KTSP Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Science Faculty

Program Outcome:

1. Students should be able understand basics of Physics, Chemistry, Botany, Zoology, Mathematics and Statistics.
2. Students should be able to understand theory behind the laboratory experiments of Physics, Chemistry, Botany, Zoology, Mathematics and Statistics.
3. Students should be able to communicate the scientific ideas effectively.
4. Students should be to develop the communication skills, personality development, and interview techniques.
5. Students should be able to preparation of application for job, presentation techniques.
6. Students should be able to develop the thinking power in scientific problems.
7. Students should be able to develop in such a way to handle unexpected situation.
8. Arrange the campus interview of national and multinational companies.
9. Arrange the program such that, How to face the interview in government and non government offices.
10. Training for MPSC/UPSC/Banking examination.
11. Develop the social awareness, environmental awareness.
12. Develop the ethical, moral and social values in personal.
13. Develop the innovation and development skill in science.
14. Students should be able to prepare the project and project writing skill.
15. Students should be able to develop business ideas and skill.

Department of Chemistry

B.Sc. Chemistry

Programme Outcomes (PO's)

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

1. Understand the central role of chemistry in our society and use as a basis for ethical behavior.

2. Provide foundation in the fundamentals & application of current chemical & scientific theories.

3. Impart skills in planning and conducting advanced chemical experiments & applying structural-chemical characterization.

4. Prepare laboratory reports that provide a description of the experiment & reasoning clearly.

5. Identify, formulate, analyze & solve problems in the analysis of chemical compounds.

Programme Specific Outcome (PSO's)

1. Student will have knowledge about fundamentals chemical and scientific theories and their applications.

2. Students familiar with the different branches of chemistry like Organic, Inorganic, Physical, Industrial, Medicinal, Analytical, Forensic, Environmental, Biochemistry.

3. Student able to prepare sample for solution preparation, prepare solution of various concentration for synthesis and analysis purpose

4. Students able to find procedure form literature to synthesize separate & purify compounds in laboratory and characterize using proper instrumentation techniques.

5. Understand the causes of environmental pollution and aware about steps to control Environmental Pollution.

6. Develops analytical and problem-solving skills among student.

7. Student able to use appropriate techniques for the qualitative and quantitative techniques for Chemical Analysis.

8. Use of Chemistry software's useful in future career such as Research, Industries & Academia.

Class	Semester	Paper no. & code	Subject	Course outcome
F. Y. B. Sc.	Ist	1 and CH101	Physical Chemistry	At the end of course student, 1.Students will be able to apply thermodynamic principles to physical and chemical process Calculations of enthalpy, Bond energy, 2.Bond dissociation energy, resonance energy. 3.Variation of enthalpy with temperature – Kirchoff's equation. 4.Third law of thermodynamic and its applications. 5.Relation between Free energy and equilibrium and factors affecting on equilibrium constant. 6.Exergonic and endergonic reaction. 7.Gas equilibrium, equilibrium constant and molecular interpretation of equilibrium constant. 8.Van't Haff equation and its application. 9.Concept to ionization process occurred in acids, bases and pH scale. 10.Related concepts such as Common ion effect hydrolysis constant, ionic product, solubility product. 11.Degree of hydrolysis and pH for different salts , buffer solutions.
		2 and CH102	Organic Chemistry	At the end of course student, 1.The students are expected to understand the fundamentals, principles, and recent developments in the subject area. 2.It is expected to inspire and boost interest of the students towards chemistry as the main subject. 3.To familiarize with current and recent developments in Chemistry. 4.To create foundation for research and development in Chemistry.

