



# **SAROJINI NAIDU VANITA MAHA VIDYALAYA**

## **OUR VISION**

*TRAINING WOMEN FOR A CHALLENGING FUTURE  
THROUGH VALUE BASED EDUCATION*

## **OUR MISSION**

*EDUCATE, EMPOWER AND LIBERATE*

## INDEX

<b>S. No.</b>	<b>Name of the Department</b>	<b>Page No.</b>
1	APPLIED NUTRITION – UG	3
2	NUTRITION & DIETETICS – PG	8
3	BOTANY – UG	14
4	BOTANY – PG	27
5	BIOCHEMISTRY	46
6	BUSINESS MANAGEMENT (MBA)	50
7	CHEMISTRY – UG	65
8	CHEMISTRY – PG	76
9	COMMERCE & BBA – UG	87
10	COMMERCE – PG	121
11	COMPUTER SCIENCE	128
12	ECONOMICS	133
13	HISTORY	138
14	MATHEMATICS	145
15	MICROBIOLOGY	147
16	PHYSICS & ELECTRONICS - UG	154
17	PHYSICS & ELECTRONICS - PG	158
18	POLITICAL SCIENCE	164
19	PUB.ADMINSTRATION	170
20	ZOOLOGY – UG	175
21	ZOOLOGY – PG	184

# DEPARTMENT OF APPLIED NUTRITION

## Department of Applied Nutrition and Public Health

### Vision

Training the future nutrition leaders to emerge as strong dietetic professionals. Foster the development of critical analysis to enable them make a lasting societal impact on solving food, nutrition and health challenges.

### Mission

Contribute to the knowledge-base of nutrition to undergraduate students. Providing credible, current and practical nutrition information to students through high quality teaching and training methods. Inspiring healthy eating and food choices in order to enable students develop knowledge and skills in advocating health. Encourage the effective application of nutrition knowledge to improve human health and well-being enhancing professional skills in students

### Programme Outcomes

Osmania University introduced the bucket system from the year 2020 for the first time so as to enable students choose any three optional subjects of their choice from life science subjects like Botany, Biochemistry, Chemistry, Microbiology and Zoology with Applied Nutrition .

Sl.No	Name of Program	Program Outcomes (PO)	Program Specific Outcomes
<b>Applied Nutrition and Public Health</b>			
1.	<b>B.C.AN</b> - Botany, Chemistry, Applied Nutrition	<b>PO – 1</b> – Acquire knowledge in Applied Nutrition along with Botany and Chemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them to day to day life.	<b>SEC 2 - Food Service Management</b> - provides the opportunity for students to acquire those skills that are necessary to operate and manage a multitude of food service operations. The curriculum enables students to develop their managerial, functional, operational, and analytical capabilities to maximize their success in hospitality and food service management industry.  <b>SEC 4 - Quantity Food Production Skills</b> - involve a thorough understanding of menu planning, recipe standardization, service procedures for quality foods , human resource utilization, hazard analysis of critical
2.	<b>B.BC.AN</b> - Botany, Biochemistry, Applied Nutrition	<b>PO – 2</b> - Acquire knowledge in Applied Nutrition along with Botany and Bio-chemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	
3.	<b>BC.C.AN</b> - Biochemistry, Chemistry, Applied Nutrition	<b>PO – 3</b> - Acquire knowledge in Applied Nutrition along with Bio-chemistry and Chemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	

5.	<b>Mb.C.AN</b> - Microbiology, Chemistry, Applied Nutrition	<b>PO- 4</b> - Acquire knowledge in Applied Nutrition along with Microbiology and Chemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	control points, and costing.  <b>GE1 - Fundamentals of Food and Nutrition</b> “ <b>Fundamentals of Food and Nutrition</b> ” aims at developing basic understanding about nutrition, its effect on <b>human</b> health and newer advances in food technology. This course encompasses physiological, biochemical and social aspects of food and discusses relationship between metabolites and <b>human</b> health.
6.	<b>Mb.Z.AN</b> - Microbiology, Zoology, Applied Nutrition	<b>PO -5</b> - Acquire knowledge in Applied Nutrition along with Microbiology and Zoology. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	
7.	<b>Mb.Bc.AN</b> - Microbiology, Biochemistry, Applied Nutrition	<b>PO- 6</b> - Acquire knowledge in Applied Nutrition along with Microbiology and Biochemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	
8.	<b>B.Z.AN</b> – Botany, Zoology, Applied Nutrition	<b>PO- 7</b> - Acquire knowledge in Applied Nutrition along with Botany and Zoology. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	
9.	<b>Z.C.AN</b> - Zoology, Chemistry, Applied Nutrition	<b>PO- 8</b> - Acquire knowledge in Applied Nutrition along with Zoology and Chemistry. Understand the basic concepts, underlying principles, related scientific theories, relate them to scientific phenomena and apply them in day to day life.	

Sl.No	Semester	Course Name	Course Outcome
1	I	Basics of Biochemistry Theory	CO 1 -Thorough understanding of nutrition basics - food groups , body needs for nutrients and carbohydrates – sources, process of digestion, metabolism and utilization.
			CO 2- Understand proteins and their role and utilization in body processes, functional importance of nucleic acids
			CO 3 - Lipid metabolism and implications of excessive consumption of fats in the diet as also importance of lipids in human nutrition
			CO 4 - Rationale for differences in energy requirement of different physiological groups. Maintaining energy balance and Ideal body weight.
2		Basics of Biochemistry Practical	CO 1 - Understanding the methodology of qualitative analysis and its application. Difference between qualitative and quantitative analysis.
			CO 2- Using different tests to identify various carbohydrates.
			CO 3 - Understanding of how the proteins are identified.
			CO 4- Understanding of how the minerals are identified.
3	II	Nutritional Biochemistry Theory	CO 1 - Understand importance of Vitamins – classification, sources, impact of excess and deficiency in human nutrition
			CO 2 - Understand importance of Minerals – classification, sources, impact of excess and deficiency in human nutrition
			CO 3 -Water as a nutrient, water and electrolyte imbalance and its regulation and diseases associated.
			CO 4 - Role of Enzymes and Hormones in human physiology
4		Nutritional Biochemistry Practical	CO -1 To quantitatively determine the concentration of reducing sugars.
			CO 2 -Understanding how to assess the concentration of proteins in a given solution.
			CO 3 -To understand the amount of free fatty acids present in the sample.
			CO 4 -Learn to determine the concentration of vitamin C in food stuff.
			CO 5 - To quantitatively determine the concentration of calcium in the food stuff.

5	III	Food Science and Technology Theory	CO 1 - Thorough understanding of the role of food in human nutrition, cooking methods, minimising nutrient losses during cooking, importance of functional foods. Importance and role of Cereals and Millets in cookery.
			CO 2- Importance and role of pulses, legumes, milk and milk products in cookery
			CO 3 - Importance and role of Fleshy Foods ,Spices, Condiments and Beverages
			CO 4 - Importance and role of Vegetables and Fruits, Sugar and Jaggery, Fats and Oils
6		Food Science and Technology Practical	CO 1 - Understanding of portion sizes and types of cuts used for display
			CO 2 - Understanding principles of cookery of each food group and their respective nutritional importance in the diet
			CO 3- Understand role of gluten in making soft dough
			CO 4- Understand how egg quality can be assessed
	CO 5 -Understand different stages of sugar cookery		
7	IV	Family and Community Nutrition Theory	CO 1 - Thorough understanding of the concept of balanced diet, RDA its rationale, principles of menu planning and requirements of different physiological age groups.
			CO 2 -Understand the nutritional needs of Pregnant and Lactating women and infants.
			CO 3 - Understand the nutritional concerns during pre-school, school going and adolescent ages, planning of packed lunches.
			CO 4 - Understand the nutritional needs of the elderly, basics and importance of Nutritional Assessment in clinical practice.
8		Family and Community Nutrition Practical	CO 1 - Understanding of nutritional requirements of different age groups
			CO 2 - Menu preparation and understanding of portion sizes of different age groups
			CO 3 - Importance and method of preparing weaning foods
9		V	Clinical Dietetics Theory
	CO 2 - Through understanding of Aetiology, symptoms, screening, medications and dietary regimen for - Obesity, Underweight, Diabetes, CVD and Hypertension		

			<p><b>CO 3</b> - Through understanding of aetiology, symptoms, screening ,medications and dietary regimen for GI diseases – Peptic Ulcer, Constipation, Diarrhoea, IBS</p> <p><b>CO 4</b> - Thorough understanding of aetiology, symptoms and dietary regimen Renal disorders, Liver Disorders</p>
<b>10</b>	<b>V</b>	<b>Clinical Dietetics Practical</b>	<p><b>CO 1</b> - Understanding principles of menu planning of different diseases</p> <p><b>CO 2</b> -Understanding correct portion sizes according to nutrient requirements</p> <p><b>CO 3</b> - Understanding anthropometric tool of nutritional assessment</p>
<b>11</b>	<b>VI</b>	<b>Public Health, Food Hygiene and Sanitation Theory</b>	<p><b>CO 1</b> -Thorough understanding of concept of public health as an emerging field in nutrition. Importance of epidemiology and its role in nutrition research. Disease transmission and control of causative factors. Role of vectors in disease transmission and control measures to check the same.</p> <p><b>CO 2</b> - Understanding the causative factors for food borne illnesses, role of food handler in causing food borne diseases. Understanding of disease transmission in food borne infections ,intoxication, and role of microbial toxins in causing food borne illnesses</p> <p><b>CO 3</b> - Effectiveness of audio visual aids in nutrition education. Emerging role of PHC in rural areas with special emphasis on maternal and child care. Government programs to eradicate vector borne diseases. Thorough understanding of immunity and related aspects.</p> <p><b>CO 4</b> -Thorough understanding of the causative factors of food adulteration and the role of various agencies in controlling the same. Role of FSSAI in curbing food adulteration and agencies in support of consumer guidance and scope and role of food inspectors.</p>
<b>12</b>		<b>Public Health, Food Hygiene and Sanitation Practical</b>	<p><b>CO 1</b> - Understanding of adulterants in different foods and methods to detect</p> <p><b>CO 2</b> - Preparation of AV Aids for nutrition education</p> <p><b>CO 3</b> - Understanding of foods which are low coast as well as nutritious</p> <p><b>CO 4</b> - Practical exposure to nutrition in community</p>

## **Department of Nutrition & Dietetics (M.Sc.)**

### **VISION**

The Department of Nutrition serves regional and local communities through discovery of the ways in which foods and their bioactive components contribute to health and their role in prevention of diseases through effective application of nutrition knowledge towards the improvements in human health and for their well-being.

### **MISSION**

The Mission of the P.G Department of Nutrition is to better human health by:

- Contributing to the fundamental knowledge of how nutrients and food components function at cellular, systematic and whole body levels and impact human health and disease,
- Delivering innovative, research-based interventions and service programs which alter meal patterns and food choices with the goal of improved health of individuals, families, and communities,
- Contributing to the knowledge-base of nutrition post graduate students through high quality teaching, training, and research mentorship, and
- Providing service to professional, governmental, and local community organizations.

### **Programme Outcomes**

M.Sc. Nutrition & Dietetics is the discipline for the students to grow as nutritionists, clinical Nutritionists, research associates in scientific bodies like CFTRI, NIN and above all an overall development as a person. Nutrition and Dietetics provides concepts related to human nutrition and helps you become an effective learner and practitioner in all fields of dietetic practice. The course also gives you the opportunity to develop advanced skills in the design and implementation of research in the field of nutrition and dietetics. It is assigned to impart advanced knowledge and skills that is life oriented, career and community oriented. It has special relevance to industry and hospital application. It comprises of hospital internship program.



S.NO	NAME OF THE PROGRAM	PROGRAM OUTOMES (PO)	PROGRAM SPECIFIC OUTCOMES
1.	<b>M.Sc. Nutrition and Dietetics</b>	<p><b>PO 1:</b> To understand the role of adequate nutrition in the stages of a human life cycle.</p> <p><b>PO 2:</b> To enable students to understand the role of nutrition in the body.</p> <p><b>PO 3:</b> To impart in depth knowledge regarding prevalence, aetiology, diagnosis, Diet and lifestyle management in different diseases.</p> <p><b>PO 4:</b> To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.</p>	<p><b>PSO 1:</b> Provides students through core modules with a knowledge and understanding of the science of human nutrition and to be able to use these critically in problem solving and data handling.</p> <p><b>PSO 2:</b> Relate the nutritional needs to physical growth, development and changes during ageing.</p> <p><b>PSO 3:</b> To understand the chemical characteristics of different classes of nutrients with reference to their physical properties and to relate this to their functions in the body.</p> <p><b>PSO 4:</b> To apply the knowledge of anatomy and physiology in the management of health and disease.</p>

<b>SEMESTER 1</b>		
<b>COURSE OUTCOMES</b>		
S.NO	COURSE NAME (Paper)	COURSE OUTCOMES
1.	<b>a) Human Nutrition</b>	<p><b>CO 1:</b> To understand the role of adequate nutrition in the stages of a human life cycle.</p> <p><b>CO 2:</b> To address the requirements of a pregnant and lactating mother with respect to nutritional demands.</p> <p><b>CO 3:</b> To know the nutritional requirement and the management of meals pertaining to the athletes.</p> <p><b>CO 4:</b> To familiarize the students with the raw and cooked quantities of food and plan diet for various age groups.</p>

	<p><b>b) Nutritional Biochemistry - I</b></p> <p><b>c) Human Physiology Theory</b></p> <p><b>Principles of Dietetics Theory</b></p>	<p><b>CO 1:</b> To enable students to understand the role of nutrition in the body.</p> <p><b>CO 2:</b> To know the classification, functions and metabolism of carbohydrates, amino acids, proteins and nucleic acids.</p> <p><b>CO 3:</b> To acquaint the students with principles, techniques and application of different methods of food analysis</p> <p><b>CO 1:</b> To enable the students to understand the functions of various systems in the body.</p> <p><b>CO 2:</b> To acquaint the students with abnormalities of endocrine system.</p> <p><b>CO 3:</b> To acquaint the students with principles, techniques and application of different methods of analysis for various components in blood.</p> <p><b>CO 1:</b> To impart in depth knowledge regarding prevalence, aetiology, diagnosis, Diet and lifestyle management in different diseases.</p> <p><b>CO 2:</b> To gain knowledge on methods of assessment of nutritional status among individuals and interaction of drugs and nutrients.</p> <p><b>CO 3:</b> To familiarize the students with newer concepts in dietary management of various disorders and diseases.</p>
	<p><b>SEMESTER 2</b></p> <p><b>COURSE OUTCOMES</b></p>	
<p><b>1.</b></p>	<p><b>a. Principles of Food Theory</b></p>	<p><b>CO 1:</b> To provide an understanding of composition of various food stuffs.</p> <p><b>CO 2:</b> To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.</p> <p><b>CO 3:</b> To familiarize students with changes occurring in various food stuffs as a result of processing and cooking.</p>

	<p><b>b. Nutritional Biochemistry– II</b></p> <p><b>c. Research Methodology</b></p> <p><b>d. Diet in Disease Theory</b></p>	<p><b>CO 1:</b> To enable students to understand the role of nutrients in the body.</p> <p><b>CO 2:</b> To know the classification, functions and metabolism of lipids, vitamins and minerals.</p> <p><b>CO 3:</b> To familiarize the students with changes occurring in various food stuffs as a result of processing and cooking.</p> <p><b>CO1:</b> To enable the students to understand the importance of research design.</p> <p><b>CO 2:</b> To impart in depth knowledge on collection, compilation and analysis of data.</p> <p><b>CO 3:</b> Understanding of the basic framework of research process and developing an understanding of various research designs and techniques.</p> <p><b>CO 1:</b> To impart in depth knowledge regarding prevalence, aetiology, diagnosis, diet and lifestyle management in acute and chronic diseases.</p> <p><b>CO 2:</b> To gain knowledge to recommend and provide appropriate nutritional care for prevention or treatment of various diseases.</p> <p><b>CO 3:</b> To familiarize the students with newer concepts in dietary management of various disorders and diseases.</p>
1.	<b>SEMESTER 3</b> <b>COURSE OUTCOMES</b>	
	<p><b>a) Community Nutrition</b></p>	<p><b>CO 1:</b> To give an insight into various low cost ingredients available in market and develop low cost nutritious recipes for venerable segments of the community.</p> <p><b>CO 2:</b> To develop teaching aids for teaching for nutrition and health education.</p>

	<p><b>b) Food Microbiology</b></p> <p><b>c) Food service Management</b></p> <p><b>d) Food Hygiene and Sanitation</b></p>	<p><b>CO 1:</b> To familiarize the students with basics of food microbiology.</p> <p><b>CO 2:</b> To enable students to gain knowledge on preservation techniques and food contamination.</p> <p><b>CO 3:</b> To familiarize students with the sterilization techniques.</p> <p><b>CO 1:</b> To develop skills in formulating and standardizing of new recipes.</p> <p><b>CO 2:</b> To gain knowledge on requirements and management of various food service establishments.</p> <p><b>CO 3:</b> To know the types of food cost involved and the methods to control them.</p> <p><b>CO 1:</b> Gain knowledge in menu planning, preparation of recipes in large scale and serving and in food costing.</p> <p><b>CO 2:</b> To make students understand environmental sanitation and the link between environmental sanitation and health.</p> <p><b>CO 3:</b> To make students assess and practice controlling factors in the environment that can potentially affect public health.</p>
<b>1.</b>	<b>SEMESTER 4 COURSE OUTCOMES</b>	
	<p><b>a) Advanced Nutrition</b></p> <p><b>b) Paediatric Nutrition</b></p>	<p><b>CO 1:</b> To familiarize students with the recent advances in nutrition.</p> <p><b>CO 2:</b> To impart knowledge on bioavailability of nutrients.</p> <p><b>CO 1:</b> To understand the growth, development and nutritional requirements of children.</p> <p><b>CO 2:</b> To get an insight knowledge on inborn errors of metabolism and paediatric critical care.</p>

	<p><b>c) Nutraceuticals and functional foods Theory</b></p> <p><b>d) Diet and psychology counselling skills Theory</b></p>	<p><b>CO 1:</b> To familiarize the students with the recent advances in nutraceuticals.</p> <p><b>CO 2:</b> To impart knowledge on the health benefits of nutraceuticals and functional foods.</p> <p><b>CO 1:</b> To familiarize students with diet counselling skills and acquaint them with basic principles of psychology.</p> <p><b>CO 2:</b> To apply counselling methods to patients with different diseases.</p>
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## DEPARTMENT OF BOTANY

**Name of the programme: B.Sc.,**

**Name of the Department: Botany (U.G).**

**Vision** – Development of scientific aptitude into the students in the field of plant sciences.

**Mission** - To educate, inculcate and integrate the concepts of plant sciences.

S.No	Name of the program	Program Outcomes (PO's)	Program Specific Outcomes (PSO's)
<b>1.</b>	<b>BOTANY</b>	<p>*Scientific knowledge</p> <p>Apply the knowledge of basic science, life sciences &amp; Fundamental Process of plants to study and analyse any plant form.</p> <p>*Practical skills</p> <p>*students learn to carry out practical work in the field &amp; in laboratory.</p> <p>*Apply Ethics; apply ethical principal &amp; commit I to environmental ethics responsibilities &amp; norms of the Biodiversity conservations.</p> <p>*Knowledge &amp; understanding of the range of plant diversity in terms of structure, functions &amp; environmental relationships. The role of plants in the functioning of the global Ecosystems.</p> <p>*They can apply the knowledge to analyse the water <math>P^H</math>, carbonates, bicarbonates &amp; soil <math>P^H</math>.</p>	<p>* Students can go for B.Ed.</p> <p>* Students can also join as a medical lab technician .</p> <p>* They can also maintain terrus garden with kitchen waste.</p> <p>* Students can learn about growing harvesting marketing, storage, pest &amp; diseases &amp; even ways cooking &amp; using mushrooms .</p> <p>They can apply knowledge in Horticulture and Nursery gardening.</p> <p>*The Botanist &amp; Society.</p> <p>Applying the knowledge to assess plant diversity its importance for the society legal &amp; environmental issues.</p> <p>*Students will be able to join as a research scholar.</p> <p>*Design of solutions from medicinal plants for health problems, disorders &amp; disease of human beings &amp; estimate the phytochemical content of plants which meet the specified need to appropriate consideration for the public health.</p> <p>*Modern tool usage ; Create, select &amp; apply appropriate techniques, resources &amp; modern instruments &amp; equipments for biochemical estimation, molecular</p>

			biology, biotechnology plant tissue culture experiments, cellular & physiological activities of plants with an understanding of the application & limitations.
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### Programme Outcomes ( POs)

S.No	Name of the program	Program Objective s (PO's)	Program Specific Outcomes (PSO's)
1.	B.Sc with Botany as one of the Optionals	<p><b>PO-1.</b>To develops the expertise in students for identification of plants.</p> <p><b>PO-2.</b>To train students in carrying out various experiments in plant sciences. .</p> <p><b>PO-3.</b> To creat awareness of the sustainability Of pollution free environment and conservation of resources.</p> <p><b>PO-4.</b>To enhances the potential in the filds of plant tissue culture and biotechnology.</p> <p><b>PO-5.</b>To enlightens students with pharmacognical, horticultural and economic significance of plant.</p>	<p><b>PSO-1.</b>The ability of plant identification. In will provide innumerable career options to the students in fields like agriculture, horticulture, Botanical survey of India CIMAP, and innumerable research centres.</p> <p><b>PSO-2.</b>Know- how of experimental technique will help students pursue higher studies, research, consultancy agencies, and jobs in research centres.</p> <p><b>PSO-3.</b>Undustanding of the importance of environmental protection and resource management venders the students “Environment friendly “citizens and will open avenues for them in this field.</p> <p><b>PSO-4.</b>Knowledge of tissue culture and biotechnology will help them get opportunities in this field at levels of universities and research centres.</p> <p><b>PSO-5.</b>Familiarity with pharma conical, horticultural and economic significance of plants will help students pursue career in pharmaceutical industries,</p>

			horticultural units nurseries and agricultural research centers. They can also start their own nurseries and units.
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## **SEMESTER I**

### **PAPER-I –Microbial Diversity and Lower Plants**

#### **Unit – I ; Bacteria & Viruses**

Students will learn about Bacteria and Viruses structure, reproduction.

They will get knowledge about plant diseases.

#### **Unit – II ; Algae & Cyanobacteria**

Students will learn about general characters & classification of Algae.

Students will also learn reproductive methods of algal forms and their economic importance.

They will get knowledge about Biofertilizers with special reference to Cyanophyceae members.

#### **Unit – III ; Fungi**

Students learn about the basic characteristics of the kingdom Fungi.

Students will get knowledge regarding general characters and reproduction methods.

To familiarize students with the overview of systematic position, life cycle, Economic importance and Diseases caused by Fungi.

#### **Unit – IV ; Bryophyta & Pteridophyta**

The study of various Bryophytes will enable the students to know how the bryophytes with their distinct adaptations .

Students will also get knowledge about their structure, reproduction and life cycle.

To familiarize the students with the overview on Evolution of sporophyte in Bryophytes.

Students will learn classification systems of Pteridophytes, their distribution, structure and Reproduction. They will also learn about the process of Stellar evolution in Pteridophytes.



## **PRACTICALS**

- \* Students will learn the difference between gram +ve / gram – ve bacteria by doing gram staining technique.
- \* They will also get knowledge of Bacterial, Viral & fungal diseases by doing infected plant material section cutting.
- \* Students will acquire knowledge of identification of algal members by doing algal mixture technique.
- \* Students will be aware of the Morphological and anatomical structure of Bryophytes & Pteridophytes by observing the slides & Specimens.

## **SEMESTER - II**

### **PAPER-II; Gymnosperms, Taxonomy of Angiosperms and Ecology**

#### **Unit – I ; Gymnosperms**

Students acquire the knowledge of distribution classification, Economic importance

Gymnosperms.

Students will learn the vegetative morphology and Anatomy of Male & Female

Cones of Pinus and Gnetum .

Geological time scale and techniques employed in the types of Fossils.

#### **Unit – II ; Plant systematics**

Students will get the knowledge of various aspects in Taxonomy like principles, Scope various

Taxonomic tools, Nomenclatures, ICN Introduction.

They also get Knowledge about Herbarium concepts, techniques and applications.

Students also learn various classifications of Angiosperms and their merits & Demerits.

#### **Unit – III ; Families**

Students will understand various important angiospermic Families with particular reference to

their systematic position, phylogeny , evolutionary trends and economic importance of both

Dicot & Monocot families.

#### **Unit – IV ; Ecology**

Students understand about the environment and ecosystems ecology.

Students will get knowledge about ecological adaptations of Hydrophytes & Xerophytes.

Students acquire knowledge of plant succession.

## **PRACTICALS**

- \* Students acquire knowledge of Morphological & anatomical structure of Pinus & Gnetum by doing T.S.&L.S.
- \* Students will get knowledge by doing technical description of plants belongs to different families.
- \* Students will collect & prepare herbarium of different flora for the purpose of identification research.

## **SEMESTER - III**

### **PAPER-III ; Plant Anatomy & Embryology**

#### **Unit – I : Meristems & Tissues**

Students will get knowledge about theories of Shoot & Root

They will also learn about Tissue systems.

#### **Unit – II : Secondary growth and wood Anatomy**

Students acquire the knowledge regarding Anomalous secondary growth of Dicot & Monocot

Stems and roots.

They will also get knowledge about wood structure & anatomy of local timbers.

#### **Unit – III : Embryology**

Students will get knowledge about history and importance of Embryology.

They will also learn about Microsporogenesis and Megasporogenesis.

Students will get knowledge of pollination & fertilization process,

Students acquire the knowledge regarding endosperm development and embryo development.

#### **Unit – IV : Palynology**

Students will learn pollen morphology NPC System and also types of pollen grains.

## **PRACTICALS**

- \* Students acquire the knowledge of double staining technique.
- \* They will also get the knowledge regarding anomalous secondary growth.
- \* Students aware of structure of wood by observing local timber.
- \* Students acquire the knowledge regarding Types of ovules & pollen grains by observing slides.
- \* They will also get knowledge viability of pollengrains by doing pollen viability test.

## **SEMESTER - IV**

### **PAPER- IV ; Cell biology, Genetics & Plant Physiology**

#### **Unit – I ; Cell Biology**

Students will learn about structure of plant cell.

They will get knowledge about structure & functions of Plasma membrane.

To familiarize the students on overview of cell organelles.

They will get knowledge briefly about nucleus chromosomes.

Students will learn how the cell cycle is responsible to the growth and life of every organism on Earth.

#### **Unit – II ; Genetics**

Students will learn basic concepts of Mendelism , Principles of inheritance.

Students acquire knowledge of Gene interactions.

Students will be enriched with gene mutations and variations in chromosome number & Structure.

They will get knowledge about linkage & Crossing over.

They will also learn about recombination frequency.

#### **Unit – III ; Plant physiology – Photosynthesis**

Students will learn various aspects of water relations and their physiological role followed by various mechanisms of ion uptake and assimilation of minerals.

Students will learn in detail regarding structures and functioning of Photosystems, Photophosphorylation, path of carbon & Photorespiration.

Students will get knowledge about stomatal movement.

Students will learn Nomenclature & Classification of enzymes.

#### **Unit – IV ; Plant physiology – Respiration**

Students will learn various aspects of respiration like Aerobic & Anaerobic.

Students will learn in details the process of respiration like glycolysis, TCA cycle Electron Transport etc, their regulations & importance in physiological role.

Students will get knowledge about general role of various plant hormones on growth

& development, mechanisms of hormonal regulation.

Students also learn physiology of flowering and pigment phytochrome involved with its structure & functions.

## **PRACTICALS**

\*Students acquire the knowledge of different stages of Mitotic division by using onion root tips by squash method .

\* They will get the knowledge either the parent is dominant or recessive and also calculating the percentage of recombinants.

\* Students will get knowledge of stomatal opening & closing mechanism by doing  $\text{COCl}_2$  method to know about the rate of transpiration .

\* Students acquire the knowledge of plasmolytic method using leaves of Rheo discolor leaves.

\* They will also get knowledge of separation of chlorophyll pigments by doing paper chromatography method.

## SEMESTER V

<b>Paper V : ECONOMIC BOTANY</b>		
<b>Course Outcomes</b>		
<b>Course objective</b>	<b>Teaching-Learning Process</b>	<b>Learning Outcomes</b>
<p>To enable the students to have an understanding on how cultivated plants originated and how they are introduced across the world.</p> <p>To impart a brief idea on various methods used for extraction of various plant products like rubber. To introduce the students to various uses of plants in day to day life.</p> <p>To provide an understanding of the economic aspects of various plants</p>	<p>Lecture Presentation Assignment Individual/group presentation</p>	<p>The course will enable students to understand how plants influence day to day life.</p> <p>The course will help the students to have a brief idea on different types of plants used for economic purposes.</p> <p>The course will help the students to have a brief idea on industrial application of different plants.</p>

<b>Paper VI : Horticulture</b>		
<b>Course Outcomes</b>		
<b>Course objective</b>	<b>Teaching-Learning Process</b>	<b>Learning Outcomes</b>
<p>The Horticulture has two major options, the Professional and the Landscape Design and Construction Option. Both options assure the students a well-rounded education in Horticulture. The options do not restrict student career choices</p>	<p>Lecture Presentation Assignment Individual/group presentation</p>	<p>When students complete the Horticulture major, they will be able to:</p> <ol style="list-style-type: none"> <li>1. Demonstrate a working knowledge and appreciation of the diversity of plants, their culture and utilization.</li> <li>2. Apply horticultural principles to the successful</li> </ol>

<p>within horticulture. .</p> <p>Horticulture Graduates have numerous opportunities and successful careers within the breadth of horticulture. and it is imperative that a students education prepare them for a changing world and changing opportunities within the discipline.</p>		<p>growth and production of horticultural plants.</p> <p>3. Demonstrate the knowledge, skills and attributes to be successful contributing members of the horticulture profession.</p> <p>4. Recognize and apply ethical professional practices to horticultural applications.</p> <p>5. Synthesize and integrate information to solve horticultural problems.</p> <p>6. Be a critical "consumer" of information; understand the relevance and scientific basis of content they read and hear.</p> <p>7. Communicate effectively within the discipline and also be able to transmit knowledge and skills to lay- persons in the general public.</p>
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## **SEMESTER VI**

### **PAPER- VI; Tissue Culture and Biotechnology**

**Course code BS-602. DSE-2B**

**Students will get knowledge of the topics:**

#### **Unit – 1**

1. Concepts and methodology involved in tissue culture.
2. Objectives, methodology and applications of organ culture, organogenesis and Embryogenesis by gametic and somatic cell fusions.

#### **Unit- 2**

1. Importance of tissuculture and its applications.
2. Pathogen free plant production.
3. Stress resistant plants somaclones and synthetic seeds.
4. Induction of hairy roots and secondary metaboli production.
5. Haploid and Triploid production.
6. Cryopreservation and germ plasm conservation.
7. Somatic hybrids and cybrids.

#### **Unit-3**

1. Biotechnology history, scope, application.
2. R-DNA technology, gene cloning, enzymes in cloning.
3. Cloning vectors
4. Applications of R-DNA technology.

#### **Unit-4**

1. Gene libraries, PCR and its applications.
2. Methods of gene transfer.
3. Applications of Transgenic plants .Bt-Cotton, Bt –Brinjal, Roundup ready Soyabeans, Flavr savr tomato and golden rice.

## **PRACTICALS**

Students are skilled in various techniques. Viz ;

1. Isolation of DNA from tomato.
2. Production of synthetic seeds.
3. Preparation of tissue culture mediaum-MS-Medium.
4. Isolation of protoplast.
5. Callus induction.
6. Micropropagation and Multiple shoot development.
7. Anther culture.
8. PCR demonstration.
9. Students develop knowledge of
  1. Antibiotics and Vaccines
  2. Gene transfer method.
  3. Instruments used in Biotechnology lab.
  4. In vitro sterilization and inoculation methods using leaf and nodal explants of Tabaco  
Dattura, Brasica

## DEPARTMENT OF BOTANY

**I. Name of the Department:** Botany (PG)

**II. Vision Statement of the Department:**

- To be a center for excellence in Botany.
- To promote the culture of learning by educating students in the basics of plant sciences and its related components and evolving advancements that will serve science and nation in the 21<sup>st</sup> century.
- To expand academic cooperation by offering new courses and upgrading programs to a wider spectrum of students and researchers.
- To conduct innovative research, teaching, and outreach on the patterns and the process of life with a focus on plants and their environment.
- Training the students in the latest aspects of Horticulture and Hydroponics.

**III. Mission:**

- To develop holistic development and academic excellence to contribute effectively to the understanding of the subject. To develop an aptitude towards nature and science.
- To equip the students with the basic skills in identifying and labelling different plants.
- To impart quality education in the field of Botany enabling our students confidently sustain in the world.
- To sensitize the students towards the need for keeping the environment clean and conserve our natural resources.
- To apply conventional as well as non-conventional tools to understand plant processes development of human resource with hands on expertise in the frontier areas of plant sciences.

