

**DEPARTMENT OF BOTANY**

<b>YEAR</b>	<b>SEMESTER</b>	<b>COURSE NO.</b>	<b>COURSE TITTLE</b>	<b>COURSE OUTCOMES</b>
I	I	COURSE - I	MICROBIAL DIVERSITY, ALGAE AND FUNGI	<ul style="list-style-type: none"> <li>• Explain origin of life on the earth.</li> <li>• Illustrate diversity among the viruses and prokaryotic organisms and can categorize them.                             <ul style="list-style-type: none"> <li>• Classify fungi, lichens and algae based on their structure, reproduction and life cycles.</li> </ul> </li> <li>• Analyze and ascertain the plant disease symptoms due to viruses, bacteria and fungi.</li> </ul>
	II	COURSE - II	DIVERSITY OF ARCHAEOGONATA AND ANATOMY	<ul style="list-style-type: none"> <li>• Classify Bryophytes, Pteridophytes and Gymnosperms based on their structure, reproduction and life cycles.</li> <li>• Recall and explain the evolutionary trends among amphibians of plant kingdom for their shift to land habitate.                             <ul style="list-style-type: none"> <li>• Justify evolutionary trends in tracheophytes to adapt to land habitate.</li> </ul> </li> <li>• Understand on the organisation of tissues and tissue systems in plants.</li> <li>• Understand general and anomalous secondary growth in several dicot and monocot plants.</li> </ul>
II	III	COURSE - III	PLANT TAXONOMY AND EMBRYOLOGY	<ul style="list-style-type: none"> <li>• Explain the process of fossilization and compare the characteristics of extinct and extant plants.                             <ul style="list-style-type: none"> <li>• Critically understand various taxonomical aids for identification of Angiosperms.</li> </ul> </li> <li>• Analyze the morphology of the most common Angiosperm plants of their localities and recognize their families.</li> <li>• Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.                             <ul style="list-style-type: none"> <li>• Locate different phytogeographical regions of the world and India and can analyze their floristic wealth.</li> </ul> </li> </ul>
	IV	COURSE - IV	PLANT PHYSIOLOGY AND METABOLISM	<ul style="list-style-type: none"> <li>• Comprehend the importance of water in plant life and mechanisms for transport of water and solutes in plants.                             <ul style="list-style-type: none"> <li>• Evaluate the role of minerals in plant nutrition and their deficiency symptoms.</li> <li>• Interpret the role of enzymes in plant metabolism.</li> </ul> </li> <li>• Critically understand the light reactions and carbon assimilation processes responsible for synthesis of food in plants.</li> <li>• Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.</li> <li>• Evaluate the physiological factors that regulate growth and development in plants.</li> <li>• Examine the role of light on flowering and explain physiology of plants under stress conditions.</li> </ul>

III		COURSE - V	CELL BIOLOGY, GENETICS AND PLANT BREEDING	<ul style="list-style-type: none"> <li>• Distinguish prokaryotic and eukaryotic cells and design the model of a cell. •</li> <li>Explain the organization of a eukaryotic chromosome and the structure of genetic material. • Demonstrate techniques to observe the cell and its components under a microscope. • Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings.</li> <li>• Elucidate the role of extra-chromosomal genetic material for inheritance of characters.</li> <li>• Evaluate the structure, function and regulation of genetic material. • Understand the application of principles and modern techniques in plant breeding. • Explain the procedures of selection and hybridization for improvement of crops.</li> </ul>
	V	COURSE - VI	PLANT ECOLOGY AND PHYTOGEOGRAPHY	<ul style="list-style-type: none"> <li>• Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities. • Appraise various qualitative and quantitative parameters to study the population and community ecology. • Correlate the importance of biodiversity and consequences due to its loss.</li> <li>• Enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation.</li> </ul>
	VI	COURSE - VII	NURSERY, LANDSCAPE AND GARDENING	<ul style="list-style-type: none"> <li>• Acquire a critical knowledge about the aesthetic value, types and styles of gardens.</li> <li>• Perform field operations in a garden by understanding the role of a gardener.</li> <li>• Identify various ornamental plants and explain the growth habits.</li> <li>• Propagate garden plants through various propagation techniques.</li> <li>• Demonstrate skills of designing and developing a garden.</li> </ul>

S.NO	SEM	PAPER TITLE	COURSE OUTCOMES						
1	1	MICROECONOMIC ANALYSIS	1. Remembers and states in a systematic way (Knowledge)						
			a. the differences between microeconomic analysis and macroeconomic analysis						
			b. various laws and principles of microeconomic theory under consumption,						
			2. Explains (understanding)						
			a. various terms and concepts relating to microeconomic analysis with the help of examples of real life						
			b. consumer's equilibrium and consumer's surplus using indifference curve analysis.						
			c. various laws and principles of consumption, production, and income distribution						
			d. determination of price and output discriminating different market conditions in short term and long term						
			3. Critically examines using data and figures (analysis and evaluation)						
			a. various laws and principles of microeconomic analysis and market conditions						
			b. application of the concept of demand elasticity and its relation with Average and Marginal Revenue						
			c. the relationship between average and marginal cost/revenue both in long term and						
			4. Draws critical diagrams and graphs to explain and examine the application of various laws and principles of microeconomic analysis						
			2	2	MACROECONOMIC ANALYSIS	1. Remembers and states in a systematic way (knowledge)			
Various concepts, definitions, laws and principles of macroeconomic theory with reference to income, employment, money, banking and finance									
2. Explains (understanding)									
a. the difference between various concepts and components of national income with illustrations and methods of measuring national income									
b. various terms, concepts, laws and principles, theories relating to income, employment, consumption, investment, money, price-level and phases of trade cycles									
d. functions of commercial banks and central bank, creation and control of credit									
3. Critically examines using data and figures (analysis and evaluation)									
a. in order to understand the interrelationship between various components of national income									
b. the theories of macroeconomics with reference to their assumptions, implications and applicability									
c. Empirical evidences of Consumption and Investment Functions and factors influencing them									
4. Draws critical formulae, diagrams and graphs.									
a. consumption and investment functions; concepts of multiplier and accelerator									
b. price indices, inflation and trade cycles									
3	3	DEVELOPMENT ECONOMICS				1. Remembers and states in a systematic way (Knowledge)			
			Various concepts and definitions and indicators relating to economic growth and Development including recent developments						
			2. Explains (understanding)						
			a. Distinction between growth and development with examples						
			c. Characteristics of developing and developing economies and distinction between the two						