		3 and CH103	Chemistry Practical Course I	At the end of course student, 1.Importance of chemical safety and Lab safety while performing experiments in laboratory 2.Determination of thermochemical parameters and related concepts 3.Techniques of pH measurements 4.Preparation of buffer solutions 5.Elemental analysis of organic compounds (non instrumental) 6.Chromatographic Techniques for separation of constituents of mixtures
F. Y. B.Sc.	IInd	1 and CH201	Inorganic Chemistry	At the end of course student, 1.Understand quantum mechanical approach to atomic structure 2. Know periodicity of elements 3.Understand theories for chemical bonding. 4. Know the various types of bonds 5. Types of hybridization 4. Discuss assumption and need of VSEPR theory.
		2 and CH202	Analytical Chemistry	At the end of course student, 1.Know about basics of analytical chemistry. 2.Know some analytical techniques of analysis. 3.Define term mole, milimole, molar concentration, molar equilibrium concentration and Percent Concentration. 4. Qualitative analysis of organic compounds-type determination, element detection, purification techniques 4.Understand theoretical background for Paper and Thin Layer Chromatography. 5. Application of pH meter
		3 and CH203	Chemistry Practical –II	At the end of course student, 1.Aware with Inorganic Estimations using volumetric analysis 2.Able to synthesize some Inorganic compounds by following given procedure 3.Analyze commercial products available in the market 4.Able to purify organic compounds.
S. Y. B.Sc.	IIIrd	1 and CH301	Physical and Analytical	At the end of course student, 1. Explain concept of kinetics, Rate of

			Chemistry	reaction, rate laws, and order. 2. Derive integrated rate laws, expression for half-life and examples of zero order, first order, and second order reactions, Graphical method, Energy of activation, Arrhenius equation 3. Define adsorption, classification of given processes into physical and chemical adsorption, Classification of adsorption isotherms, Langmuir adsorption isotherm, Freudlich's adsorption, BET Theory. 4. Discuss the types of volumetric analysis methods –Neutralisation titrations, complexometric titrations, Redox titrations, Precipitation titration 5. Apply volumetric methods of analysis to real problem in analytical chemistry. 6. Define and explain the meaning of accuracy and precision, solved problems based on standard deviation.
		2 and CH302	Inorganic and Organic Chemistry	At the end of course student, 1. Explain molecular orbital theory, Werner's theory of coordination compounds 2. Define different terms related to molecular orbital theory and coordination chemistry 147 3. Explain synthesis of aromatic hydrocarbons, mechanism of reactions involved. 4. Explain important reactions of aromatic hydrocarbon. 5. Write / discuss the mechanism of Nucleophilic Substitution (SN1, SN2 and SNi) reactions. 6. Identify and draw the structures alcohols / phenols from their names or from structure name can be assigned.

		3 and CH303	Practical Chemistry-III	At the end of course student, 1. Correlate theory to experiments. 2. Understand systematic methods of identification of substance by chemical methods. 3. Perform organic and inorganic synthesis and trace chemical reaction by suitable method i.e. (colour change, ppt. formation, TLC). 4. Set up the apparatus / prepare the solutions - properly for the designed experiments. 5. Perform the quantitative chemical analysis of substances explain principles behind it. 6. Systematic working skill in laboratory will be imparted in student.
	IVth	1 and CH401	Physical and Analytical Chemistry	At the end of course student, 1. Define the terms in phase equilibria such as- system, phase in system, components in system, degree of freedom, one / two component system, phase rule, etc. 2. Explain thermodynamic aspects of Ideal solutions-Gibbs free energy change, Volume change, Enthalpy change and entropy change of mixing of Ideal solution. 3. Explain solubility of partially miscible liquids- systems with upper critical. Solution temperature, lower critical solution temperature and having both UCST and LCST. 4. Define different terms in conductometry such as electrolytic conductance, resistance, conductance, Ohm's law, cell constant, specific and equivalent conductance, molar conductance, Kohlrausch's law, etc. 5. Apply conductometric methods of analysis to real problem in analytical laboratory. 6. Explain terms in Colorimetry such as radiant power, transmittance, absorbance, molar, Lamberts Law, Beer's Law, molar absorptivity 7. Apply colorimetric methods of analysis