**IV. Programme Outcomes and Program Specific Outcomes:**

S. No.	Name of the Programme	POs	PSOs
<b>I.</b>	<b>MSc., Botany</b>	1. Knowledge and understanding about plant diversity  2. A research oriented learning.	1. The students will be qualified to face IFS, CSIR-NET, SET, GATE and other competitive exams.  2. They become focused to take up research and teaching opportunities.

	<p>3. It enhances skills in handling scientific instruments, planning and executing biological research.</p> <p>4. Individual and teamwork-workout an experiment, and a project independently as well as with team to develop individual competency and group work skills.</p> <p>5. knowledge inculcation of theoretical and practical knowledge of topics included in syllabus.</p> <p>6. Scientific aptitude development with knowledge of methodologies and principles of subjects studying.</p> <p>7. Research skill development by completing a scientific project.</p> <p>8. It provides entrepreneurship development.</p>	<p>3. It promotes career opportunities in both government and private sections.</p> <p>4. The students will be able to utilize the knowledge of mycology and pathology to satisfy the need of farmers.</p> <p>5. They will be able to work in state level and district level biodiversity boards and also can be resource persons to these boards.</p> <p>6. They will be able to work in the R&amp;D dept of the pharmaceutical industries with the knowledge of cultivation of various medicinal plants.</p> <p>7. With the pharmacognosy knowledge they can associate with Ayurveda, Sidda drug development and research.</p>
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V. **Course Outcomes (COs)**

**SEMESTER - I**

S. No.	Course Name (Paper)	COs
1.	<b>Paper-I Phycology and Mycology</b>	<p><b>CO1:</b> Students will learn general and distinct characters of the lower groups of plants. Criteria of the primary classification of algae and diversity of this group habit and habitat will be analysed.</p> <p>Students will also learn reproductive methods of algal forms, their economic importance and the basic Fritsch Classification and the recent Parker's classification.</p> <p><b>CO2:</b> Students acquire knowledge</p>

	<p><b>Paper-I Phycology and Mycology (Practicals)</b></p>	<p>of general characters, morphology, life histories of different, distinct type studies from Chlorophyceae and Cyanophyceae.</p> <p><b>CO3:</b> Students learn about the basic characteristics of the kingdom Fungi.</p> <p>Identification of different algal members upto the genera and identification of different algal members from different water samples to know the algal flora.</p> <p>Students acquire knowledge of identification of slides and specimens of Synchitrium, Melampora, Ustilago, Fusarium, etc</p> <p>Students learn about the identification of the pathogens of fungal diseases such as Downy mildews, Tikka disease, Melampora rust, wheat rust and white rust through section cutting of the infected plant material.</p> <p>Students acquire knowledge regarding general characters, sexual, asexual reproduction, fungal cytology and genetics, classification of Fungi.</p> <p><b>CO4:</b> To familiarize students with the overview of systematic position and lifecycles of various given fungal members.</p>
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		morphology and anatomy of vegetative and reproductive organs of pteridophytes such as Psilofum, Isoetes, Ophioglossum, Adiantum, Salvinia, Azolla.
3.	<b>Taxonomy of Angiosperms and Medicinal Plants</b>	<p><b>CO1:</b> Students learn various aspects in taxonomy like principles, scope, various taxonomic tools, plant nomenclatures, and ICN articles and recommendations. They also come to know web resources for proper nomenclature and also regarding biosystematics.</p> <p><b>CO2:</b> Students will be learning synthetic approaches and also they study various classifications of angiosperms and their merits and demerits.</p> <p><b>CO3:</b> Students will understand various important angiospermic families with particular reference to their systemic position, phylogeny, evolutionary trends and economic importance from both dicot and monocot families.</p> <p><b>CO4:</b> Students acquire knowledge about the role of plants in medicine, the morphology, active principles and medicinal values of selected plants, to introduce the flora of Telangana.</p>
	<b>Paper-III Taxonomy of Angiosperms and Medicinal Plants (Practicals)</b>	<p>Students will be able to gain proficiency in identifying any unknown plant to genera and species level using floras.</p> <p>Students will be able to recognize the families studied based on flowers or essential parts of flowers,</p>

		students acquire knowledge of Herbarium techniques. Students will be able to construct indented key for any given sample. To familiarize the students with the biochemical aspects in plants.
<b>4.</b>	<b>Plant Biochemistry</b>	<p><b>CO1:</b> Students will be learning the concept of bioenergetics which include the structures and reactions of energy currencies like ATP, NAD etc. In this unit they also come across the importance, properties and functioning of various enzymes and their regulations.</p> <p><b>CO2:</b> Students acquire the knowledge of classification, structure and functioning of carbohydrates and lipids.</p> <p><b>CO3:</b> Students acquire the knowledge of general properties, classification and biosynthesis of amino acids, proteins and nucleic acids.</p> <p><b>CO4:</b> To inculcate the knowledge of structure, functions and composition of membranes, biochemistry of cell wall and secondary metabolites.</p> <p>Students will be able to conduct experiments on determination of amylase activity in a given sample, iodine number, and estimation of proteins, reducing sugars and alkaloids of given samples. Students will be able to work out the experiment individually.</p>
	<b>Paper-IV Plant Biochemistry (Practicals)</b>	





	<p><b>Paper-II Gymnosperms and Embryology (Practicals)</b></p>	<p><b>CO2:</b> In this unit, students learn the vegetative morphology and anatomy of male and female cones of various gymnospermic taxa.</p> <p><b>CO3:</b> Students learn about the development of male and female gametophytes and embryogeny in Gymnosperms. They also learn fossil Gymnosperms.</p> <p><b>CO4:</b> In this unit, the students come across various concepts of embryology right from the structure, development, and special features of anther and ovule, fertilization, and they also come across embryology in relation to taxonomy.</p> <p>Students learn about the morphology and anatomy of Arucaria, Ginkgo and Taxus.</p> <p>Students will be able to identify the slides and specimens of Lygnopteris, Medullosa, Ptilophyllum, and glossopteris.</p> <p>Students will be able to identify slides and specimens of TS of anther, globular embryo.</p> <p>Students acquire knowledge of pollen viability.</p>
<p>3.</p>	<p><b>Plant Anatomy and Palynology</b></p>	<p><b>CO1:</b> Theories of shoot and root developments, leaf structure with reference to C3 and C4 plants and Kranz and CAM syndrome mechanism and importance.</p> <p><b>CO2:</b> Students learn in detail about</p>

	<p><b>Paper-III Plant anatomy and palynology (Practicals)</b></p>	<p>epidermology.</p> <p><b>CO3:</b> Study of dicot stem secondary growth, significance of Dicots wood anatomy, morphology and arrangement of various secondary elements of their value in wood identification, salient features of various woods.</p> <p><b>CO4:</b> Students will come across various aspects of palynology, Aeropalynology, Melittopalynology, applied aspects of palynology.</p> <p>Students acquire knowledge of epidermal peels, stomatal frequency, stomatal index.</p> <p>Students acquire knowledge of wood anatomy through maceration and section cuttings of Tectona Bomax, Micellia, Pongamia and Azadirachta.</p> <p>Students conduct histochemical test for identification of callose, lignin, pectin, starch and suberin.</p>
<p><b>4.</b></p>	<p><b>Plant Physiology</b></p>	<p><b>CO1:</b> Students will learn various aspects of water relations and their physiological role followed by various mechanisms of ion uptake and assimilation of minerals like nitrogen and sulphur.</p> <p><b>CO2:</b> Students will learn in detail regarding their structures and functioning of photosystems, photophosphorylation, path of carbon and photorespiration.</p> <p><b>CO3:</b> Students will learn various aspects of respiration like TCA cycle and its regulation, electron</p>

	<p><b>Paper-IV Plant Physiology (Practicals)</b></p>	<p>transport chain, HMP shunt, cyanide resistant respiration etc., their regulations and importance of physiological role.</p> <p><b>CO4:</b> General role of various hormones on growth and development, mechanisms of hormonal regulation, Physiology of flowering and pigment phytochrome involved with its structure and functions, Physiology and biochemistry of seed dormancy and germination.</p> <p>Students will be able to conduct experiments on determination of water, total and titrable acidity, anthocyanin pigments, chlorophyll A, B, and estimation of IAA.</p> <p>Students will be able to work out the experiments independently.</p>
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### SEMESTER - III

S. No.	Course Name (Paper)	Cos
1.	<p><b>Paper-I Cell Biology, Genetics, and Biostatistics</b></p>	<p><b>CO1:</b> Brief study of replication and transcription will enable to know the fundamental genetic processes that are essential for cell growth and development, regulation of gene expression mechanism in prokaryotes and eukaryotes.</p> <p>Students will learn how the cell cycle is responsible to the growth and life of every organisms on earth, and how cyclins and cyclin dependent kinases regulate the cell cycle apoptosis, a form of</p>

	<p><b>Paper-I Cell Biology, Genetics, and Biostatistics (Practicals)</b></p>	<p>programmed cell death its mechanism that is essential for the well-being of the organisms.</p> <p><b>CO2:</b> Students will learn mutations, study of DNA damage, and various inherited human diseases and gene therapy. They also learn the basic concepts of genetics from Mendelian inheritance from linkage to chromosome mapping in eukaryotes.</p> <p><b>CO3:</b> To introduce the concepts, procedures and applications of extranuclear inheritance, Hardy-Weinberg law, plant tissue culture, recombinant DNA technology and a brief overview of plant breeding methods.</p> <p><b>CO4:</b> Students learn basic concepts of genomics, proteomics, and bioinformatics. They also come across the importance concepts of biostatistics and the basics of computers.</p> <p>Students learn about plant tissue culture methods, mitosis through cytological squash preparation of onion root tips.</p> <p>Students workout problems on genetics and biostatistics.</p>
2.	<p><b>Environmental Pollution and Protection</b></p>	<p><b>CO1:</b> To help the social groups and individuals to acquire knowledge of the pollutants and environmental degradation, it means education towards protection</p>

	<p><b>Paper-II Environmental Pollution and Protection (Practicals)</b></p>	<p>and enhancement of the environment, to acquire knowledge of kinds of pollution, major air pollutants, acid rains, its effects on terrestrial and aquatic systems.</p> <p><b>CO2:</b> Students will be enriched knowledge about the sources, effects of water pollution and they will be conscious being aware of the seriousness of water pollution and their sources and how to control and curb it at the source level.</p> <p>Characteristics of water, criteria of water quality, processes involved in various industrial wastewaters before releasing them into surface water bodies can be learnt.</p> <p><b>CO3:</b> Students will learn in detail regarding soil pollution, bioremediation and concept of phytoremediation.</p> <p><b>CO4:</b> Students learn in detail regarding classification of solid waste, their disposal methods, and management of municipal waste and also hazardous and biomedical wastes. They also know regarding environmental protection act-1986.</p> <p>Students conduct experiments on estimation of total hardness, calcium, organic matter, and BOD of water.</p> <p>Students conduct experiments on estimation of noise through noise level meter.</p> <p>Students will acquire knowledge of</p>
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		quantitative estimation of solid waste, coal, fly ash, sugar cane bagasse, wood and cow dung.
3.	<b>Biodiversity of Angiosperms</b>	<p><b>CO1:</b> Study of Biodiversity will impart the knowledge about how life is dependent on the nature for human existence, the characteristics and nature of biodiversity, how to measure biodiversity, the aims and objectives of studying biodiversity, so that we can conserve it for the future generations.</p> <p><b>CO2:</b> The magnitude and distribution of biodiversity on the globe, different floristic regions for the study to be done in a scientific manner, different aspects of conservation by studying hotspots, endemism, and how to maintain and sustain the biodiversity by knowing the proximate causes of ecological extinction and how to conserve them.</p> <p><b>CO3:</b> To raise awareness about biodiversity and its essential role in the overall health of the planet Earth, to learn about protection, preservation, management/restoration of natural resources.</p> <p><b>CO4:</b> Students will be familiar with economic values and utilization of biodiversity with reference to different categories of plants taking five examples for each. Important crop plants origin</p>

	<p><b>Paper-III Biodiversity of Angiosperms (Practicals)</b></p>	<p>and evolution and their diversity will be assessed.</p> <p>A brief note of origin of cultivated plants, biodiversity conventions and conservation of biodiversity, in-situ and ex-situ methods will be made clear to understand the overall significance of biodiversity sustainable utilization.</p> <p>Students will be able to interpret biodiversity and vegetation based on the data provided to them. Students workout problems on Jaccard index coefficient.</p>
<p><b>4.</b></p>	<p><b>Cultivation and Post-Harvest Technology of Medicinal Plants</b></p>	<p><b>CO1:</b> Students were introduced about origin, development and evolution of medicinal Botany.</p> <p>Students will know what are the active principles and what are the various medicinal plants used in different traditional systems of medicine and allopathy.</p> <p><b>CO2:</b> Students learn origin, historical background, active principles, uses and cultivation practices of the important medicinal plants.</p> <p>Students also learn organic farming and cultivation practices along with their active principles and uses of four aromatic plants.</p> <p><b>CO3:</b> To familiarize the students with details regarding post-harvest management of medicinal plants and various distillation methods.</p>





		dissolved oxygen. Students learn about the determination of quantitative characters by random quadrat method.
2.	<b>Paper-II Horticulture and Plant Breeding</b>	<p><b>CO1:</b> Students come across the importance and propagation of horticultural plants and their nutrient management.</p> <p><b>CO2:</b> Students will learn regarding disease and pest management of horticultural plants and mass production of horticultural plants through tissue culture and micropropagation.</p> <p><b>CO3:</b> Plant breeding objectives, traits of interest of plant breeding, resistance to biotic and abiotic stresses, various selection methods, usefulness of MAS, development of various inbred cultivars, commercial hybrids, factors like heterosis, combining ability and heritability.</p> <p><b>CO4:</b> Commercial breeding aspects like mutation breeding, induced polyploidy in plant breeding, importance of haploids and dihaploids</p> <p>Transgenic technology and its acceptance, Bt-Cotton, Bt-Brinjal, herbicide resistant crops, golden rice, different analysis techniques like PCR based zygosity and Elisa.</p> <p>Students acquire knowledge of</p>

	<p><b>Paper-II Horticulture and Plant Breeding (Practicals)</b></p>	<p>micropropagation and plant breeding techniques. Students learn about the propagation methods like cutting, layering, budding and grafting. Students conducts experiment on seed viability by tetrazolium test.</p>
<p>3.</p>	<p><b>Paper-III Taxonomy of Angiosperms and Ethnobotany</b></p>	<p><b>CO1:</b> Students will know the methods to describe a new taxon up to genus and species, further for plant identification by preparing taxonomic keys.</p> <p>Study the RMT-Dahlgren, R.F. Thorne and Kubitzki contributions to the growth of taxonomy.</p> <p><b>CO2:</b> Students will be familiar with the role of BSI-Botanical survey of India, Kew gardens, London, UK, and Smithsonian Institutions, Washington DC USA in the growth of taxonomy.</p> <p>Students will know the floral diversity of Annonaceae, Malvaceae, Apocyanaceae, Asclepiadaceae, Hydrocharitaceae and Lemnaceae.</p> <p><b>CO3:</b> Students will acquire knowledge of taxonomy of certain significant families such as Nymphaeaceae, Euphorbiaceae, Podostemaceae, Musaceae, and Arecaceae.</p> <p>Students were introduced to seed morphology with special reference to embryo, endosperm and seed coat anatomy. Corners classification and its role in</p>

	<p><b>Paper-III Taxonomy of Angiosperms and Ethnobotany (Practicals)</b></p>	<p>taxonomy also emphasized.</p> <p><b>CO4:</b> Students will understand the concept, scope and objectives of Ethnobotany.</p> <p>Ethnobotany is inter-disciplinary science.</p> <p>Methodology of ethnomedicinal studies such as field work, ancient literature, archaeological findings, temples and sacred grooves.</p> <p>Students will be able to gain proficiency in identifying families based on their androecium and gynoecium.</p> <p>Students will be able to identify the key characters of species of given genera and construct a key.</p> <p>Students learn about the seed morphology of Gossypium, Cleome, Calotropis and Annona etc.</p>
<p><b>4.</b></p>	<p><b>Paper-IV Pharmacognosy</b></p>	<p><b>CO1:</b> Students were introduced to introduction and scope of pharmacognosy, pharmacognosy and modern medicine.</p> <p>Students will learn different sources of crude drugs and their classification, students study indigenous traditional drugs and their market adulterants.</p> <p><b>CO2:</b> Students will learn pharmacognostic studies of different plant drugs such as root drugs, rhizome drugs, leaf drugs, bark drugs flower drugs, seed drugs, fruit drugs, and whole plant drugs.</p> <p><b>CO3:</b> Students will be familiar</p>

	<p><b>Paper-IV (Practicals)</b></p> <p><b>Pharmacognosy</b></p>	<p>with drug evaluation methods, students will know the various drug constituents such as Acacia gum, Phyllanthus, Coleus, Asparagus and Rauwolfia.</p> <p><b>CO4:</b> Students can do powder analysis of several drugs like Curcuma, Senna, Fennel and Cinnamon</p> <p>Students will be familiar with large scale industrial preparation of crude drugs, import and export potential of crude drugs. Students will be aware of quality control of crude drugs, contamination and adulteration.</p> <p>Students learn about the organoleptic evaluation of Glycyrrhiza (root), ginger (Rhizome) eucalyptus (leaf) etc</p> <p>Students acquire knowledge of powder analysis of curcuma cloves, Senna, Fennel and Cinnamon.</p> <p>Students conduct histochemical analysis of alkaloids, steroids, quinone and resins etc.</p>
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## DEPARTMENT OF BIOCHEMISTRY

### VISION

Changing the world through scientific discoveries and empowering educational experiences for all students. The department envisions quality students oriented towards research and higher studies.

### MISSION

To develop interest in Biochemistry, train students to ask scientific questions and seek answers, Skilled in modern techniques of biology and develop a scientific temper that can be applied in diverse fields. Good laboratory practices and ethics in scientific research.

S.no	Name of the program	Program outcomes (PO'S)	Program specific outcomes
1.	<b>BIOCHEMISTRY</b> <b>(B.BC.C)</b> <b>(MB.BC.C)</b> <b>(B.BC.AN)</b> <b>(MB.BC.AN)</b> <b>(BC.C.AN)</b>	<p><b>PO1. Botany</b> Acquire knowledge related with the evolution, plant characteristics and behaviour, classification, theories about the plant kingdom, and the interaction of plants with the environment</p> <p><b>PO2. Chemistry</b> Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.</p> <p>Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.</p> <p><b>PO3. Microbiology</b> Acquire knowledge and investigate the breadth of cellular processes of life from the biological molecules of life, through viruses, cells, cellular pathways, and the mammalian immune system.</p> <p><b>PO4. Applied Nutrition</b></p>	<p><b>PSO1.</b>Students are able to Understand the current developments in the different areas of Botany and limitations and to solve problem, using techniques take real time decisions and innovate, while working with plants</p> <p><b>POS2.</b> Students are able to Acquire methodical and logical understanding of the fundamental concepts in Physical, Organic, Inorganic, Analytical and all other integrated Chemistry subjects.</p> <p><b>POS3.</b>Students are able to Apply the knowledge of techniques for isolation and cultivation (including high-throughput cultivation) of microorganisms (algae, fungi, bacteria and virus).</p> <p><b>POS4.</b>Students are able to</p> <p>1. Capable of describing</p>

		Biomolecules as a basis for understanding the role of food and nutrients in health and disease processes.	biochemical pathways relevant in nutrient metabolism  2. Understand the complex interaction of foods and food components (biomolecules) on human health and disease.
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### Course outcomes of Biochemistry

S.no	COURSE NAME	COURSE OUTCOME
1.	<b>Chemistry Of Biomolecules</b>	<p><b>Students will be able to:</b></p> <p><b>CO1</b> Understand biochemistry at the atomic level, draw molecules and reactions involved with biomolecules.</p> <p><b>CO2</b> Know the various weak acids and bases biological buffers present in our body.</p> <p><b>CO3</b> Understanding the structure, functions, properties and classification of biomolecules.</p>
2.	<b>Chemistry Of Nucleic Acids &amp; Biochemical Techniques</b>	<p><b>CO1</b> Acquired knowledge of basic structures of nitrogen bases</p> <p><b>CO2</b> Learn the molecular structures of DNA double helical structure, denaturation, biological importance of RNA, types of RNA and their functions.</p> <p><b>CO3:</b> Learn the principles, instrumentation and application in TLC paper chromatography, gel filtration, ion-exchange and affinity chromatography.</p> <p><b>CO4:</b> Use biophysical techniques to analyze biomolecules in term of secondary structure and able to learn to establish structure function relationship</p>
3.	<b>Bioenergetics, Biological oxidation</b>	<p><b>CLO-1.</b> Ability and knowledge to explain molecular mechanisms of energy transformation and energy accumulation in living organisms.</p> <p><b>CLO-2.</b> Skills to analyze the bioenergetics related</p>

4.	<p><b>and Enzymology</b></p> <p><b>Intermediary Metabolism</b></p>	<p>problems and information</p> <p><b>CLO3</b> Knowing in detail about concepts to illustrate how enzymes and redox carriers and the oxidative phosphorylation machinery occur.</p> <p><b>CLO4</b> To understand insight in to the fundamentals of enzyme structure and function and kinetics of soluble and immobilized enzymes.</p> <p>Analyze enzyme kinetics and mechanistic data, research approaches to characterize new enzymes and comprehensively present the understanding of the subject.</p> <p><b>CLO1</b> Students learn the metabolic pathway of biomolecules such as carbohydrates, lipids, amino acids and nucleic acid and inborn errors.</p> <p><b>CLO2.</b> Recognize how metabolism can be related to related to issues in lifestyle, health, disease.</p>
5.	<p><b>Physiology, Nutrition and clinical Biochemistry</b></p>	<p><b>CLO1</b> Understanding of the role of hormones in human physiology and the molecular mechanisms (signaling) of hormone action</p> <p><b>CLO2</b> Connecting the hormones deficiencies with clinical significance</p> <p><b>CLO3</b> understanding about the fundamental concepts and processes underlying the field of nutritional biochemistry and Malnutrition.</p> <p><b>CLO4</b> Study the value of food and nutrients in health and disease and principles of clinical biochemistry in diagnosis of diseases</p>
6.	<p><b>Molecular Biology and Immunology</b></p>	<p><b>CLO1</b> Gain knowledge of DNA replication transcription and translation</p> <p><b>CLO2</b> Understand the gene regulation</p> <p><b>CLO3</b> learn about the structural features, functions of the components of immune system and the molecular and cellular mechanisms, cellular communication, migration and regulation towards generation of B-cell and T-cell</p>



		<p>repertoires and their effector responses</p> <p><b>CLO4</b> Apply the concepts of innate and adaptive immune responses to understand the cross talks between innate and adaptive responses, MHC hypersensitivity, transplantation immunity and immunodeficiencies.</p>
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## DEPARTMENT OF BUSINESS MANAGEMENT

- I. **Name of the Department:** Department of Business Management
- II. **Vision Statement of the Department:** Women's Empowerment for Global Betterment
- III. **Mission Statement of the Department:** To motivate students and maintain environmental connectivity for Women's empowerment.
- IV. **Programme Outcomes (POs):**

S. No.	Name of the Programme	POs	PSOs
1.	<b>Business Management</b>	<p><b>PO1:</b> Develop strategic thinking, leadership, research and negotiation skills.</p> <p><b>PO2:</b> Identify key issues facing a business and utilize quantitative methods to solve them.</p> <p><b>PO3:</b> Integrate tools and concepts from multiple functional areas by evaluating, integrating Ideas with ethical considerations in multicultural perspective while making business decisions.</p>	<p><b>PSO1: FINANCE</b> After completing this program with marketing specialization students will be able to develop strategies for building new brands, manage existing brands, manage new product introduction, develop strategies for customer life cycle management. They will also be able to develop strategies across promotion mix elements for a new brand or a new product. Students will be able to assess service company performance in terms of service quality and provide strategies for betterment.</p> <p><b>PSO2: HUMAN RESOURCE</b> Students learn about the Labour force composition and the concept of payment and employees benefits, issues for talented employees in the organization and how they impact human resource management practices. They also understand the HR Professional's difficulties in selecting, recruiting, placing and training the talented people. The course leads to careers in HR.</p>

			<p><b>PSO3: MARKETING</b>  After completion of MBA with marketing specializations students will be able to develop strategies for building new brands, manage new product introduction, develop strategies for customer life cycle management. They will also be able to develop strategies across promotion mix elements for a new brand or a new product. Students will be able to assess service company performance in terms of service quality and provide strategies for betterment.</p>
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**v. Course Outcomes (COs)**

<b>S. No.</b>	<b>Course Name (Paper)</b>	<b>COs</b>
<b>SEM I</b>	<b>1. MANAGEMENT &amp; ORGANISATION BEHAVIOUR (MB 101)</b>	<p><b>CO1:</b> Students would have a comprehensive understanding of management functions and its theories.</p> <p><b>CO2:</b> To acquaint students with decision making models.</p> <p><b>CO3:</b> Students would have understanding of managing the organizational setting through gaining insights into individual and inter-personal relations</p> <p><b>CO4:</b> Students can gain knowledge of group dynamics and leadership</p> <p><b>CO5:</b> Students can understand the emerging aspects of organizational behavior</p>
	<b>2. ACCOUNTING FOR MANAGEMENT (MB 102)</b>	<p><b>CO1:</b> To help the students to acquire knowledge of the Process, Principles and Conventions of Accounting.</p>

		<p><b>CO2:</b> To acquaint students with Journal, Ledger, Trial Balance and Final Accounts.</p> <p><b>CO3:</b> To develop the skills of preparation of Final Accounts.</p> <p><b>CO4:</b> Students can understand the methods of analysis of financial statements</p> <p><b>CO5:</b> Students can gain knowledge of breakeven analysis and its use to management.</p>
	<p><b>3. MARKETING MANAGEMENT (MB 103)</b></p>	<p><b>CO1:</b> Students can equip with marketing and selling tools.</p> <p><b>CO2:</b> Students can learn about the competition levels in the market and various market position skills can be obtained for competitive advantage.</p> <p><b>CO3:</b> Buyer behavior and perceptions are key of any business; that can be thoroughly learnt.</p> <p><b>CO4:</b> Group Dynamics and Channel Dynamics involved in marketing can be assessed.</p> <p><b>CO5:</b> Better control of key resources and optimum utilization of resources can be attained</p>
	<p><b>4. STATISTICS FOR MANAGEMENT (MB 104 )</b></p>	<p><b>CO1:</b> To introduce basic statistics to management students like measures of central – tendency, measures of dispersion, skewness, and kurtosis and concepts of probability.</p> <p><b>CO2:</b> To enable learners understand probability distribution as it plays an important role in all areas of</p>

		<p>management.</p> <p><b>CO3:</b>To provide understanding of sampling and sampling distributions</p> <p>hypothesis testing framework with small samples and large samples.</p> <p><b>CO4:</b> To make them understand the hypothesis testing framework with small samples and large samples</p> <p><b>CO 5:</b> To show how correlation, regression techniques are integral part of planning and controlling.</p>
	<p><b>5. ECONOMICS FOR MANAGERS (MB 105)</b></p>	<p><b>CO1:</b> Students can learn micro factors of Economic behavior of a consumer.</p> <p><b>CO2:</b> Would be Managers needs market dynamics and the same is imparted.</p> <p><b>CO3:</b> Students can assess opportunities and threats of business.</p> <p><b>CO4:</b> Students can better understand nature of the products and demand conditions.</p> <p><b>CO5:</b> It is also provided through this paper the decision making tools and investment avenues.</p>
	<p><b>6. IT APPLICATIONS FOR MANAGEMENT (MB 106)</b></p>	<p><b>CO1:</b> To acquaint the students' with the micro-level competency with regard to contemporary Information Technology Tools in organizations.</p> <p><b>CO2:</b> To provide real-time insights into the fundamentals of</p>

		<p>computers as business tools</p> <p><b>CO3:</b> To Create Awareness in upcoming managers, of different types of Information Technology, Management Systems so as to enable the use of IT resources efficiently</p> <p><b>CO4:</b> To study the role and Value addition of IT in business</p> <p><b>CO5:</b> To enable students to develop proficiency in using certain components of the package includes MS Excel, MS Access</p>
	<p><b>MANAGERIAL COMMUNICATION (MB 107) OPEN ELECTIVE – 1</b></p>	<p><b>CO1:</b> To understand the importance of communication and listening techniques.</p> <p><b>CO2:</b> To enhance the written skills of the students through letter, email and report writing.</p> <p><b>CO3:</b> To improve the oral communication of students through presentations, GDs and negotiations.</p> <p><b>CO4:</b> To enable the students to enhance their employment communication.</p> <p><b>CO5:</b> To teach business and social etiquette.</p>
	<p><b>COMPUTER PRACTICAL'S (MB 108)</b></p>	<p><b>CO1:</b> To provide real time insights into the fundamentals of computers as Business Tools like MS-EXCEL and MS-ACCESS.</p>
<p><b>SEM II</b></p>	<p><b>HUMAN RESOURCE MANAGEMENT (MB 201)</b></p>	<p><b>CO1:</b> Transform Human beings into Human Resources</p> <p><b>CO2:</b> To build Global Level HR Managers</p>

		<p><b>CO3:</b> Create Agile Workforce</p> <p><b>CO4:</b> Innovate Winning Organizations.</p> <p><b>CO5:</b> Learn about the emerging trends in HRM</p>
	<p><b>FINANCIAL MANAGEMENT (MB 202)</b></p>	<p><b>CO1:</b> Students can learn about the scope and goal of financial management.</p> <p><b>CO2:</b> Students would have knowledge about the concepts of long term investment decisions.</p> <p><b>CO3:</b> Students can learn about the financing decision.</p> <p><b>CO4:</b> To understand the corporate practices of dividend payment and current assets management.</p> <p><b>CO5:</b> To learn about corporate events like mergers.</p>
	<p><b>OPERATIONS RESEARCH (MB 203)</b></p>	<p><b>CO1:</b>Helps in formulating real life situations in organization in Quantitative form</p> <p><b>CO2:</b> Helps in formulating strategies for optimal use of various resources within the organization</p> <p><b>CO3:</b> Application of optimization tools for decision making</p> <p><b>CO4:</b> Helps as a powerful tool for planning, scheduling and controlling projects</p> <p><b>CO5:</b> Develop mathematical model for interactive decision making situations where two or more players involved under competition</p>
	<p><b>ENTREPRENEURSHIP AND</b></p>	

	<b>DEVELOPMENT (MB 204)</b>	<p><b>CO1:</b> To make the students learn the importance of Entrepreneurship.</p> <p><b>CO2:</b> To make them learn about entrepreneurial environment.</p> <p><b>CO3:</b> Students can learn more about types of enterprises and growth.</p> <p><b>CO4:</b> To provide information about financial resources.</p> <p><b>CO5:</b> To impart training to raise and establish enterprises.</p>
	<b>BUSINESS RESEARCH METHODS (MB 205)</b>	<p><b>CO1:</b> To gain understanding of various kinds of research design</p> <p><b>CO2:</b> To enable learners to be able to formulate the research problem</p> <p><b>CO3:</b>To acquire basic knowledge on qualitative and quantitative research</p> <p><b>CO4:</b> To have knowledge on descriptive and inferential data tools</p> <p><b>CO5:</b> To be able to write and develop independent and critical analysis for report writing.</p>
	<b>BUSINESS LAW AND ETHICS (MB 206)</b>	<p><b>CO1:</b> To introduce students with law of contracts.</p> <p><b>CO2:</b> To acquaint students with the legal aspects of business from the national.</p> <p><b>CO3:</b> To enable students with Companies Act 2013.</p> <p><b>CO4:</b> Students can learn more about Consumer Protection and</p>



		Essential Laws.  <b>CO5:</b> To offer insights into ethical considerations in Business entities and their responsibility towards society.
	<b>INNOVATION MANAGEMENT (MB 207) OPEN ELECTIVE – II</b>	<b>CO1:</b> Helps in understanding the concept of Research & Development  <b>CO2:</b> Helps in formulating R&D policy and strategy for an organization.  <b>CO3:</b> Helps in making budget allocations for R & D projects in organization.  <b>CO4:</b> Helps in understanding the concept of innovation and its types.  <b>CO5:</b> Helps in managing Innovation in Organization.
	<b>SEMINAR PRESENTATION (MB 208)</b>	<b>CO1: Presentation Skills:</b> Student is expected to present with clear aims and outcomes.  <b>CO2: Argumentative and Critical Thinking:</b> It is closely related to how student is able to relate critical thinking, thought process and reasoning.  <b>CO3: Inter Disciplinary Approach:</b> Relating knowledge more than one branch.  <b>CO4: Presentation of the text:</b> The sequence of text presentation in order to provide logical clarity.
<b>SEM III</b>	<b>OPERATIONS MANAGEMENT (MB 301)</b>	<b>CO1:</b> To acquire knowledge in basic manufacturing processes.

