cutting)of Dicot and Monocot root,stem and leaves from the locally available material. Study of anomalous secondary growth. Examination of flowers for their pollination mechanism
SEM-IV	Section cutting, identification of slides with diagnostic features.
SEM-V&VI	Students learn to perform different types of experiments pertaining to theory paper 9 & 10 i.e. plant physiology and plant growth, development and biotechnology

## *Department of Math (B.Sc./BA)*

### *Programme Outcomes*

The Bachelor's Degree in B.Sc. Mathematics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements sought to be acquired by learners at the end of this program. Hence, the learning outcomes of mathematics for this course are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for knowledge of mathematics. Mathematics is the study of quantity, structure, space and change. It has very broad scope in science, engineering and social sciences. The key areas of study in mathematics are Calculus, Algebra, Geometry, Analysis, Differential Equations and Mechanics.

#### **Programme Specific Outcome**

- Think in a critical manner.
- Familiarize the students with suitable tools of mathematical analysis to handle issues and problems in mathematics and related sciences.
- Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of mathematics and statistics.
- Provide students/learners sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with mathematics.
- Encourage the students to develop a range of generic skills helpful in employment, internships and social activities.

### Course Out Comes

Course Name	Course Out Comes
SEM-I&II Calculus	Calculus is used to improve the architecture not only of buildings but also of important infrastructure such as bridges. Biologist use differential calculus to determine the exact rate of growth in a bacterial culture when different variables such as temperature and food sources are changed. With the help of calculus center of mass, center of gravity and moment of inertia of a sports utility vehicle can be calculated.
SEM-I&II Linear algebra	Algebra helps us to solve problems more quickly and easily .algebra also opens up whole new areas of life problems, such as graphing curves that cannot be solved with only foundational mathematical skills.
SEM-I&II Differential equations	Differential equations are very important in the mathematical modeling of physical systems. Many fundamental laws of physics and chemistry can be formulated as differential equations. In. Biology and economics, differential equations are used to model the behaviour of complex systems.

SEM-III&IV Mathematical Analysis	Sequences and series play an important role in various aspects of our lives. They help us predict, evaluate and monitors the outcome of a situation or event and help us a lot in decision making.Riemann sums give us a systematic way to find the area of a curved surface when we know the mathematical function of that curve.
SEM-III&IV Mechanics	This course enables the students to understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body. Determine the center of gravity of some materialistic system and discuss the equilibrium of a uniform cable hanging under its own weight.Its also deals with the kinematics and kinetics of the rectilinear and planar motions of a particle including constrained oscillatory motion of particles. Students also learn that a particle moving under a central force describes a plane curve and know the kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton.
SEM-III&IV Linear programming	Linear programming methods are helpful for solving problems related to production. A company that produces multiple types of products can use linear programming methods to calculate how much of each product to produce to maximize it's profits. Many large distribution companies use linear programming in the analysis of their supply chain operations.
SEM-V&VI Discrete mathematics	Concepts and notations from Discrete mathematics are useful in studying and describing objects and problems in branches of computer science such as computer algorithms, programming languages and software development.Google maps uses discrete mathematics to determine fastest routes and times.



SEM-V&VI Number theory	Number theory is a branch of pure mathematics devoted to the study of the natural numbers and the integers.it is the study of the set of positive whole numbers which are usually called the set of natural numbers. Number theory is also called the Queen of mathematics.
------------------------	---

## *Department of Zoology*

### *Programme Outcomes*

Students enrolled in B.Sc. degree program in Zoology will study and acquire complete knowledge of disciplinary as well as allied biological sciences. At the end of graduation, they are likely to possess expertise which will provide them competitive advantage in pursuing higher studies from India or abroad; and seek jobs in academia, research or industries. Students will be able to define and explain major concepts in the biological sciences. They are able to correctly use biological instrumentation and proper laboratory techniques. Students will be able to communicate biological knowledge in oral and written form. Students will be able to identify the relationship or synchronization between structure and function at all levels: molecular, cellular, and organismal. Students should be able to identify, classify and differentiate diverse chordates and nonchordates based on their morphological, anatomical and systemic organization. They will also be able to describe economic, ecological and medical significance of various animals in human life.