			d. factors contributing to development, Choice of Techniques and a few important models and strategies of growth						
			3. Critically examines using data and figures (analysis and evaluation)						
			a. the theoretical aspects of a few models and strategies of economic growth						
			b. role and importance of various financial and other institutions in the context of India's economic development						
			4. Draws critical diagrams and graphs.						
			a. to explain the models and strategies						
			b. to highlight empirical evidences to support the strategies						
									of International Institutions-IDBI, ADB, IMF -Foreign Trade - FIs and FDIs
4	4	ECONOMIC DEVELOPMENT- INDIA AND ANDHRA PRADESH	1. Remembers and states in a systematic way (Knowledge)						
			a. leading issues of Indian economic development with reference to potential for growth, obstacles and policy responses						
			b. Objectives, outlays and achievements of economic plans and growth strategies						
			2. Explains (understanding)						
			a. Available Resources, demographic issues, general problems of poverty and unemployment and relevant policies						
			b. Sector specific problems, remedial policies and their effectiveness relating to Agriculture and Industrial Sectors of Indian and AP economy and infrastructure issues of AP economy						
			c. Indian Tax system, recent changes, issues of public expenditure and public debt, recent finance commissions and devolution of funds						
			d. Major issues of economic development of Andhra Pradesh after bifurcation and Central assistance						
			3. Critically examines using data and figures (analysis and evaluation)						
			a. Leading issues of current importance relating to India and AP economy, major policies and programmes						
			b. Covid- 19 and its impact on Indian economy						
			4. Uses official statistical data and reports including tables and graphs						
			a. To explain the achievements of Indian economy with reference to the objectives of planning and policy and make critical evaluation						
5	4	STATISTICAL METHODS FOR ECONOMICS	1. Remembers and states in a systematic way (Knowledge)						
			a. the definitions, terms and their meaning relating to statistical methods						
			b. various formulae used to measure central tendency, correlation regression and Indices						
			2. Explains (understanding)						
			a. Importance of statistics and its applications						
			b. The method of classification of primary data						
			c. Uses of Correlation and Regression analysis, time series and index numbers in economic analysis						
			3. Analyses and solves using given data and information (analysis and evaluation)						
			a. different kinds of statistical problems using various principles and formulae relating to central tendency, correlation, regression, time series and indices						

			b. to interpret data and suggest solutions to economic problems					
			4. Draws critical diagrams and graphs.					
			a. Histogram, Frequency Polygon and Frequency Curve					
			b. More than cumulative and less than cumulative frequency curves (Ogive)					
			c. Different types of Bar diagrams					
			d. Pie Diagram and its uses in economic analysis					
6	5	Course 6C: Insurance Services	1. Explain the concept and principles of insurance service and functioning of insurance service agencies;					
			2. Identify and analyse the opportunities related insurance services in local rural area;					
			3. Apply the concepts and principles of insurance to build a career in Insurance services;					
			4. Demonstrate practical skills to enable them to start insurance service agency or earn wage employment in it.					
	5	Course 7C: Banking and Financial Services	1. Explain the concept and essentials banking and financial services.					
			2. Identify and analyse the employment opportunities related to banks and other financial institutions.					
			3. Apply the concepts to banking and financial opportunities and formulate ideas related to them.					
			4. Demonstrate practical skills to enable them to get employment in Banks and other financial institutions as business correspondents or Common Service Centers or marketing agents.					

<b>YEAR</b>	<b>SEMESTER</b>	<b>COURSE NO.</b>	<b>COURSE TITLE</b>	<b>COURSE OUTCOMES</b>
	SEMESTER – I	1	GENERAL ENGLISH	

DEPARTMENT OF MATHS					
YEAR	SEMESTER	COURSE NO.	COURSE TITLE	COURSE OUTCOMES	
1	DIFFERENTIAL EQUATIONS		I	CO1	Solve linear differential equations.
				CO2	Convert non exact homogeneous equations to exact differential equations by using integrating factors.
				CO3	Know the methods of finding solutions of differential equations of the first order but not of the first degree.
				CO4	Solve higher-order linear differential equations, both homogeneous and non homogeneous, with constant coefficients.
				CO5	Understand the concept and apply appropriate methods for solving differential equations.
2	THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY		II	CO1	Get the knowledge of planes.
				CO2	Basic idea of lines, sphere and cones.
				CO3	Understand the properties of planes, lines, spheres and cones.
				CO4	Express the problems geometrically and then to get the solution.
3	ABSTRACT ALGEBRA		III	CO1	Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
				CO2	Get the significance of the notation of a normal subgroups.
				CO3	Get the behavior of permutations and operations on them.
				CO4	Study the homomorphisms and isomorphisms with applications.
				CO1	Get a clear idea about the real numbers and real valued functions.
				CO2	Obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
				CO3	Test the continuity and differentiability and Riemann integration of a function.

4	REAL ANALYSIS		IV	CO4	Know the geometrical interpretation of mean value theorems.
				CO1	Understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
				CO2	Understand the applications of ring theory in various fields.
				CO3	Learn multiple integrals as a natural extension of a definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.
				CO4	Learn applications in terms of finding surface area by double integral and volume by triple integral.
				CO5	Determine the gradient, divergence and curl of a vector and vector identities.
				CO6	Evaluate line, surface and volume integrals.
5	RING THEORY AND VECTOR CALCULUS		V	CO7	Understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)
				CO1	Understand the concepts of vector spaces, subspaces, basis, dimension and their properties
				CO2	Understand the concepts of linear transformations and their properties
				CO3	Apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
6	NEAR ALGEBR		V	CO4	Learn the properties of inner product spaces and determine orthogonality in inner product spaces
				CO1	Understand various finite difference concepts and interpolation methods.