		<p><b>CO2:</b> Should be able to understand and apply the concepts of sequencing, MPS and facility maintenance.</p> <p><b>CO3:</b> Should be able to understand and apply concepts of work study to a shop floor. Appreciate a service facility and be able to measure the quality of the same.</p> <p><b>CO4:</b> Acquire the knowledge in MRPI and MRP II to apply in a production facility.</p> <p><b>CO5:</b> Should be able to understand concepts of inventory management and control.</p>
	<p><b>E-BUSINESS (MB 302)</b></p>	<p><b>CO1:</b> It helps students to understand the micro level competency with regard to contemporary E-Business Tools in Organization.</p> <p><b>CO2:</b> It helps students to understand the fundamentals of online mode business, different types of online business technology.</p> <p><b>CO3:</b> Students can work in latest trends in business field to make positive contribution to the organization.</p> <p><b>CO4:</b> Students can take professional responsibilities and make informed judgments in the organization for E-Business.</p> <p><b>CO5:</b> Students can get streamline work processes and improve communication within the organization to meet their objectives by involving with E-Business Models.</p>

	<p><b>TOTAL QUALITY MANAGEMENT (MB 303)</b></p>	<p><b>CO1:</b> Understand the basic terminologies and metrics that are used to govern quality management</p> <p><b>CO2:</b> Get a better perspective on quality standards like ISO</p> <p><b>CO3:</b> Be able to identify the various metrics that govern quality</p> <p><b>CO4:</b> Elucidate the role and importance of six sigma as a quality measurement tool</p> <p><b>CO5:</b> Identify the various means and techniques for establishing quality in services sector.</p>
	<p><b>GLOBAL BUSINESS STRATEGIES (MB 304)</b></p>	<p><b>CO1:</b> To impart skills in global business skills to students.</p> <p><b>CO2:</b> To make students learn about the global markets and understand changes in global business environment.</p> <p><b>CO3:</b> To understand the theories of international trade, and multilateral trade negotiations</p> <p><b>CO4:</b> To Understand the problems of global business..</p> <p><b>CO5:</b> To implement strategy for global business.</p>
	<p><b>INVESTMENT MANAGEMENT (MB 305-F-I)</b></p>	<p><b>CO1:</b> Understand the various avenues of investment with return and risk profile.</p> <p><b>CO2:</b> Analyse and value stocks with help of fundamental and technical analysis.</p> <p><b>CO3:</b> Value various financial instruments (like equity,</p>

		<p>preference shares, bonds) and take appropriate decisions.</p> <p><b>CO4:</b> To estimate performance of portfolio in terms of return and risk.</p> <p><b>CO5:</b> Understand mutual funds, their performance evaluation and regulations.</p>
	<p><b>INTERNATIONAL FINANCE (MB 305-F-II)</b></p>	<p><b>CO1:</b> To provide an analysis of the evolution of International Financial Systems and to learn about international banking.</p> <p><b>CO2:</b> To study about the foreign exchange markets.</p> <p><b>CO3:</b> To understand the theories of exchange rate behaviour and Risk Management in Multinational corporations.</p> <p><b>CO4:</b> To Learn the Financial Management of MNCs.</p> <p><b>CO5:</b> To Understand the International Tax Environment.</p>
	<p><b>INDUSTRIAL RELATIONS AND LABOUR LAWS (MB 305-HR-I)</b></p>	<p><b>CO1:</b> Comprehensive understanding of industrial relations problems and Labour laws</p> <p><b>CO2:</b> Framework for analysis of Problems relating to Labour Laws</p> <p><b>CO3:</b> To generate alternate decision making of such problems and would be able to generate new policies or procedure</p> <p><b>CO4:</b> To Learn and then put into practice the different laws</p> <p><b>CO5:</b> To Know about the different managerial perspectives</p>

		about the Laws.
	<b>ORGANISATION DEVELOPMENT(MB 305-HR-II)</b>	<p><b>CO1:</b> The students would gain the conceptual clarity of OD and its Process</p> <p><b>CO2:</b> Focussed on how to change and develop organizations</p> <p><b>CO3:</b> The students would be familiarized with the major OD interventions</p> <p><b>CO4:</b> Students learn to improve the interpersonal relations and group dynamics</p> <p><b>CO5:</b> Focussed on organizational transformation through strategic interventions</p>
	<b>TUTORIALS: PROJECT WORK SYNOPSIS(MB 306)</b>	<p><b>CO1:</b> Students synopsis is assessed in terms of his/her originality in thinking, pedagogical aspects, clarity in their proposal. Sequence etc.,</p> <p><b>CO2:</b> Each student is expected to prepare project synopsis as per given outline by supervisor assigned and proceed to work on next stages of main project report preparation.</p>
<b>SEM IV</b>	<b>BUSINESS POLICY &amp; STRATEGY (MB 401)</b>	<p><b>CO1:</b> . To impart key strategic business skills to the learners</p> <p><b>CO2:</b> To make students learn about I business environment, and understand changes in global business environment.</p> <p><b>CO3:</b> To educate students about the industry and market.</p> <p><b>CO4:</b> To make students understand practical problems in</p>

		<p>strategy implementation.</p> <p><b>CO5:</b> To Prepare students to attain knowledge on industry analysis.</p>
	<p><b>BUSINESS INTELLIGENCE (MB 402)</b></p>	<p><b>CO1:</b> Explain the fundamentals of business intelligence. (Understand)</p> <p><b>CO2:</b> Identify the concepts of business analytics and business intelligence methods for decision Process (Understand)</p> <p><b>CO3:</b> Compare and contrast the strengths and limitations of various data mining and data Warehousing models (Analyze)</p> <p><b>CO4:</b> Describe different methodologies used in data mining and data ware housing. (Analyze)</p> <p><b>CO5:</b> Apply business intelligence methods to various situations. (Apply)</p>
	<p><b>SUPPLY CHAIN MANAGEMENT(MB 403)</b></p>	<p><b>CO1:</b> Will gain the knowledge of framework and value chain in supply chain management.</p> <p><b>CO2:</b> Will learn to apply the knowledge of logistics and inventory in supply chain.</p> <p><b>CO3:</b> Will gain insight into transportation in supply chain to evaluate and manage an effective supply chain,</p> <p><b>CO4:</b> Gain an insight into the role of information technology in making supply chain agile.</p> <p><b>CO5:</b> To understand the role of network design in supply chains and work force management to make supply chains effective and efficient.</p>

	<p><b>FINANCIAL RISK MANAGEMENT (MB 404-F-I)</b></p>	<p><b>CO1:</b> To understand the concept of risk and its types. Enables students to get a clear view of how risk is managed in Financial Institutions.</p> <p><b>CO2:</b> Exposes students to the concept of measurement and management of risk</p> <p><b>CO3:</b> Deals with techniques and tools to manage risk with Futures and forwards with practical exposure</p> <p><b>CO4:</b> To understand the mechanism of using Swaps to mitigate risk, with practical examples</p> <p><b>CO5:</b> To gain knowledge of using options and various models to hedge risk.</p>
	<p><b>BANKING AND INSURANCE (MB 404-F-II)</b></p>	<p><b>CO1:</b> To provide an overview of the structure of Banking and Insurance business in India.</p> <p><b>CO2:</b> To describe the products and services in Banking and Insurance.</p> <p><b>CO3:</b> To highlight the regulatory changes and innovations in Banking and Insurance sector.</p> <p><b>CO4:</b> To educate students about the role, importance and performance of Banks and Insurance companies in India.</p> <p><b>CO5:</b> To Prepare students for career opportunities Banking and Insurance.</p>
	<p><b>LEADERSHIP AND CHANGE MANAGEMENT (MB 404-HR-I)</b></p>	<p><b>CO1:</b> learn and gain knowledge about the concept of Leadership and its related tactics.</p> <p><b>CO2:</b> understand the different</p>

		<p>leadership styles and models</p> <p><b>CO3:</b> get familiarized with the concept of Change and its drivers</p> <p><b>CO4:</b> Know about the Change initiation</p> <p><b>CO5:</b> Get the Knowledge of Change Management and its related methods and models</p>
	<b>PERFORMANCE MANAGEMENT(MB 404-HR-II)</b>	<p><b>CO1:</b> To produce Competent Executives</p> <p><b>CO2:</b> To transform Performance Appraisal, Performance Management</p> <p><b>CO3:</b> To build pivotal performance</p> <p><b>CO4:</b> To establish leading Human Capital</p> <p><b>CO5:</b> To get perspective about the application of various performance metrics and models</p>
	<b>PROJECT WORK (MB 405)</b>	<p><b>CO1:</b> Students are expected to submit a dissertation with clear and scientifically drawn inferences, suggestions and conclusion.</p>
	<b>COMPREHENSIVE VIVA – VOCE (MB 406)</b>	<p><b>CO1:</b> Students are expected to have a clear understanding of conceptual questions related to the topic of study.</p> <p><b>CO2:</b> They need to have clarity with regard to research methodology followed scientific techniques of analysis followed.</p>



## DEPARTMENT OF CHEMISTRY

### UG Programme

**Vision:** Moulding youthful girls into independent and innovative thinkers in Chemical Sciences

**Mission:** To promote, inspire and nurture the fundamentals of chemistry.

Name of the Programme	POs	PSOs
<b>Chemistry</b>	<p><b>PO1.</b> The students after completing course at graduation level in chemistry will develop an understanding of major concepts, theoretical principles and experimental findings in chemistry</p> <p><b>PO2.</b> They are able to employ critical thinking and efficient problem solving skills in the four basic areas of chemistry (analytical, inorganic, organic, and physical).</p> <p><b>PO3.</b> They are able to conduct experiments, analyze data, and interpret results, while observing responsible and ethical scientific conduct.</p> <p><b>PO4.</b> They will be able to use modern library searching and retrieval methods to obtain information about a topic, chemical technique, or an issue relating to chemistry.</p> <p><b>PO5.</b> They know the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedures and regulations for safe handling when using chemicals following chemical hygiene regulations</p>	<p><b>PSO1.</b> Understand chemical bonding, structure and properties of covalent compound, structure, defects and properties and chemical forces of ionic and non-ionic crystalline solids.</p> <p><b>PSO2.</b> Study preparation, bonding, structure and properties and reactions of compounds of s, p, d and f block elements.</p> <p><b>PSO3.</b> Study organometallic and coordination compounds and bioinorganic chemistry.</p> <p><b>PSO3.</b> Identify cation and anion present in a mixture of inorganic salts, oxides, hydroxides or carbonates.</p> <p><b>PSO4.</b> Estimate quantitatively metal ions present in mixture by volumetric analysis.</p> <p><b>PSO5.</b> Understand basic principles of thermodynamics, Chemical Kinetics, equilibrium, colligative properties, phase rule and Electrochemistry.</p> <p><b>PSO6.</b> Study and understand properties of ideal gases; speed, kinetic energy, heat capacity, real gases, intermolecular forces, liquefaction.</p> <p><b>PSO7.</b> Understand properties of liquid; viscosity and surface tension.</p>

## SEM-1 COs

S.No	Course Name	Course Outcome
1.	<b>Organic Chemistry</b>	<p><b>CO1.</b>To discuss the preparation of benzene with their chemical properties.</p> <p><b>CO2.</b>To describe preparation &amp; applications of alkanes, alkenes and alkynes.</p> <p><b>CO3.</b>To understand aromaticity &amp; Huckel's rule of aromatic compounds.</p> <p><b>CO4.</b>To understand the electronic displacement and concept of organic reaction mechanism.</p>
2	<b>Inorganic Chemistry</b>	<p><b>CO1.</b>To explain the VESPER &amp; MOT of different molecules.</p> <p><b>CO2.</b>To describe preparation and properties and structures of group 13,14,15 elements.</p> <p><b>CO3.</b>To know the different types of hybridization &amp; shape of the molecules.</p> <p><b>CO4.</b>To know the concept of Fajan's rule, polarity of the ions</p>
3	<b>Physical Chemistry</b>	<p><b>CO1.</b>Knows the idea of de-Broglie equation &amp; Heisenberg's principle</p> <p><b>CO2.</b>To understand the quantum numbers &amp; principle of extra stability.</p> <p><b>CO3.</b>Understand the mechanism involved in conversion of gases in liquids.</p> <p><b>CO4.</b>Understands different types of gases exists in nature.</p> <p><b>CO5.</b>To understand the properties of liquid.</p>
4	<b>General Chemistry</b>	<p><b>CO1.</b>To know the concept of semi micro analysis of inorganic mixture containing anions and cations.</p> <p><b>CO2.</b>To understand the concept of solubility product and common ion effect.</p> <p><b>CO3.</b>To understand the basic concept of isomerism</p>

		and chirality. <b>CO4.</b> To know different types of isomerism & Bragg's equation.
<b>5</b>	<b>Laboratory Course</b>	<b>Co1.</b> To impart skills to students in systematic qualitative analysis of mixtures containing two acid and two basic radicals by semi micro method.

### SEM-2Cos

<b>S.No</b>	<b>Course Name</b>	<b>Course Outcome</b>
<b>1</b>	<b>Organic Chemistry</b>	<b>CO1.</b> Halogen Compounds: Differentiate various types of halogen compounds, Understand and identify $SN^1$ and $SN^2$ reactions  <b>CO2.</b> Hydroxy Compounds and Ethers: Learn the methods to prepare different alcohols & phenols. Preparation & various properties of phenols.  <b>CO3.</b> Carbonyl Compounds: Learn preparations and properties of carbonyl compounds. Differentiate between aldehydes and ketones
<b>2</b>	<b>Inorganic Chemistry</b>	<b>CO1.</b> p-block elements-II: To learn about the structures of oxides, oxidation states, reactivities and thermal stabilities interhalogen compounds and difference between halogen and interhalogens.  <b>CO 2.</b> Chemistry of zero group elements: To learn General preparation, structure, bonding and reactivity of Xenon compounds .  <b>CO 3.</b> Chemistry of d-block elements: To learn characteristics of d-block elements like magnetic & catalytic properties.
<b>3</b>	<b>Physical Chemistry</b>	<b>CO1.</b> Electrochemistry : To learn electrical transport conduction in metals & electrolyte solutions, specific & equivalence conductance measurements variation with

		<p>dilution.</p> <p><b>CO2.</b> Learn about migration of ions &amp; Kolrausch law, Arrhenius theory ,Ostwald's dilution law, Debye-Huckel-Onsagar,s equation.</p> <p><b>CO3.</b> To know about transport numbers &amp; its determination by Hittorf's method.Learn applications of conductivity measurements ,electrolytic &amp; galvanic cells.</p> <p><b>CO4.</b> Learn EMF of a cell &amp; its measurements, types of reversible electrodes.To learn Applications of EMF measurements, determination of pH using hydrogen electrode, gas electrode &amp; quin hydrone electrode.To learn solubility product of AgCl &amp; Potentiometric titrations.</p>
<b>4</b>	<b>General Chemistry</b>	<p><b>CO1.</b>Theory of Quantitative analysis: Learn the selection of indicators and titration curves.</p> <p><b>CO2.</b> Learn the theory involved in Redox ,Acid-Base ,complexometric &amp;precipitation titrations.</p> <p><b>CO3.</b> Stereoisomerism: Learn optical activity, Learn about asymmetric and dissymmetric molecules, RS &amp;DL Configurations.</p> <p><b>CO4.</b> Dilute solutions and colligative properties: Learn Raoult's law, relative lowering of vapour pressure, elevation of boiling point, depression in freezing point, osmotic pressure, determination of molecular weight.</p>
<b>5</b>	<b>Laboratory Course</b>	<p><b>Co1.</b>To impart skills to students in systematic quantitative analysis by Acid-base, Redox &amp; Complexometric titrations.</p>

## SEM-3 Cos

S.No	Course Name	Course Outcome
1	<b>Organic Chemistry</b>	1. Study different classes of aromatic compounds such as , aromatic sulphonic acids, phenols, aldehydes , ketones , aromatic acids, nitro hydrocarbons , aromatic halogen, nitro, amino, diazonium salts.
2	<b>Inorganic Chemistry</b>	1. Study chemistry of lanthanides and actinides. 2. Understands crystal field theory for coordination compounds and their electronic spectra. 3. Study structure & bonding I metal carbonyls and metal nitrosyls
3	<b>Physical Chemistry</b>	1. Understand concepts of thermodynamics (I, II Law). 2. Understand concept of efficiency using Carnot's cycle. 3. Determine heat of neutralization, enthalpy of solutions, transition temperature. 4. Able to predict reversible & irreversible cells. 5. To understand physical significance of third law of thermodynamics.
4	<b>General Chemistry</b>	1. Construct phase diagrams of two component systems. 2. Evaluate analytical data in terms of statistics 3. Evaluates effects of systematic errors on analytical results. 4. Express the significant figures and rounding of data. 5. To understand importance of carbanions in chemistry and various compounds formed from it.
5	<b>Laboratory Course</b>	1. Learns method for the preparation of organic compounds such as Aspirin, p-bromoacetanilide etc. 2. Understands different types of reactions and mechanisms involved in preparation

## SEM-4 Cos

S.No	Course Name	Course Outcome
1	<b>Organic Chemistry</b>	<ol style="list-style-type: none"><li>1. Study chemistry of carbohydrates with special reference to structure and configuration of glucose and fructose.</li><li>2. Study chemistry of Quinoline, isoquinoline &amp; indole.</li><li>3. Gain knowledge about amino acids , peptides and proteins.</li><li>4. To study various heterocyclic compounds which are used in various purposes</li></ol>
2	<b>Inorganic Chemistry</b>	<ol style="list-style-type: none"><li>1. Understand the meaning of various terms involved in coordination chemistry</li><li>2. To understand Werner's formulation of complexes and identify types of valences.</li><li>3. Know the limitations of VBT</li><li>4. Know the shape of d- orbitals &amp; degeneracy of d-orbitals.</li></ol>
3	<b>Physical Chemistry</b>	<ol style="list-style-type: none"><li>1. Understand the concepts of Beer's- lambert's law Joblonski diagram which tells</li><li>2. Understand about emission and absorption of radiations.</li><li>3. To write an expression for rate constant of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> order reactions.</li><li>4. Solve the numerical problems based on rate constant.</li><li>5. To know the adverse effect of temperature on rate of reaction.</li></ol>
4	<b>General Chemistry</b>	<ol style="list-style-type: none"><li>1. To learn about metal-ligand bonding</li><li>2. To understand thermodynamic &amp; kinetic aspect of metal carbonyls.</li><li>3. Understand adsorption process &amp; its mechanisms</li></ol>

		<p>on the surfaces.</p> <p>4.learn types of emulsions</p> <p>5. Learn about colloids and how to destabilize dispersed phase particles.</p>
<b>5</b>	<b>Laboratory Course</b>	<p>1. Learns different types of functional groups.</p> <p>2. learns special methods for identification of functional groups</p> <p>3. Learns to prepare derivatives of functional groups.</p>

### SEM – 5 Cos

#### Discipline Specific Elective A (Spectroscopy & Chromatography)

S.No	Course Name	Course Outcomes
<b>1</b>	<b>Molecular Spectroscopy</b>	<p>At the end of course student will be able to –</p> <p><b>CO1.</b>Recognize spectroscopy in microwave, Rotational spectra of rigid diatomic molecules, selection rules.</p> <p><b>CO2.</b>Study of Vibrating diatomic molecule, energy levels of a diatomic molecule, simple harmonic and anharmonic oscillator.</p> <p><b>CO3.</b>Charecteristic absorption bands of various functional groups, finger print nature of IR spectrum</p> <p><b>CO4.</b> Electronic Spectroscopy – Selection rules representation of UV - visible spectra.</p>
<b>2</b>	<b>NMR &amp; Mass Spectrometry</b>	<p>At the end of course student will be able to –</p> <p><b>CO1.</b>Study important concepts of Mass spectrometry and its role in structure elucidation of organic compounds.</p> <p><b>CO2.</b>Study important concepts of <sup>1</sup>H NMR and <sup>13</sup>C NMR spectroscopy and its role in structure elucidation of organic compounds.</p>
<b>3</b>	<b>Separation Techniques 1</b>	<p>At the end of course student will be able to –</p> <p><b>CO1.</b>Understand methods of extraction: batch extraction,</p>

		<p>continuous extraction and counter current extraction.</p> <p><b>CO2.</b> Learn how to use thin layer chromatography (TLC): advantages, preparation of plates, development of chromatogram, detection of spots, applications of TLC</p> <p><b>CO3.</b> Learn how to use paper chromatography: Principle, application of paper chromatography.</p>
<b>4</b>	<b>Separation Techniques 2</b>	<p>At the end of course student will be able to –</p> <p><b>CO1.</b> Learn about column chromatography: Principle, selection criteria of mobile and stationary phases and its applications.</p> <p><b>CO2.</b> Ion exchange chromatography: Principle and its application in separation of ions, de ionized water.</p> <p><b>CO3.</b> Gas Chromatography: Principle, theory and instrumentation and its applications.</p> <p><b>CO4.</b> HPLC High Performance Liquid Chromatography: Principle and its applications ex: analysis of paracetamol.</p>
<b>5</b>	<b>Laboratory Course</b>	<p>At the end of course student will be able to –</p> <p><b>CO1.</b> Determine molecular status and partition coefficient by using <b>Distribution Law</b>.</p> <p><b>CO2.</b> Determine cell constant of a conductivity cell and determine dissociation constant by <b>Conductivity Measurements</b>.</p> <p><b>CO3.</b> Verify Beer's law using <b>Colorimetry</b>.</p> <p><b>CO4.</b> Determine adsorption of acetic acid on animal charcoal – <b>Freundlich Adsorption Isotherm</b>.</p> <p><b>CO5.</b> Determine surface tension and Viscosity.</p>

**SEM – 6 Cos**  
**Discipline Specific Elective-B (Agricultural & Fuel Chemistry)**

<b>S.No</b>	<b>Course Name</b>	<b>Course Outcomes</b>
<b>1.</b>		<p>At the end of course student will be able to learn –</p> <p><b>CO1.</b> Classification of pesticides based on use</p>



	<b>Pesticides</b>	<p>(target). Toxicity and chemical structure, adverse effects of pesticides and its impact on environmental pollution.</p> <p><b>CO2.</b> Synthesis, technical manufacture and uses of representative pesticides</p> <p><b>CO3.</b> Role of Neem in plant protection-constituents</p> <p><b>CO4.</b> Azadirachtin and its role in pest control</p>
<b>2</b>	<b>Fertilizers</b>	<p>At the end of course student will be able to learn about –</p> <p><b>CO1.</b> Need of Fertilizers, functions of essential plant nutrients.</p> <p><b>CO2.</b> Nitrogenous fertilizers, Phosphate fertilizers, potassium fertilizers and bio fertilizers.</p> <p><b>CO3.</b> Organic farming – Principal methods, Crop rotation, green manures and compost, biological pest control, mechanical cultivation and uses.</p>
<b>3</b>	<b>Energy Sources &amp; Coal</b>	<p>At the end of course student will be able to learn about –</p> <p><b>CO1.</b> Renewable and non-renewable energy sources, their calorific value.</p> <p><b>CO2.</b> Uses of coal in various industries, its composition.</p> <p><b>CO3.</b> Composition and uses of Coal gas, producer gas and water gas.</p> <p><b>CO4.</b> Coal gasification, coal liquefaction and solvent refining, fractionation of coal tar and its uses.</p>
<b>4</b>	<b>Petroleum &amp; its Products, Petro Chemicals &amp; Non-Petroleum Fuels</b>	<p>At the end of course student will be able to learn about –</p> <p><b>CO1.</b> Properties of petroleum – flash point and its determination</p> <p><b>CO2.</b> Knocking and anti-knocking compounds, octane number and cetane number of petroleum. Cracking of Petroleum, reforming.</p> <p><b>CO3.</b> Petroleum products and their applications. Petro chemicals and their uses.</p>

		<p><b>CO4.</b>Lubricants – types, properties and mechanism of lubrication</p> <p><b>CO5.</b> Non Petroleum fuels –Natural gas, fuel from waste, bio gas, fuel from bio mass and their application.</p>
5	Laboratory Course	<p>At the end of course student will be able to–</p> <p>CO1.Determine rate of reaction by <b>Kinetics</b> experiments.</p> <p>CO2.Determine redox potentials by <b>Potentiometry</b> technique.</p> <p>CO3.Determine concentration of acids and bases using <b>pH metry</b>.</p> <p>CO4.Determine overall order using <b>conductometry</b>.</p>

**SEM -6 Cos**  
**Optional for Chemistry Stream (Advanced Chemistry)**

S.No	Course Name	Course Outcomes
1	Inorganic Chemistry	<p>At the end of course student will be able to learn about</p> <p><b>CO1.</b>Inorganic reaction mechanisms,Stability of complexes, substitution reactions, Trans effect and applications of trans effect.</p> <p>Reactions of tetrahedral complexes - Hydrolysis of silicon halides and phosphorous oxides</p> <p><b>CO2.</b> Boranes and Carboranes, Structures of boranes and carboranes- Wade’s rules closo , nido, arachno boranes and carboranes.</p> <p><b>CO3.</b> Symmetry of Molecules : Symmetry operations and symmetry elements in molecules &amp; examples</p> <p><b>CO4.</b> Non-aqueous solvents : Characterucs of a solvents, Reactions in liquid ammonia.Physical properties,Auto-ionisation,examples of ammono acids &amp; ammono bases.Reactions in liq.ammonia. Reactions in HF</p>

2	<b>Organic Chemistry</b>	<p><b>CO1.</b> Pericyclic Reactions : Concerted reactions ,thermal and photochemical pericyclic reactions.Types of pericyclic reactions, explanation by FMO theory.</p> <p><b>CO2.</b> Synthetic Strategies: Disconnection approach- Retrosynthesis, synthon, synthetic Functional group interconversion (FGI) ,Linear convergent synthesis ,Retrosynthetic analysis.</p> <p><b>CO3.</b> Assymmetric synthesis : Classification of stereoselective reactions- substrate, product, stereoselective reactions, enantio and diastereo selective reactions , Stereospecific reactions- Enantioselective reactions- definition and example and reduction of ethylacetoacetate by yeast. Diastereoselective reaction.</p>
3	<b>Physical Chemistry</b>	<p><b>CO1.</b> Polymers : Natural polymers and synthetic polymers .Classification as plastics, fibres, elastomers .Thermosetting, thermoplastic polymers . Addition and condensation polymerization and coordination polymerization</p> <p><b>CO2.</b> Kinetics of free radical polymerization ,Tacticity, atacticity, stereospecific synthesis- Zeigler- Natta catalyst.</p> <p><b>CO3.</b> Determination of molecular weight of polymers using viscosity method &amp; Osmometric method</p> <p><b>CO4.</b> Preparation and industrial applications of polyethylene,biodegradability</p>
4	<b>General Chemistry</b>	<p><b>CO1.</b> Electroanalytical methods: Types of Electroanalytical Methods.</p> <p>Principle, Electrochemical cell, Electrodes- (i) Indicator and (ii) Reference electrodes – Normal Hydrogen Electrode, Quinhydrone Electrode, Saturated Calomel Electrode.</p> <p><b>CO2.</b> Voltametry -three electrode assembly; types of voltametric techniques, micro electrodes</p> <p><b>CO3.</b> Over potential and Polarization. Bulk methods – Conductometry, Conductivity Cell.</p> <p><b>CO4.</b> Applications of conductometry.Estimation of Cl using AgNO<sub>3</sub>. Determination of Aspirin with KOH</p>

# DEPARTMENT OF CHEMISTRY

## PG

**I. Name of the Department:** Chemistry

**II. Vision:** Moulding youthful girls into independent and innovative thinkers in Chemical Sciences

**III. Mission:** To promote, inspire and nurture the fundamentals of chemistry.

### IV. PROGRAMME

S.No.	Name of the Programme	Programme Outcomes	Programme Specific Outcomes
1.	M.Sc. Organic Chemistry	<p><b>PO1:</b> To provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes.</p> <p><b>PO2:</b> Specialized Knowledge in the field. Career advancement. Increased earning Potential.</p> <p><b>PO3:</b> With a masters degree in chemistry job opportunity exist both in the private sector, research institution, pharmacy and other industries.</p> <p><b>PO4:</b> Students also develop valuable personal skills and fulfill a crucial prerequisite to Ph.D. study.</p>	<p><b>PSO1:</b> Organic Chemistry is important for students intending to become chemist and is involved in cross disciplined work with Life Sciences, Biotechnology and Engineering.</p> <p><b>PSO2:</b> Develop an understanding of chemistry of carbon based compounds.</p> <p><b>PSO3:</b> Develop an expertise relevant to professional practice of chemist. Develop skills in procedures and spectroscopic methods applied in analytically and synthetic task of organic chemistry.</p> <p><b>PSO4:</b> Experience in some</p>

			scientific methods employed in organic chemistry.
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## SEMESTER I

### COURSE OUTCOMES:

S.No.	Course Name ( Paper)	Course Outcomes
1.	a. Inorganic Chemistry	<p><b>CO1: Symmetry of molecules:</b> knowledge of symmetry gives us power of prediction. As a result we use symmetry in decision making process of virtually every task we perform. Symmetry is very useful in day to day life.</p> <p><b>CO2: Bonding in metal complexes:</b> Several metal complexes have many interesting properties in many aspects of human life. A huge number of metal complexes are used as catalyst in variety of organic reactions. For example: Polymerization, Hydrogenation. Several metal complexes are in clinical use for the treatment of various diseases one such example is cisplatin. It is most successful example for the treatment of cancer.</p> <p><b>CO3: Coordination Equilibria:</b> The metal ligand interaction in equilibria is used for determination of stability constant values and factors affecting the stability constant values.</p> <p><b>CO4: Ligational aspects of diatomic molecules:</b> Metal carbonyls are useful in the organic synthesis and as catalyst in homogenous catalysis as hydroformylation. In organometallic chemistry metal carbonyls serves as precursors for preparation of other organometallic complexes. These are useful in</p>

		industrial process for example extraction and purification of Nickel.
	<b>b. Organic Chemistry</b>	<p><b>CO1: Stereochemistry:</b> Stereochemistry is 3D chemistry. It is a field that has often been especially challenging for students because of difficulty in visualizing 3D objects, given 2D representation on paper. Physical models and 3D computer models can be of great help and the student is encouraged to use them to understand the stereochemistry. It has significance in Pharmaceutical industries. Food and Drug Administration (FDA) requires the drug be produced in enantiomerically pure form, for which understanding the stereochemistry of drug molecule is essential.</p> <p><b>CO2: Reaction Mechanism:</b> A reaction mechanism can be simply defined as the detailed, step- by -step description of the pathway by which reactants are converted into products. The study of detailed process of reaction mechanism is important for many reasons; including the help it gives in understanding and controlling chemical reactions. There are several reaction mechanisms which describes chemical transformations occurring in the atmosphere.</p> <p><b>CO3: Conformational Analysis:</b> Conformational analysis is an indispensable tool for elucidation of the properties and the behavior of organic molecules. Conformational analysis plays a fundamental role in various research fields of organic chemistry.</p> <p><b>CO4: Natural Products &amp; Heterocyclic Compounds:</b> Natural products have high structural diversity and unique pharmacological or biological activities. It covers the field of herbal medicine, organic chemistry and pharmaceutical science. It plays a critical role in the identification of numerous</p>

		medicines. Natural products are the inspiration of approximately half of US FDA approved drugs.
	<b>c. Physical Chemistry</b>	<p><b>CO1: Thermodynamics:</b> The heat changes during the chemical reaction can be known efficiency (working capacity) of all machines can be known.</p> <p><b>CO2: Chemical kinetics:</b> It relates to many aspects of cosmology, geology, biology, and engineering psychology for reacting implication. Refrigerator is real life application for chemical kinetics a refrigerator lowers the temperature of the reactants therefore slowing down the reaction of food rotting because with the lower temperatures the rate of the reaction decreases.</p> <p><b>CO3: Electrochemistry:</b> It deals with the interconversion of electrical energy &amp; chemical energy. The principles of cells are used to make electrical batteries. In science and technology a battery is a device that stores chemical energy and makes it available in an electrical form.</p> <p><b>CO4: Quantum chemistry:</b> Quantum theory include quantum chemistry, quantum optics, quantum computing, super conducting magnet, light emitting diode &amp; the laser transistor and semi-conductors such as micro-processor medical and research imaging. Today the most precious clocks in the world atomic clocks are able to use the principle of quantum theory to measure time such super sensitive atomic clocks help with GPS navigation ,telecommunication, surveying.</p>
	<b>d. Analytical techniques &amp; Spectroscopy I:</b>	<b>CO1: Techniques of chromatography:</b> Chromatography techniques are very useful in the separation of different samples mainly organic samples. Chromatography can be used in flavor studies and to detect spoilage in foods such as additive detection, determining nutritional quality, crime sense

		<p>testing, forensic pathology metabolomics and proteomics and nucleic acid research.</p> <p><b>CO2: NMR-Spectroscopy-I:</b> NMR spectroscopy is widely used to determine the structure of organic molecules in solution and study of molecular physics, crystals as well as non crystalline materials. NMR is also routinely used in advance medical imaging techniques such as magnetic resonance imaging (MRI)</p> <p><b>CO3: Rotational and Vibrational spectroscopy:</b> Rotational spectroscopy is primarily used in investigation of molecular physics. It is a unique precise tool to determine molecular structure in gas phase.</p> <p>Vibrational spectroscopy is used for the identification of functional groups, structural determination of organic compounds, used in pharmaceutical research.</p> <p><b>CO4: Electronic spectroscopy:</b> Electronic spectroscopy is related to uv-visible radiation. Electronic spectroscopy is widely used to detect environmental samples.</p> <p>It is an analytical technique to study electronic structure and its experimental applications include high resolution measurements on the intensity and angular distribution of emitted electrons</p>
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**SEMESTER – II COURSE OUTCOMES:**