Students will be able to explicate the ecological interconnectedness of life on earth by tracing energy and nutrient flows through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems. Students undertaking skill enhancement courses like aquaculture, sericulture and apiculture will inculcate skills involved in rearing fish, bees and silk moth which would help them in starting their own ventures and generating self employment making them successful entrepreneurs. Acquired skills in diagnostic testing, haematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory. Candidates find opportunities in government departments, environmental

agencies, universities, colleges,biotechnological,

**Course Out Comes**

Course Name	Course Out Comes
Cell biology	<p>The course provides a detailed insight into basic concepts of cellular structure and function.it also gives an account of the complex regulatory mechanisms that control cell function. It also gives an account of cell division,cell cycle and its regulation.</p> <p><b>Outcomes</b></p> <p>After successfully completing this course,the students will be able to understand the functioning of nucleus and extra nuclear organells and understand the intricate cellular mechanisms involved. Students also understand the structure, position,and functions of plasma membrane &amp;all cellular organells in details. They will acquire knowledge about chromosomes and cell divisions,both mitosis and meiosis</p>
Non chordates	<p>Describe general taxonomic rules on animal classification. Classify phylum protozoa to hemichordata with taxonomic keys. Getting an overview of typical examples in each phyla. Some special features,organs, pathogenicity,life history and significance are studied. <b>Outcomes.</b></p> <p>After successfully completing this course, the students will be able to develop an understanding of the characters used to classify besides being able to differentiate the organisms belonging to different taxa .students also have hands on experience of materials demonstrating the diversity of nonchordates. Students can undertake research in any aspect of animal physiology in future</p>
Ecology	<p>This course will take students on a journey through the physical working Of the Earth,the interaction between species and their environment.The course highlights on some of the important aspects viz. Growth and survival of population and communities in different habitats, energy flow in the ecosystems, interaction between the</p>

	<p>communities,exclusion of niches and consequences of changing environment on the biodiversity.</p> <p><b>Outcomes</b></p> <p>After successfully completing the course, the students will be able to know the evolutionary and functional basis of animal ecology. Students understand what makes the scientific study of animal ecology a crucial and exciting endeavour. Students also analysis a biological problem,derive testable hypothesis and then design experiments and put the tests into practice. Students can solve the environmental problems involving interaction of human and natural system at local or global level.</p>
Chordates	<p>The course explores vertebrate morphology with the aims of understanding major events in the history of vertebrate evolution and integrating the morphology of vertebrates with their ecology , behaviour and physiology adaptation in diverse.</p> <p><b>Outcomes.</b></p> <p>After successfully completing this course, the students will be able to develop an understanding of the evolution of vertebrates thus integrating structure function and development. Understand how cells, tissues and organisms function at different levels. The project assignments also given students a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills.</p>
chordates and evolution, chordates	<p>This course explore vertebrates morphology with the aims of understanding major events in the history of vertebrate evolution and integrating the morphology of vertebrates with their ecology, behaviour and physiological adaptation in diverse habitats.it also deals with the differences and similarities between organisms on the basis of their morphology and anatomy which led to their grouping into taxa.</p> <p><b>Outcomes</b></p>

	<p>After successfully completing the course the students will be able to develop understanding on the diversity of life. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan. Understand how morphological change due to change in environment helps drive evolution over a long period of time. Students also get a flavour of research besides improving their writing skills and making them well versed with the current trends. It will further enable the students to think and interpret individually due to different aspects chosen.</p>
<p>Biochemistry.</p>	<p>The course provides an introduction to the structure of biomolecules with the emphasis on the techniques used for structure determination and analysis. The course covers basic aspects of sample preparation for analysis and aims to enlighten the students how structural information can be utilized for better understanding of biological processes.</p> <p><b>Outcomes</b></p> <p>After successfully completing the course, the students will be able to understand the metabolism of carbohydrates, lipids and proteins in details. understand about the importance and scope of biochemistry. understand the concept of enzyme, it's mechanism of action of regulation. Understand the process of DNA replication, transcription and translation.</p>
<p>Animal physiology.</p>	<p>The course provides knowledge about various metabolic and physiological mechanism of the human body.</p> <p><b>Outcomes</b></p> <p>After successfully completing the course the students will be able to understand the mechanism that work to keep the human body alive and functioning. Understand fundamental knowledge of physiology and endocrine system. understand and learn details of</p>