				CO2	Find numerical solutions of ordinary differential equations by using various numerical methods.
				CO3	Analyze and evaluate the accuracy of numerical methods.
				CO4	Analyze and evaluate the accuracy of numerical methods.
7	umerical Analys		VI	CO5	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.
				CO1	Evaluate Laplace transforms of certain functions, find Laplace transforms of derivatives and of integrals.
				CO2	Determine properties of Laplace transform which may be solved by application of special functions namely Dirac delta function, error function, Bessel function and periodic function.
				CO3	Understand properties of inverse Laplace transforms, find inverse Laplace transforms of derivatives and of integrals.
				CO4	Solve ordinary differential equations with constant/ variable coefficients by using Laplace transform method.
				CO5	Comprehend the properties of Fourier transforms and solve problems related to finite Fourier transforms. Polynomials, understand the orthogonal properties of Legendre Polynomials.
8	tegral Transform		VI	CO6	Solve Bessel equation and write the Bessel equation of first kind of order n, also find the generating function for Bessel function and understand the orthogonal properties of Bessel function.
				CO1	Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
				CO2	Find numerical solutions of ordinary differential equations by using various numerical methods

				CO3	Analyze and evaluate the accuracy of numerical methods.
				CO4	Acquire basic knowledge in solving interpolation with equal interval problems by various numerical methods. Estimate the missing terms through interpolation methods.
				CO5	Develop skills in analyzing the methods of interpolating a given data, properties of interpolation with unequal intervals and derive conclusions, approximate a function using an appropriate numerical method.
				CO6	Be able to derive Least – Squares curve fitting procedures, fitting a straight line, fitting a parabola, nonlinear curve fitting, Curve fitting by a sum of exponentials.
				CO7	Be able to find the solution of ordinary differential equations of first order by Euler, Taylor and Runge-Kutta methods.
9	Advanced Numerical Analysis		VI		
				CO1	To provide an opportunity for students. to apply theoretical concepts in real life situations at the workplace.
10	Project Work		VI	CO2	To enable students to manage resources, work under deadlines, identify and carry out specific goal oriented tasks, to get innovative ideas, to sharpen domain knowledge and provide cross functional skills.

<b>2016-17</b>			
<b>Sem</b>	<b>Title of Course</b>	<b>CO</b>	<b>Course outcomes</b>
I	<b>ANIMAL DIVERSITY – I BIOLOGY OF NONCHORDATES</b>	CO1	To know about brief history, significance and diversity of non-chordates
		CO2	General characteristics of Protozoa, prouifera and Coelenterata with classification upto classes
		CO3	Classify phylum platyhemninthos to Annelida using examples
		CO4	Describe phylum Arthropoda to Mollusca using examples and structure of prawns and Molluscans
		CO5	Describe Echinodermata to Hemi chordata with suitable examples and different larval stages in relation to the phylogeny
II	<b>ANIMAL DIVERSITY – II BIOLOGY OF CHORDATE S</b>	CO1	To know about the general characters of chordates and prochordata
		CO2	Classify protochordata to Mammalia with taxonomic keys with suitable examples
		CO3	Understand the adaptations in fishes, Amphibians, Reptiles and Aves
		CO4	Understand the evolutionary relationship of different phyla from prochordata to mammalia
		CO5	To understand the structural and behavioural adaptations

III	<b>CYTOLOGY , GENETICS AND EVOLUTIO N</b>	CO1	To understand the basic unit of the living organisms and to differentiate the cells/organisms according to structure
		CO2	Describe the structure and functions of plasma membrane by using different models
		CO3	Describe the structure and functions of different cell organelles of Eutaryotic cell
		CO4	To learn the basic principles of inheritance at the molecular, cellular and organismal level
		CO5	To study the structure and functions of chromosome and DNA
		CO6	To understand the concept of evolution and the role of mutations in Darwin's evolution
IV	<b>EMBRYOLO GY, PHYSIOLO GY AND ECOLOGY</b>	CO1	To understand the basic human development from gametes formations and cleavages in zygote
		CO2	To understand the structure and functions of different organ systems and co-ordination between them
		CO3	To gain knowledge about various community interactions- mutualism, commensalism and parasitism
		CO4	To gain knowledge geography distribution of various animals
		CO5	To know about the physical attributes, climate conditions, geographical extent and Zoological characteristics of oriental and Australian regions
V	<b>ANIMAL BIOTECHN OLOGY</b>	CO1	To gain fundamental knowledge of animal biotechnology and their applications
		CO2	To understand the various techniques used in recombinant DNA technology and PCR

		CO3	Knowledge about preparation and uses of genomic and cDNA libraries
		CO4	To understand animal cell technology and its applications like preparation of culture media, cell cultures, hybridana technolgy and stem cell culture, IVF
		CO5	To understand applied aspects of biotechnology in industry, agriculture and aquaculture
VI	<b>ANIMAL HUSBANDRY</b>	CO1	To understand all about poultry farming like poultry housing, systems of poultry housisng, poultry farming,management of layers and broillers
		CO2	To gain knoledge in egg testing and sexing of chicks
		CO3	To understand about different breeds of diary animals and buffaloes , both indegenous and exotic.
		CO4	To know about caring of diary animals like milking animalsand pregnant animals and their deworming and vaccination schedules.
VII-A	<b>IMMUNOLOGY</b>	CO1	To understand about innate and adaptive immunity and various cells and organs of immune system
		CO2	To gain knowledge in antigens, haptens , adjuvants
		CO3	To understand about antigens, haptens and adjuvants
		CO4	To understand about antibodies their structure, classes and function of antibodies. Detail understanding of monoclonal antibodies and its application
		CO5	To understand about structure and function of MHC Antigen
		CO6	To understand briefly about hypersensitivities, autoimmunity and immuno deficiency diseases.
		CO7	To know in detail about vaccines and their types

VIII-B1	<b>PRINCIPLES OF AQUACULTURE</b>	CO1	To understand about significance and history of aquaculture ,its global scenario.
		CO2	To know various cultivable species for aquaculture, culture systems and culture practices
		CO3	Knowledge about design and construction of aqua farms, seed resources, nutrition and feeds
		CO4	To understand about management of carp culture ponds and culture of giant fresh water prawn -- <i>Machrobrachium rosenbergii</i>
VIIIB-2	<b>AQUACULTURE MANAGEMENT</b>	CO1	To understand about breeding and Hatchery management of <i>Penaeus monodon</i>
		CO2	To understand in detail water quality management,
		CO3	To gain complete knowledge of feed management, feed formulation and feed strategies
		CO4	To know about various fin fish and shell fish diseases, their symptoms, and vaccination.