S.No.	Course Name ( Paper)	Course Outcomes
1.	<b>a. Inorganic Chemistry</b>	<p><b>CO1:</b> Acquire knowledge about the nature of ligands &amp; Bonding modes of ligands</p> <p><b>CO2:</b> Able to calculate microstates and terms related to complexes.</p> <p><b>CO3:</b> Acquire Knowledge about the stability and structural patterns of metal clusters</p> <p><b>CO4:</b> Able to identify role of metal ions in the biological and physiological systems and applications.</p>
	<b>b. Organic Chemistry</b>	<p><b>CO1: Reaction Mechanism II:</b> To propose reaction mechanisms and determine NGP effects on rates of reactions.</p> <p><b>CO2: Pericyclic reactions</b> are used in a vast way in nature and also by organic chemist. This course gives the student the theoretical basis of this kind of reaction and also helps them to find a way to carry out these types of reaction.</p> <p><b>CO3: Photochemistry:</b> After completing the course, the student should be able to demonstrate a sound knowledge of the photochemistry principles and their applications.</p> <p><b>CO4: Reactive intermediates and Molecular Rearrangements:</b> To identify intermediates formed in given reaction and able to write mechanisms for molecular Rearrangements</p>
	<b>c. Physical Chemistry</b>	<p><b>CO1: Thermodynamics:</b> Applicative Knowledge of thermodynamics to non- equilibrium and equilibrium systems</p> <p><b>CO2: Chemical kinetics:</b> Obtain knowledge about the interaction of light with chemical systems</p> <p><b>CO3:</b> Theoretical Knowledge of various orbitals of atoms and molecules</p> <p><b>CO4:</b> Unique importance of solids and technological applications in the advancement of human life.</p>
		<b>CO1:</b> Analytical chemistry is successfully used to ascertain the quality of

	<b>d. Analytical techniques &amp; Spectroscopy II:</b>	<p>the manufactured drug in tablets.</p> <p><b>CO2:</b> The various nutritional values and calories present in food can be calculated.</p> <p><b>CO3: Spectroscopy:</b> Able to interpret structures of compounds by applying NMR, PS and Mass spectral methods.</p>
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### SEMESTER III: COURSE OUTCOMES

S.No.	Course Name ( Paper)	Course Outcomes
1.	<b>a. Synthetic Reagents, Advanced NMR, Conformational Analysis &amp; ORD</b>	<p><b>CO1: Synthetic Reagents:</b> Synthetic reagents consist of a broad range of chemicals with many uses in chemical synthesis. They are the key components used for transforming functional groups. There are specialized reagents which can be used in trace amounts instead of using large quantities. In research, synthetic reagents are used as a catalyst and intermediate in different reactions. Many organic compounds have been synthesized using a variety of synthetic reagents.</p> <p><b>CO2: Advanced NMR- <sup>13</sup>C NMR &amp; 2D NMR:</b> <sup>13</sup>C NMR is an important tool in chemical structure elucidation in organic chemistry. It is a noninvasive and non destructive method i.e. especially used in repetitive invivo analysis of the sample without harming tissue. <sup>13</sup>C NMR of biological materials allows for the assessment of the metabolism of carbon, which is so elementary to life on earth.</p> <p>2D NMR is one of the emerging analytical techniques being used more and more in the pharmaceutical and chemical industries. In order to fully prepare students for future jobs in industry, it is important to educate students about 2D NMR.</p> <p><b>CO3: Conformational analysis (Cyclic system) &amp; ORD:</b> Conformational analysis of medium and large rings is important as they are present in numerous natural products and</p>

		<p>pharmacologically active products. Thus, not only thoroughly understanding but also an ability to apply conformational analysis to comprehend biological properties of organic compounds and interaction in complex system.</p> <p><b>CO4:</b> ORD can be used to find absolute configuration of metal complex and other organic compounds. It also determines optically active substance and stereochemistry of aminoacids and steroids. It is widely used in the structure determination of polypeptides.</p>
	<b>b. Modern Organic Synthesis</b>	<p><b>CO1: Asymmetric Synthesis:</b> It is one of the important topics of research which completely deals for the development of technology, for production of high value pharmaceuticals and agrochemicals.</p> <p><b>CO2: Synthetic Strategies and Synthetic reaction:</b> It involves the design and control of stereochemistry. It focus on developing key skills in making complicated organic molecules from simple building blocks and transforming one organic molecule to another using the synthetic strategy..</p> <p><b>CO3:</b> The concept of retro synthetic analysis is a logic based tool that uses pattern recognition and mechanistic understanding for the design of synthetic pathway.</p>
	<b>c. Bioorganic Chemistry</b>	<p><b>CO1:</b> Bioorganic chemistry develops an advanced understanding of the structure and functions of natural organic molecules or compounds.</p> <p><b>CO2:</b> Bioorganic chemistry is chemistry at the interface of organic and biological chemistry and involves the design, synthesis and evaluation of substrate, probes and materials for the study of biological systems and principles</p> <p><b>CO3:</b> It involves the study of biological process using chemical methods. Organic chemistry methods are used to synthesize</p>

		biological molecule and to examine their structure, to investigate biochemical reactions.
	<b>d. Green Chemistry &amp; Organic Materials</b>	<p><b>CO1: Green Chemistry:</b> Green chemistry is the new and rapid emerging branch of chemistry. The beginning of green chemistry is considered as a response to the need to reduce the damage of the environment by manmade materials and the process used to produce them.</p> <p>It includes anything from producing waste to even disposing of waste in the correct manner. Success of green chemistry depends on the training and education of new generation of chemist. Students at all levels have to be introduced to the philosophy and practice of green chemistry.</p> <p><b>CO2: Supramolecular Chemistry:</b> It is important for the development of new pharmaceutical therapies by understanding the interaction at a drug binding site.</p> <p><b>CO3: Nanochemistry:</b> It is the combination of chemistry and nanoscience. One highly researched application of nanochemistry is medicine Eg: Simple skin care product using the technology of nanochemistry is sunscreen. Nanochemistry presents a blueprint for the future development of an existing teaching and research programme. Many nanotechnological methods and materials can be functionalized for drug delivery.</p>

#### SEMESTER IV: COURSE OUTCOMES

S.No.	Course Name ( Paper)	Course Outcomes
1.	<b>a. Drug Design &amp; Drug Discovery:</b>	<b>CO1:</b> This course will explore the process of drug development, from target identification to final drug registration. It will present drug development as a process involving target selection, lead discovery using computer-based methods and combinatorial chemistry/high-throughput screening.

		<p><b>CO2:</b> Be able to describe the process of drug discovery and development chemistry.</p> <p><b>CO3:</b> Be able to discuss the challenges faced in each step of the drug discovery process.</p> <p><b>CO4:</b> Have gained a basic knowledge of computational methods used in drug discovery.</p>
	<p><b>b. Drug Synthesis and Mechanism of Action:</b></p>	<p><b>CO1:</b> Recognize the drug structure and predict its pharmacologic action;</p> <p><b>CO2:</b> Recognize the drug physico-chemical and stereochemical features;</p> <p><b>CO3:</b> Describe the mechanism of action, use and mode of application of the selected drugs on the basis of their structure;</p> <p><b>CO4:</b> Describe and perform synthesis of the drugs and determine the reaction yield</p>
	<p><b>c. Advanced Heterocyclic Chemistry</b></p>	<p><b>CO1:</b> Provides theoretical understanding of heterocyclic chemistry which includes various methods for ring synthesis and application of those methods for the preparation of specific groups of heterocyclic systems.</p> <p><b>CO2:</b> The students will be made familiar with particular properties, reactions, and applications of the most important as well as less common heterocycles</p> <p><b>CO3:</b> Students will understand the importance heterocycles in biological systems and in pharmaceuticals.</p> <p><b>CO4:</b> Students will be able to draw mechanisms for reactions involving heterocycles as starting materials, intermediates and products, and be able to propose syntheses of heterocycles from the major classes. Students will be able to relate significant chemical properties to structure.</p>

	<p><b>d.      Advanced Natural Products</b></p>	<p><b>CO1:</b> Understand the importance of natural compounds as lead molecules for new drug discovery.</p> <p><b>CO2:</b> Learn the constituent present in crude drugs .Elaborate general methods of structural elucidation of compounds of natural origin.</p> <p><b>CO3:</b> Learn advanced methods of structural elucidation of compounds of natural origin. Understand isolation, purification and characterization of simple chemical constituents from the natural source</p>
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# DEPARTMENT OF COMMERCE

## UG Programme

**MISSION:** *COMMERCE WITH PURPOSE OPPORTUNITY, EQUALITY AND SOCIAL JUSTICE*

**VISION:** *TRANSFORMING WOMEN THROUGH COMMERCE SKILLS AND VALUE BASED EDUCATION*

### B.COM GENERALS

S.no	Name of the Programme	POs	PSOs
1.	B.COM GENERAL	<ol style="list-style-type: none"><li>1. The outcome of well framed semester- wise commerce syllabus is to enhance the ability of students to apply the learned principles and concepts of accountancy, basic concepts and allied aspects of commerce, Foreign Trade.</li><li>2. Students will acquire thorough knowledge in the chosen subjects and course specialisation.</li><li>3. Students can start up their own business and go for placements with the gained knowledge, well developed professional skills in the fields of Banking, Insurance, Costing Techniques and Financial Services with Commerce Lab undertaken by them.</li></ol>	<p style="text-align: center;"><b>Semester I</b></p> <ol style="list-style-type: none"><li>1. To acquire accounting and preparation of knowledge of basic accounts.</li><li>2. To gain knowledge of basics of commerce and business concepts.</li><li>3. To create awareness about foreign trade of India with international policies procedures and institutions.</li><li>4. To acquaint knowledge about basic computer skills to the students.</li></ol> <p style="text-align: center;"><b>Semester II</b></p> <ol style="list-style-type: none"><li>1. To gain knowledge about various business accounting methods.</li><li>2. To acquire accounting knowledge on Bills of Exchange and other Business Accounting Methods.</li><li>3. To understand basics of contract act, sale of goods act, IPRS and legal provisions applicable for establishment, management and winding up of companies in India.</li><li>4. To familiarise fund based and non-fund based financial services.</li></ol> <p style="text-align: center;"><b>Semester III</b></p> <ol style="list-style-type: none"><li>1. To gain knowledge about partnership accounts and joint stock companies.</li><li>2. To inculcate analytical and computational ability among the students.</li><li>3. To familiarise with financial institutions and markets.</li></ol>

			<p>4. To gain knowledge in general insurance and policies.</p> <p style="text-align: center;"><b>Semester IV</b></p> <p>1. To acquire legal and conceptual knowledge to students for filling of returns and computation of income of individual assessee.</p> <p>2. To inculcate analytical computational ability among students.</p> <p>3. To acquire knowledge accounting standard 14 and banking and administration accounts.</p> <p style="text-align: center;"><b>Semester V</b></p> <p>1. To equip the students with the knowledge regarding Insurance Business Regulations.</p> <p>2. To equip the students with the knowledge regarding Basics of Indian Economy.</p> <p>3. To equip the students with the knowledge regarding Theory and Practice of GST.</p> <p>4. To understand legal provisions applicable for establishment, management and winding up of companies in India as per Companies Act 2013.</p> <p style="text-align: center;"><b>Semester VI</b></p> <p>1. To acquire Managerial Accounting decision-making techniques and reporting methods.</p> <p>2. To become familiar with various business documents and acquire practical knowledge, which improve over all skill and talent.</p> <p>3. To familiarize with various Financial Institutions and Markets.</p> <p>4. To gain knowledge of AS-19&amp; 21 and format accounts.</p> <p>5. To acquire conceptual and application knowledge of ecommerce.</p>
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## B.COM COMPUTER APPLICATIONS

S.no	Name of the Programme	POs	PSOs
1.	<b>B.COM COMPUTER APPLICATIONS</b>	<ol style="list-style-type: none"> <li>1. The outcome of well framed semester- wise commerce syllabus is to enhance the ability of students to apply the learned principles and concepts of accountancy, basic concepts and allied aspects of commerce, Foreign Trade.</li> <li>2. Students will acquire thorough knowledge in the chosen subjects and course specialisation.</li> <li>3. Students can start up their own business and go for placements with the gained knowledge, well developed professional skills in the fields of Banking, Insurance, Costing Techniques and Financial Services with Commerce Lab undertaken by them.</li> </ol>	<p style="text-align: center;"><b>Semester I</b></p> <ol style="list-style-type: none"> <li>1. To acquire knowledge of basic accounting and preparation of accounts.</li> <li>2. To gain knowledge of basics of commerce and business concepts.</li> <li>3. To create awareness about foreign trade of India with international policies procedures and institutions.</li> <li>4. To acquaint knowledge about basic computer skills to the students.</li> </ol> <p style="text-align: center;"><b>Semester II</b></p> <ol style="list-style-type: none"> <li>1. To gain knowledge about various business accounting methods.</li> <li>2. To acquire accounting knowledge on Bills of Exchange and other Business Accounting Methods.</li> <li>3. To understand basics of contract act, sale of goods act, IPRS and legal provisions applicable for establishment, management and winding up of companies in India.</li> <li>4. To familiarise fund based and non-fund based financial services.</li> </ol> <p style="text-align: center;"><b>Semester III</b></p> <ol style="list-style-type: none"> <li>1. To gain knowledge about partnership accounts and joint stock companies.</li> <li>2. To inculcate analytical and computational ability among the students.</li> <li>3. To familiarise with</li> </ol>

			<p>financial institutions and markets.</p> <p>4. To gain knowledge in general insurance and policies.</p> <p style="text-align: center;"><b>Semester IV</b></p> <p>1. To acquire legal and conceptual knowledge to students for filling of returns and computation of income of individual assessee.</p> <p>2. To inculcate analytical computational ability among students.</p> <p>3. To acquire knowledge accounting standard 14 and banking and administration accounts.</p> <p style="text-align: center;"><b>Semester V</b></p> <p>1. To equip the students with the knowledge regarding Insurance Business Regulations.</p> <p>2. To equip the students with the knowledge regarding Basics of Indian Economy.</p> <p>3. To equip the students with the knowledge regarding Theory and Practice of GST.</p> <p>4. To understand legal provisions applicable for establishment, management and winding up of companies in India as per Companies Act 2013.</p> <p style="text-align: center;"><b>Semester VI</b></p> <p>1. To acquire Managerial Accounting decision-making techniques and reporting methods.</p>
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			<ol style="list-style-type: none"><li>2. To become familiar with various business documents and acquire practical knowledge, which improve over all skill and talent.</li><li>3. To familiarize with various Financial Institutions and Markets.</li><li>4. To gain knowledge of AS-19&amp; 21 and format accounts.</li><li>5. To acquire conceptual and application knowledge of ecommerce.</li></ol>
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## BACHELOR OF BUSINESS ADMINISTRATION

S.no	Name of the Programme	POs	PSOs
1.	<b>BACHELOR OF BUSINESS ADMINISTRATION</b>	<ol style="list-style-type: none"> <li>1. The outcome of well framed semester- wise commerce syllabus is to enhance the ability of students to apply the learned principles and concepts of Business administration, basic concepts and allied aspects of administration.</li> <li>2. Students will acquire thorough knowledge in the chosen subjects and course specialisation.</li> <li>3. Students can start up their own business and go for placements with the gained knowledge, well developed professional skills in the fields of marketing, management, statistics, human resources, personality development skills, accountancy, customer relationship management, buy behaviour, international finance with Research Project undertaken by them.</li> </ol>	<p style="text-align: center;"><b>Semester I</b></p> <ol style="list-style-type: none"> <li>1. To provide broad and integrative introduction to theory and practice of management.</li> <li>2. To provide exposure pertaining to the scope of marketing</li> <li>3. To apply micro economics tools for analyzing business problems and make accurate decision.</li> </ol> <p style="text-align: center;"><b>Semester II</b></p> <ol style="list-style-type: none"> <li>1. To explain the fundamentals of managing business and to understand the individual and group behaviour.</li> <li>2. To provide the tools to analyse, tabulation and presentation of statistical data.</li> <li>3. To familiarise them with the mechanics of preparation of financial statements to understand, analyze and interpret.</li> <li>4. To enable the student to apply basic computer knowledge.</li> </ol> <p style="text-align: center;"><b>Semester III</b></p> <ol style="list-style-type: none"> <li>1. To provide proper perspective towards ones personality development.</li> <li>2. To enhance the advance computer skills &amp; provide</li> </ol>

			<p>knowledge of computer technology.</p> <ol style="list-style-type: none"> <li>3. To aware the students about the traditional &amp; modern quality perspective.</li> <li>4. To acquaint the students with understanding the business environments &amp; decision strategies to meet challenges it focuses on designing plans and policies.</li> <li>5. To introduce the students with the basic concepts &amp; advance concepts in human resources in an organisation</li> <li>6. The aim of the course is to give a management practical experience on software skills.</li> <li>7. To acquaint students with the techniques of financial management and their applications for business decision making.</li> </ol> <p style="text-align: center;"><b>Semester IV</b></p> <ol style="list-style-type: none"> <li>1. This course is to intend to help the students to present themselves properly to the corporate world and formally highlighting their strengths.</li> <li>2. To enable the students to understand the importance of goal setting, time management and trust worthiness.</li> <li>3. It help the students acquaint themselves</li> </ol>
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			<p>with special challenges for starting new ventures and introducing new product service ideas.</p> <ol style="list-style-type: none"> <li>4. The aim of the course is to provide a basic understanding of business intelligence and its appreciation through data visualisation</li> <li>5. To help the students to focus on contract act, companies ethics &amp; legal aspects Contract Act.</li> <li>6. To provide an exposure pertaining to marketing research, basic techniques &amp; tools of marketing.</li> <li>7. To provide the students with adequate knowledge regarding managerial skills to address their problems.</li> </ol> <p style="text-align: center;"><b>Semester V</b></p> <ol style="list-style-type: none"> <li>1. The objective of the course is to provide the students with mobile commerce concepts environment &amp; customer value.</li> <li>2. To explain the structure of Indian financial system and mutual funds.</li> <li>3. To provide an understanding of different types of brand awareness, equity.</li> <li>4. This course offers an exploration of the field of organisational development and change in a rapidly</li> </ol>
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			<p>changing context of globalisation.</p> <ol style="list-style-type: none"> <li>5. To explain basic concepts of risk, portfolio &amp; various theories of Evolution.</li> <li>6. This course introduces the role in retaining, various formats and theories in distribution management.</li> <li>7. This course offers an employee performance and measures to improve through HRD.</li> <li>8. The course helps the students to know about Insurance and latest Trends in Insurance.</li> <li>9. To know the importance of customer involvement and relations with corporations making the students know and build beneficial relations.</li> <li>10. To impart techniques and methods for competing employer employee negotiations for arriving at optimal compensation system.</li> </ol> <p style="text-align: center;"><b>Semester VI</b></p> <ol style="list-style-type: none"> <li>1. The aim is to understand the basic concepts of business analytics and practical approach using MS. EXCEL.</li> <li>2. This course helps the students to know the banking and its trends.</li> <li>3. To focus on the</li> </ol>
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			<p>learning theories of buying behaviour.</p> <ol style="list-style-type: none"> <li>4. The course offers the students to understand leadership activities and its influence on management.</li> <li>5. To enable the students with inputs on globalisation, risk management and international trade.</li> <li>6. <input type="checkbox"/>It helps the students to understand the important of advertisement of promotion of products media planning, personal selling and sales promotion.</li> <li>7. The main objective of the course is to offer knowledge on various approaches to talent and knowledge management. The course also facilitates discussion on variety of institutional strategies and models for dealing the talent and knowledge management.</li> <li>8. The objective of this course is to provide inputs on globalisation exchange risk management financing of international trade etc.</li> <li>9. The objective of this course is to introduce rural market dynamics</li> </ol>
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			<p>to the students so that they can learn about rural behaviour that differs from urban market.</p> <p>10. The main aim of this course is to introduce students to the theories and practise of industrial relations. The module examines the relationship existing between employer and employee.</p>
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**COURSE OUTCOMES (CO'S)**  
**SEMESTER –I**

<b>S.NO</b>	<b>SEMESTER –I</b>	<b>CO's</b>
<b>1.</b>	<b>Paper DSC 101: FINANCIAL ACCOUNTING –I</b>	<p><b>CO1:</b> To understand basic concepts of accounting.</p> <p><b>CO2:</b> To demonstrate recording and posting of the transaction.</p> <p><b>CO3:</b> To classify and compare various subsidiary books.</p> <p><b>CO4:</b> To eliminate differences in cash book and pass book.</p> <p><b>CO5:</b> students are equipped with skills in financial statement/balance sheet.</p>
<b>2.</b>	<b>Paper DSC 102: BUSINESS ORGANISATION AND MANAGEMENT</b>	<p><b>CO1:</b> Understand the basic concepts of business organizations.</p> <p><b>CO2:</b> Identifying the factors involved in determining the formation of business units.</p> <p><b>CO3:</b> Applying the ethics of business in the ordinary trade.</p> <p><b>CO4:</b> Gaining the knowledge on the applicability of the recent trends involve in various supporting institutions and secondary market.</p>

## SEMESTER- II

<b>S.NO</b>	<b>SEMESTER- II</b>	<b>CO's</b>
<b>1.</b>	<b>Paper DSC 201: FINANCIAL ACCOUNTING-II</b>	<b>CO1:</b> To understand business and its role in society.  <b>CO2:</b> To have an understanding of business ethics and CSR.  <b>CO3:</b> Understanding the financial statements of various types of business units other than corporate.  <b>CO4:</b> Calculate profits or losses from incomplete records.  <b>CO6:</b> Prepare accounts of consignment.
<b>2.</b>	<b>BUSINESS LAW</b>	<b>CO1:</b> Understand the concept of agreement, contract, essentials and classification of contracts.  <b>CO2:</b> Identify the essentials of consideration and free consent including rules regarding minor agreement.  <b>CO3:</b> Examine the circumstances and the object can be considered in intellectual property rights. <b>CO4:</b> to understand the consumer protection law.  <b>Co5:</b> To understand the winding up of company, insolvency and bankruptcy.

### SEMESTER- III

S.NO	SEMESTER- III	CO's
1.	<b>Paper DSC 301: ADVANCED ACCOUNTING</b>	<p><b>CO1:</b> Identify the rules relating to partnership accounts revaluation partners capital balance sheet.</p> <p><b>CO2:</b> Apply accounting treatment to prepare necessary accounts at the time of retirement and death of the partners, dissolution of partnership firms.</p> <p><b>CO3:</b> To understand the issues of shares debentures, bonus shares and under writing.</p> <p><b>CO4:</b> To examining company final accounts and profits prior to incorporation</p> <p><b>CO5:</b> To understand valuation of goodwill and shares.</p>
2.	<b>Paper DSC 302: BUSINESS STATISTICS-I</b>	<p><b>CO1:</b> Acquire knowledge about statistical tools.</p> <p><b>CO2:</b> Analyze the various techniques to calculate the various statistical measures.</p> <p><b>CO3:</b> Application of various techniques on consumer price understands.</p> <p><b>CO4:</b> Acquire knowledge on sampling of probability condition and marginal probability.</p>

### SEMESTER- IV

S.NO	SEMESTER- IV	CO's
1.	<b>Paper DSC 301: INCOME TAX</b>	<p><b>CO1:</b> To understand the scope and direct taxes and application of income tax in India. Acquire knowledge of agriculture income in India.</p> <p><b>CO2:</b> Computation of income from head income from salary.</p> <p><b>CO3:</b> Computation of income from head income from house property.</p> <p><b>CO4:</b> Computation of income from head income from business and profession.</p> <p><b>CO5:</b> Computation of income from other sources</p>
2.	<b>Paper DSC 302: BUSINESS STATISTICS-II</b>	<p><b>CO1:</b> to understand regression analysis of dependent and independent variable.</p> <p><b>CO2:</b> To understand the weighted and unweighted index numbers and test of consistency.</p> <p><b>CO3:</b> To know the components of time series combining the series and different methods of time series.</p> <p><b>CO4:</b> To understand probability theories</p> <p><b>CO5:</b> To learn different theoretical distribution without find out the expected frequency.</p>

## SEMESTER- V

<b>S.NO</b>	<b>SEMESTER- V</b>	<b>CO's</b>
<b>1.</b>	<b>Paper DSC 301:</b>  <b>ADVANCED ASPECTS OF INCOME TAX</b>	<b>CO1:</b> Calculate tax liability using tax rates. <b>CO2:</b> Compute basic capital gains/losses. <b>CO3:</b> Ascertain the special deduction may affect taxable income. <b>CO4:</b> computation of individual tax liability. <b>CO5:</b> Outline individual tax return filing and estimated tax payment requirements and other types of judgments.
<b>2.</b>	<b>Paper DSC 302:</b>  <b>COST ACCOUNTING:</b>	<b>CO1:</b> Understand the fundamental aspects of cost accounting and preparation of cost sheet. <b>CO2:</b> Comprehend the various methods and techniques of material costing. <b>CO3:</b> Analyses and ascertain the cost of labour through different method. <b>CO4:</b> Apply the various costing concepts in the ascertainment of overhead cost of various products and services. <b>CO5:</b> Demonstrate skilled expertise in process costing.

<p style="text-align: center;"><b>3.</b></p>	<p style="text-align: center;"><b>COMPUTERSIED ACCOUNTING</b></p>	<p><b>CO1:</b> To introduce the students to basic of accounts and the usage of tally for accounting purpose.</p> <p><b>CO2:</b> To help students to work with well-known accounting software i.e., Tally is an accounting package which is used for learning to maintain accounts.</p> <p><b>CO3:</b> Students will learn to create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and also print financial statements ect. In tally ERP.9 software.</p> <p><b>CO4:</b> Demonstrate an understanding of various predefine inventory vouchers to suits the various business requirements and flexibility to create unlimited stock items, use simple to complex conversion units and generate invoices with the required information and dimensions.</p> <p><b>CO5:</b> Demonstrate an understanding of how to maintain a payroll register. This helps to understand how to maintain management related information, statutory forms and reports in the prescribed formats such as: pay slip, payroll statements, attendance and overtime registers etc.</p> <p><b>CO6:</b> Develop the students use the tally software that helps to prepare accounting, payroll billing sales.</p>
<p style="text-align: center;"><b>4.</b></p>	<p style="text-align: center;"><b>E-COMMERCE</b></p>	<p><b>CO1:</b> To understand the impact of e-commerce on business models and application of e-commerce.</p> <p><b>CO2:</b> To analysis the framework of e-commerce data encryption and cryptography.</p> <p><b>CO3:</b> To gain insights of different process models of e-commerce.</p> <p><b>CO4:</b> To familiarize with Edi standard and software implementation.</p> <p><b>CO5:</b> To acquire knowledge about e-marketing techniques.</p>

## SEMESTER -VI

S.NO	SEMESTER –VI	CO's
1	<p><b>Paper PR:</b></p> <p><b>RESEARCH METHODOLOGY &amp; PROJECT REPORT</b></p>	<p><b>CO1:</b> A comprehensive understand on all aspects of research.</p> <p><b>CO2:</b> A guide on how to conduct research in a systematic way.</p> <p><b>CO3:</b> A guide to solve and analyze data and results.</p> <p><b>CO4:</b> A guide on writing techniques and presentation skills.</p>
2	<p><b>Paper DSE 602 - (a):</b></p> <p><b>THEORY AND PRACTICE OF GST</b></p>	<p><b>CO1:</b> Understand various concepts of goods &amp; service tax.</p> <p><b>CO2:</b> Understand the impact of new regulation on destruction of pesticides and kind of changes needed to be done.</p> <p><b>CO3:</b> Gain an insight on the recording and analyzing the transactions for compliance under GST especially in supply chain &amp; distribution.</p> <p><b>CO4:</b> Getting familiar with the flow of return filing under GST.</p> <p><b>CO5:</b> Knowing “place of supply rules” and applicability of the same under GST.</p>



<p><b>3</b></p>	<p><b>Paper DSE 603 (b):</b></p> <p><b>CYBER SECURITY</b></p>	<p><b>CO1:</b> Distinguish cybercrime from traditional crime.</p> <p><b>CO2:</b> Explain the differences between cyber talking and cyber bullying.</p> <p><b>CO3:</b> Describe the three following forms of malware (a) botnets, (b) worms, (c) viruses.</p> <p><b>CO4:</b> Explain how the internet has contributed to the piracy of intellectual property.</p> <p><b>CO5:</b> Outline the three major reasons why the internet is conducive to the dissemination.</p>
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**B.COM (Generals)**  
**CBCS COURSE STRUCTURE**  
**SEMESTER -I**

S.NO	SEMESTER –I	CO's
1.	<b>Paper DSC 101: FINANCIAL ACCOUNTING –I</b>	<p><b>CO1:</b> To understand basic concepts of accounting.</p> <p><b>CO2:</b> To demonstrate recording and posting of the transaction.</p> <p><b>CO3:</b> To classify and compare various subsidiary books.</p> <p><b>CO4:</b> To eliminate differences in cash book and pass book.</p> <p><b>CO5:</b> students are equipped with skills in financial statement/balance sheet.</p>
2.	<b>FOREIGN TRADE</b>	<p><b>CO1:</b> To understand the concept of international trade.</p> <p><b>CO2:</b> To familiarize the concepts of BOP and BOT</p> <p><b>CO3:</b> To analyze the policies of export and imports.</p> <p><b>CO4:</b> To learn the growth of free, preferential trade areas TPP and monetary unions.</p> <p><b>Co5:</b> To understand the agreements of, economic NBD, AIIB, UNCTAD, WTO agreements.</p>
3	<b>Paper DSC 102: BUSINESS ORGANISATION AND MANAGEMENT</b>	<p><b>CO1:</b> Understand the basic concepts of business organizations.</p> <p><b>CO2:</b> Identifying the factors involved in determining the formation of business units.</p> <p><b>CO3:</b> Applying the ethics of business in the ordinary trade.</p>

		<b>CO4:</b> Gaining the knowledge on the applicability of the recent trends involve in various supporting institutions and secondary market.
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### SEMESTER- II

S.NO	SEMESTER- II	CO's
1.	<b>Paper DSC 201: FINANCIAL ACCOUNTING-II</b>	<p><b>CO1:</b> To understand business and its role in society.</p> <p><b>CO2:</b> To have an understanding of business ethics and CSR.</p> <p><b>CO3:</b> Understanding the financial statements of various types of business units other than corporate.</p> <p><b>CO4:</b> Calculate profits or losses from incomplete records.</p> <p><b>CO6:</b> Prepare accounts of consignment.</p>
2.	<b>BUSINESS LAW</b>	<p><b>CO1:</b> Understand the concept of agreement, contract, essentials and classification of contracts.</p> <p><b>CO2:</b> Identify the essentials of consideration and free consent including rules regarding minor agreement.</p> <p><b>CO3:</b> Examine the circumstances and the object can be considered in intellectual property rights.</p> <p><b>CO4:</b> to understand the consumer protection law.</p> <p><b>CO5:</b> To understand the winding up of company, insolvency and bankruptcy.</p>

## SEMESTER III

1.	<p><b>Paper DSC 301</b></p> <p><b>ADVANCED ACCOUNTING</b></p>	<p><b>CO1:</b> Identify the rules relating to partnership accounts revaluation partners capital balance sheet.</p> <p><b>CO2:</b> Apply accounting treatment to prepare necessary accounts at the time of retirement and death of the partners, dissolution of partnership firms.</p> <p><b>CO3:</b> To understand the issues of shares debentures, bonus shares and under writing.</p> <p><b>CO4:</b> To examining company final accounts and profits prior to incorporation</p> <p><b>CO5:</b> To understand valuation of goodwill and shares.</p>
2.	<p><b>Paper DSC 302</b></p> <p><b>STATISTICS –I</b></p>	<p><b>CO 1:</b> To Understand the importance of statistics, sampling methods, primary and secondary data, classification and tabulation.</p> <p><b>CO 2:</b> To Understand different diagrammatic and graphical presentation and its importance.</p> <p><b>CO 3:</b> To know the importance and method of measure of central tendency.</p> <p><b>CO 4:</b> To Know different types of dispersion, skewness and kurtoss.</p> <p><b>CO 5:</b> To understand and find out the relationships between two variables.</p>

## SEMESTER IV

<b>1.</b>	<b>Paper DSC 401: INCOME TAX</b>	<p><b>CO1:</b> TO understand the scope and direct taxes and application of income tax in India.</p> <p><b>CO2:</b>To acquire knowledge of agriculture income in India.</p> <p><b>CO3:</b> Computation of income from head income from salary.</p> <p><b>CO4:</b> Computation of income from head income from house property.</p> <p><b>CO5:</b> Computation of income from head income from business and profession.</p>
<b>2.</b>	<b>Paper DSC 402: BUSINESS STATISTICS-II</b>	<p><b>CO1:</b> to understand regression analysis of dependent and independent variable.</p> <p><b>CO2:</b> To understand the weighted and unweighted index numbers and test of consistency.</p> <p><b>CO3:</b> To know the components of time series combining the series and different methods of time series.</p> <p><b>CO4:</b> To understand probability theories.</p> <p><b>CO5:</b> To learn different theoretical distribution without find out the expected frequency.</p>
<b>3.</b>	<b>CORPORATE ACCOUNTING</b>	<p><b>CO1:</b> To Prepare company financial statement of affairs and liquidation.</p> <p><b>CO2:</b> To prepare accounting treatment of merger and amalgamation.</p> <p><b>CO3:</b> TO learn the accounting treatment for internal reconstruction and acquisition of business.</p> <p><b>CO4:</b> To learn the legal provision of banking companies.</p> <p><b>CO5:</b> To calculate insurance companies accounts and its claims.</p>