	<p>endocrinology with classification of hormones, their biosynthesis, feedback control and related disorders.</p>
Developmental Biology	<p>The course describes how embryos develop (embryology) and also highlights how the process of development are brought about by changing individual cells into specialized cells with specific functions and how genes within the genome of the organisms drive and guide these changes .it also deals with a comparative account of development in some selected groups of animals.</p> <p><b>Outcomes</b></p> <p>After successfully completing the course the students will be able to develop critical understanding how a single celled fertilized egg becomes an embryo and then a fully formed adult by going through three important processes of cell division, cell differentiation and morphogenesis. Students understand how the field of developmental biology has changed since the beginning of the 19th century with different phases of developmental research predominating at different times. Students can distinguish between the main stages of embryonic, foetal and neonatal development and causes of foetal disorder.</p>
Genetics.	<p>The course is designed to revise basic concepts of genetics and then move on to advanced concepts. Some key aspects include the mechanism of inheritance, gene structure and function, multiple alleles and multiple factors, aspects of human genetics, etc. Will be covered. A strong emphasis will be laid on the modern tools and techniques used in genetics.</p> <p><b>Outcomes</b></p> <p>After successfully completing the course the students will be able to understand how DNA encodes information and the function of mRNA and tRNA. Students can apply the principles of Mendelian inheritance. Students can understand the causes and effects of alterations in chromosomes number and structure. Students can get</p>

	new avenues of joining research in related area such as genetic engineering of cells,cloning,genetic disorder etc.
Economic Entomology.	The course Imparts knowledge of beneficial and non beneficial insects, knowledge of how they interact with their environment, other species and human, classification of insects/pests,role of pests in spread of diseases,role of pests of medical and veterinary importance. Outcomes. Students gain knowledge about the concept of overview of Entomology, course gives insight into physiology, biochemistry and reproduction of insect vectors and their control measures. Students gets good insight into how medical Entomology is acting as a promising factor for entomologist vacancies in both public and private sectors. Students feel confident in teaching Entomology as well as executing research projects
Pest Management	The Course is unique in highlighting the commercial and industrial significance/ value of animals. It discusses the technique/ methods of rearing of animals for commercial usage and the prerequisites for their successful maintenance and sustenance. <b>Outcomes</b> After successfully completing this course the Students will be able to:- <ol style="list-style-type: none"> <li>1. Understand silk worms rearing and their products.</li> <li>2. Understand the bee keeping equipment of apiary management.</li> <li>3. Learn Various concepts of the bc cultivation.</li> <li>4. Learn Various concepts of pest Management.</li> <li>5. Learn recent methods of pest control, IPM and Its framework programme and implementation strategy and perspective in IPM.</li> </ol>
	After successfully completing the course the students will be able to

<b>Zoology practical.</b>	<p><b>B.sc 1</b> Understand about cells-The basic unit of life and recognize various cellular organisms and various stages of cell diversity. Understand Ecology and evolution of non chordates and chordates and able to identify and classify them.</p> <p><b>B.sc2</b> Understand basics of biochemistry, nature of enzymes and metabolism of carbohydrates, lipids and proteins. Understand animal physiology with the study of experiments based on medical zoology. Understand chordates and evolution with their identification and classification.</p> <p><b>B.Sc. 3</b> Understand embryonic development with the basic concept of egg maturation, gameto geners and functioning of mammalian placenta. Understand genetic and study about Mendelian ratios and Gene frequencies and also inheritance of human characteristics. Understand different types of pastes and their identification of management. Understand the concept of IPM.</p>
---------------------------	--

***Department of Chemistry***  
***Programme Outcomes***

After doing chemistry subject in B.Sc students can gain knowledge of handling the chemicals. Students can adopt the field of food safety, health inspector, pharmacist and forensic science etc. Students achieve skills to take job in chemical Industries like paint Industries, Rubber industries, food processing industries, cement industries, fertilizer industries etc. All three branches i.e organic, inorganic, physical chemistry are studied in B.Sc.

**Course Out Comes**

<b>Course Name</b>	<b>Course Out Comes</b>
SEM-I Organic chemistry, Inorganic Chemistry,	<p><b>Organic Chemistry</b> After completion of this course students are able to</p> <ol style="list-style-type: none"> <li>1) Understand concepts of Bond Length, bond angle, bond energy</li> <li>2) Can compare acidic nature &amp; basic nature with help of</li> </ol>