SNo	Course title	Course code	Semester	Outcomes
1	Inorganic and Organic Chemistry		CO1	To understand the basic of organic chemistry including hybridization. Type of organic reactions and cleavage
		1		
			CO2	. To Discuss the periodic properties and chemical bonding.
			CO3	Knowledge about the s-and p-block element's and understand the group relationship and gradation properties.
			CO4	To understand the basic of organic chemistry including hybridization. Types of organic reactions and cleavage.
			CO5	Introduce to stereo chemistry and distinguish between optical & geometrical isomerism.
			CO6	Discuss about the conformation analysis of alkanes and know reaction mechanism and understand mechanism of E1 & E2 reaction.
2	Physical & General Chemistry	2	CO1	To understand basic mathematical concept for chemist-logarithmic / functions / vectors, and discuss about gaseous theory.
			CO2	To know the liquid state / colloid's and surface chemistry, understand the gold number & physical adsorption, BET equation.
			CO3	Discuss the solid state chemistry -x-ray diffraction & Bragg's law.
			CO4	To learn the basic concepts of Stereochemistry

			CO5	To understand about the formation and stability of reaction intermediates and their electrophilic and nucleophilic behavior	
			CO6	To learn stereochemistry of chiral compounds arises due to presence of stereo-axis; concept of prostereoisomerism and concept of conformations of stereo Isomers	
			CO7	To understand reaction kinetics, reaction thermodynamics and tautomerism of organic compounds.	
3	Inorganic and Organic Chemistry	3	CO1	Discuss the C0ncept of Symmetry Elements, Symmetry Operations and Point Groups	
			CO2	Classify & recognize the symmetry elements and their operations as required to specify molecular symmetry & possible point groups from symmetry elements & be able to find point group of molecule by systemic procedure .	
			CO3	Discuss the d-orbital splitting pattern in different geometries like octahedral, tetrahedral.	
			CO4	Explain high spin and low spin complexes & formation of metal complexes in solution.	
			CO5	Discuss bonding modes of CO, NO, 18-electron rule , different bond lengths & frequencies of CO, NO.	
			CO6	Explain the criteria for chirality and discuss axial, planar and helical chirality	
4	Spectroscopy and Physical Chemistry	4	CO1	Explain pericyclic reactions like Electrocyclic reactions, Cycloaddition reactions and Sigmatropic reactions.	



			CO2	Discuss Aromatic Transition States (ATS)/Perturbation Molecular Orbitals (PMO) approach- Concept of Huckel – Mobius aromatic and antiaromatic transition states and Solve problems based on ATS approach	
			CO3	Explain the Frontier Molecular Orbital (HOMO-LUMO) approach, WoodwardHofmann selection rules for all the pericyclic reactions and solve problems based on FMO approach.	
			CO4	Discuss the Photochemistry of ( $n-\pi^*$ ) transitions with particular reference to Norrish type I , Norrish II type reactions , Paterno Bucchi reactions & photochemistry of nitrites	
			CO5	Explain the generation, detection, structure, stability and reactions of carbocations, carbanions, carbenes, nitrenes and free radicals	
	Inorganic,Organic and Physical Chemistry	paper 5	CO1	Discuss the concept of symmetry element, symmetry operation and point groups . • CO6 Discuss HSAB rule chelation, macro cyclic, cryptate effect.	
			CO2	Classify & recognize the symmetry elements and their operations as required to specify molecular symmetry & possible point groups from symmetry elements & be able to find point group of molecule by systemic procedure .	
			CO3	Discuss the d-orbital splitting pattern in different geometries like octahedral, tetrahedral.	
			CO4	Calculate magnetic moment & crystal field stabilization energy of metal complexes	
			CO5	Explain high spin and low spin complexes & formation of metal complexes in solution.	

5	Inorganic, Organic and Physical Chemistry	paper6	CO1	Describe quantum yield and the method of its determination. Derive quantum yield of fluorescence and phosphorescence.	
			CO2	Describe types of photochemical reactions and photosensitization reactions	
			CO3	To learn about the laws of absorption of light energy by molecules and the subsequent photo chemical reactions.	
			CO4	To understand the concept of quantum efficiency and mechanisms of photo chemical reactions	
6	6 - Elective Paper		6 CO1	student completing a major in Environmental Chemistry and Toxicology shall demonstrate the ability to: .	
			CO2	Synthesize and apply concepts from multiple sub-disciplines in environmental chemistry and toxicology.	
			CO3	Use technical and analytical skills to quantify the level and effects of xenobiotics in environmental	
			CO4	<ul style="list-style-type: none"> <li>Identify relationships between chemical exposure and effects on physiological systems and design strategies for study of dose-response relationships.</li> </ul>	
			CO5	Effectively understand and convey scientific material from peer-reviewed sources.	

			CO6	Conduct an individual research project within the university of other appropriate setting	
	PAPER -VIII-C-1				
	<b>PAPER – VIII-C-1 : ORGANIC SPECTROSCOPIC TECHNIQUES</b>	C-1	CO1	provides detailed information about the structure, dynamics, reaction state, and chemical environment of molecules.	
			CO2	Learn about the possible electronic transitions	
			CO3	Recognize spectroscopy in microwave, Rotational spectra of rigid diatomic molecules, selection rules, interaction of spectral lines	
			CO4	Understand concepts of Nuclear and Radiation Chemistry. Applications of Radioisotopes	
			CO5	The study of the emission and absorption of light and other radiations by matter	
	PAPER-VIII-C-2 ADVANCED ORGANIC REACTIONS	6 CLUSTER C-2	CO1	<b>Understand what electromagnetic radiation is. Analyze the electromagnetic spectrum . Understand concept of UV-Visible spectroscopy. Learn about the possible electronic transitions.</b>	
			CO2	<b>The aim is to enable students to acquire specialised understanding of how light interacts with molecules and materials. Different methods of optical spectroscopy and their use to examine chemical and physical properties are addressed at an advanced level.</b>	
			CO3	<b>Students will gain an understanding of: the hybridization and geometry of atoms and the three-dimensional structure of organic molecules. the reactivity and stability of an organic molecule based on structure, including conformation and stereochemistry</b>	