## SEMESTER V

S.NO	NAME OF THE PAPER /SUBJECT	CO's
1	<p><b>Paper GE: (b)</b></p> <p><b>ADVANCED ASPECTS OF INCOME TAX</b></p>	<p><b>CO1:</b> Calculate tax liability using tax rates.</p> <p><b>CO2:</b> Compute basic capital gains/losses.</p> <p><b>CO3:</b> Ascertain the special deduction may affect taxable income.</p> <p><b>CO4:</b> computation of individual tax liability</p> <p><b>CO5:</b> Outline individual tax return filing and estimated tax payment requirements and other types of judgments.</p>
2	<p><b>Paper DSE -501 (a)</b></p> <p><b>COST ACCOUNTING</b></p>	<p><b>CO1:</b> Understand the fundamental aspects of cost accounting and preparation of cost sheet.</p> <p><b>CO2:</b> Comprehend the various methods and techniques of material costing.</p> <p><b>CO3:</b> Analyses and ascertain the cost of labour through different method</p> <p><b>CO4:</b> Apply the various costing concepts in the ascertainment of overhead cost of various products and services.</p> <p><b>CO5:</b> Demonstrate skilled expertise in process costing</p>
4	<p><b>Paper DSE 502 (a)</b></p> <p><b>COMPUTERIZED ACCOUNTING</b></p>	<p><b>CO1:</b> To introduce the students to basic of accounts and the usage of tally for accounting purpose.</p> <p><b>CO2:</b> To help students to work with well-known accounting software i.e. Tally is an accounting package which is used for learning to maintain accounts.</p> <p><b>CO3:</b> Students will learn to create</p>

5	AUDITING:	<p>company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and also print financial statements act. In tally ERP.9 software.</p> <p><b>CO4:</b>Demonstrate an understanding of various predefine inventory vouchers to suits the various business requirements and flexibility to create unlimited stock items, use simple to complex conversion units and generate invoices with the required information and dimensions.</p> <p><b>CO5:</b> Demonstrate an understanding of how to maintain a payroll register. This helps to understand how to maintain management related information, statutory forms and reports in the prescribed formats such as: pay slip, payroll statements, attendance and overtime registers etc.</p> <p><b>CO6:</b> Develop the students use the tally software that helps to prepare accounting, payroll billing sales.</p> <p><b>CO1:</b> Perceiving the basic concepts of auditing and working of an auditor.</p> <p><b>CO2:</b> Understanding the recent trends in auditing and activities.</p> <p><b>CO3:</b> Analyzing the verifications and valuation of assets and liabilities</p> <p><b>CO4:</b> Gaining knowledge on audit of share capital and share transfer.</p>
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## SEMESTER VI

S.NO	NAME OF THE PAPER /SUBJECT	CO'S
1	<b>Paper PR : RESEARCH METHODOLOGY &amp; PROJECT REPORT</b>	<p><b>CO1:</b> A comprehensive understand on all aspects of research.</p> <p><b>CO2:</b> A guide on how to conduct research in a systematic way.</p> <p><b>CO3:</b> A guide to solve and analyze data and results.</p> <p><b>CO4:</b> A guide on writing techniques and presentation skills.</p>
2	<b>Paper DSE 601 (a)  COST CONTROL AND MANAGEMENT ACCOUNTING</b>	<p><b>CO1:</b> To understand basic concepts of cost and management accounting.</p> <p><b>CO2:</b> To apply the techniques of standard costing and variance analysis for analyzing the financial position of business.</p> <p><b>CO3:</b> To make use of marginal costing techniques for analyzing the financial position of business.</p> <p><b>CO4:</b> To analyze the financial statement using comparative statement and common size statements.</p> <p><b>CO5:</b> To discuss and solve the financial ratios for analyzing the financial statements.</p>
3	<b>ACCOUNTING STANDARD</b>	<p><b>CO 1:</b> To Understand the Accounting Theory and evolution of standard.</p> <p><b>CO2:</b> To familiarize standard relating to financial reporting and disclosure.</p> <p><b>CO 3:</b> To analyses the standard providing guidance on financial statements items.</p> <p><b>CO 4:</b> To learn the business acquisitions and consolidations.</p> <p><b>CO 5:</b> To acquire knowledge on financial reporting</p>



4	GST	<p><b>CO1:</b> Understand various concepts of goods &amp; service tax.</p> <p><b>CO2:</b> Understand the impact of new regulation on destruction of pesticides and kind of changes needed to be done.</p> <p><b>CO3:</b> Gain an insight on the recording and analyzing the transactions for compliance under GST especially in supply chain &amp; distribution.</p> <p><b>CO4:</b> Getting familiar with the flow of return filing under GST.</p> <p><b>CO5:</b> Knowing “place of supply rules” and applicability of the same under GST.</p>
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# BACHELOR OF BUSINESS ADMINISTRATION (BBA)

## COURSE OUTCOMES (COs)

### SEMESTER -I

S.NO	NAME OF THE COURSE	COURSE OUTCOME'S
1.	<b>COURSE NO.DSC – 101</b>  <b>PRINCIPAL OF MANAGEMENT</b>	<b>CO1:</b> Analysis the concepts of principal of management and its different level. <b>CO2:</b> understand the process of planning. <b>CO3:</b> learns to organizing process in organizations. <b>CO4:</b> Gain the knowledge in selection controlling processes. <b>CO5:</b> Gain knowledge on TQM and organizational change.
2.	<b>COURSE NO. DSC – 102</b>  <b>BASICS OF MARKETING</b>	<b>CO1:</b> learns the scope of marketing and its core concepts of marketing. <b>CO2:</b> learns the product positioning & market segmentation. <b>CO3:</b> Gain knowledge about NPD and its techniques. <b>CO4:</b> Analysis the concepts of pricing <b>CO5:</b> Understand the significance of product pricing decision
3.	<b>COURSE NO. DSC-103</b>  <b>BUSSINESS ECONOMICS</b>	<b>CO1:</b> acquire knowledge on opportunity cost and time perspective. <b>CO2:</b> understand the demand concept and elasticity of demand. <b>CO3:</b> application of cost and production concepts. <b>CO4:</b> understand the concepts of economics and disanomics of scale. <b>CO5:</b> learn the market structures and pricing positioning.

## II- SEMESTER

S.NO	NAME OF THE COURSE	COURSE OUTCOMES
1.	<p><b>COURSE NO. DSC-201</b></p> <p><b>ORGANIZATIONAL BEHAVIOUR:</b></p>	<p><b>CO1:</b> acquire knowledge on organizational behavior.</p> <p><b>CO2:</b> understand the motivation concepts and leadership skills.</p> <p><b>CO3:</b> acquire knowledge on group cohesiveness and group dynamics.</p> <p><b>CO4:</b> understand factors contributing to organizational changes.</p> <p><b>CO5:</b> Analyze the culture and conflict and effectiveness of organisation culture.</p>
2.	<p><b>COURSE NO. DSC- 202</b></p> <p><b>BUSINESS STATISTICS:</b></p>	<p><b>CO1:</b> Acquire knowledge about statistical tools.</p> <p><b>CO2:</b> Analyze the various techniques to calculate the various statistical measures.</p> <p><b>CO3:</b> Application of various techniques on consumer price understands.</p> <p><b>CO4:</b> Acquire knowledge on sampling of probability condition and marginal probability.</p>
3.	<p><b>COURSE NO. DSC -203</b></p> <p><b>FINANCIAL ACCOUNTING:</b></p>	<p><b>CO1:</b> To understand basic concepts of accounting.</p> <p><b>CO2:</b> To demonstrate recording and posting of the transaction.</p> <p><b>CO3:</b> To classify and compare various subsidiary books.</p> <p><b>CO4:</b> To calculate the various ratios of balance sheet</p> <p><b>CO5:</b> To understand Indian and international accounting standards and reporting.</p>

### III- SEMESTER

1.	<b>COURSE NO.dsc-301</b>  <b>HUMAN RESOURCE MANAGEMENT</b>	<p><b>CO1:</b> To summarize the concepts of human resource management and identify the careers in HRM.</p> <p><b>CO2:</b> To understand the HR planning process and selection procedure if employees in an organization.</p> <p><b>CO3:</b> To analyses the training and development methods to upgrade the skills of employees.</p> <p><b>CO4:</b> To apply the techniques of evaluating and examine the factors affecting wage and salary administration.</p> <p><b>CO5:</b> To examine innovative HRM strategies in contemporary organization.</p>
2.	<b>COURSE NO.DSC-302</b>  <b>INFORMATION TECHNOLOGY FOR BUSINESS</b>	<p><b>CO1:</b> to familiarize the management studies in IT</p> <p><b>CO2:</b> Analyze the expect system like (EIS)</p> <p><b>CO3:</b> Analyze the multimedia techniques.</p> <p><b>CO4:</b> To analyze the internet security &amp; online business security.</p> <p><b>CO5:</b> To familiarize the database application.</p>
3.	<b>COURSE NO.DSC-303</b>  <b>FINANCIAL MANAGEMENT</b>	<p><b>CO1:</b> To acquire knowledge on financial management traditional and modern asset management decisions.</p> <p><b>CO2:</b> TO familiarize the various concepts of time value of money.</p> <p><b>CO3:</b> To enable the long term finance and its determinants.</p> <p><b>CO4:</b> To acquaint knowledge of working capital management.</p> <p><b>CO5:</b> To understand receivables management and levels of safety.</p>

## IV- SEMESTER

S.NO	NAME OF THE COURSE	COURSE OUTCOMES
1.	<p><b>COURSE NO. DSC- -401</b></p> <p><b>BUSSINESS LAW &amp; ETHICS</b></p>	<p><b>CO1:</b> Understand the concept of agreement, contract, essentials and classification of contracts.</p> <p><b>CO2:</b> Identify the essentials of consideration and free consent including rules regarding minor agreement.</p> <p><b>CO3:</b> Examine the circumstances and the object can be considered unlawful and void.</p> <p><b>CO4:</b> to understand the consumer protection law.</p> <p><b>Co5:</b> To understand the morale &amp; ethical values of business.</p>
2.	<p><b>COURSE NO. DSC -402</b></p> <p><b>MARKETING RESEARCH</b></p>	<p><b>CO1:</b> To understand the role of market research in decision making.</p> <p><b>CO2:</b> To analyze the sources of data.</p> <p><b>CO3:</b> To familiarize the criteria for evaluation sources of data.</p> <p><b>CO4:</b> to learn the type of scales.</p> <p><b>CO5:</b> To learn the various sampling techniques.</p>
3.	<p><b>COURSE NO. DSC-403</b></p> <p><b>MANAGEMENT SCIENCE</b></p>	<p><b>CO1:</b> To analyze the factors that are critical for selecting the location to set up a plant with required process technologies</p> <p><b>CO2:</b> To apply the quality control tools and techniques in assessing the quality.</p> <p><b>CO3:</b> To understand work study and effective way of doing the work and explain the plant layout design and its maintenance.</p> <p><b>CO4:</b> To understand materials management and effectively manage the stores.</p> <p><b>CO5:</b> To apply selective control techniques in inventory Management and control.</p>

## COURSES OUTCOMES (COs)

### V- SEMESTER

S.NO	NAME OF THE COURSE	COURSE OUTCOMES
1.	<p><b>COURSE NO. GE-1</b></p> <p><b>MOBILES COMMERCE</b></p>	<p><b>CO1:</b> To analyze the mobile commerce concepts.</p> <p><b>CO2:</b> To familiarize the various device limitations.</p> <p><b>CO3:</b> To analyze the wireless communication technology.</p> <p><b>CO4:</b> To understand the mobile application.</p>
2.	<p><b>COURSE NO.DSC-501(C)</b></p> <p><b>ORGANIZATION DEVELOPMENT (HR)</b></p>	<p><b>CO1:</b> Exploration of field of organization development organization change.</p> <p><b>CO2:</b> To familiarize with teamwork in organization development.</p> <p><b>CO3:</b> To enable the students with various models in organization.</p> <p><b>CO4:</b> to analyze the organization development Interventions.</p> <p><b>CO5:</b> To analyze the quality circle, quality of work life.</p>
3.	<p><b>COURSE NO.DSC-502(C)</b></p> <p><b>PERFORMANCE APPRAISAL AND COUNSELLING (HR)</b></p>	<p><b>CO1:</b> To understand the performance appraisal and benefits.</p> <p><b>CO2:</b> To understand the employee appraisal process and appraisal design.</p> <p><b>CO3:</b> To familiarize the pro's and con's of performance measurement.</p> <p><b>CO4:</b> To analyse the legal issues in performance appraisal.</p> <p><b>CO5:</b> To understand the role of counselling.</p>

<b>4.</b>	<b>COURSE NO.DSC-503 (C)</b>  <b>COMPENSATION MANAGEMENT (HR)</b>	<p><b>CO1:</b> To familiarize the students with the role of compensation with the non-financial terms.</p> <p><b>CO2:</b> To analyze traditional and modern pay system.</p> <p><b>CO3:</b> To familiarize with pay structure and program.</p> <p><b>CO4:</b> To understand the core &amp; thing benefits to employees.</p> <p><b>CO5:</b> To execute contemporary strategic compensation challenges.</p>
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**COURSES OUTCOMES (COs)**  
**VI- SEMESTER**

S.NO	NAME OF THE COURSE	COURSE OUTCOMES
<b>1.</b>	<b>COURSE NO. GE-2</b>  <b>BASIC BUSINESS ANALYICS (GE-II)</b>	<p><b>CO1:</b> To understand the predicative and perspective application of big data.</p> <p><b>CO2:</b> To understand majors of mean median mode and relationship between them.</p> <p><b>CO3:</b> To understand the measures of variability.</p> <p><b>CO4:</b> To analyses trend regression and other methods.</p>
<b>2.</b>	<b>COURSE NO. DSC -601(c)</b>  <b>LEADERSHIP AND CHANGE MANAGEMENT (HR)</b>	<p><b>CO1:</b> To understand the role &amp; skills of leadership in organization</p> <p><b>CO2:</b> TO familiarize with leadership style and theories</p> <p><b>CO3:</b> TO acquire knowledge in proactive and reactive change in organization.</p> <p><b>CO4:</b> TO learn the change through approaches.</p> <p><b>CO5:</b> To diagnose the organization culture and change management.</p>

3.	<p><b>COURSE NO.DSC -602(C)</b></p> <p><b>TALENT AND KNOWLEDGE MANAGEMENT (HR)</b></p>	<p><b>CO1:</b> To understand the talent and management approaches.</p> <p><b>CO2:</b> To familiarize with career planning and development.</p> <p><b>CO3:</b> To acquire knowledge on various faces in technologies.</p> <p><b>CO4:</b> To familiarize the mechanism and infrastructure in organization.</p> <p><b>CO5:</b> To learn impact of knowledge management and people forces on performance.</p>
4.	<p><b>COURSE NO.DSC-603(c)</b></p> <p><b>EMPLOYEE RELATIONS (HR)</b></p>	<p><b>CO1:</b> To examine the approaches of employer and employee relations.</p> <p><b>CO2:</b> To analyses the grievances red renal procedures.</p> <p><b>CO3:</b> To enable employee relations ships.</p> <p><b>CO4:</b> To understand the various concepts of trade unions and industrial relations.</p> <p><b>CO5:</b> To understand wage legislation and administration acts of health &amp; wealth management.</p>
5.	<p><b>COURSE NO.DSC-604</b></p> <p><b>PROJECT REPORT AND VIVA-VOCE</b></p>	<p><b>CO:</b> to acquaint the students with research Work.</p>



**DEPARTMENT OF COMMERCE**  
**PG - M.COM**

S.No.	Name of the Programme	PO's	PSO's
1	M.Com	<p><b>PO1:</b> The students will develop the ability to work in teams with enhanced interpersonal skills.</p> <p><b>PO2:</b> The students will develop the ability to apply knowledge in the fields of managerial economics, Financial Management, Marketing to apply accounting standards in the preparation of financial statement.</p> <p><b>PO3:</b> The students will be ready for employment in functional areas like Accounting, Taxation, Computerized accounting.</p> <p><b>PO4:</b>The students will develop the skills in analysing a data to research work.</p> <p><b>PO5:</b> To provide the skills, and application of advanced cost accounting techniques for cost control and cost reduction.</p>	<p><b>PSO1:</b> After completing this program the students will learn about how to manage the finance in any organization and will acquaint with various techniques of Financial Management.</p> <p><b>PSO2:</b> Students learn about Indian accounting standards and various financial reporting practices. The students will understand the application of advanced corporate accounting practices in the fields of modern business and profession.</p> <p><b>PSO3:</b> To familiarize the students with the principles and practice of Investment Management and acquaint the students with the functioning of the Indian Capital Market.</p> <p><b>PSO4:</b> To provide the skills, and application of advanced cost accounting techniques for cost control and cost reduction.</p> <p><b>PSO5:</b> The Aim of the project is to give an opportunity to students to learn independently and show that they can identify, define, analyse problems in the Business Context.</p>

## COURSE OUTCOMES (COs)

S.No.	Course Name	COs
<b>SEMESTER I</b>		
<b>1.</b>	<b>Managerial Economics</b>	<p><b>CO1:</b> Students understand the concepts of managerial economics &amp; economic theory.</p> <p><b>CO2:</b> To familiarize students with demand theory &amp; analysis.</p> <p><b>CO3:</b> To inculcate knowledge of production analysis and production function.</p> <p><b>CO4:</b> To familiarize students with the concept of cost, types of cost</p> <p><b>CO5:</b> Students gain knowledge of market structures.</p>
<b>2</b>	<b>Principles of Marketing</b>	<p><b>CO1:</b> To introduce the concept of marketing</p> <p><b>CO2:</b> To familiarize students with marketing environment</p> <p><b>CO3:</b> Students acquire knowledge about market segmentation and target marketing.</p> <p><b>CO4:</b> Students understand consumer behaviour and decision-making process.</p> <p><b>CO5:</b> To familiarize students with the concept of marketing planning and strategy</p>
<b>3</b>	<b>Organisation Theory and Behaviour</b>	<p><b>CO1:</b> To introduce the concept of organisation theory and behaviour.</p> <p><b>CO2:</b> To familiarize students with the concept of personality and group behaviour.</p> <p><b>CO3:</b> Students understand motivation, morale and organization culture.</p> <p><b>CO4:</b> To familiarize students with the concept of power, conflict and communication in the organization.</p> <p><b>CO5:</b> To familiarize students with the concept of leadership and organizational change.</p>
<b>4</b>	<b>Financial Management</b>	<p><b>CO1:</b> To introduce the concepts of financial management and time value of money.</p> <p><b>CO2:</b> Students learn the techniques of capital budgeting &amp; risk analysis.</p>

		<p><b>CO3:</b> To familiarize students with concept of working capital management.</p> <p><b>CO4:</b> To inculcate knowledge regarding financial decisions.</p> <p><b>CO5:</b> To familiarize students with the theories of dividend.</p>
5	<b>Indian Accounting Standards</b>	<p><b>CO1:</b> To impart students with the concepts of accounting theory.</p> <p><b>CO2:</b> To familiarize students with the overview of accounting standards.</p> <p><b>CO3:</b> Students understand accounting standards.</p> <p><b>CO4:</b> To familiarize students with reporting standards</p> <p><b>CO5:</b> Students learn the significance of financial reporting.</p>
<b>SEMESTER II</b>		
6	<b>International Business and Business Environment</b>	<p><b>CO1:</b> To familiarize students with the concepts of business environment and policies.</p> <p><b>CO2:</b> Students gain knowledge of liberalization and globalization.</p> <p><b>CO3:</b> To inculcate knowledge about public sector and private sector.</p> <p><b>CO4:</b> To gain information about FDI and mergers and acquisitions.</p> <p><b>CO5:</b> Students understand about WTO agreements and FTP.</p>
7	<b>Marketing Management</b>	<p><b>CO1:</b> Students learn the concepts Product management.</p> <p><b>CO2:</b> To familiarize students with the pricing policies.</p> <p><b>CO3:</b> Enable the students to know product promotion management.</p>

		<p><b>CO4:</b> To familiarize students with channel management</p> <p><b>CO5:</b> Students acquire information about MIS, marketing research and digital marketing</p>
<b>8</b>	<b>Human Resource Management</b>	<p><b>CO1:</b> To inculcate knowledge of HRM and its techniques.</p> <p><b>CO2:</b> To familiarize students with acquisition of human resources.</p> <p><b>CO3:</b> Students develop motivating skills</p> <p><b>CO4:</b> Students are aware of compensation management and employee relations.</p> <p><b>CO5:</b> Enable the students to know the significance of knowledge management and work life balance.</p>
<b>9</b>	<b>Investment management</b>	<p><b>CO1:</b> To make the students aware of investment and financial assets.</p> <p><b>CO2:</b> To familiarize students with the overview of Indian capital market.</p> <p><b>CO3:</b> Enable the students to acquire knowledge on risk and return analysis.</p> <p><b>CO4:</b> To inculcate knowledge on portfolio analysis</p> <p><b>CO5:</b> To familiarize students with portfolio selection</p>
<b>10</b>	<b>Advanced Managerial Accounting</b>	<p><b>CO1:</b> To enable the students to know the concepts of FSA.</p> <p><b>CO2:</b> Students gain overview of HR and responsibility accounting.</p> <p><b>CO3:</b> Students learn about inflation accounting and income measurement.</p> <p><b>CO4:</b> To acquaint students with knowledge of financial measures of performance.</p> <p><b>CO5:</b> To acquire skills regarding contemporary issues in management accounting.</p>
<b>SEMESTER III</b>		
<b>11</b>	<b>Research Methodology and</b>	<b>CO1:</b> The student will be well versed in the concept of QT & research.

	<b>Statistical Analysis</b>	<p><b>CO2:</b> To acquire knowledge regarding collection &amp; analysis of data.</p> <p><b>CO3:</b> To understand the concept of interpretation &amp; report writing.</p> <p><b>CO4:</b>To familiarize the concept of statistical estimation and hypothesis testing.</p> <p><b>CO5:</b> To familiarize the students about large samples and small samples.</p>
<b>12</b>	<b>E-Commerce</b>	<p><b>CO1:</b> The understand the concept of E-Commerce.</p> <p><b>CO2:</b> To acquire knowledge of EDI &amp; supply chain management.</p> <p><b>CO3:</b> To familiarize the concept of EPM &amp; web page designing.</p> <p><b>CO4:</b> To train the students in computerized accounting.</p> <p><b>CO5:</b> To understand the various computerized statements along with GST.</p>
<b>13</b>	<b>Cost Accounting and Control</b>	<p><b>CO1:</b> To familiarize students with the scope of cost accounting.</p> <p><b>CO2:</b> Students acquire knowledge of various cost concepts.</p> <p><b>CO3:</b> To familiarize students with the concepts of marginal &amp; differential costing</p> <p><b>CO4:</b> To inculcate knowledge of budgetary control.</p> <p><b>CO5:</b> Students develop understanding in the concept of standard costing.</p>
<b>14</b>	<b>Advanced Corporate Accounting</b>	<p><b>CO1:</b> To familiarize the concept of holding companies.</p> <p><b>CO2:</b> Students gain knowledge in investment accounting.</p> <p><b>CO3:</b> To inculcate knowledge on lease accounting.</p> <p><b>CO4:</b> Students are trained to prepare consolidated</p>

		statements of foreign branches. <b>CO5:</b> - Students will develop an understanding of Forensic accounting.
<b>15</b>	<b>Financial Statement Analysis</b>	<b>CO1:</b> Students will be well versed in the concepts of financial statements. <b>CO2:</b> To familiarize students with the overview income statement. <b>CO3:</b> To familiarize students with the overview of balance sheet. <b>CO4:</b> To inculcate knowledge in financial statements of special organizations. <b>CO5:</b> Students are trained in various analysis techniques.
<b>SEMESTER IV</b>		
<b>16</b>	<b>Quantitative Techniques for Business Decisions</b>	<b>CO1:</b> To inculcate knowledge in F test and ANOVA. <b>CO2:</b> Students gain knowledge about association of attributes and chi-square test. <b>CO3:</b> To understand about other non-parametric tests like Whitney test, Sign test etc. <b>CO4:</b> Students will be familiar in statistical decision and game theory. <b>CO5:</b> Students will develop an understanding in linear programming.
<b>17</b>	<b>Business and Corporate Taxation</b>	<b>CO1:</b> Students will be well versed in the assessment of partnership firms and AOP. <b>CO2:</b> To familiarize students with the assessment of companies. <b>CO3:</b> To familiarize students with the assessment of companies and other taxes. <b>CO4:</b> To inculcate knowledge in the assessment of co-operative societies and trust. <b>CO5:</b> Students acquire knowledge in the fundamentals of GST and custom act.
<b>18</b>	<b>Strategic Management</b>	<b>CO1:</b> The understand the concept of strategic management. <b>CO2:</b> To acquire knowledge of environmental

		<p>analysis.</p> <p><b>CO3:</b> To familiarize students in crafting strategies for organisation.</p> <p><b>CO4:</b> To train the students in implementation of strategies.</p> <p><b>CO5:</b> To understand evaluation of strategies implemented.</p>
<b>19</b>	<b>Advanced Cost Accounting and Control</b>	<p><b>CO1:</b> The student will be well versed in the concept of ABC.</p> <p><b>CO2:</b> To acquire knowledge regarding costing of service sector.</p> <p><b>CO3:</b> Students understand the concept of uniform and inter firm costing.</p> <p><b>CO4:</b> To inculcate the knowledge of concepts of cost audit, control and reduction.</p> <p><b>CO5:</b> To familiarize students in transfer pricing and cost reporting.</p>
<b>20</b>	<b>Mergers and Acquisition</b>	<p><b>CO1:</b> - Students will be well versed in the concepts of mergers and acquisitions.</p> <p><b>CO2:</b> To familiarize students with the overview of corporate valuation.</p> <p><b>CO3:</b> To familiarize students with the legal aspects and SEBI regulatory.</p> <p><b>CO4:</b> To inculcate knowledge in accounting for mergers and acquisitions.</p> <p><b>CO5:</b> Students acquire knowledge about demerger.</p>
<b>21</b>	<b>Project Work</b>	<p><b>CO1:</b> The Aim of the project is to give an opportunity to students to learn independently and show that they can identify, define, analyse problems in the business context.</p>

## DEPARTMENT OF COMPUTER SCIENCE

### ***Vision :***

To empower the graduates to technologically adopt, innovative, self-motivated and responsible citizens, possessing human values and contribute significantly towards being a center of excellence in providing globally standard education, through a conducive Teaching and learning environment, that responds swiftly to the challenges of the ever changing world.

### ***Mission :***

1. To provide conceptual as well as practical knowledge to adapt changing technology in computer field.
2. To provide the quality education to meet needs of profession and society by arranging seminars, workshops and interactive sessions.
3. Cultivate the students with all-round competencies, for career, higher education and self-employability
4. To prepare for interpersonal skills, leadership qualities, ethical values, lifelong learning skills and higher education.

### **Program Outcomes:**

Osmania University introduced the bucket system from the year 2020 for the first time so as to enable students choose any four optional subjects of their choice from Physical Science subjects like Maths, Physics, Electronics, Chemistry with Computer Science.

Sl. No	Name of Program	Program Outcomes (PO)	Program Specific Outcomes(PSO)
1	<b>BSC (COMPUTER SCIENCE)</b> <b>(MPCS,MECS,MCCS)</b>	<b>PO 1</b> –The purpose of this topic is to introduce to students in the field of programming language. The students will be able to enhance their analyzing and problem solving skills the same for writing programs in C.	<b>PSO1:</b> After completion of the course, student should be able to know concepts in problem solving, To do programming in C-language and to write diversified solutions using C-language.



Sl.No	Semester	Course Name	Course Outcomes(COs)
1	I	<b>Programming in C (Theory and Lab)</b>	<p><b>CO 1</b> - Can be able to write a program, save and open it.</p> <p><b>CO 2</b>- I/O Functions are used to read and display the data in the memory</p> <p><b>CO 3</b> - Reduces the size of the code by duplicate set of statements are replaced by function calls.</p> <p><b>CO 4</b> - Efficient use of memory, Different modes of files can be retrieved effectively</p>
2	II	<b>Programming in C++ (Theory and Lab)</b>	<p><b>CO 1</b> -. Can be able to write a program, save and open it extending C++.</p> <p><b>CO 2</b>-. I/O Member functions are used to read and display the data in the memory, Creations of objects</p> <p><b>CO 3</b> - Less code using reusability and maintenance upgrades and good clean code.</p> <p><b>CO 4</b>- Errors and Abnormalities to design, implement generic classes.</p>
3	III	<b>Data Structure with C++ (Theory and Lab)</b>	<p><b>CO 1</b> - Solve problems computationally through the application of fundamental data structures and algorithms.</p> <p><b>CO 2</b> - Dynamic memory allocation.</p> <p><b>CO 3</b> -. Used as Navigating Technique, Presenting the information with ease, storing the date efficiently without collision.</p> <p><b>CO 4</b> - Ad-hoc finding smallest and largest elements.</p>
4	IV	<b>DBMS (Theory and Lab)</b>	<p><b>CO 1</b>- DBMS has evolved from a specialize computer application to central component of a modern computing environment.</p> <p><b>CO 2</b> - These concepts include aspects of database design, database languages and database-system implementation</p> <p><b>CO 3</b> - The ERM provides high level view issues in database design and encounter in capturing the semantics of realistic applications.</p> <p><b>CO 4</b> - In this it focuses on the fundamentals of a transaction-processing system: Atomicity, consistency, isolation and durability.</p>
5	V	<b>Programming in Java (Theory and Lab)</b>	<p><b>CO 1</b> - Solve problems computationally through the application of fundamental concepts and able to write a java program.</p> <p><b>CO 2</b>- Memory gaining methods, implements packages, Extends Classes.</p> <p><b>CO 3</b> - Exception handling Techniques Files, Input/output, how to Implement Multiple inheritance.</p> <p><b>CO 4</b> - Design and analysis of Patterns and Apps development.</p>

6	VI	<b>Web Technologies (Theory and Lab)</b>	<p><b>CO 1</b> - To design Web Pages.</p> <p><b>CO 2</b> - Covers the creation of multipage websites and layouts using the CSS technologies and JavaScript.</p> <p><b>CO 3</b>- To declare and manipulate multidimensional arrays and to represent Objects.</p> <p><b>CO 4</b>- To retrieve and manipulate XML data programmatically using JavaScript and to create a full scale Ajax enabled application.</p>
7	VII	<b>PHP(Optional) (Theory and Lab)</b>	<p><b>CO 1</b> - Solve problems computationally through the application of fundamental concepts and able to Design Web Pages.</p> <p><b>CO 2</b> - PHP's built-in server to serve static resources and to upload files to the website.</p> <p><b>CO 3</b> - Design and analysis of Patterns and Apps development.</p>

Sl. No.	Name of Program	Program Outcomes (PO)	Program Specific Outcomes
	<b>B.Com (Computer Applications)</b>	<p>PO1: Understand basic concepts and terminology of information technology, basic understanding of personal computers and their operations</p> <p>PO2: Interpret the basic principles of C Programming. Learn syntax of various concepts in C language.</p> <p>PO3: Students to create databases and insert in information about tables. Updates the information to the data base, modify ,add information to the tables.</p> <p>PO4: The purpose of this topic is to introduce to students to web-programming language.</p>	<p>PSO1: To impart a basic level understanding of working of a computer and its usage. Able to work on DOS and MS Office.</p> <p>PSO2: Students will design and develop modular programming. Can illustrate the concepts of various data structures.</p> <p>PSO3: - These concepts include aspects of database design, database languages and database-system implementation</p> <p>PSO4: Students will be able to enhance their analyzing and develop web pages.</p>

Sl. No	Semester	Course Name	Course Outcomes(COs)
1	I	<b>Fundamentals of Information Technology (Theory and Lab)</b>	<p><b>CO 1</b> - Introduction, Evolution, Classification and Application of Computer. Introduction to Input and Output Devices, acquire knowledge on basic understanding of personal computers and their operations Can be able to write a program, save and open it.</p> <p><b>CO 2</b>- Acquire knowledge on to Number System and Primary and Secondary Storage</p> <p><b>CO 3</b> - Types of Software, Differences, Types of Languages, and Introduction to MS Office, Able to work on documents, perform calculations in spread sheet using formulae, can make a presentation using slides and can explore using web browsers..</p> <p><b>CO 4</b> - Demonstrate an understanding of the operating system, different types of networks and execute its associated commands properly</p> <p><b>CO 5</b>- Basic Networking Devices and types of Networks, Communication Process, Data Transmission speed, Communication Types(modes), Data Transmission Medias, Modem and its working, characteristics, LAN Topologies</p>
2	II	<b>Programming in C &amp; C++ (Theory and Lab)</b>	<p><b>CO 1</b> -. Types of Languages, Variables, Data types and Operators used in C Language Read, understand and trace the execution of programs written in C language.</p> <p><b>CO 2</b>-. Acquire Conditional statements and Looping Statements</p> <p><b>CO 3</b> - Functions and its types, explore usage of Arrays, strings, and functions.</p>

			<p><b>CO 4-</b> Introduction to Pointers, structures and Unions – Declarations, Initialization and differences.</p> <p>Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.</p> <p><b>CO5-</b>Introduction to Object Oriented Programming, Basic Structure of C++ program, Storage Classes-Similarities and Differences between C &amp; C++</p>
<b>3</b>	<b>III</b>	<b>RDBMS (Theory and Lab)</b>	<p><b>CO 1</b> – Create and compile, Execute.</p> <p><b>CO 2</b> - Using various DDL, DML, DCL programs.</p> <p><b>CO 3</b> - Lab list programs</p> <p><b>CO 4</b> - Database, Tables linking, like joins</p> <p><b>CO 5</b> - Lab programs.</p>
<b>4</b>	<b>IV</b>	<b>Web Technology (Theory and Lab)</b>	<p><b>CO 1-</b> Can be able to write a program, save and open it, Color-full web-pages.</p> <p><b>CO 2</b> - dynamic changing Reduces the steps</p> <p><b>CO 3</b> – Reduces the size of the code, set of statements are replaced by function calls.</p> <p><b>CO 4</b> - Mouse action, keyboard action, Window Events</p> <p><b>CO 5</b> - Efficient use of memory, Different modes of files can be retrieved effectively.</p>

## DEPARTMENT OF ECONOMICS

### VISION

To develop the the ability to apply the knowledge they acquired by the study of economics to become competitive in the job market.