Physical Chemistry	<p>Resonance &amp; Inductive effects.</p> <p>3) Can understand Mechanism of reactions.</p> <p>4) Can understand preparation and properties of alkanes.</p> <p>5) Students understand concepts of cycloalkanes. Understanding the concepts of cycloalkanes &amp; their properties are crucial as many of the biological processes that occur in most living things involve cycloalkane like structures.</p> <p>6) Study the concept of Baeyer strain theory.</p> <p><b>Inorganic Chemistry</b></p> <p>1) Understand structure of atoms.</p> <p>2) Shapes of various orbitals</p> <p>3) Understand concepts of Schrodinger wave equation, Heisenberg principle.</p> <p>4) Understand position of elements in periodic table and their properties.</p> <p>5) Concept of Noble gases.</p> <p>6) Understand the concept of chemical bonding which is one of the key concepts in the study of chemistry.</p> <p><b>Physical Chemistry</b></p> <p>1) Concept of different types of liquid crystals.</p> <p>2) Concepts of Ideal gases and Non-Ideal gas.</p> <p>3) Understand concepts of optical activity, dipole moment and polarization.</p> <p><b>Practical Chemistry</b></p> <p>In Sem-I Students Learn Salt Analysis.</p>
SEM-II Organic chemistry, Inorganic Chemistry, Physical Chemistry	<p><b>Organic Chemistry</b></p> <p>1) The students study the concepts of Stereochemistry. With its help, students can work out the relationship between different molecules. They can also study the effect of relationship of molecules on their physical or biological properties. Knowledge of isomerism can help in introducing safer &amp; effective drug alternatives of the new as well as existing drugs.</p> <p>2) Understand concepts of Resonance in Benzene,</p>



	<p>its Aromatic nature and electrophilic substitution reaction of benzene.</p> <ol style="list-style-type: none"> <li>3) Concept of Alkyl halides and aryl halides, their preparation and properties.</li> <li>4) Concepts of Nucleophilic substitution reactions.</li> </ol> <p><b>Inorganic Chemistry</b></p> <ol style="list-style-type: none"> <li>1) Understand concept of structure of various Ionic solids.</li> <li>2) Properties of S-Block elements.</li> <li>3) Concepts of p-block elements which include Boron, Carbon, Nitrogen, Oxygen, Halogen and Noble gases. P-block elements are used in various fields in many ways for e.g. A compound of boron called Borax is used in glass making industry &amp; pottery. Aluminium is used in utensils, foils to wrap articles etc. &amp; many more.</li> </ol> <p><b>Physical Chemistry</b></p> <ol style="list-style-type: none"> <li>1) Various types of solutions.</li> <li>2) Colligative properties and their use.</li> <li>3) Preparation and properties of colloidal state.</li> <li>4) Expressions for rate constants of zero, first and second order reaction.</li> <li>5) Know the concept of Activation energy and its calculation.</li> </ol> <p>Various types of Acidic, Basic, Enzym</p> <p><b>Practical Chemistry</b></p> <p>Students learn to perform purification techniques, melting and boiling points determination techniques.</p>
<p>SEM-III Organic chemistry, Inorganic Chemistry, Physical Chemistry</p>	<p><b>Organic Chemistry</b></p> <ol style="list-style-type: none"> <li>1) Preparations of Alcohols and Phenols</li> <li>2) Properties of Alcohols and Phenols</li> <li>3) Preparations of Aldehyde &amp; ketones</li> <li>4) Properties of Aldehyde &amp; ketones</li> </ol> <p>Inorganic Chemistry</p> <ol style="list-style-type: none"> <li>1) Understand chemistry of elements of transition series.</li> <li>2) Understand concepts of lanthanide and Actinide elements.</li> </ol> <p>Physical Chemistry</p> <ol style="list-style-type: none"> <li>1) The Students study the concept of Thermodynamics, its laws, Joule Law, Carnot cycle etc.</li> </ol>

	<p>2) The Students understand how the energy in a system changes &amp; whether the system can perform useful work on its surroundings.</p> <p>3) Concepts of Entropy and Free energy of system.</p> <p>Understand chemical equilibrium concepts and Le- Chatlier principle</p> <p>Practical Chemistry</p> <p>1) Students Learn to perform volumetric Analysis techniques.</p> <p>2) Thin layer Chromatography &amp; different types of Estimation.</p>
<p>SEM-IV chemistry, Chemistry, Chemistry</p> <p>Organic Inorganic Physical</p>	<p><b>Organic Chemistry</b></p> <p>1) Students study carboxylic acid &amp; their derivatives which are used in the production of polymers, biopolymers, Adhesive ,Pharmaceutical drugs , Food additives and Antimicrobial etc.</p> <p>2) Preparation and Properties of ethers.</p> <p>3) Concepts of fats, oils and detergents.</p> <p>Preparation and properties of Nitro and Amines</p> <p><b>Inorganic Chemistry</b></p> <p>1) Concepts of Coordination Compounds.</p> <p>2) Concepts of various types of Acid &amp; Bases.</p> <p>3) Concepts of solvents like <math>\text{NH}_3</math>, <math>\text{SO}_2</math></p> <p><b>Physical Chemistry</b></p> <p>1) Students study Phase Equilibrium.</p> <p>2) Students study Electrochemistry Which has many common application in everyday life. All types of batteries from those we use power, various types of cells are studied here.</p> <p>3) Concepts of conductance and its measurement.</p> <p>4) Determination of solubility products.</p> <p>5) Various type of electrodes.</p> <p>6) Reversible and Irreversible cells.</p> <p>7) Concepts of pH and its measurements.</p>