			CO4	<p><b>]Besides identification, NMR spectroscopy provides detailed information about the structure, dynamics, reaction state, and chemical environment of molecules. The most common types of NMR are proton and carbon-13 NMR spectroscopy, but it is applicable to any kind of sample that contains nuclei possessing spin.</b></p>
	cluster 3		CO1	Includes studies which describe the cost, utilization and
	PHARMACEUTICAL CHEMISTRY		CO2	economic efficiency of pharmaceutical products and related
			CO3	services in the delivery of health care and the development and application of health care policy.
			CO4	About the instruments like NMR, Mass spectrometer, IR, HPLC, GC etc.
			CO5	Understand the basic concepts and advances in analytical techniques and theoretical skills of the analytical instruments.
			CO6	Advanced analytical instrumental techniques for identification,
			CO7	characterization and quantification of drugs. The analysis of various drugs in single and combination dosage forms.
			CO8	Skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals

SEM	Name of the Department	Course code	Name of the Course		Course outcome(CO)/ Learning outcomes
1	Physics	PHY1A	Mechanics	CO1	Applications of vectors for all physical principles
				CO2	Logical derivation-Rocket motion- satellites
				CO3	Analyse the Force and motion of rotating bodies
				CO4	Problem solving-Motion of satellites- GPS methods
				CO5	Measurement skills of Special theory of relativity
2		PHY1B	Waves and Oscillations		Analyse the types of and modes of Oscillations
					Apply the basic ideas of Oscillations and solve the problems of interest
					Evaluate the oscillation and ultra sonics.
3		PHY II A	Optics		Applications of laser, holography and fiber optics
					Under stand the basic concepts of light and use of tools needed to formulate problems
					Analyse the defect of lenses and prisms resolving power of grating
4		PHY II B	Heat and Thermodynamics		under stand the central concepts basic formalisms of specific heat,entropy,and quantum theory of radiation
					Applications of heat transfer and entropy
					Evaluate the basic thermal properties
5		PHY IIIA	Electricity and Magnetism		Apply knowledge of mathematics and physics fundamentals of electro magnetic waves
					Analysis of variations on electric field and magnetic field
					Evaluate the boolean algebra by following their truth tables
6		PHY IIIA	Modern Physics		Explore the fundamental concepts of physics
					Understand the energy involved in nuclear reactions and crystal structure
					Get depth knowledge of physics in day to day life
7			Elective1- Renewable energy		Develop knowledge about various types of Renewable energy resources and their importance
					Analyse the benefits of renewable energy usage and methods of reduction cost per unit electricity
					Methods of disposal of used renewable energy materials and environment concerns
			Cluster-C1- Solar Thermal and Photo Voltaic aspects		Understand the prime factors influencing the absorption of Solar energy

				Theoretical aspects of absorption and reflection of solar energy- key parameters
				Solar panels fabrication- estimation of cost per unit electricity for a small household or a company
			Cluter-C2- Wind, Hydro and ocean energies	Understanding the nature of wind, Hydro and ocean energies and harnessing methods
				Basics and engineering aspects of wind mill, Hydel power plants and Ocean energies
				Challenges and oppertunities of wind, Hydro and ocean energies in India
			Cluter-C3- Energy Storage Devices	Knowledge of different types energy storage methods
				Functioning and usage of energy storage devices
				Recent devolopments in energy storage devices
			Elective2 Material Science	Understanding of Mechanical, chemical and electromagnetic properties of materials
				Knowledge of Different types of instruments measuring material properties
				Analyze the differences between bulk and nano properties
			Cluter-B1- Fundamentals of Nanoscience	Knowledge of factors responsible for the differences in properties between bulk and nano particles
				Understanding the Classical and quantum aspects of nano particle properties
				KNOWledge of instruments working TEM, SEM, FRSEM
			Cluter-B2- Synthesis and Characterizati on of Nanomaterial s	Knowledge of various synthesis and charectirisation methods and their difficulties
				Understanding chemical and mechanical milling methods
				Knowledge of estimating particle size by TEM, XRD
			Cluter-B3- Applications of Nanomaterial s and Devices	Knowledge of key parameters responsible for modifications in properties of nano particles
				Understanding the working of devices with nano materials
				Analyze the scope and challenges of devices with nano materials
			Elective2 Electronics	Recognise a variety of exciting high-tech products and systems enabled by electronics.

					manipulate voltages, currents and resistances in electronic circuits.
					Demonstrate familiarity with basic electronic components and use them to design simple electronic circuits.
			Cluter-A1- Introduction to Microprocess ors and Microcontroll ers		Express that microcontrollers are the only an integrated construction equipped by processor, I / O, timer ADC / DAC, serial communication unit etc.
					Express that both microprocessors and microcontrollers are used as controlling unit in similar industrial applications and there is a grand similarity in programme logic.
					Explain what the LOOP is. Know how to write instructions which have to be repeated in the programme, in the loop
			Cluter-A2- Computational Physics and Programming		Computational simulations will give better outcomes and will avoid hit and trial methods as well as waste methods of approach. It also reduces time of approach and wastage of materials. In a single attempt one can reach desired outcomes.
			<a href="#">Cluter-A3- Electronic Instrumentati on</a>		This course will help the students in designing of new electronic measurement gadgets. This also helps to work with different electronic measuring devices which are used for different purposes in various sectors like medical, communication and space applications.