### MISSION

To provide a firm foundation about the working of the economy and develop the relevant skills for the application of the knowledge of Economics in the professional and personal lives of the students.

<b>S No</b>	<b>Name of the Programme</b>	<b>Programme Outcomes (PO's)</b>	<b>Programme Specific Outcomes(PSO's)</b>
<b>1</b>	<b>B.A. Economics</b>	1. Understand basic concepts in economics and apply economic principles in real world situation.	1. Ability to become economic advisors to government and policy makers.
		2. Foster the economic way of thinking.	2. Acquiring knowledge and confidence to take up career in Indian economic services.
		3. Ability to Understand various social issues and economic problems.	3. Knowledge of contemporary social and economic issues.
		4. Develop the ability to apply the knowledge they acquired through the study of Economics to become competitive in the job market.	4. Ability to apply knowledge of economics with statistical tool.
		5. Acquire skills in critical thinking, problem solving and communication.	5. Students will understand role of service sector in overall of development of economy.

## U.G PROGRAM OUTCOMES

	Course Name	COs
<b>SEM I</b>	<b>Micro Economics</b>	<p>Module-I-consumer Behavior  <b>CO1</b> :Students will learn the Hicks version of consumer behavior and how the consumer try to get maximum level of stratification.</p> <p>Module-II-Production Analysis  <b>CO2</b>: Students will know the varies combination of factors of production and how can the least cost combination of factors be obtained by a firm.</p> <p>Module-III- Cost and Revenue Analysis  <b>CO3</b>: Students will learn the nature of cost refers to the cost output relation during the short and the long periods</p> <p>Module-IV-Market structure – Imperfects  <b>CO4</b>: Students will get the information about the present market structure and how the prices of commodities prices are determine under different markets.</p> <p>Module-V-Analysis of Business firm, profit and pricing strategies.  <b>CO5</b>: Students will learn profit maximation strategies of firm.</p>
<b>SEM II</b>	<b>Macro economics</b>	<p>Module –I- Introduction of Macro economics.  <b>CO1</b>: It provides knowledge regarding the formulation of broad economic policies that maximize the level of national income.</p> <p>Module-II- Theories of Income and employment.  <b>CO2</b>: Students can understand the theory of employment multiplier and acceleration, and importantnce of government in economics activates.</p> <p>Module-III-Investment and the pries of interest rate.  <b>CO3</b>: Students will understand the relationship between Investment and savings and demonstrate investment.</p> <p>Module-IV-Supply of Money and demand for</p>

		<p>money.</p> <p><b>CO4:</b> Students will analyses the factors to determine the supply of money and demand for money.</p>
<b>SEM III</b>	<b>Statistics for economics.</b>	<p>Module-I- Introduction of Statistics. <b>CO1:</b> Students can understand the using statistics as a tool on business and commerce is for decision making.</p> <p>Module-II- Measures of central Tendency and Dispersion. <b>CO2:</b> Students will know the averages proved the gist and give a bird eye view of the huge mass of unwieldy numerical data.</p> <p>Module –III- Correlation and Regression <b>CO3:</b> Students will able analysis the relates to varies methods and techniques used for studying and <b>CO4:</b> measurering the extent of relationship between the two variables. <b>CO5 :</b>After studying the regression students will understand the functional and mathematical relationship between two variables.</p> <p>Module-IV-Index Numbers <b>CO6:</b> It give the knowledge of base period and current period price index numbers. Module-V-Analysis of Time series. <b>CO7:</b> It demonstrates understanding of the concepts of time series and arrangement of values of a variable over successive time periods.</p>
<b>SEM IV</b>	<b>Indian Economy DSE</b>	<p>Module-I-Structure of the Indian Economy. <b>CO1:</b> After studying of Indian Economy Students will understand structural changes and problems of Indian Economy. Module-II-Indian Agriculture <b>CO2:</b> Students will understand the role of agrarian</p>

		<p>relation, land reforms and technological changes in agricultural development.</p> <p>Module –III- Indian Industry and services.  <b>CO3:</b> After studying of this Module students can understand the Industrial development in India.</p> <p>Module-IV- NITI AAYOG  <b>CO4:</b> Students acquire knowledge of the process of transformation from planning commission to Nitti Aayog and understand strategies of Nitti Aayog.</p> <p>Module-V- Service sector, Economic Reforms.  <b>CO5:</b> Students will understand the service sector play the important role in overall development of economy.</p>
<b>SEM V</b>	<b>Public finance.</b>	<p>Module –I-Introduction of Public finance.  <b>CO1:</b> Students will able to understand the scope and importance of public finance.</p> <p>Module-II-Public Expenditure  <b>CO2:</b> Students will understand the various theories of public expenditure and importance of public expenditure in development of economy.</p> <p>Module-IV-Fiscal policy and Federal finance.  <b>CO3:</b> Students will understand the how Fiscal policy influence the economic condition and distribution public revenue among the state and central.</p> <p>Module-V-Budget  <b>CO4:</b> Students will understand the preparation of budget and how they are passed in the houses.</p>
<b>SEM VI</b>	<b>INTERNATINAL ECONOMICS</b>	<p>Module-I-Theories of International trade.  <b>CO1:</b> Students will know classical and modern theories of international trade.</p> <p>Module-II-Trade and growth.  <b>CO2:</b> Students will understand international trade is the engine of Economic growth and development.</p> <p>Module-III-Tariff and Nontariff Barriers to trade.  <b>CO3:</b> Students will able to understand the tariffs and nontariff are the barriers of international trade and protection policies of countries.</p> <p>Module-IV- Balance of Payment</p>



		<p><b>CO4:</b> Student gain the knowledge of BOP and its components closely and able to identify trends that may be beneficial or harmful to the county`s economy.</p> <p>Module –V-Internal factors movements.</p> <p><b>CO5:</b>Students will understand the movements of labor, capital and other factors of production between countries.</p>
<b>SEM V</b>	<b>H.P.P Generic elective.</b>	<p>Module-I- Telangana Economy</p> <p><b>CO1:</b>After studying this module the students will understand the total structure of Telangana Economy.</p> <p>Module-II-Gross State Domestic Product, Poverty and Unemployment.</p> <p><b>CO2:</b> Students will get the knowledge of trend in GSDP of Telangana and the process development of the state.</p>

# DEPARTMENT OF HISTORY

## OUR VISION

Unravelling the Past for the Present

## OUR MISSION

To educate and empower students with the knowledge of history, which is an unending dialogue between the past, present and future, enabling them to understand and comprehend the subject and its importance in their daily lives.

S.no	Name of the Programme	Programme Outcome	Programme Specific Outcome
1.	<b>B.A. HISTORY (REGULAR)</b>	<p><b>PO 1:</b> The current syllabus is well chosen to represent and make the students familiar with the dominant events of different ages, and open out new perspectives to the student.</p> <p><b>PO 2:</b> The students acquire knowledge of the historical events of the Ancient, Medieval, Modern Indian History and European History in new aspects.</p> <p><b>PO 3:</b> The expected outcome is to provide students with a sense of how interconnected our present is with the past.</p>	<p style="text-align: center;"><b>SEMESTER I</b></p> <p style="text-align: center;"><b>History of India (From Earliest Times to 700 CE)</b></p> <p><b>PSO 1:</b> As a history student one will learn from this paper about the status of the society and culture of the Paleolithic, Mesolithic, Neolithic, Harappa and Bronze ages in ancient India.</p> <p><b>PSO 2:</b> They can acquire knowledge about the Vedic and later-Vedic Period of India and gather knowledge about rise of Jainism and Buddhism.</p> <p><b>PSO 3:</b> To be acquainted with the agrarian and commercial economy, social practices and polity of the Gupta and post-Gupta period.</p> <p style="text-align: center;"><b>SEMESTER II</b></p> <p style="text-align: center;"><b>History of India (c.700 – 1526 CE)</b></p> <p><b>PSO 1:</b> To be acquainted with the political structure of the time with reference to the regional polities and Arab and Turkish invasion.</p> <p><b>PSO 2:</b> To know the political structure of the Delhi Sultanate and as well as provincial powers—their expansion, consolidation, theories of kingship.</p> <p><b>PSO 3:</b> To understand the religious beliefs and cultural trend of the period with references to Sufi and Bhakti movements.</p> <p style="text-align: center;"><b>SEMESTER III</b></p> <p style="text-align: center;"><b>History of India (1526 – 1857 CE)</b></p>

			<p><b>PSO 1:</b> Students acquire knowledge towards the Turkey’s invasion and Struggle for Empire in North-Western India and foundation of the Mughal Rule in India.</p> <p><b>PSO 2:</b> They will learn about how the Regional Powers had been raised in different parts of India after downfall of the Mughal Empire of Delhi.</p> <p><b>PSO 3:</b> They learn the Company’s Rule, its establishment in India after the Battle of Plessey and Legitimized the regulating Act, Pitt’s India Act, Charter Acts of 1813, 1833 and 1853, Administrative, Military, Police and Educational Reforms as well.</p> <p><b>PSO 4:</b> The renaissance and socio-religious reforms movement occurred by Rammohan Roy (Brahma Samaj), Young Bengal, Vidyasagar under the rule of the Company in Bengal.</p> <p><b>Skill Enhancement Course (SEC D)</b></p> <p><b>Historical and Cultural Tourism</b></p> <p><b>PSO 1:</b> Students will learn about the environment, culture, tradition, practices of Indian people.</p> <p><b>PSO 2:</b> They will acquire knowledge towards the urbanization and changing socio-cultural scenarios of India.</p> <p><b>PSO 3:</b> Students gather knowledge about the cultural heritage, performing arts, fairs and festivals.</p> <p style="text-align: center;"><b>SEMESTER IV</b></p> <p><b>History of India (1858 – 1964 CE)</b></p> <p><b>PSO 1:</b> To be acquainted with the rise of nationalism in India with reference to moderates, extremists and revolutionaries, Partition of Bengal.</p> <p><b>PSO 2:</b> They can acquire knowledge of rise of Gandhiji’s power in Indian politics and his activities towards the freedom like,</p>
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			<p>Rowlatt Satyagraha, Khilafat and Non-cooperation movement.</p> <p><b>PSO 3:</b> The causes and impact of the partition of India in 1947.</p> <p><b>PSO 4:</b> To understand the character of post-independence Indian state.</p> <p><b>Skill Enhancement Course (SEC II)</b></p> <p><b>Archives and Museums</b></p> <p><b>PSO 1:</b> Students will learn how to maintain documentary, visual and material remains of the past.</p> <p><b>PSO 2:</b> They can understand the importance and significance of the Museum and Archives in building the History of India.</p> <p><b>Generic Elective (GE)</b></p> <p><b>Indian National Movement</b></p> <p><b>PSO 1:</b> Understand the events which lead to the growth of nationalism in India.</p> <p><b>PSO 2:</b> Acquaint themselves with major events of the freedom struggle under the leadership of Mahatma Gandhi.</p> <p><b>PSO 3:</b> Explain the contribution of Revolutionaries, Left Movement, and Indian National Army.</p> <p><b>PSO 4:</b> Know the concept of Communalism and the causes and effects of the partition of India.</p> <p><b>SEMESTER V</b></p> <p><b>History of Modern World (1453 – 1964 CE)</b></p> <p><b>PSO 1:</b> To understand the meaning and nature of the European renaissance—its spread and impact.</p> <p><b>PSO 2:</b> To understand the socio-economic and political dimensions of the crisis in Europe in the 17th century.</p> <p><b>PSO 3:</b> To acquire knowledge about the economic doctrine like mercantilism and factors leading to the industrialization.</p> <p><b>PSO 4:</b> To learn European politics in the 17th and 18th with reference</p>
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			<p>to parliamentary monarchy and patterns of absolutism in Europe.</p> <p style="text-align: center;"><b>SEMESTER VI</b></p> <p><b>History and Culture of Telangana (From Earliest Times to 2014 CE)</b></p> <p><b>PSO 1:</b> Brief Political Survey of Satavahanas, Ikshvakus, Vishnukundins</p> <p><b>PSO 2:</b> The information of Medieval Telangana from Kakatiyas to Qutb Shahis</p> <p><b>PSO 3:</b> Political Developments in Hyderabad State from 1900 to 1942</p> <p><b>PSO 4:</b> December 2009 Declaration</p> <p><b>PSO 5:</b> The Formation of Telangana State, June 2014.</p> <p><b>Optional Paper – Ancient Civilizations</b></p> <p><b>PSO 1:</b> Identify geographic and agricultural factors that shaped the development of early civilizations</p> <p><b>PSO 2:</b> Distinguish, compare, and contrast key cultural and political characteristics of advanced ancient societies.</p> <p><b>PSO 3:</b> Explain major social, economic, political, and cultural historical themes or patterns in the history of Early Civilizations.</p> <p><b>An Introduction to Archaeology</b></p> <p><b>PSO 1:</b> Students will gather knowledge about definition and components of archaeology.</p> <p><b>PSO 2:</b> They will acquire knowledge on historiography and research methodology in history.</p> <p><b>PSO 3:</b> They will learn how to identify archaeological sites and explorations of ancient history.</p> <p><b>Understanding Heritage</b></p> <p><b>PSO 1:</b> To understand the different facets of heritage and their significance.</p> <p><b>PSO 2:</b> To understand about the legal and institutional frameworks for heritage protection</p>
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			<p>in India. <b>PSO 3:</b> Gather knowledge about the heritage through projects and visit to Museum and Archives.</p>
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## Course Outcomes of History U.G.

S.no.	Course Name	Course Outcomes
1.	<b>SEMESTER – I History of India (From Earliest Times to 700 CE)</b>	<p><b>CO 1:</b> Perceive various sources to study of Ancient India.</p> <p><b>CO 2:</b> Know about the development and the achievements of man in the Stone Age.</p> <p><b>CO 3:</b> Understand the glory of Indian history in the age of Harrappa civilization</p> <p><b>CO 4:</b> Comprehend the history of Vedic period.</p> <p>Understand the philosophy of Jainism and Buddhism.</p>
2.	<b>SEMESTER – II History of India (c.700 – 1526 CE)</b>	<p><b>CO 1:</b> Understand early difficulties of Sultans in India</p> <p><b>CO 2:</b> Grasp territorial expansion of Sultanate Period.</p> <p><b>CO 3:</b> Understand the administrative setup of Sultanate from central to local level.</p>
3.	<b>SEMESTER – III History of India (1526 – 1857 CE)</b>	<p><b>CO 1:</b> Understand the political situation of India on the eve of Babar's invasion.</p> <p><b>CO 2:</b> Grasp territorial expansion of Mughal empire</p> <p><b>CO 3:</b> Understand the emergence &amp; consolidation of Sher Shah.</p> <p><b>CO 4:</b> Grasp the Mughal concept at divine theory of kingship &amp; state</p> <p><b>CO 5:</b> Discuss the advent of Europeans and their administration</p> <p><b>CO 6:</b> To gain knowledge with respect to the first uprising war of Independence, its causes, and consequences.</p>
4.	<b>SEMESTER – IV History of India (1858 – 1964 CE)</b>	<p><b>CO 1:</b> Understand about the Socio-religious reform movements in 19th century.</p> <p><b>CO 2:</b> State the role of moderates and extremists in the freedom movement.</p> <p><b>CO 3:</b> Rise of Gandhiji and his contribution to freedom struggle.</p> <p><b>CO 4:</b> Multiple struggles of various other freedom fighters and movements that led to the rise of Nationalism among the among the people and fight for Independent India from the British.</p> <p><b>CO 5:</b> Insights into various regulating acts and crown rules with respect to the administrative reforms in India.</p>
5.	<b>SEMESTER – V History of Modern World (1453 – 1964 CE)</b>	<p><b>CO 1:</b> Understand the Geographical discoveries and the Renaissance movement in Europe.</p> <p><b>CO 2:</b> Assess the causes and effects of Reformation and Counter-Reformation movements.</p> <p><b>CO 3:</b> Realize the cause and results of French Revolution and the achievements of Napoleon Bonaparte.</p> <p><b>CO 4:</b> Visualize the importance of revolt of 1830 and 1848 in France and the efforts of Bismarck for the unification of Germany.</p> <p><b>CO 5:</b> Understand the causes and results for the First world war.</p> <p><b>CO 6:</b> Examine the Nazism and Fascism in German and Italy.</p> <p><b>CO 7:</b> Understand the causes and results of Second World</p>

		War and the establishment of UNO.
6.	<b>SEMESTER – VI History and Culture of Telangana (From Earliest Times to 2014 CE)</b>	<p><b>CO 1:</b> To understand the Geo-Historical aspects of Telangana, Religious Movements, Art and Architecture, Folk and Tribal Art, Handicrafts etc.</p> <p><b>CO 2:</b> To learn and understand the heritage and culture of Telangana with a focus on Religious Movements, Art &amp; Architecture, Folk and Tribal Culture.</p> <p><b>CO 3:</b> Focusing on imparting knowledge about the dynasties of the state majorly the Asaf Jahi dynasty and their contribution in the development of the state and the modernization of Hyderabad under their reign.</p> <p><b>CO 4:</b> The state of Hyderabad during 1900-1942 and the major events that contributed to the National Movement for freedom.</p> <p><b>CO 5:</b> The major events that later led to the formation of the present-day Telangana State.</p>



# Department Of Mathematics

## Vision

Bring out ingenuity among students and provide them a support that fosters intellectual growth.

## Mission

Develop the attitude and ability to apply Mathematical skills for suitable career and groom them for inter disciplinary domain.

S.NO	program	Program Outcomes (PO'S)	Program Specific Outcomes(PSO'S)
1	M.P.C	<b>PO1:</b> Possess a sound understanding of the theoretical foundations of various core subjects.  <b>PO2:</b> Acquire analytical and logical thinking skills necessary to persue higher education.  <b>PO3:</b> Gain employment at entry level positions based on program curriculum.	<b>PSO1:</b> Learn various concepts which help in developing logical and analytical skills used to solve various Real Life Problems.  <b>PSO2:</b> Learn traditional techniques of solving Algebraic ,Differential Integral &Transcendental equations which have applications in many disciplines.
2.	M.P.Cs		
3	M.E.Cs		
4	M.C.Cs		
5	M.P.E		

S.No.	Course Name	Course Outcomes
1.	<b>Differential and Integral Calculus</b>	<b>CO1:</b> learn the concept of two variables  <b>CO2:</b> Gain the knowledge on Partial Derivatives ,Homogeneous functions and Maxima and Minima of the functions. <b>CO3;</b> Learn about Curvature,Evolutes,Envelopes and Partial Differentiation. <b>CO4:</b> Able to find the lengths of a Plane curves,Volumes and surface of Revolution.

2.	<b>Differential Equations</b>	<p><b>CO1:</b> learn the concept of two variables</p> <p><b>CO2:</b> Gain the knowledge on Partial Derivatives ,Homogeneous functions and Maxima and Minima of the functions.</p> <p><b>CO3;</b> Learn about Curvature,Evolutes,Envelopes and Partial Differentiation.</p> <p><b>CO4:</b> Able to find the lengths of a Plane curves,Volumes and surface of Revolution.</p>
3.	<b>Real Analysis</b>	<p><b>CO1:</b> Learn about Sequences,Series,Subsequences and to identify convergence and divergence of the Sequences ,infinite series by tests.</p> <p><b>CO2:</b> Gain knowledge on the concepts of continuity,Differentiation of Real valued functions and Riemann integrability of Bounded functions.</p>
4	<b>Abstract Algebra</b>	<p><b>CO1:</b> Acquire knowledge of fundamental algebraic structures namely Groups ,Rings,Fields and Polynomial Rings.</p>
5.	<b>Linear Algebra</b>	<p><b>CO1:</b> Understand the concepts of Vector spaces,Subspaces,Linear span ,Bases,Dimension.</p> <p><b>CO2:</b> Relate Matrices and Linear Transformation.Able to compute Eigen values and Eigen Vectors.</p> <p><b>CO3:</b> Learn the properties of inner product spaces ,determine orthogonality in inner product spaces and diagonalisation of Linear Transfomations.</p>
6.	<b>Solid Geometry</b>	<p><b>CO1:</b> Gain knowledge on Planes, sphere, Cone, Cylinder and Coinicoids.</p>

## DEPARTMENT OF MICROBIOLOGY

### Vision:-

To make students self-sustain.

### Mission:-

Best life practices.

### PROGRAM OUTCOMES

S.No.	Name of the Programme	POs	PSOs
1	<b>Microbiology</b> ( <b>B.M.C,</b> <b>Mb.Z.C,</b> <b>Mb.Bc.c,</b> <b>Mb.Bc.An,</b> <b>Mb.C.An,</b> <b>Mb.Z. An</b> )	<p><b>PO1.</b>Microbiologist who has knowledge of botany can have the subject knowledge about what are the different microbes which are useful or harmful to the plants and how to increase or decrease their effects on plants without using artificial chemicals.</p> <p><b>PO2.</b>Students can also have the information about how to produce the different useful products from plants using microbes and also know about the different chemical reactions occurring in plants and microbes during their survival as well as processing.</p> <p><b>PO3.</b>Students who pot combination of Zoology, Microbiology and Chemistry can have the knowledge about the different microbes causing different disease, diagnosing them &amp; treating them in both humans &amp; animals.</p> <p><b>PO4.</b>Production of various drugs by using microbes and their effect in different animals in different species and the type of enzymatic reaction it undergoes can be known.</p> <p><b>PO5.</b>Students who have combination with Applied nutrition can study the</p>	<p><b>PSO1.</b>Microbiology overlaps with various courses/areas of biology like molecular biology, genetics, forensic, biotechnology &amp; immunology. Scope of microbiology is huge because of the involvement of microbiology in various fields such as pharmacy, medicine, clinical research, agriculture, dairy industry, water industry, medical transcription, nanotechnology &amp; chemical technology.</p> <p><b>PSO2.</b>Microbiologist role is to ensure developing green technologies, treating and preventing disease or tracking the role of microbes in the climate change.</p> <p><b>PSO3.</b>The graduate students of microbiology can go for their further studies for post graduate level in microbiology.</p> <p><b>PSO4.</b>In P.G level specialization in microbiology like Industrial microbiology, cellular microbiology, soil microbiology, microbial</p>

		micro organisms involved in food fermentation, production of probiotics.	genetics, Agriculture microbiology, Medical microbiology etc are available. <b>PSO5.</b> Further students can go into the research field where new discoveries in the field of science is taking place. <b>Academics:</b> They can go as a professor in microbiology after completion of M.Sc.
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### UG Microbiology Course Outcomes

S.No.	Course Name (Paper)	COs
1	<b>Course: Sem I</b> <b>Paper I: General microbiology</b>	<b>CO1.Introduction to Microbiology</b> Understand the contributions of different eminent scientist in the development of Microbiology & scope of various branches & it's application <b>CO2.Structure of bacteria, viruses &amp; pure culture concept</b> Study the morphology of microorganism's & different instruments techniques used to view different microorganisms. <b>CO3.Microbial nutrition and metabolism</b> Understand and explain various processes of metabolism of carbohydrates. <b>CO4. Sterilization techniques and microbial growth</b> Illustrate & describe the structures and components of different microorganisms.
2	<b>Course: Sem I Lab</b> <b>Paper I: General microbiology</b>	*Understand working and mechanism of different equipments and tools used in microbiology and calibration of microscope. *Prepare various nutrient media for cultivating microbes in laboratory. *Perform the staining technique of various bacteria. *Enumerate the bacterial number in the sample by viable count. *Design an experiment to isolate specific bacteria in pure form from sample.

		*Demonstrate different methods to preserve microbial cultures.
3.	<b>Course: Sem II</b> <b>Paper II : Microbial diversity</b>	<b>CO1. Concept of biodiversity</b> Study about biodiversity and classification of living organisms <b>CO2. Prokaryotic microbial diversity</b> Learn the characteristics of Different microorganisms. <b>CO3. Eukaryotic microbial diversity</b> Understand the basic nutritional requirements of bacteria & compare the characteristics properties of algal, fungal & protozoan forms. <b>CO4. Microbial ecosystems</b> Gain knowledge about different microbial interaction
4.	<b>Course: Sem II lab</b> <b>Paper II : Microbial diversity</b>	*Isolate methanogenic bacteria from manure by anaerobic culturing *Demonstrate the isolation and enumeration of halophiles from saline environment *Isolate & demonstrate microbial interactions from different habitats. *Perform the fungal staining technique Demonstrate the experiment to show that microscopic cell counts are significantly higher than corresponding counts of colony forming units on agar plates. *Demonstrate how the microorganisms are present in different layers of this microcosm by winogradsky's column
5.	<b>Course: Sem III</b> <b>SEC - Haematology</b>	<b>CO1. Introduction to blood</b> To study about blood & its components, complete blood picture, normal and abnormal conditions. <b>CO2. Blood transfusion</b> Get the knowledge about blood transfusion & its preservation, Blood diseases.
6.	<b>Course: Sem III</b> <b>Paper III : Food and environmental microbiology</b>	<b>CO1. Fermented foods</b> Explain about how different microorganism are involved in production of different fermented foods, diary products . <b>CO2. Microbial food spoilage and poisoning</b> Study about different food preservation methods, spoilage & food quality control <b>CO3. Air and water microbiology</b> Compare the role played by different microorganism in relation with environment <b>CO4. Soil microbiology</b>

		Study the Properties of soil & methods of how plants and microbes interact can be known.
7.	<b>Course: Sem III Lab Paper III : Food and environmental microbiology</b>	<p>*Determine the microbiological quality of milk &amp; microbial load present in the give water sample</p> <p>*Isolate the different microorganisms present in air and also the microbes involved in spoilage of fruits/vegetables.</p> <p>*Demonstrate the amount of dissolved oxygen needed by aerobic organisms to breakdown organic material present in a given water sample over a specific time period</p> <p>*Extract and detect the toxins produced by fungal organisms in contaminated food.</p> <p>*Design an experiment to isolate &amp; identify bacteria &amp; yeast which help in maintaining natural balance of organisms in the intestines</p>
8.	<b>Course: Sem IV SEC – Mushroom cultivation</b>	<p><b>CO1.</b> Importance and history of mushrooms which is an energy rich, protein rich food can be known.</p> <p><b>CO2.</b> Get information on how to cultivate the useful mushrooms</p>
9.	<b>Course: Sem IV Paper IV : Medical microbiology and immunology</b>	<p><b>CO1. Medical bacteriology</b> Different bacteria causing different diseases are been studied</p> <p><b>CO2. Medical virology and parasitology</b> Gain information about different viruses &amp; parasites causing different disease can be known.</p> <p><b>CO3. Introduction to immunology</b> Understand and describe human body resistance mechanism against diseases</p> <p><b>CO4. Immunological disorders and Ag-Ab reactions</b> Different reactions occurring in vivo and invitro to diagnose causative agent of particulars disease and also naturally curing of the some disease/infections by our body can be studied, production of vaccines can be studied.</p>
10	<b>Course: Sem IV lab Paper IV : Medical microbiology and immunology</b>	<p>*Enable the students to determine various components of the blood like RBC, WBC, blood grouping &amp; Rh typing</p> <p>*Understand and analyze the antigen and antibody interactions which is used in diagnosis of typhoid &amp; syphilis also determine the homologies between antigens</p> <p>*Demonstrate different biochemical test used in</p>

		<p>identification of bacteria in the given sample</p> <p>*Determine the sensitivity of specific bacteria to given antibiotics</p>
11	<p><b>Course: Sem V</b> <b>GE – Microbiology and human health</b></p>	<p><b>CO1.Introduction</b> Gain the knowledge about different scientist contributions. Characteristics , media used and growth of bacteria can be known.</p> <p><b>CO2.Microorganisms: Good and Bad</b> Know what are the different beneficial microorganisms present in our body</p> <p><b>CO3.Immunity and health</b> Different components, cells, organs and their involvement in developing immunity in the body, production of vaccines, probiotics can be known.</p> <p><b>CO4.Waste management and health hazards</b> Study the different methods of safe disposal of industrial and biomedical waste can be known.</p>
12.	<p><b>Course: Sem V</b> <b>Paper V :Molecular biology and microbial genetics</b></p>	<p><b>CO1.Microbial genetics</b> Knowledge about what is the genetic material and how it is transferred from one generation to another generation – basis of their transfer.</p> <p><b>CO2.Mutations and genetic recombination</b> Analysis the changes occurring in the gene and how the genes are transferred.</p> <p><b>CO3.Gene expression</b> By this unit, knowledge about how the information present on the gene can be expressed is known.</p> <p><b>CO4.Recombinant DNA technology</b> Illustrate the different methods of genetic material transferred.</p>
13	<p><b>Course: Sem V lab</b> <b>Paper V :Molecular biology and microbial genetics</b></p>	<p>*Determine the concentration of various components like DNA, RNA, protein present in the given samples by different techniques.</p> <p>*Demonstrate the method involved in extraction and separation of genetic material i.e DNA and extra chromosomal, self-replicating DNA i.e plasmid</p>

14	<b>Course: Sem VI</b> <b>Paper VI : Industrial microbiology</b>	<b>CO1.Microorganisms and selection</b> An overview on utilization and application of microorganisms in different industrial products can be studied. <b>CO2.Fermentation</b> Known the instruments used to produce different industrial products and information about different raw materials used can be known. <b>CO3. Types of fermentation</b> Different types of fermentations can be studied <b>CO4.Microbial products</b> Study the production of different industrial products — like ethanol, beverages, Antibiotics, Vitamins, etc production.
15	<b>Course: Sem VI lab</b> <b>Paper VI : Industrial microbiology</b>	*Design the experiments to isolate industrial useful microorganisms like amylase producers, organic acid producers by different techniques *Determine the amount of ethanol produced during the process of fermentation process *design an experiment for the production of citric acid by fermentation technique and also estimate the amount of citric acid produce *Estimate the amount of penicillin present in the given sample
16	<b>Course: Sem VII</b> <b>Paper VII : Applied microbiology</b>	<b>CO1.Microbial products for small scale entrepreneurs</b> Gain the knowledge about different strains of microorganisms, culture collection centres and methods to increase the fertility of soil by using microorganisms <b>CO2.Metabolic engineering for microbial products</b> To study the methods of metabolic engineering techniques to produce pigments, flavouring, aroma agent etc. <b>CO3.Microbial diagnostics and health</b> Understand the steps involved in diagnosing different diseases, hospital acquired infection and also how to dispose the hospital waste can be known.
17	<b>Course: Sem VII lab</b> <b>Paper VII : Applied microbiology</b>	*Isolate and also findout the microbial load present in the soil surrounding th root system *perform the staining technique to observe the fungi which adhere to the plant roots *Segregate and grow rhizobium from the root nodules



		<p>of leguminous plants</p> <ul style="list-style-type: none"><li>*Design the experiment for the mass production and also the procedure involved for quality control of rhizobium, mycorrhizae, trichoderma &amp; Pseudomonas.</li><li>*Perform the different bacterial staining technique.</li><li>*Demonstrate how a thick and thin blood smear are prepared for examination of different blood cells.</li></ul>
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## Department of Physics & Electronics

### VISION

Foster the spirit of inquiry and the students to expand their potential and enhance their intellectual growth to the highest possible levels of academic achievement.

### MISSION

Encourage and equip the students with differential abilities to pick and analyse by keenly observing the nature through the lens of physics .Impart education through adoption methods that create interest, stimulate curiosity and inculcate critical and independent thinking essential for pragmatic learning .This is proposed to be accomplished through interactive teaching ,arranging guest lectures and organizing relevant field visits that uncover the minds of students. The scientific favour thus acquired is expected to facilitate the students in choosing to pursue higher education in physics &Electronics as well as in interdisciplinary areas.