	<p>8) Concept of Buffer.</p> <p><b>Practical chemistry</b></p> <p>1) Students perform experiments to study the Quantitative analysis of organic Compounds.</p> <p>2) Also Perform Experiments of Enthalpy of dissolution, Enthalpy of neutralization.</p>
<p>SEM-V Organic chemistry, Inorganic Chemistry, Physical Chemistry</p>	<p><b>Organic Chemistry</b></p> <p>1) Different type of spectroscopies like NMR, UV, IR are being taught. Spectroscopy is used in physical &amp; analytical chemistry. Different types of spectra can be used to detect, identify structures of various molecules.</p> <p>2) Concepts of Organometallic compounds like Grignard reagents &amp; organosulphur compounds are being taught</p> <p><b>Inorganic Chemistry</b></p> <p>1. Concepts of VBT</p> <p>2. Concepts of crystal field theory.</p> <p>3. Concept of thermodynamic and kinetic aspects of metal complexes.</p> <p>4. Understand properties of transition metal complexes and their electronic spectra.</p> <p><b>Physical Chemistry</b></p> <p>1) Students were taught Molecular spectroscopy which is based on the interaction of radiation &amp; matter.</p> <p>2) They study Rotation &amp; Vibrational spectrum.</p> <p>3) Students understand photoelectric effect, heat capacity, Schrodinger wave equation.</p> <p><b>Practical Chemistry</b></p> <p>1) Students learn to prepare various organic and inorganic compounds.</p>
<p>SEM-VI</p>	<p><b>Organic Chemistry</b></p>

<p>Organic chemistry, Inorganic Chemistry, Physical Chemistry</p>	<ol style="list-style-type: none"> <li>1) Students would be able to understand different types of heterocyclic compounds, various types of polymers.</li> <li>2) Alkylation &amp; Acylation of enamines were also being studied.</li> <li>3) Biomolecules like carbohydrates, Amino acids, proteins &amp; Nucleic acids are also the part of this course.</li> </ol> <p><b>Inorganic Chemistry</b></p> <ol style="list-style-type: none"> <li>1) Concepts of Hard and Soft Acids and Bases.</li> <li>2) Concepts of Hemoglobin, Nitrogen fixation.</li> <li>3) Biological role of various metal ions</li> <li>4) Concepts of silicones and phosphazenes.</li> <li>5) Concepts of various organometallic compounds</li> </ol> <p><b>Physical Chemistry</b></p> <ol style="list-style-type: none"> <li>1) This course gives an opportunity for the students to learn about photochemistry, which is the basis of photosynthesis and the formation of vitamin D.</li> <li>2) Students also study different laws of crystallography, Bragg equation &amp; the crystal structure of NaCl, KCl &amp; CsCl</li> <li>3) They also learn about Franck-Condon Principle, Concept of Polarizability.</li> </ol> <p><b>Practical Chemistry</b></p> <ol style="list-style-type: none"> <li>1) Students learn to operate Conductometer, pH metre.</li> <li>2) Measurement of Refractive Index.</li> <li>3) Practicals of Distribution coefficient.</li> <li>4) Techniques of chromatography.</li> </ol>
---	---

***Department of Physics***  
***Programme Outcomes***

**This undergraduate course in Physics Would provide the opportunity to the students:**

- To understand the basic laws and explore the fundamental concepts of physics
- To carry out experiments to understand the laws and concepts of Physics.
- To apply the theories learnt and the skills acquired to solve real time problems.
- To acquire a wide range of problem solving skills, both analytical and technical and to apply them.
- To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
- To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.
- To motivate the students to pursue PG courses in reputed institutions.
- This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements.
- Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.