YEAR	SEMESTER	COURSE	COURSE TITLE	COURSE OUTCOMES
2016	I	A	ANCIENT INDIAN HISTORY & CULTURE (From earliest times to 600 A.D.)	Identify Approaches towards the sources and the study of ancient Indian history.
			CO2	Evolution of social and political institutions in the Vedic society ,Religious dissent and the rise of Jainism and Buddhism
			CO3	Understand Asoka's Dharma and his inscriptions e. Mauryan administration, Art and Architecture
			CO4	To Know Art and Culture under Kanishka
			CO5	Explain Changes in political organisation of empire during the Gupta rule
II			EARLY MEDIEVAL INDIAN HISTORY & CULTURE (600 A.D to 1526 A. D.)	
			CO1	Explain Sources of Medieval Indian History
			CO2	Understand Arab invasion of Sind, Campaigns of Mahmud of Ghazni and Ghor
			CO3	Describing Establishment and Territorial consolidation of the Delhi Sultanate
			CO4	Know the Socio-economic and religious life in Delhi Sultanate
III			LATE MEDIEVAL & COLONIAL HISTORY OF INDIA (1526 to 1857 A. D.)	Describe Foundation of the Mughal empire by Babur Conquest and the Afghan despotism of Sher Shah
			CO2	Know Economic prosperity and cultural splendor under Mughals.
			CO3	Play Significance of role of the British and the French in the Carnatic Wars Establishment of the British control in Bengal after the battles of Plassey and Buxar
			CO4	Discrimination Anglo-Mysore Wars and Consolidation of the British power in the South
			CO5	Understand Anglo-Maratha Wars and the British control in the North and the West. Mutiny of 1857 and Queen Victoria's Proclamation of 1858
IV			SOCIAL REFORM MOVEMENT & FREEDOM STRUGGLE (1820 to 1947 A.D.)	
			CO1	To understand about Brahma Samaj, Arya Samaj, Ramakrishna Mission ,Theosophical Society ,Aligarh Movement
			CO2	Describing Constitutional Developments from 1858 to 1909, Government of India Act of 1919 ,Act of 1935
			CO3	Explain Constitutional Developments and Ministries from 1937 to 1947
			CO4	Know Establishment of the Indian National Congress Prominent leaders of early stage.
			AGE OF RATIONALISM AND HUMANISM THE WORLD BETWEEN 15TH& 18TH CENTURIES	
			CO1	Understand Learn political and economical structure of Feudal society in 15th century and its crisis in 18th century.
			CO2	Gather knowledge about the nature Feudal Society, regional variation, crisis in Feudalism and transition debate.
			CO3	They will acquire knowledge how to rise renaissance in Europe after downfall of feudal Society in Europe and also to learn how the European Society transformed from Feudalism to Capitalism
			Understanding East India Company's Author Describe French Revolution , Era of Napoleon	
			HISTORY & CULTURE OF ANDHRA DESA (from 12th to 19th Century A.D.)	
			CO1	Discriminate Kakatiyas, Vijayanagara Empire – Origin & its Antecedents – Administration – Social & Economic Life – Industries & Trade – Promotion of Literature and Culture – Architecture & Sculpture – Decline: The Age of Reddy Kingdoms: Patronage to Literature – Trade & Commerce.
			CO2	Evolution of Composite Culture -The QutbShahis of Golkonda – Origin & Decline – Administration, Society & Economy – Literature & Architecture
			CO3	Understanding East India Company's Authority over Andhra – Three Carnatic Wars – Occupation of Northern Circars and Ceded Districts –Early Uprisings –Peasants and Tribal Revolts.
			CO4	Know the Impact of Company Rule on Andhra – Administration – Land Revenue Settlements – Society – Education – Religion – Impact of Industrial Revolution on Economy – Peasantry & Families – Contribution of Sir Thomas Munroe, C. P. Brown & Sir Arthur Cotton – Impact of 1857 Revolt in Andhra.



				CO1	Concepts of statistical population and sample, variables and attributes.
				CO2	Tabular and graphical representation of data based on variables.
				CO3	Conditions for the consistency and criteria for the independence of data based on attributes.
				CO4	Moments and their use in studying various characteristics of data.
				CO5	Different approaches to the theory of probability.
				CO6	Important theorems on probability and their use in solving problems.
				CO7	Concept of correlation, various correlation coefficients- Pearson's correlation coefficient, Spearman's rank correlation coefficient, partial correlation coefficient and Multiple correlation coefficient.

1	Descriptive Statistics	I	CO8	Concept of Principle of least squares for curve fitting and regression lines.
2	Mathematical Expectation and Probability Distributions	II	CO1	A probability distribution is a statistical model that shows the possible outcomes of a particular event or course of action as well as the statistical likelihood of each event
			CO2	Probability distribution functions are quite important and widely used in actuarial science (insurance), engineering, physics, evolutionary biology, computer science and even social sciences such as psychiatry, economics and even medical trials.

					Students would be able to learn about the topics Correlation and Regression and their properties and the relationship between two variables and interpretation.
				CO1	
					Students would be able to know the principle of least squares, fitting of straight-line, second degree parabola, power curves and the theory of attributes, and its various measures.
				CO2	
					Students would be able to know the concepts of population, parameter, sampling distribution and standard error, Exact sampling distributions like chi-square, t and F distribution their properties and applications.
				CO3	

3	Statistical Method		III	CO4	Students would be able to learn about the theory of estimation, Criteria of good estimator, methods of estimation like Maximum likelihood method, method of moments and its properties and to learn about confidence intervals.
				CO1	Students would be able to learn about the testing of hypothesis, null and alternative hypothesis, two types of errors, one tail and two tailed tests and problem solving skills.
				CO2	Students would be able to learn about Large sample tests like proportions, standard deviations and correlation coefficients.

				CO3	Students would be able to learn about small sample tests like chi-square, t and F, test for goodness of fit and goodness of fit for independence of attributes.
4	Statistical Inference		IV	CO4	Students would be able to learn about Non parametric tests, their advantages and disadvantages , One sample and two sample tests.
				CO1	The sampling techniques deals with the ways and methods that should be used to draw samples to obtain the optimum results, i.e., the maximum information about the characteristics of the population with the available sources at our disposal in terms of time, money and manpower to obtain the best possible estimates of the population parameters.