### UG Program Outcomes

S.No	Name of the program	Program Outcomes (PO's)	Program Specific Outcomes(PSO's)
1	PHYSICS (MPCS,MPC)	<p><b>PO1.</b> Acquired knowledge with facts related to Mathematics ,Physics, Electronics&amp; Computer device and understand the basic Concepts , fundamental principles scientific theories related to various scientific phenomena and their relevance in day to day life.</p> <p><b>PO2.</b> Develop critical thinking skills to identify analyse and solve problem of their core areas using modern tools.</p>	<p><b>PSO1.</b>Develop proficiency to apply basic concepts in problem solving and provide foundation to understand the advanced topics of physics.</p> <p><b>PSO2.</b>The students acquire sound knowledge in the ocean of Mechanics, Oscillations, Thermal Physics and Electronics For pursuing higher education and Research.</p>

<b>S NO</b>	<b>Course name</b>	<b>Course outcomes</b>
<b>1</b>	<b>Mechanics &amp; Oscillations</b>	<p><b>CO1.</b> Analysing the concepts of physics with the help of Vector analysis.</p> <p><b>CO2.</b> Understand translational and rotational dynamics and their application.</p> <p><b>CO3.</b> Gain knowledge on central forces.</p> <p><b>CO4.</b> Understand SHM and lissajou's figures to find out frequencies of waves</p>
<b>2</b>	<b>Thermal Physics</b>	<p><b>CO1.</b> Gain knowledge in kinetic theory of gases.</p> <p><b>CO2.</b> Evaluate entropy changes in a wide range of processes.</p> <p><b>CO3.</b> Understand the significance of laws of thermal radiation.</p> <p><b>CO4.</b> Analyse in depth about statistical distribution and basic ideas about Boltzmann Fermi-Dirac and Bose –Einstein statistics.</p>
<b>3</b>	<b>Electromagnetic theory</b>	<p><b>CO1.</b> Gain knowledge on basic laws and concepts in Electrostatics and Magnetostatics.</p> <p><b>CO2.</b> Understand the concepts of Electromagnetic Induction and applications.</p> <p><b>CO3.</b> Understand the concepts of Network Transformation &amp; Network Theorem.</p>
<b>4</b>	<b>Waves and Optics</b>	<p><b>CO1.</b> Understand the significance of longitudinal and transverse waves in strings and bars.</p> <p><b>CO2.</b> To solve wave equation and derive boundary condition of longitudinal waves in bars.</p> <p><b>CO3.</b> Understand the concept of interference .</p> <p><b>CO4.</b> Study the concept of diffraction and differentiate between Frenel's and Fraunhoufer's diffraction.</p> <p><b>CO5.</b> Analyse the methods of reflection, refraction ,scattering.</p>
<b>5</b>	<b>Modern Physics</b>	<p><b>CO1.</b> Understand the atomic and molecular spectroscopies.</p> <p><b>CO2.</b> Understand the dual nature of matter.</p> <p><b>CO3.</b> Derive Schrodinger time dependent and independent wave equations .</p> <p><b>CO4.</b> Get an insight to basic unclear structure and model.</p> <p><b>CO5.</b> Gain knowledge on crystallography X-ray diffraction and super conduction.</p>
<b>6</b>	<b>Electronics-VI A</b>	<p><b>CO1.</b> Study the basics of semiconductor &amp; devices also their application</p> <p><b>CO2.</b> Understand the operation of diodes&amp; transistors and utilize their concepts to design Rectifiers ,Amplifiers and oscillations.</p> <p><b>CO3.</b> Gain knowledge on different number systems their conventions from one systems to another and solve the binary arithmetic problems.</p>

		<b>CO4</b> .Get an insight to analyse and design various logic gates& combinational gates.
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## Programme Outcomes of Electronics

S.No	Name of the program	Program outcomes (PO's)	Program Specific Outcomes(PSO's)
2	<b>ELECTRONICS (MECS,MPE)</b>	<p><b>PO1:</b> Acquire required skills in handling scientific instruments and skills of observation and drawing logical inference from experiments to meet the industrial needs</p> <p><b>PO2:</b> Apply suitable techniques &amp; skills while doing the experiments ,the ability to think independently and creatively and function effectively as an individual and as a member or leader in diverse team and multidisciplinary environments.</p>	<p><b>PSO1.</b>Students attain comprehensive knowledge in Electronics that helps to construct analyse , and verify ;digital &amp; discrete component circuits , using appropriate tools &amp; Techniques</p> <p><b>PSO2.</b>Design develop Electronic system for practical applications.</p>
S.NO	Name of the course	Course outcomes	
1	<b>Circuit Analysis</b>	<p><b>CO1.</b> Analyse the electric circuit using kirchoff's laws and Network theorem.</p> <p><b>CO2.</b> Evaluate transient response and study state responses of RC &amp; RL circuit.</p> <p><b>CO3.</b> Analyse the frequency response of RC&amp;RL circuits.</p> <p><b>CO4.</b> Understand working and application of CRO.</p>	
2	<b>Electronic Devices</b>	<p><b>CO1.</b> Study and analyse the behaviour of semiconductor materials.</p> <p><b>CO2.</b> Understand the behaviour of BJT in CC,CB &amp; CE configuration.</p> <p><b>CO3.</b> Use Diodes, BJT , FET , UJT , SCR in simple application.</p> <p><b>CO4.</b> Understand the behaviour and characteristics of Photoelectric devices.</p>	
3	<b>Analog Circuits</b>	<p><b>CO1.</b> Construct and Design a better and regulated Power Supply.</p> <p><b>CO2.</b> Understand the working of Amplifiers responses.</p> <p><b>CO3.</b> Observe the effect of feedback frequency responses.</p> <p><b>CO4.</b> Explain and compare the working of Multivibration.</p>	
	<b>Linear integrated circuits and basic of</b>	<p><b>CO1.</b> On communication of the course students are able to :</p> <p><b>CO2.</b> To learn basic function of operational Amplifier,</p>	

4	<b>communication.</b>	<p>Ideal and practical characteristics and their mathematical application.</p> <p><b>CO3.</b> To understand basic construction of active filters, comparators and their application in Electronics.</p> <p><b>CO4.</b> To understand amplitude, phase , frequency modulation.</p>
5	<b>Digital electronics</b>	<p><b>CO1.</b> Study various number systems , conversions one from other and carryout arithmetic operation.</p> <p><b>CO2.</b> Understand combinational logic circuits.</p> <p><b>CO3.</b> Analyse and design sequential circuits</p> <p><b>CO4.</b> Understand the architecture of microprocessor and realize the programming and interfacing with 8085 microprocessor.</p>
6	<b>8051 Microcontroller and Applications-VI B</b>	<p><b>CO1.</b> To understand the basic architecture of 8- bit microcontrollers.</p> <p><b>CO2.</b> Able to write programs on8051 microcontroller based systems.</p> <p><b>CO3.</b> Identify the addressing modes of an instruction .</p> <p><b>CO4.</b> Develop programming skills in assembly language.</p> <p><b>CO5.</b> Application of 8051microcontroller.</p>

## M.Sc PHYSICS

### PROGRAMME OUTCOMES

S.No	Name of the program	Program outcomes (PO's)	Program Specific Outcomes(PSO's)
1	<b>MSc PHYSICS</b>	<p><b>PO1</b> Apply the knowledge of physics to solve complex scientific problems. (Scientific Knowledge)</p> <p><b>PO2:</b> Identify, formulate and analyse complex scientific problem for higher studies. (problem analysis)</p> <p><b>PO3:</b> select, design and apply appropriate experimental techniques with computational tools to solve problems of physics. (Design / development of solutions)</p> <p><b>PO4.</b> apply and demonstrate the basic physics in environmental context for sustainable development. (Environment and sustainability)</p> <p><b>PO5.</b> understand ethical principles and responsibilities of a physics graduate to serve the society. (Ethics)</p> <p><b>PO6.</b> communicate effectively through report, writing, documentation and effective presentation (communication)</p> <p><b>PO7.</b> enhance and adopt new skills for future employability in teaching and research through seminar, internship. (Future Employability).</p> <p><b>PO8.</b> successfully compete at national and international level competitive examinations. (Competency)</p>	<p><b>PSO1:</b> have fundamental and advanced level knowledge in field of nuclear and particle physics, particularly plasma and fusion reactor, and radiation physics together with their applications and mathematical physics ,spectroscopy and its applications</p> <p><b>PSO2.</b> have fundamental and advanced level knowledge in field of classical, quantum and statistical mechanics</p> <p><b>PSO3.</b> have fundamental and advanced level knowledge in field of electronics , communication, control systems, microprocessor and microcontrollers Embedded systems , Electronics and Instrumentation together with their applications in interdisciplinary areas of science.</p> <p><b>PSO4.</b> have fundamental and advanced level knowledge in field of material science particularly solid state Physics</p>

## SEMESTER I

S.NO	Name of the course	Course outcomes
I	<b>MATHEMATICAL PHYSICS</b>	<p><b>CO1</b> .Gain Knowledge in Legendere's and Bessel's Differential Equation</p> <p><b>CO2.</b> Gain Knowledge in Hermite and Lauguerree Diddereential equations</p> <p><b>CO3.</b> Understands the difference between laplace and fourier Transform</p> <p><b>CO4.</b> Understands the difference between Tensors and Matrices</p>
II	<b>CLASSICAL MECHANICS</b>	<p><b>CO1.</b> Gain knowledge in Newtonian Mechanics ,Lorentz Transformation .</p> <p><b>CO2.</b> Understands The Concepts Pf Lagrangian Mechanics</p> <p><b>CO3.</b> Gain knowledge about Hamiltonian Mechanics</p> <p><b>CO4.</b> Understands basic mechanical concepts related to discrete and continuous mechanical systems.</p>
III	<b>QUANTUM MECHANICS-I</b>	<p><b>CO1.</b>Student identifies mathematical space that contains all possible states of a physical system using Dirac's notation.</p> <p><b>CO2.</b>Students computes the energy eigen values and evolution of the quantum simple harmonic oscillator and evolution of a particle in a box.</p> <p><b>CO3.</b>Student finds the transmission and reflection coefficients for one dimensional barriers.</p> <p><b>CO4.</b>Student finds the commutation relations for linear angular momentum.</p>
IV	<b>SOLID STATE PHYSICS</b>	<p><b>CO1.</b>Gain basic knowledge of crystal systems and spatial symmetries, concepts like structure factor, and able to account for how crystalline materials are studied using diffraction.</p> <p><b>CO2.</b> Understand vibrational properties of solid state system, know what phonons are and be able to perform estimates of their dispersive and thermal properties.</p> <p><b>CO3.</b>Gain knowledge About Bloch's theorem and about energy bands, fundamental principles of semiconductors and to estimate the charge carrier mobility and density</p> <p><b>CO4.</b>gain knowledge about the experiment techniques of crystal growth</p>
V	<b>C-PROGRAMMING</b>	<p><b>CO1:</b> gain knowledge about basics of C-Programing</p> <p><b>CO2:</b> will implement numerical methods in C-Programming</p>
VI	<b>Optics</b>	<p><b>CO1.</b> To understand diffraction and interference patterns of monochromatic light</p> <p><b>CO2.</b> Students try to understand double refraction of light ,and obtain minimum deviation for poly chromatic light passing through the prism.</p>

## SEMESTER II

S.NO	Name of the course	Course outcomes
<b>I</b>	<b>ELECTROMAGNETIC THEORY</b>	<p><b>CO1:</b>To familiarize the students with different concepts of electrostatic, magnetostatic and time varying electromagnetic systems.To analyze Maxwell's equations in different forms and apply them to solve various electromagnetic field problems.</p> <p><b>CO2:</b>Students are exposed to the ideas of plane em waves, their propagation in different media, power flow, polarization.</p> <p><b>CO3:</b>Students gain knowledge about boundary conditions, plane em wave reflection and transmission at boundaries, Fresnel's equations, metallic reflection and dispersion.</p> <p><b>CO4:</b>Students will be able to understand wave equations for potentials, retarded potentials, oscillating source and able to explain electric and magnetic dipole radiation, linear antenna.</p>
<b>II</b>	<b>STATISTICAL MECHANICS</b>	<p><b>CO1.</b>Students will have basic idea of phase space, micro state, macro state and provides the idea of probability to the particles.</p> <p><b>CO2.</b> Students have the insight of postulates of statistical physics and learn which particles follow which statistics and why.</p> <p><b>CO3.</b>Students apply the statistical distribution in real life problem and understand their problem.</p> <p>Many real system of particles will be dealt throughout the course to relate the theoretical knowledge to practical one.</p> <p><b>CO4.</b>Students will be able to compute the fluctuation in the number of particles in the system at constant V and T .</p>
<b>III</b>	<b>QUANTUM MECHANICS -II</b>	<p><b>CO1.</b>Student is able to explain the Dirac equation and its free-particle solutions.</p> <p><b>CO2.</b>Students will be able to know how to express observables in field theory in terms of annihilation and creation operators.</p> <p><b>CO3.</b>Study the Stark effect, characters of hydrogen atom.</p> <p><b>CO4.</b>Study the wkB approximation method.</p>



<b>IV</b>	<b>ELECTRONICS</b>	<p><b>CO1.</b>Gain Knowledge about Ana log Circuits and there Applications,</p> <p><b>CO2.</b>To understand basic function of OP-Amp ,and its applications and learnt about 555 IC</p> <p><b>CO3.</b>gain knowledge about Digital systems and its applications</p> <p><b>CO4.</b>To understand basic architecture of 8-bit microprocessor, able to write programs on 8085 microprocessor. Develop skills in assembly language programme</p>
<b>V</b>	<b>ELECTRONICS LAB</b>	<p><b>CO1:</b>Gain knowledge to design digital circuits</p> <p><b>CO2:</b>able to implement analog circuits</p>
<b>VI</b>	<b>HEAT &amp; ACOSTICS LAB</b>	<p><b>CO:</b> Students finds out the young,s ,rigidity modulus and understand the viscosity of water ,estimates the errors in simple pendulum oscillations. Students comes to understand thermistor behaviour , and also find out the Stephen’s constant.</p>

### SEMESTER III

<b>S.No</b>	<b>Name of the course</b>	<b>Course Outcome</b>
<b>I</b>	<b>MODERN OPTICS</b>	<p><b>CO1.</b>able to understand principles involved in the interactions between light and matter, the requirements for a system to act as a laser.</p> <p><b>CO2.</b>To differentiate the various types of lasers and their means of excitation, assess which laser would best meet the need for a particular industrial or research task</p> <p><b>CO3.</b>..understands the fundamentals ,techniques and applications of holography and Fourier optics.</p> <p><b>CO4’</b>To expose the students to fundamental concepts of non linear optics, second harmonic generation ,self focusing of light, phase matching considerations</p>
<b>II</b>	<b>ADVANCED SOLID STATE PHYSICS</b>	<p><b>CO1.</b> Gain Knowledge for what Fermi surface is and how it can be measured, effect of electric and magnetic fields on it.</p> <p><b>CO2.</b>understand about dielectrics and to measure dielectric constant of a solid and their behaviour, ferroelectric crystals classification ,polarization.</p> <p><b>CO3.</b> understand magnetic properties of solids along with the theoretical methods of quantum mechanics, statistical mechanics.</p> <p><b>CO4.</b> gain knowledge about super conductivity , and its applications.</p>

<b>III</b>	<b>ELECTRONIC INSTRUMENTATION</b>	<p><b>CO1.</b>How the errors are occurring in measuring system and how to test the system performance by using different input signals.</p> <p><b>CO2.</b>About concept of amplifiers &amp; filters and their importance in instrument design.</p> <p><b>CO3.</b>About various signal generators and spectrum analysers. And also the types of distortions in the instrument</p> <p><b>CO4.</b> the concept of different types of measuring and recording systems and also about displays.</p>
<b>IV</b>	<b>MICROPROCESSORS, DSPs &amp; INTERFACING</b>	<p><b>CO1.</b>gain knowledge about architecture of 8086 microprocessor and how to interfacing various ICs to the microprocessor in system design and also how to write assembly language programs and run on 8086 based system.</p> <p><b>CO2.</b>understands how to interface various ICs to 8086 while designing 8086 microprocessor based systems. And also difference between 16-bit, 32-bit and also multi core and advanced processors and their architectures.</p> <p><b>CO3.</b>gain knowledge about special purpose DSP processor and its usage in day to day life.</p> <p><b>CO4</b> undersatands various addressing modes and Instructions of DSP processor.</p>
<b>V</b>	<b>GENERAL PHYSICS LAB-I</b>	<p><b>CO1.</b> Understands and gain skills to study Hall effect ,Temperature variation of Resistivity of semiconductor ,determining the magnetic susceptibility of liquid .</p> <p><b>CO2.</b> Understands ultrasonic wave velocity in different liquids, thermo emf solar cell characteristics.</p>
<b>VI</b>	<b>SPECIAL LAB -I</b>	<p><b>CO1.</b>Gain skills to run programs using 8086 microprocessor and constructing digital experiments using ICs.</p> <p><b>CO2.</b> Gain knowledge about interfacing</p>

## SEMESTER -IV

S.No	Name of the Course	Course Outcome
<b>I</b>	<b>NUCLEAR PHYSICS</b>	<p><b>CO1.</b>understands about nuclear forces and nuclear models using quantum mechanical theories.</p> <p><b>CO2.</b>will be exposed to understand the theories of three types of radioactive decay (<math>\alpha</math>, <math>\beta</math>, <math>\nu</math>), nature of <math>\alpha</math>, <math>\beta</math> spectra.</p> <p><b>CO3.</b>To compare the relative penetrating power of three types of nuclear radiation,</p> <p><b>CO4.</b>Helps students to learn about nuclear reactions, characteristics, fusion and fission reactions and information about nuclear structure.</p>
<b>II</b>	<b>SPECTROSCOPY</b>	<p><b>CO1.</b>understands the atomic spectra of one and two valence electrons of atoms</p> <p><b>CO2.</b>undersatans the Molecular Spectra and its salient features and explains Rotational Vibrational spectra of atoms.</p> <p><b>CO3.</b>gain knowledge about Raman and IR spectra and how Fourier principle used in spectrometer.</p> <p><b>CO4.</b>gain information about Electron spin and nuclear magnetic resonance spectroscopy and there applications</p>
<b>III</b>	<b>INTRUMENTATION MEASUREMENT, CONTROL,</b>	<p><b>CO1.</b>About concept of transducers and their usage in measuring physical parameters.</p> <p><b>CO2.</b>About pressure measuring transducers and flow measurement meters.</p> <p><b>CO3.</b>the importance of open &amp; closed loop control systems in designing various process control systems and also about the concept of servomechanism.</p> <p><b>CO4.</b>About various data transmission</p>
<b>IV</b>	<b>Embedded systems and Its applications</b>	<p><b>CO1.</b>Various types of architectures, CISC and RISC processors, architecture of 8051 microcontroller and its importance in embedded system design.</p> <p><b>CO2.</b> Programming &amp; instructions of 8051, the importance of interrupts and also serial communication.</p> <p><b>CO3.</b>PIC microcontrollers, architecture and pin diagram of different types of PIC controllers.</p> <p><b>CO4.</b>How to interface various ICs to microcontrollers in designing embedded systems and also how to control various motors by the microcontrollers.</p>
<b>V</b>	<b>GENERAL PHYSICS LAB-II</b>	<p><b>CO1.</b>Understands different nuclear radiations, detection and nuclear properties.</p>
<b>VI</b>	<b>SPECIAL LAB-11</b>	<p><b>CO1.</b>Gain skills to run programs using 8051 microcontrollers and understands various types of filters</p> <p><b>CO2.</b> Gain knowledge about interfacing.</p>

## DEPARTMENT OF POLITICAL SCIENCE

### *VISION*

Training India's future Political Leaders.

### *MISSION*

Political Science is Fundamental to helping student understand and Act more effectively in the world.

### U.G PROGRAM OUTCOMES

<b>Name of the Programme</b>	<b>Programme Outcomes (PO's)</b>	<b>Programme Specific Outcomes(PSO's)</b>
<b>B. A. POLITICAL SCIENCE</b>	1. BA Political Science offers a strong platform to venture into diverse field like academics, research, teaching, administrative jobs, journalism, work in national and international nonprofit organization (NGOs) and election campaign manager.	Ability to become teachers, professors and Political leaders.
	2. Educate students about normative political value, concepts and debates centre don these along with political processes, theories, governments in India and other countries and international relations between those countries.	Acquire Knowledge of World Politics.
	3. Educates the students about the safeguards of their Rights.	Students can protect their Rights.
	4. Aim of the course is to expose the students to the diverse Political philosophies from the ancient to modern times, and how they have	Acquire knowledge about Constitution.

	envisioned of and engaged with the issues of rights, liberty, equality, justice, citizenship, constitution and constitutionalism, etc.	
	5. The course has been designed in such a way that every student is equipped with certain practical skills which can be used for seeking gainful employment if one exists after completing the graduation.	Students can get employment in various government sectors.

### U.G COURSE OUTCOMES

	Course Name	COs
<b>SEM I</b>	<b>Political Theory</b>	Module I: Introduced the student about the subject of Political Science and seek interest in Politics
		Module II: Gives an insight of Political Science and its relation with other Social Sciences
		Module III: It gives students an in-depth study of quality and different approaches like liberalism and Marxism, etc.
		Module IV: Create interest among the students about the different ideologies.
		Module V: Gives knowledge and an approach to the study of an Origin and Theories of the state.
<b>SEM II</b>	<b>Concepts Theories and Institutions</b>	Module VI: Introduces to the students the concept of the State, Nation and Civil Society.
		Module VII: Explains about Sovereignty, Monism and Pluralism and the role played by individuals in it.
		Module VIII: Gives an idea to the students about different

		concepts like Law, Powers, Liberty, Equality and Human Rights.
		Module IX: Gives detailed explanation about Forms of Government and how they will function.
		Module X: It seeks to the student and interest in different organs of government.
<b>SEM III</b>	<b>Indian Government and Politics</b>	Module I: To faster interest to the students about basic roots of Nationalistic Movement and making of Constitution.
		Module II: Gives in-depth Knowledge of Fundamental Rights and Directive Principles of Sate Policy.
		Module III: Knowledge about Statutory Commissions for protection of different rights and their application.
		Module IV: Initiation of Social and Political Movements in India.
<b>SEM IV</b>	<b>Indian Government and Politics</b>	Module V: To give knowledge to the students about the Union Government and its functioning.
		Module VI: Decentralization of Power through State Government and its functioning at Sate level.
		Module VII: Gives the students the directions of both Union and State relations.
		Module VIII: Gives the students the emphasis of Local Self-Governments at grass root level and their functioning.
		Module IX: To faster the students interest about the nature of Indian Political Parties both National and Regional parties.
		Module X: To create awareness among the students

		about Electoral Politics and their functioning and contribution.
<b>SEM V</b>	<b>Political Thought</b>	Module I: To introduce the students Western and Indian Political Thought and comparison.
		Module II: Gives a detailed explanation about Ancient and Medieval Political Thought.
		Module III: To know the roots of early Mordent Western Political Thought.
		Module IV: To create an interest and seek information about Social Contractualist.
		Module V: To foster to the students the importance of relevance of utilitarianism.
<b>SEM VI</b>	<b>Political Thought</b>	Module VI: To help students in knowing the characteristics functions of Western Ideologies.
		Module VII & VIII: The Relevance and importance of Marxist philosophy in Political thought and its application arenas.
		Module IX: To know the roots of Indian Political Thought, ideas and give its relevance to the students in the present Political System.
		Module X: To further study the consequences of Indian Nationalistic Political Thought and its present day role.
<b>SEM V</b>	<b>International Relations</b>	Module I: Introduced the students about the subject of International Relations and significance.
		Module II: It gives students an in-depth study of First and Second World War causes and consequences.
		Module III: It gives students in-depth knowledge about

		Emergence of Third World.
		Module IV: It creates interest among the students about different Powers, Peace and Security.
		Module V: It creates interest among the student about International Organizations and Global Development.
<b>SEM VI:</b>	<b>International Relations</b>	Module VI: It gives students an in-depth study of International Political Economy.
		Module VII: It gives students in-depth knowledge about International Security and Nuclear Politics.
		Module VIII: Gives knowledge about Environmental Problems and how they can protect their Rights.
		Module IX& X: It seeks to the student an interest about Foreign Policies with different Countries.
<b>SEM V</b>	<b>Contemporary Political Economy (GE) Paper I</b>	Module I: Approaches to Political Economy. To familiarize the students with the different theoretical approaches.
		Module II: Capitalist transformation To give a brief over view of the history of the evolution of the Modern Capitalist World.
	<b>Paper II: Human Rights Gender and Environment Pare IV</b>	Module I: Understanding social inequality In this student understands the issues concerning the Rights of citizens.
		Module II: Human Rights. In this students can get in-depth knowledge about Human Rights.
<b>SEM VI</b>	<b>Laws Duties and Rights of Citizens (SEC) Paper V</b>	Module I: Rule of Law and the Criminal. Students can give the knowledge about the Rule of Law.
		Module II:



		<p>Laws relating to the Criminal Justice Administration.</p> <p>The students will get knowledge about how to file a complaint and how to take a bail.</p>
<b>SEM VI</b>	<b>Legislative Practices and Procedures (SEC) Paper VI</b>	<p>Module I:</p> <p>Powers and Functions of the people's representative different tiers of Governance. In this students can know about Rural and Urban Self-Government and they will know cooperation to Panchayat/Wards.</p>
		<p>Module II:</p> <p>Supporting the Legislative Process</p> <p>Here Student will get to know how to apply a bail in the Legislature.</p>

## B. A - PUBLIC ADMINISTRATION

- I. **Name of the Department** : Public Administration
- II. **Vision Statement to the Department** : Public administration can be broadly described as the study and implementation of government policy. Public administration is linked to pursuing the public good through the creation of civil society and social justice. Though public administration has historically been referred to as government management, it increasingly encompasses non-governmental organizations that are not acting out of self-interest. Public administration, as a field of systematic study.
- III. **Mission Statement of the Department** : Development – Improvement in the quality of life of people – poses a major challenge to policy makers, and administrators in the developing countries. In all these countries the administrative system has an important role in bringing the fruits of development to all the people. The study of Indian Administrative system helps us to appreciate its role in nation building. With this view the course in Indian Administration is conceived.
  - a. Programme 1: A Department can offer different programmes, like History, Economics, Political Science & Public Administration
  - b. **Programme Outcomes (POs)**: Programme Outcomes examine what a program or process is to do, achieve, or accomplish for its own improvement and/or in support of institutional goals. That is a program outcome describes what the program will do.
  - c. **Programme Specific Outcomes (PSOs)**: Programme Specific Outcomes are statements that define outcomes of a program which make students realize the fact that the knowledge and techniques learnt in this programme has direct implication for the betterment of society and its sustainability. These are what the students should be able to do at the time of graduation.
  - d. **Course Outcomes (COs)**: Course Outcomes are the statements of what a student should know, understand and/or be able to demonstrate after completion of a course.

S.No	Name of the programme	Pos	PSOs
1.	<b>Introduction to Public Administration</b>	Meaning and Importance of Public Administration State and Evolution of Public Administration . Law b. Political Science c. Economics d. Psychology a. Oriental Approach -Kautilya	Students after completing this program will get the knowledge on public administration evaluation and relation with social sciences

		<ul style="list-style-type: none"> <li>b. Classical Approach: Henri Fayol, Luther Gulick and Lyndall Urwick</li> <li>c. Scientific Management Approach: F.W.Taylor</li> <li>d. Bureaucratic Approach: Max Weber and Karl Marx</li> <li>a. Human Relations Approach –Elton Mayo</li> <li>b. Behavioural Approach: Herbert A. Simon</li> <li>c. Socio- Psychological Approach: Abraham Maslow; Mc Gregor, Rensis Likert</li> <li>a. Administrative Ecology: F.W.Riggs</li> <li>b. Social Justice Approach – B.R.Ambedkar</li> <li>c. Jyothirao Pule</li> </ul>	and also administrative theories applicable in administrative knowledge and efficiency.
<b>2.</b>	<b>Comparative and Development Administration</b>	<ul style="list-style-type: none"> <li>a. Comparative Administration</li> <li>b. Development Administration</li> <li>c. Changing Dynamics of Development Administration</li> <li>a. New Public Administration – Minnowbrook-I</li> <li>b. New Public Administration – Minnowbrook-II</li> <li>c. New Public Administration – Minnowbrook-III</li> <li>a. Public Choice Approach</li> <li>b. New Public Management</li> <li>a. Public Policy and Governance</li> <li>b. Role of Public Services in the Emergence and Development of New State of Telangana</li> <li>a. Globalization and Public Administration</li> <li>b. Present Status of Public Administration in the context of Globalization</li> </ul>	After completing this scores student may know the knowledge on historical background of public administration and also changes in public administration in different countries of the world and public administration from the public perspective.

<b>S.No</b>	<b>Name of the programme</b>	<b>Pos</b>	<b>PSOs</b>
<b>1.</b>	<b>Indian Administration</b>	<ul style="list-style-type: none"> <li>a. Evolution of Indian Administration</li> <li>b. Indian Administration after Independence: Continuity and Change</li> <li>c. Indian Constitutional Moorings and Administration.</li> <li>a. Political Executive at Central Level <ul style="list-style-type: none"> <li>i. Presidentii. Prime Ministeriii. Council of Ministers</li> </ul> </li> <li>b. Central Secretariat and other Offices</li> <li>a. Centre-State Administrative</li> </ul>	After completing this course student may know the knowledge on background of the Indian Administration before and after

		<p>Relations</p> <p>b. Central Personnel Agencies-All India Services</p> <p>a. Union Public Service Commission</p> <p>b. Election Commission and Comptroller and Auditor General of India (C&amp;AG)</p> <p>c. NITI Aayog</p> <p>a. Forms of Public Enterprises - Department, Corporation, Company</p> <p>b. Performance and Disinvestment</p>	<p>independence and central and state government services and central constitutional bodies.</p>
2.	<b>State Administration Structure and process</b>	<p>a. Administrative History of Telangana</p> <p>b. Political Executive at State Level, Governor &amp; Chief Minister</p> <p>a. State Secretariat &amp; Directorates</p> <p>b. Local Governance &amp; District Administration in Telangana</p> <p>a. Administrative Reforms: Need and Importance</p> <p>b. 2<sup>nd</sup> Administrative Reforms Commission – Features and Recommendations</p> <p>a. e-Government</p> <p>b. Values and Ethics in Administration</p> <p>a. Redressal of Citizen Grievances: Transparency, Accountability and Right to Information Act</p> <p>b. Administrative Accountability: Legislative and Judicial Control</p>	<p>After completing this course student may gain the knowledge and state administration services and the implementation of the administrative reforms in india and ICT in administration the transparency accountability to the people.</p>

S.No	Name of the programme	Pos	PSOs
1.	<b>Human Resource Management</b>	<p>a. Meaning and Significance of Human Resource Management</p> <p>b. Human Resource Planning</p> <p>a. Concept and Principles of Office Management</p> <p>b. Job Analysis, Job Description, Recruitment and Promotion</p> <p>c. Compensation Administration - Wage, Pay and Pay Commissions</p> <p>a. Performance and Competency Mapping System</p> <p>b. Employee Capacity Building Strategies-Training</p> <p>c. Total Quality Management and Productivity Management</p> <p>a. Redressal of Employee Grievances</p> <p>b. Right sizing, Outsourcing and Consultancies</p>	<p>For students it gives the knowledge on Human Resource management in Industries and companies how for the man power may utilize needs to the organization its helps in companies</p>

		c. Interpersonal Skills	training and development of employees.
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S.No	Name of the programme	Pos	PSOs
1.	<b>Financial and Material Resource Management</b>	a. Meaning and Scope b. Importance of Financial Management a. Concept and Principles of Budget b. Preparation of Budget c. Enactment and Execution of Budget a. Organization and Functioning of Finance Ministry b. Union – State Financial Relations and the role of Finance Commission c. Parliamentary Financial Committees: Public Accounts Committee, Estimates Committee and Committee on Public Undertakings a. Meaning and Concept of Materials Management b. Procurement, Storage and Distribution c. Inventory Control and Management	For the students this course may helped in financial budget and also enactment and execution of budget by the finance ministry and also parliamentary committees and the HRM for material management services.

S.No	Name of the programme	Pos	PSOs
1.	<b>Good Governance (GE)</b>	a) Meaning and Definitions of Governance b) Government and Governance c) Concepts of Good Governance a) Origin and types of State b) Democratic State and Democratic Administration c) Neo-Liberalism and Rolling Back State d) Reforming Institutions: The State, Market and Civil Society a) Rule of Law and Human Rights b) Accountability c) Participation a) Rule of Law and Human Rights b) Accountability	It gives for the students this knowledge will produce the governance system to the citizens and also the good governance responsible to the services and ICT information

		c) Participation a) Public and Private Governance b) Good Governance and Civil Society c) ICT and Good Governance	communication technology in peoples participation.
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# DEPARTMENT OF ZOOLOGY

## UG PROGRAMME

**1.Name of the Department:** Zoology.

**2.Vision:** To enhance and impact the latest technological skills in animal sciences for taking up the challenges in ever changing scientific world.