**Core Papers:**

Name of course	Course Out Comes
Mechanics	The students would learn about the behaviour of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life. The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation and special theory of relativity.
	It gives an opportunity for the students to learn about one of the

Electricity and Magnetism	fundamental interactions of electricity and magnetism, both as separate phenomena and as a singular electromagnetic force. The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equations. The course is very useful for the students in almost every branch of science and engineering.
Waves And Vibration	Through this course student will understand the concept of mechanics, Acoustics and properties of matter. Understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations. Calculate logarithmic decrement relaxation factor and quality factor of a harmonic oscillator. Use lissajous figures to understand simple harmonic vibrations of same frequency and different frequencies. Solve wave equation and understand significance of transverse waves. Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.
Thermal Physics and Statistical Mechanics	The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation and statistical mechanics.
Optics & Laser	The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering. Laser include fundamental of laser light generation Principle, Techniques & laser application. Different types of laser like solid state laser, gas laser, semiconductor laser are a part of syllabus. Holographic technique to study Hologram is also comprises in the syllabus.

<p>Modern Physics or Quantum Physics</p>	<p>Students would know about the basic principles in the development of modern physics. The topics covered in the course build a basic foundation of undergraduate physics students to study the advance branches: quantum physics, nuclear physics, particle physics and high energy physics. The course contains the study of Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations. In this course students would be able to understand Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of H-spectrum, Single and double slit diffraction, Photo electric effect. Quantum mechanics provides a platform for the physicists to describe the behaviour of matter and energy at atomic and subatomic level. The course plays a fundamental role in explaining how things happen beyond our normal observations. The course includes the study of Schrodinger equations, particle in one dimension potential, quantum theory of H like atoms, atoms/molecules in electric and magnetic fields.</p>
<p>Solid State Physics</p>	<p>Students would be able to understand various types of crystal structures and symmetries and understand the relationship between the real and reciprocal space and learn the Bragg's X-ray diffraction in crystals. Would also learn about phonons and lattice.</p>
<p>Electronics</p>	<p>The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications. Students would learn about electronic circuits such as Amplifiers and Oscillators. Various types of Amplifier and Oscillator circuits their working and applications in in domestic, industrial and scientific devices/equipment.</p>

Nuclear & Particle Physics	The student would gain of the knowledge of Nuclear structure, shell model, Liquid drop model, Radio activity and nuclear reactions. The students would gain the knowledge of different types of radiation and its interactions with matter, would also know about the photons, charged particles, neutrons, about radiation detection, monitoring and safety measures, and also learn about the applications of nuclear techniques.
LAB	<p>Students would perform basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements.</p> <p>Students would gain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc. Students would learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: Prism, grating, spectrometers.</p> <p>Various practical problems solving methods related to Quantum Mechanics would be learned by students.</p> <p>The course Provides practical knowledge of various physical phenomena such as: magnetism and semiconductors. Students would gain a hands-on learning experience by performing experiments on these properties of materials.</p>

### ***B.Sc. English***

#### **Course outcomes**

<b>Course Name</b>	<b><u>Course Out Comes</u></b>
<b>SEM-III</b>	<p><u>Section A</u> :Perspectives: selections from modern English prose and fiction, edited by S.A Vasudevan and M.Sathya Babu.It contains prose , fiction, biographies which includes characters , theme and incident/ episode.</p> <p><u>SectionB</u>: Six one act plays, edited by Maurice Stanford.</p>
<b>SEM-IV</b>	The course content of the paper shall comprise composition, comprehension, translation and grammar. Paper shall have two sections that test the



students skills in composition and translation and their skills in grammar.

**SECTION A:**

1. Essay writing
2. Letter writing
3. Precis
4. Comprehension of an unseen passage
5. Translation from Punjab into English.

**SECTION B:**

1. Analysis of sentences: converting simple sentence into complex and compound ones and identify clauses.
2. Synthesis of sentences: Combining two simple sentences into a single simple sentence by using a participle, noun, phrase or infinitive. Combining simple sentence into complex ones by using noun clause.
3. Transformation of sentences: Transformation of degree from positive to comparative degree, active into passive voice and from direct to indirect speech.

From the above importance and objectives of English language as a subject to students is the dominant language and it has become almost a necessity for students to speak English if they are to enter a global workforce. Given the education and work scenario today, it is literally essential for students to understand and speak this universal language. It plays a very important role in determining the success in their respective roles.