				CO2	This paper throws light on understanding the variability between group and within group through Analysis of Variance.
				CO3	This gives an idea of logical construction of Experimental Design and applications of these designs nowadays in various research areas.
5	Sampling Techniques and Design of Experiments		V	CO4	Factorial designs allow researchers to look at how multiple factors affect a dependent variable, both independently and together.
				CO1	Students would be able to learn about Importance of statistical quality control in industry, Construction of control charts for variables and attributes and to draw conclusions and interpret the result.

				CO2	Students would be able to learn about acceptance sampling plans-single and double sampling plans of attributes.
				CO3	Students would be able to know the concept of reliability and the role of Exponential distribution and its memory less property.
6	Quality, Reliability		V	CO4	Students would be able to estimate reliability function and to understand the concept of system reliability.
				CO1	Students would be able to learn about Time series and its components, Determination of trend by least squares, moving averages methods and to determine seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

				CO2	Students would be able to know the functions and organization of CSO and NSSO, National income and its computation, difficulties in estimation of national income.
				CO3	Students would be able to know about the definition, uses of vital statistics and its sources, Various mortality and fertility rates, Life tables-its construction and uses.
7	Applied Statistics		VI	CO4	Students would be able to learn about demand and supply, price elastics of supply and demand, methods of determining demand and supply curves, Leotinef's and Pigou's methods from time series data and Pareto law of income distribution of curves of concentration.



					Students would be able to know the meaning and scope of operations research, and to know about Linear programming problem-its formulation and finding a solution by graphical method.
				CO1	
					Students would be able to learn the concept of artificial variables-Big M method and two phase method and their solvation by simplex method, concept of degeneracy and resolving it, concept of duality and primal dual relationship and its fundamental theorem.
				CO2	

				<p>Students would be able to learn about the Definition of Transportation problem, obtaining feasible solution by North-west, Matrix minimum and Vogel's approximation methods, Obtaining Optimal solution through MODI method and stepping stone methods and the concepts of degeneracy and resolving it.</p> <p>CO3</p>
8	OPERATIONS RESEARCH		VI	<p>Students would be able to know the formulation and description of Assignment problem and finding optimal solution by Hungarian method and also to learn about the problem of sequencing and finding optimal solution through Johnson's algorithm method.</p> <p>CO4</p>

				CO1	To provide an opportunity for students. to apply theoretical concepts in real life situations at the workplace.
10	Project Work		VI	CO2	To enable students to manage resources, work under deadlines, identify and carry out specific goal oriented tasks, to get innovative ideas, to sharpen domain knowledge and provide cross functional skills.

<b>POLITICAL SCIENCE</b>				
SNo	Course title	Course code	Semester	Outcomes
	<b>BASIC CONCEPTS OF POLITICAL SCIENCE</b>	<b>PAPER-I</b>	<b>SEMESTER – I</b>	CO1Analysing what is Politics and explaining the approaches to the Study of Political Science – Normative, Behavioral, Post Behavioral, Feminist
				CO 2- Understanding basic concepts of Liberty, Equality, Rights, Law and Justice
				CO3 grasp the concepts of nation, nationalism and self-determination
				CO4-the need to strive for higher education, economic status and liberation from an imbalanced justice system.
	<b>POLITICAL INSTITUTIONS (CONCEPTS, THEORIES AND INSTITUTIONS)</b>	<b>PAPER-II</b>	<b>SEMESTER – I</b>	CO1 enables students to have an insight into the legal principles and their role in society
				CO2 understanding analytically various phenomena in immediate social environment.
				CO3 This course acquaints students with the constitutional design of state structures and institutions, and their actual working overtime.
				CO 4 Motivate the students in civil engagement with rights and duties .
	<b>INDIAN CONSTITUTION</b>	<b>PAPER-III</b>	<b>SEMESTER – III</b>	<b>CO1: Understand the meaning and importance of Constitution</b>
				<b>CO2: Explain about making of Indian Constitution - contribution of Constituent assembly on it.</b>
				<b>CO3: Describe the Salient (Outstanding) features of Indian Constitution.</b>
				<b>CO4: Describe the importance of Preamble of the Indian Constitution and its significance.</b>
	<b>INDIAN POLITICAL PROCESS</b>	<b>PAPER-IV</b>	<b>SEMESTER – IV</b>	<b>CO 1- Understanding basic concepts of Liberty, Equality, Rights, Law and Justice.</b>
				CO 2-Analysing what is Politics and explaining the approaches to the Study of Political Science – Normative, Behavioral, Post Behavioral, Feminist
				CO 3 Investigating the nature and scope of Comparative Politics.
				CO 4 Examining the Fundamental Rights and Duties of Indian citizens with a study of the significance and status of Directive Principles.
	<b>INDIAN POLITICAL THOUGHT</b>	<b>PAPER-V</b>	<b>SEMESTER – V</b>	CO 1- Outlining the basic values and philosophy of Indian Constitution as expressed in the Preamble.
				CO 2- Studying Fundamental rights , duties and Directive Principles of State Policy.
				CO 3- Examining Indian federalism through Centre-state relations.
				CO 4- Evaluating the structures of government at the National level.

	WESTERN POLITICAL THOUGH	PAPER-VI	SEMESTER – V	CO1 familiarity with the ideas or concepts of some major western political thinkers will help the students to understand different perspectives and approaches to state, politics, government, sovereignty, citizenship
				CO2 this course will enable the student to make sense of and interpret the major developments and key debates in the political debates and discussions in any contemporary society and polity.
				CO3 Western political thought concentrates principally on the history of the West and different issues confronting it.
				CO4 This allows key themes (such as justice, the nature of the state, citizenship, and the role of religion) to be explored across the long-term development of western political thought.
	(ELECTIVE): MAJOR ISSUES IN INDIAN POLITICS	PAPER-VII-(A)	SEMESTER – VI	CO1The learner acquires the ability to reflect on social and ethical responsibilities in his/her professional life.
				CO2.The learner becomes able to assess the impact of the economic, social, and political environment from a global, national and regional level.
				CO3provides the students with a rigorous conceptual framework, basic analytical tools and sound methodological training in the discipline
				CO4 The program covers the major fields of Political Science (Comparative Politics, International Relations, Political Theory, Public Administration and Indian State and Society) and offers a rich set of specialization possibilities.