**3.Mission:** Inculcate ethical values to nourish and nurture animal welfare.

### 4.PROGRAMME OUTCOMES :

S.NO	Name of the program	Programme Outcomes	Programme Specific Outcome
1.	B.Sc	<p><b>PO1:</b> Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms.</p> <p><b>PO2:</b> Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of the organisms.</p> <p><b>PO3:</b> Correlates the physiological processes of animals and relationship of organ systems.</p> <p><b>PO4:</b> Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species.</p>	<p><b>PSO1:</b> Students will appreciate the importance, value and diversity of the invertebrates. Understands the diversity, evolution and relationships between major groups of invertebrates.</p> <p><b>PSO2:</b> Understands the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied zoology.</p> <p><b>PSO3:</b> Analyse the relationships among animals ,plants and microbes.</p> <p><b>PSO4:</b> Study reveles the problems faced by the animals with population explosion and insufficient resources available for them in the ecosystem and distribution of organism and biodiversity in the context of the environment .</p>

	<p><b>PO5:</b> Understands about various concepts of Genetics and its importance in Human health.</p> <p><b>PO6:</b> Develops empathy and love towards the animals and apply the knowledge and understanding of zoology to one's own life and work.</p>	<p><b>PSO5:</b> Gains knowledge about research methodologies effective communication and skills of problem solving methods.</p> <p><b>PSO6:</b> Contributes the knowledge for nation building.</p>
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## 5. COURSE OUTCOMES:

### SEMESTER I

S.No	Course Name (Paper)	Course Outcomes
1.	<b>Animal Diversity - Invertebrates</b>	<p><b>CO1 : Protozoa &amp; Porifera:</b> Students will appreciate the importance, value and diversity of the invertebrates. Understands the diversity, evolution and relationships between major groups of invertebrates.</p> <p><b>CO2 : Cnidarians and Helminthes :</b> Important phyla comprising most of the freshwater ecosystem. Coral reef forms world's most productive ecosystem. Help with nutrient recycling, assist in carbon and nitrogen fixing, source of nitrogen and nutrients for marine food chains. Able to study the host parasite interaction, help to study diseases caused by the helminthes.</p> <p><b>CO3 : Annelida and Arthropoda :</b> Annelids showing division of body and play a key role in evolution. Important decomposers and useful in medicinal field. Arthropoda includes more species and more individuals than all other groups of animals species. Used in experimental to reveal valuable basic biological information. Help to grow food crops through pollination, create and maintain soil quality.</p> <p><b>CO4: Mollusca, Echinodermata and Hemichordata :</b> The objectives of this study were to analyze the distribution pattern of molluscs in freshwater systems. A total of 45% freshwater habitats were sampled for living mollusks. Echinodermata play numerous ecological roles. Sand dollars and sea cucumbers burrow into sand providing more oxygen at greater depths of the sea floor. Also used as food, medicine and source of lime for farmers.</p>

## SEMESTER II

S.No	Course Name (Paper)	Course Outcomes
1.	<b>Animal Diversity - Vertebrates</b>	<p><b>CO1:Hemichordata &amp; Urochordata, Cephalochordata, Cyclostomata:</b> Students should be able to understand different categories, general characters and the level of organization in chordate sub phylum.</p> <p><b>CO2 : Pisces &amp; Amphibia :</b> Fishes are used as a basis to show that their communities have only a weak relationship to the structure of phytocenoses, unlike plants vertebrates actively choose preferable biotopes and do not die off upon transition between the stages of succession. The role of vertebrates in the functioning of ecosystems is determined to matter and energy turnover and effect on the structure of ecosystems of different ranks.</p> <p><b>CO3 : Reptilia and Aves:</b> Students will be able to appreciate about how life have evolved from water to land, their populations and their habitats are of profound importance to advancements of basic scientific knowledge that is vital to the well-being of human societies. Adaptations by birds help to know about the evolution and physiology of birds, as they are the phyla which is showing aerial mode of life.</p> <p><b>CO4: Mammalia :</b> Taxonomy help in finding the evolutionary significance. Many species are extincting, so it help for conservation of species. Play a key role in biodiversity and evolution.</p>

### SEMESTER III

S.No	Course Name (Paper)	Course Outcomes
1.	Animal Physiology &Animal Behaviour	<p><b>CO1:Digestion, Excretion and osmoregulation:</b> . the study of physiology is in a sense the study of life, from the study students are enlightened about how Digestion, excretion and osmoregulation work as physiological process.</p> <p><b>CO2 : Homeostasis, Respiration and Circulation :</b> Student understand about Homeostasis maintains optimal conditions for enzyme action throughout the body, as well as all cell functions. It is the maintenance of a constant internal environment despite changes in internal and external conditions. From the study students learns about circulation and also the main purpose of respiration is to provide oxygen to the cells at a rate adequate to satisfy their metabolic needs.</p> <p><b>CO3 : Muscle contraction, Nerves and Endocrine systems:</b> Students learns about muscle and nervous systems function and also the importance of endocrine glands and their secretions.</p> <p><b>CO4: Animal behavior:</b> Students acquire knowledge of key concepts and principles and overarching themes in animal behavior, animal cognition, conservation psychology/ biology,animal welfare science, comparative psychology and research methods. Students acquire credentials for employment in fields related to Animal behavior and conservation.</p>

## SEMESTER IV

S.No	Course Name ( Paper)	Course Outcomes
1.	<b>CellBiology,Genetics &amp;DevelopmentalBiology</b>	<p><b>CO1:Cell Biology:</b> Cell teaches us about the biological processes that keeps us healthy. It also uncovers new ways to treat diseases. Cellular research as lead cancer treatments, antibiotics, medicine the lowers cholesterol and improved methods for delivering drugs. Example, understanding how stem cells and certain other cells regenerate could offer insight on how to repair damaged or lost tissue.</p> <p><b>CO2 : Molecular Biology :</b> Students can learn the molecular basic of biological activity between biomolecules in the various system of a cell including the interactions between DNA,RNA, Proteins and their biosynthesis</p> <p><b>CO3 : Genetics:</b> It is the study of gene, the basic heredity material of living organism. Students get to know about the how and why physical characters are passed on from one generation to another. Help to study the pattern in genetic information. Comprehensive and detailed understanding of the chemical basic of heredity.</p> <p><b>CO4:Developmental Biology and Embryology:</b> The study focuses on the growth and development of plants and animals at the genetic, cellular and molecular levels. Development biology studies the various actions involved in the development of living organisms. Embryology is a section of development biology that focuses on the development from one differentiated cell to a complete organism.</p>

## SEMESTER V

S.No	Course Name (Paper)	Course Outcomes
1.	Immunology and Animal Biotechnology	<p><b>CO1 :Basics of Immune System:</b>. Students learn about the basic concepts of Immunology. They get familiar with the cells that get involve in the immune system they gain information about primary and secondary organs of immune system. Students acquire knowledge on the types of immunity they get to know about how the antigen and antibody reacts and also the reactions that triggered the immune response. They get to know how the B-Cells and T-Cells gets activated and how the specific antibodies are produced for a particular antigen. They also learn about hybridoma technology.</p> <p><b>CO2 : Antibodies and Antigens and Immune System Diseases:</b> Students will be enlightened on the study of immune systems, malfunctions of the immune system in immunological disorders.</p> <p><b>CO3 : Animal Biotechnology and Genetically modified Organisms:</b> Study helps the student to understand molecular biology techniques used to genetically engineer animals in order to improve their suitability by the application of scientific and engineering principles to the processing by biological agents.</p> <p><b>CO4: Applications of Biotechnology:</b>To understand principles of animal culture, media preparation. To explain invitro fertilization and embryo transfer technology. To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.To explain the microbial degradation of pesticides, Bioremediation &amp; Biofertilizers.</p>

## SEMESTER VI

S.No	Course Name (Paper)	Course Outcomes
1.	<b>Ecology, Zoogeography and Evolution</b>	<p><b>CO1 :Ecology – I :</b>Study help to explore about different type of ecosystem and they function and also interaction between environment and organism. Students get to know about the different nutrient cycles which is the basic source of energy. Get the knowledge about the animal behavior in response to that ecosystem and how they survive in that particular environment.</p> <p><b>CO2: Ecology – II :</b> Study reveals the problems faced by the animals with population explosion and insufficient resources available for them in the ecosystem. It help in wild life conservation and protecting endangered species. Help in understanding the movement of materials and energy through living communities. Study the abundance and distribution of organism and biodiversity in the context of the environment.</p> <p><b>CO3 : Zoogeography :</b> It is the study of some paradoxical to begin an account of animal distribution by a reference to cave animals which have by far the most isolated and circumscribed habitat of all the ecological communities. Nevertheless a comparision of the cave habitat with those of the open lands seems to me to have some bearing on the problems of animals distribution.</p> <p><b>CO4: Evolution :</b> It is the study to described origin of species on earth. To describe evolutionary history of man. Be familiar with events that lend up to fertilization. Students get to know about the first four stages of cell division in different groups and cellular mechanisms for gastrulation.</p>

## B.Sc Zoology Practical's Course Outcomes

S.No	Course Name (Paper)	Practical Course Outcomes
<b>Sem -I</b>	<b>Animal Diversity - Invertebrates</b>	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. Dissection is also important because it helps students learn about the internal structures of animals.
<b>Sem-II</b>	<b>Animal Diversity - vertebrates</b>	Course will provide knowledge regarding the various vertebrates species Students gain knowledge in the areas of systematic position, general organization and affinities of vertebrates.
<b>Sem-III</b>	<b>Animal Physiology and animal behavior</b>	Students will learn more about animal physiology, anatomy and also about animal behavior.
<b>Sem-IV</b>	<b>Cell Biology ,Genetics &amp; Developmental biology</b>	Understanding on the details of the basic unit of life at the molecular level. Introduce the new developments in genetics and its implications in human welfare. 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 the reproductive cancers
<b>Sem-V</b>	<b>Physiology And Biochemistry</b>	Students will learn the detailed concepts of digestion, absorption, excretion. Understanding of the functions of effectors in the circulatory physiology and adaptations by animals to environment
<b>Sem-VI</b>	<b>Aquatic Biology</b>	Course provides them comprehensive understanding about aquatic ecosystem and various economical important fishes. Students gain knowledge of integumentary system –basic structure of skin, dermal and epidermal pigments, fins, and scales .

## DEPARTMENT OF ZOOLOGY – PG

**1.Name of the Department:** Zoology.

**2.Vision:** To enhance and impact the latest technological skills in animal sciences for taking up the challenges in ever changing scientific world.

**3.Mission:** Inculcate ethical values to nourish and nurture animal welfare.

Name of the program	POs	PSOs
<b>MSc., ZOOLOGY</b>	<b>PO-I</b> -This programme is a multidisciplinary study which completely gives knowledge about the various branches of life sciences like animals, their evolution, animal physiology, their behaviour, habit, habitat, molecular level organisation of the biomolecules and their mechanisms, laboratory techniques, Research knowledge, environmental study, immunology, systems biology, agriculture and fish biology.	<b>PSO1:</b> The students can opt their careers options in different fields like public sectors, zoologists, forest department, laboratories, medical coding, medical analysis, scientific writers, lab technicians, teaching sectors, agriculture units, fisheries department, research etc.
	<b>PO-II</b> the students with knowledge of environmental and conservation biology acquire knowledge about the environment and methods to conserve the environment.	<b>PSO2:</b> They can also work under NGO's as per their enthusiasm.
	<b>PO-III</b> Gives the Students clear knowledge of the unicellular, multicellular organisms.	<b>PSO3:</b> This knowledge helps them to plan their career in the researches and also helps them to work as parasitologists and microbiologist.
	<b>PO-IV</b> -Students can explore their career in the branches of genetics like laboratories, gene engineering and the applied molecular biology and different laboratories.	<b>PSO4:</b> They can also plan their career as a developmental advisors in the gynecology departments.



## SEMESTER I

1.	<b>Paper I: Structural Biology [SB]</b>	<p><b>CO1 :Basic Concepts of Biomolecules and Structural Biology</b> Students gain an understanding of biomolecules their structure, function and applications.</p> <p><b>COII :Enzymes and Metabolism</b> This unit provides knowledge about the metabolic pathways of biomolecules and the role of enzymes ,their regulating factors &amp; deficiency disorders.</p> <p><b>CO- III – Cellular Organization</b> Student understands that the molecular organization of cell membrane determines the function and specificity of the membrane. They learn about communication mechanisms involved in multicellular organisms which is quintessential for coordinating their various activities.</p> <p><b>CO-IV – Synthetic Biology</b> Student learns about the mechanisms involved in the chromosomereplication and maintaining the fidelity of the genes and also about the disorders developed due to malfunctioning of these mechanisms.</p> <p><b>Practical's</b> The students learn to handle the various equipment and learn the protocols, for the estimation of Protein, Lipids, Glycogen and Cholestrol in the given animal tissue.The aim is to enable the students to learn about enzyme activity like SDH and LDH in normal tissue and also in pH variation in the given tissue The protein fractionation enables the students to learn about the different types of proteins present in the blood sample . The students learn about the DNA and RNA structure by extraction methods and Feulgen Stain technique.</p>
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2	<p><b>Paper II: Environmental and Conservation Biology [ECB]</b></p>	<p><b>CO-1 – Basic Concepts of Ecology</b> Students gain knowledge about different ecosystems and factors governing them. They also learn about population dynamics and the concepts relating to growth.</p> <p><b>CO-II – Community Organization and Structure</b> This unit deals with community organization, structure &amp; their dynamics. they also learn about impact of pollutants &amp; their indicators.</p> <p><b>CO- III –Biogeography of India, Habitats and Resources</b> The students learn about the biogeographic regions of India&amp; their salient features. They gain knowledge about types of renewable and nonrenewable resources &amp; their importance in sustaining the life forms.</p> <p><b>CO-IV– Natural Resource Management .</b> This unit deals with purpose &amp; importance of economic impact assessment&amp; ecological conservation. Students also learn about legal &amp; policies laid down by the government for protection of biological resources.</p> <p><b>Practicals</b> Students learn to estimate alkalinity, hardness of water and biological indicators of water quality. They identify the zooplanktons and learn their ecological significance.</p>
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3	<b>Paper III: Immunology [IMM]</b>	<p><b>CO- I – Introduction to Immunology</b></p> <p><b>1. Immunology:</b>  <b>Students learn about the evolutionary aspects of organs &amp; immunology, types of immunity &amp; the cells involved in the immune system.</b></p> <p><b>CO-II – Immunoglobulins and Complement system</b>  Knowledge about different types of antigens, antibodies &amp; the immunological techniques is dispensed, students learn about components &amp; pathways of complement system.</p> <p><b>CO-III – Hypersensitivity Reactions and Autoimmune Diseases</b>  Students gain knowledge about different types hypersensitivity and auto immune disorders.</p> <p><b>CO-IV – Transplantation and Tumour Immunology</b>  This unit deals with the genetic predispositions of transplantation&amp; mechanisms involved in immune system during various infections. students learn about tumor specific antigens &amp; the treatment involved in treating the tumors</p> <p><b>Practicals</b>  The immunological practicals help them to know the blood groups, which helps them to donate Blood when required in emergency.  WIDAL test, VDRL test for Syphils, HIV TRI dot test, Dengue and malaria test that help the student have the basic knowledge of the immunology and the diseases.</p>
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<p>4</p>	<p><b>Paper IV: Advances in Taxonomy &amp; Functional Anatomy of Invertebrates [ATFAI]</b></p>	<p><b>CO- I – Advances in Taxonomy</b> This unit deals with conventional &amp; new methods of taxonomy and classification. students learn about the significance of ICZN.</p> <p><b>Co- II – Lower Invertebrates</b> This course explores the diversity of lower invertebrates as well as the evolution of animal structure and function. Students will study human health and diseases caused by various parasites by their mode of transmission, treatment and preventive measures. This course also covers crucial concepts including the filter feeding mechanism.</p> <p><b>CO-III – Higher Invertebrates</b> Students will be able to identify and appreciate the unique characters of different Annelids, Molluscs and Echinoderms. They will understand evolutionary history and relationships of different invertebrates through functional and structural affinities, complexity and characteristic features of non-Chordates along with their significance and interactions with the environment.</p> <p><b>CO- IV – Minor Phyla</b> Minor Phyla includes very minute organisms which are numerous and important as members of food chain /as parasites, veterinary, medical or taxonomic importance. Student learns about the structure mechanism involved in feeding, reproduction.</p> <p><b>Practicals</b> The Slides and Specimens of animals starting from Protozoa to Echinodermata help the students to understand the organization of animal structure and the functions along with the identification features. Collection of zooplanktons help the students to identify the organisms present in the given water.</p> <p>The dissections help the student to learn the organization, structure and functions of the nervous system, Reproductive system of cockroach.</p>
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## Semester-II

1	<p><b>Paper I: Tools, Techniques and Biostatistics [TTB]</b></p>	<p><b>CO: I – Tools and Separation Techniques</b> The students understand the working principles, methods and the applications of various biological instruments like microscopes and microtomes. They also learn about the separation techniques principles and applications like centrifugation, Chromatography and Electrophoresis.</p> <p><b>CO:II – Separation and Imaging Techniques</b> This unit provides knowledge about quantitative and qualitative methods of various biomolecules and inorganic molecules. Students learn about PCR and electrophysiological techniques and their applications.</p> <p><b>CO: III – Diagnostic Techniques:</b> Students gain insight into the usage of radioisotopes in medical and research fields. This unit also provide the students knowledge about the principle and functioning of various diagnostic and imaging techniques. Imaging Techniques like RT-PCR, Micro Array, PET, MRI, fMRI and CAT along with Conventional and recently discovered Gene Editing Technologies like CRISPER/CAS9.</p> <p><b>CO:IV – Biostatistics– Descriptive Statistics</b> Students understand the significance of use of statistics in biology and learn the various methods of organization and tabulation of data. They also learn about the basic concepts in biostatistics like measures of central tendency, population and sampling and basics in probability.</p> <p><b>Practicals</b> Students learn to apply the techniques learned in the theory like microtome technique- from fixation step to mounting the tissue is practiced, separating the biomolecules using centrifugation and chromatographic techniques and subsequently quantification of biomolecules using colorimetry, is learnt. In biostatistics they learn to organize, tabulate, calculate and analyze the data given and also learn to represent the same graphically.</p>
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2	<p><b>Paper II: Animal Physiology [AP]</b></p>	<p><b>CO: I – Digestion, Respiration &amp; Circulation</b>  Students learn about digestion, respiration and haemodynamics of blood in mammals. In digestion-the types of digestion, the process of digestion along with neural and endocrinal regulatory factors are taught. Respiration-Effect on transport of oxygen at different heights, levels, and adaptations for the same along with note on bodyfluid buffering mechanism is learned by the students. Circulation – cardiac cycle, dynamics involved in blood circulation along with process of blood coagulation and anti-coagulants are taught.</p> <p><b>CO:II – Osmoregulation, Excretion &amp; Thermoregulation</b>  Students learn about Principles of Osmoregulation and Excretion involved in active regulation of water and ionic balance. Students learn about Thermal Regulation for body temperature and the organs involved in regulation of temperature for normal functioning of the body.</p> <p><b>CO: III – Muscle Physiology, Neurophysiology &amp; Receptors</b>  The goal of the course is to foster critical thinking, understand various physiological systems like muscle contraction, synaptic transmission, receptor mechanism and neurophysiology. Students will be able to explain how the skeletal, neurological, and muscular systems work together to move the body</p> <p><b>CO: IV – Endocrinology, Bioluminescence &amp; Stress Physiology</b>  Students will critically understand, evaluate, and assess scientific literature about endocrine function and pathology. The structures, development, histology, and blood supply of the various endocrine glands, bioluminescence will be covered in this unit.</p> <p><b>Practicals</b>  The course is designed to help students develop critical thinking skills and apply physiological concepts, and principles at the basic and applied levels, to develop a working knowledge of the major physiological systems,</p>
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		<p>and to associate anatomical areas with their specific function. The students will understand important physiological challenges animals face and the processes by which animals deal with them. They will be studying the effects of thermal stress on glycogen levels, metabolic rate of crab as well as estimate the blood chloride and acetyl choline esterase activity in crab. Kymographic recordings of twitch,</p> <p>tetanus and fatigue will be dealt with along with key concepts like cell fragility. The students will be able to apply their knowledge practically through this course.</p>
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P-III	<p><b>Paper III: Molecular Genetics and Developmental Biology [MGDB]</b></p>	<p><b>CO: I – Introduction to Genetics</b> Students learn about mendelian, non mendelian inheritance (linkage, multiple alleles and many more) and along with the disorders. They also learn about chromosome structure and method of karyotyping. Bacterial genetics are also studied by the students</p> <p><b>CO: II – Molecular Genetics</b> Students understand recombinant technology and its application in various fields of biology like medical, forensic, agriculture, evolution, genetics and molecular genetics. Various tools of r DNA technology and methods involved like- Restriction endonucleases, ligases, vectors, DNA fingerprinting, cloning and construction of libraries are understood by the students.</p> <p><b>CO: III – Overview of Developmental Biology</b> This course seeks to give students a thorough understanding of the theories underlying early animal development, molecular, biochemical, and cellular activities that control the growth of specialised cells, tissues, and organs during embryonic development, gametogenesis, fertilization, the cleavage mechanisms and patterns. The morphogenetic movements, presumptive areas, and fate maps will also be studied by the pupils.</p> <p><b>CO: IV – Organogenesis</b> This unit teaches the students with the Developmental Biology which means the growth of organisms, process of organ formation, role of specific hormones in the metamorphosis and regeneration in certain animals along with the process of teratogenesis.</p> <p><b>Practicals</b> Students learn and perform the blood grouping and</p>
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		karyotyping. They also learn to isolate and estimate the nucleic acids, enzymes and proteins from embryonated eggs. They study stages in embryonated eggs and cleavage patterns in lymnaea eggs.
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<b>P-IV</b>	Paper IV: Evolution & Functional Anatomy of Vertebrates [EFAV]	<p><b>CO: I – Evolution of Life</b> This course deal with evolution, which means the change in heritable characters of animals over a period of time. Students will get aware of evolution , theory of evolution ,patterns of evolution ,speciation ,how humans have evolved and significance of bipedalism .</p> <p><b>CO:II – Evolution of Vertebrates</b> Students learn about the evolution of vertebrates like extinct and extant fishes , amphibians ,Mesozoic ,living reptiles ,birds and mammals.</p> <p><b>CO:III – Functional Anatomy – I</b> Through this unit students will learn about the integumentary system , cranial skeletal system like skull , jaw suspension ,post cranial skeletal system like axial skeletal system and joints ,digestive system in aves and mammals and respiratory system in vertebrates.</p> <p><b>CO;IV – Functional Anatomy – II</b> This unit develops understanding for the fundamental concepts of physiology of nervous system, excretory system and sense organs. Students will make a comparative study of the anatomy of an organ in different groups of vertebrate and derive the evolutionary significance from it.</p> <p><b>Practicals</b></p> <p>This course discusses the taxonomic position, characteristic features and distribution of different orders of Vertebrates right from the Pisces to Mammals. The students will obtain comprehensive knowledge of comparative anatomy of chordates and be able to recognize their evolutionary trends. There are two minor dissections which include the Weberian ossicle of Labeo and respiratory trees of Clarius and one major dissection which are the Cranial nerves of Labeo. The hands on approach of dissection will help students gain physiological and anatomical feature of the Pisces. The students will also be collecting scales of the fishes, classify them and study their characteristic. The course</p>
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		will be very helpful for students that are aspiring for a career in the research field.
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### SEMESTER III

<b>Paper I - Systems Biology [SMB]</b>	<p><b>CO:I- Introduction to Systems Biology</b> System Biology is an approach in biomedical research to understand the necessity of treating an individual as a whole not as parts as with interconnectedness of these parts lead to emergence of new behaviour than when in parts. Students learn about graph theory method and types of networks which help in simulating the real life networks in computers as models for predicting and solving problems faced by humans and environment.</p> <p><b>CO: II – Systems Approach</b> Students understand the need for Systems Approach to learn about key factors responsible for many disorders of humans like metabolic cycles, biological clocks and cell death programming and search for the most appropriate treatment. They also learn about the systems approach to agriculture and environmental fields like pest management and bioremediation.</p> <p><b>CO: III – Predictive Modeling</b> Students will know about predictive modeling which is a form of statistical techniques that analysis the historical data with a goal of identifying trends or patterns and then using those insights to predict future outcomes.They also learn about data formats, simulation techniques and modelling tools.</p> <p><b>CO:IV – Systems Biology Applications</b> Students will learn how the systems biology techniques applied is giving benefits to human life. Many fields of medical, evolution, agricultureis reaping the benefits of the systems approach in solving challenges like the tumortreatment by nanoparticles, evolutionary mysteries by genome wide sequencing methods, host-parasite interactions in agriculturerespectively.</p> <p><b>Practicals:</b> Students learn about the fluorescent microscope and its application. They practically learn predator-prey relationship by conducting experiment on larvivorous fish. They build an in-silico phylogenetic tree using the data available on Genbank, Swiss-prot or uni-port websites. students assess and analyze the toxicity and different environmental factors (temp, pH, salinity etc) effect on the enzyme activity and growth pattern- trying to mimic the real</p>
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		life challenges in the laboratory to understand modelling.
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<b>Paper-II</b>	<b>Research Methodology [RM]</b>	<p><b>CO: I – Research Design and Method</b> Students will learn about the essential steps in scientific research. They understand the need for choosing the right type of research or study (observation, experimental, natural, field etc) for the problem chosen by them. They learn all the concepts involved in research like population-Sampling methods, research design, variables, hypothesis etc. this unit provides knowledge about gathering information from primary and secondary data.</p> <p><b>CO: II – Computers in Research &amp; Concepts of Probability and Hypothesis</b> This unit deals with the computers and their application in biology data processing probability distribution statistical modules like null hypothesis's alternative hypothesis, hypothesis testing and type-1, type-II error's in hypothesis testing.</p> <p><b>CO: III – Inferential Statistical Tools in Research.</b> Students will learn about different statistical tools used in research like Z test, students-t test, one-way and two-way, ANOVA, concept and applications of chi-square test, correlation and regression.</p> <p><b>CO: IV – Reporting Research</b> This unit helps students to know about collecting the literature, components of research report, how to write the dissertation, intellectual property rights, plagiarism, safety methods, practiced in laboratories and animal model systems.</p> <p><b>Practicals:</b></p>
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		Students are taught to calculate measures of central tendency, standard deviation and error and prepare a graph using MS-Excel. They also learn to calculate one way, two way anova along with correlation and regression and prepare a graph using MS-Excel. Students are given an assignment to prepare a document using online resources.
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<p><b>Paper III - Comparative Animal Physiology – I [CAP-I]</b></p>	<p><b>CO: I – Comparative Aspects of Digestion and Nutrition</b> This unit help us to understand special dietary requirement feeding mechanism of different animals and their regulatory mechanism of digestion and metabolic pathways and their regulation.</p> <p><b>CO:II – Comparative Aspects of Respiration</b> The students learn Respiration as a biological process as Oxygen is required for Respiration. Importance of Respiration and the effects seen under hypoxic condition and the care to be taken during hypoxic conditions. The different types of Respiratory pigments present in differerent animals for normal functioning of the body</p> <p><b>CO: III – Osmoregulation, Excretion and Thermoregulation</b> In this unit the students gain knowledge on responses of animals to the averment and the mechanisms to deals with various un favorable environmental conditions.</p> <p><b>CO: IV – Deranged Metabolism and Disorders</b> In this unit students gain knowledge about the frequent and commonly acquired metabolic disorder and the different preventive mechanisms to over come these metabolic disorder.</p> <p><b>Practicals</b> Students perform the experiments to find the effect of hetero-osmotic effect on SDH,LDH,Blood chlorides of fish/Crab. They study the effect of starvation on the glycogen, aminotransferases and excretory products in fishes.</p>
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P-IV	<b>Applied Toxicology [AT]</b>	<p><b>CO: I – Principles of Toxicology</b> Students will get to know importance of toxicology effects and dose response relationship, acute and chronic toxicity and the factors likes age, sex, hormones which affect them.</p> <p><b>Co: II – Biochemical toxicology</b> Enables the students to understand the mechanism of the toxicity, antioxidant defense mechanism, oxidative stress mechanism and the effects they cause on the organism.</p> <p><b>CO: III – Systemic toxicology</b> Enables the students to understand the organ toxicity like liver injury long injury renal toxicity and effect of toxic agents on neurons.</p> <p><b>CO: IV – Environmental and Occupational Toxicology</b> Students get to know the environmental problems by studying the occupational hazards causing agents, carcinogenic agents and that induce lung cancer, skin cancer and leukemia. Environmental laws and Regulation are also briefed with the students. the effects of toxicities</p> <p><b>Practicals:</b> Students learn to calculate LC50/LD50 values. The effects of toxicity i.e., Lipid per Oxidation, Glycogen, Glucose. The effects on total Bilirubin hepato toxicity are learnt by students by experimentation.</p>
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### Semester-IV

<b>Paper-I</b>	<b>Animal Biotechnology [AB]</b>	<p><b>CO: I – Introduction and Animal Improvement</b> Students will understand the basic technologies involved in biotechnology like in-vitro fertilization, embryo transfer, ICSI, Sperm sexing, cryopreservation, cryoprotection, gamete banking and scope and importance biotechnology.</p> <p><b>CO: II – <i>In vitro</i> Culture of Cells and Tissues.</b> This unit teaches about cell culture technology, cell techniques mammalian cell lines basic techniques of mammalian cell culture in vitro,</p>
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		<p>cell separation, tissue culture system and cell synchronization.</p> <p><b>CO:III –Production of Recombinant Organisms and Transgenic Animals .</b> Students will gain knowledge on cloning of mammals transgenic animals retro viral vector method, microinjection production of transgenic animals, genetically engineering animal cell culture and downstream processing .</p> <p><b>CO:IV – Application of Biotechnology.</b> Through this unit students will learn about medical biotechnology, hybridoma technology, bioassay, bio sensors ecotoxicological screening ,bio leaching of metals ,insecticide development ,use of bio technology in aquaculture and use of animals as bioreactors.</p> <p><b>Practicals</b> Students learn the sterilization techniques of cell culture, they also prepare media, for culture growth. Staining techniques, antibiotic sensitivity test and yield estimation are performed.</p>
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<p><b>Paper-II</b></p>	<p><b>Paper II: Fish Biology [FB]</b></p>	<p><b>CO: I – Introduction and Diversity of Fishes</b> .this unit teaches the evolution ,introduction ,general characteristics ,classification of fishes and integumentary system of fishes .with this unit students will understand the evolution and physical fishers of fishes.</p> <p><b>CO: II – Fishes – Habits and Habitats</b> This unit teaches about buoyancy in fishes, structure and function of swim bladder in fishes ,caudal fin oscillation mechanism ,feeding mechanism, food webs and food chains, osmoregulation and ion balance, fish migration and prenatal care of fishes.</p> <p><b>CO:III – Fish Biology</b> This unit deals with the physiological system like skeletal system, digestive system ,respiratory mechanism ,circulatory system ,and excretory system of fishes. This unit helps students in understanding the internal body mechanism of fishes.</p> <p><b>CO:IV – Fish Biology and Embryogenesis</b> By this unit students will get an opportunity to learn</p>
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		<p>about the central nerve system ,peripheral nerve system ,scienceorganic of fishes, endocrine system, reproductive system, roll of hormone ,embryonic development, of fishes.</p> <p><b>Practical's</b> Students learn the taxonomic importance of different fishes &amp; also learn how to Classify the fishes. Students learn about different types of scales and their importance in classification of fishes. Students gain knowledge about fish, morphology, anatomy, hormones and reproductive structure of fishes.</p>
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Paper-III	<p><b>Comparative Animal Physiology -II</b></p>	<p><b>CO: I – Responses of Animals to Their Environment</b> In this unit students will be come familiar with different types of receptors and there characteristics they will get to know the basic stricture of brain and the spinal cord from invertebrates to vertebrates</p> <p><b>CO: II – Effectors and Responses</b> Students learn the various glands &amp; process of section .muscle contraction &amp; the Biological process involved in muscle contraction.</p> <p><b>CO: III – Circulation of Body Fluids</b> The students will get to know the different types of hearts and their different circulatory mechanisms.</p> <p><b>CO: IV – Control of Reproduction &amp; Adaptations to Environment</b> The students will study about the various reparative patterns and factors that control reproduction and behavior.</p> <p><b>Practicals</b> Students perform the enzyme activity test on metabolic distinct muscle.They learn the effect of acetylcholine, adrenalin and temperature effect on the heart beat of crab. They perform dissections of nervous and reproductive systems in crab and cockroach.</p>
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<p><b>Paper-IV</b></p>	<p><b>Project</b></p>	<p>project work helps students to explore different scientific fields under the lifesciences, understand the research methodology witch inculcates interest in pursuing research.</p> <p>The students will get aexposure and they will get a chance to interact and workwith the laboratories, hospitals, research scholars etc which helps them to plantheircareer.</p>
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