S.NO	SEMESTER	TITLE OF THE COURSE	CO NUMBER	COURSE OUTCOME
	I	Computer Fundamentals & Photoshop	CO 1	To explore basic knowledge on computers
			C01	To impart knowledge on number systems
			C02	To learn how to create images and edit images in Photoshop
			C03	To learn how to use various filters in Photoshop that will bring beauty to the images
			C04	To create own images and banners using options of photoshop
			C05	To retouch the images
	II	PROGRAMMING IN C	C01	Appreciate and understand the working of a digital computer
			C02	Analyze a given problem and develop an algorithm to solve the problem
			C03	Develop an algorithm for solving a given problem.
			C04	Understand "C" language constructs like Iterative statements, Array processing, Pointers, etc.
			C05	Apply "C" language constructs to the algorithms to write a "C" language program.
	III	OBJECT ORIENTED PROGRAMMING USING JAVA	C01	Understand the concept and underlying principles of Object-Oriented Programming
			C02	Understand how object-oriented concepts are incorporated into the Java programming language
			C03	Develop problem-solving and programming skills using OOP concept
			C04	Understand the benefits of a well structured program
			C05	Develop the ability to solve real-world problems through software development in high-level programming language like Java
			C06	Develop efficient Java applets and applications using OOP concept
			C07	Become familiar with the fundamentals and acquire programming skills in the Java language.
	IV	DATA STRUCTURES USING JAVA	C01	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
			C02	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
			C03	Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
			C04	Demonstrate different methods for traversing trees
			C05	Compare alternative implementations of data structures with respect to performance
			C06	Compare and contrast the benefits of dynamic and static data structures implementations
			C07	Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack .
			C08	Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.
	V	DATABASE MANAGEMENT SYSTEMS	C01	Gain knowledge of Database and DBMS.
			C02	Understand the fundamental concepts of DBMS with special emphasis on relational data model.
			C03	Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
			C04	Model database using ER Diagrams and design database schemas based on the model.
			C05	Create a small database using SQL.
			C06	Store, Retrieve data in database.
	V	SOFTWARE ENGINEERING	C01	Ability to gather and specify requirements of the software projects.
			C02	Ability to analyze software requirements with existing tools
			C03	Able to differentiate different testing methodologies
			C04	Able to understand and apply the basic project management practices in real life projects
			C05	Ability to work in a team as well as independently on software projects
	VI	Web Technologies	C01	To understand the web architecture and web services.
			C02	To practice latest web technologies and tools by conducting experiments.
			C03	To design interactive web pages using HTML and Style sheets.
			C04	To study the framework and building blocks of .NET Integrated Development Environment.
			C05	To provide solutions by identifying and formulating IT related problems.
	VI	Distributed Systems	C01	To create models for distributed systems.
			C02	To apply different techniques learned in the distributed system.
			C03	To impart knowledge of Inter-process communication
			C04	To learn the concepts of Distributed Mutual Exclusion and Distributed Deadlock Detection algorithm.

	VI	Cloud Computing	C01	Compare the strengths and limitations of cloud computing				
			C02	Identify the architecture, infrastructure and delivery models of cloud computing				
			C03	Apply suitable virtualization concept.				
			C04	Choose the appropriate cloud player , Programming Models and approach.				
			C05	Address the core issues of cloud computing such as security, privacy and interoperability				
			C06	Design Cloud Services and Set a private cloud				

	2016-17			
	ELECTRONICS			
<u>S.NO</u>	<b>Semester</b>	<b>Title of the course</b>	<b>COURSE NO</b>	<b>Course outcomes</b>
	<b>1 SEMESTER-I</b>	<b><u>BASIC CIRCUIT THEORY</u></b>		<b>To explain the basic concepts and laws of DC and AC electrical networks and solve them using mesh and nodal analysis techniques.</b>
				<b>To analyze circuits in time and frequency domain.</b>
				<b>To synthesize the networks using passive elements.</b>
				<b>To understand the construction, working and VI characteristics of electronic devices.</b>
				<b>To understand the concept of power supply.</b>
	<b>2 SEMESTER-II</b>	<b><u>Electronic Devices and Circuits</u></b>		<b>Apply time and frequency concepts of analysis.</b>
				<b>Synthesize the network using passive elements.</b>
				<b>Know about amplifier circuits, switching circuits and oscillator circuits their design and use in electronics.</b>
				<b>Design and construction of a power supply.</b>
	<b>3 SEMESTER – III</b>	<b>Digital Electronics</b>		<b>To understand the number systems, Binary codes and Complements.</b>
				<b>To understand the Boolean algebra and simplification of Boolean expressions.</b>
				<b>To analyze logic processes and implement logical operations using combinational logic circuits.</b>
				<b>To understand the concepts of sequential circuits and to analyze sequential systems in terms of state machines.</b>



			<b>To understands characteristics of memory and their classification.</b>
			<b>To implement combinational and sequential circuits using VHDL</b>
4 SEMESTER – IV	Analog and Digital ic-pplications		<b>To understand the concepts, working principles and key applications of linear integrated circuits</b>
			<b>To perform analysis of circuits based on linear integrated circuits.</b>
			<b>To design circuits and systems for particular applications using linear integrated circuits.</b>
			<b>To introduce students to various modulation and demodulation techniques of analog communication.</b>
			<b>To analyse different parameters of analog communication techniques.</b>
			<b>It also focuses on Transmitters and Receivers.</b>
5 SEMESTER – V	<u>MICROPROCESSOR SYSTEMS</u>		· <b>To understand basic architecture of 16 bit and 32 bit microprocessors.</b>
			· <b>To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.</b>
			· <b>To understand techniques for faster execution of instructions and improve speed of</b>
			<b>operation and performance of microprocessors</b>
			· <b>To understand RISC based microprocessors.</b>
			· <b>To understand concept of multi core processors.</b>
6 SEMESTER – VI	<b>MICRO CONTROLLER AND INTERFACING</b>		· <b>To understand the concepts of microcontroller based system.</b>

				<b>· To enable design and programming of microcontroller based system.</b>
				<b>To know about the interfacing Circuits</b>