				to real problem, analysis in analytical laboratory.
		2 and CH402	Inorganic and Organic Chemistry	At the end of course student, 1. Explain different types of isomerism in coordination complexes. 2. Apply principles of VBT to explain bonding in coordination compound of different geometries, limitation of VBT. 3. Explain principle of CFT. 4.Explain spectrochemical series, tetragonal distortion / Jahn-Teller effect in Cu (II) Oh complexes. 148 5. Explain structure, synthesis, mechanism reactions aldehydes and ketones, carboxylic acids and their derivatives, amines and cyclohexane. 6.Give synthesis diazonium salt from amines and reactions of diazonium salt.
		3 andCH403	Practical Chemistry-IV	At the end of course student, 1. Correlate the theory to the experiments. Understand / verify theoretical principles by experiment or explain practical output with the help of theory. 2. Understand systematic methods of identification of substance by chemical methods. 3. Write balanced equation for all the chemical reactions performed in the laboratory. 4. Perform organic and inorganic synthesis and able to follow the progress of the chemical reaction. 5. Set up the apparatus properly for the designed experiments. 6. Perform the quantitative chemical analysis of substances and able to explain principles behind it.
T. Y. B. Sc.	Vth	1 and CH501	Physical Chemistry-1	At the end of course student, 1.Know historical of development of quantum mechanics in chemistry and understand terms involved in quantum chemistry. 2.Understand the term additive and constitutive properties. 3.Explain Raman spectra: Concept of polarizability, Pure rotational Raman spectra of diatomic molecules, Energy

				Expression, Selection rule, Rotational energy level diagram, Rotational Raman spectrum and Problems 4. Discuss difference between thermal and photochemical processes. 5.Know photochemical reactions: photosynthesis, photolysis, photocatalysis, photosensitization, Various photochemical phenomena like fluorescence and phosphorescence, Chemiluminescence, 6.Solve numerical Problems.
		2 and CH502	Analytical Chemistry- I	At the end of course student, 1. Explain different principles involved in the gravimetry, spectrophotometry, parameters in instrumental analysis, qualitative analysis. 2. Perform quantitative calculations depending upon equations student has studied in the theory. Furthermore, student should able to solve problems on the basis of theory. 3. Design analytical procedure for given sample, discuss procedure for different types analyses included in the syllabus. 4. Select particular method of analysis if analyte sample is given to him. 5. Differentiate / distinguish / Compare among the different analytical terms, process and analytical methods. 6. Apply whatever theoretical principles he has studied in theory during practical session in laboratory.
		3 and CH503	Physical Chemistry Practical – I	At the end of course student, 1.Determine specific refractivity's of the given liquids 2.Calibrate and use pH meter for analysis. 3. Prepare of buffer solutions and measure its pH. 4.Determine the indicator constant of methyl red indicator by colorimetry 5.Determine the titration of a mixture of weak acid and strong acid with strong alkali. 6. Do qualitative analysis of vitamin by Photoflurometry.

		4 and CH504	Inorganic Chemistry – I	At the end of course student, 1. Explain electro-neutrality principle and Nephelauxetic effect towards covalent bonding, explain Charge Transfer Spectra 2. Explain MOT of Octahedral complexes with sigma bonding and compare the different approaches to bonding in Coordination compounds. 3. Understand Tran's effect and applications of Trans effect, Stereochemistry of mechanism 4. Gain the knowledge of inorganic reaction mechanisms available in the literature to solve chemical problems. 5. Explain metal, non-metal, insulator & semiconductor with intrinsic and extrinsic properties.
		5 and CH505	Industrial Chemistry – I	At the end of course student, 1. Know various industries, aspects and importance of chemical industry. 2. Explain manufacture of sugar, fruit juice, dye, soap and pigment 3. Aware of Fermentation Industry and manufacturing of ethyl alcohol by using molasses and fruit juice. 4. Understand chemistry of soap and different types of soap products, 5. Explain: Dyes its classification, synthesis, Structures, properties and applications of dyes.
		6 and CH506	Inorganic Chemistry Practical – I	At the end of course student, 1.Verify theoretical principles experimentally 2.Conceptual understanding of electrogravimetric principle, Numerical Problems 3.Principles of common ion effect and solubility product, Formation of complex ion 4.Factors affecting on solubility of precipitation 5. Prepare of inorganic complexes and spot tests for metal ions and ligands: 6. Qualitative and confirmatory tests of inorganic toxicants.
		7 and	Organic	At the end of course student,

		CH507	Chemistry – I	1.Define and classify, draw structure, synthesis polynuclear and hetreonuclear aromatic hydrocarbons & Understood their reactivity, meaning of active methylene group & its Reactivity 2.To predict product with planning or supply the reagent/s for these reactions 3.Learnt different types of rearrangement and intermediate formed 4. Able to write the mechanism of rearrangement reactions and their applications 5.Understand stereochemistry by using models and learn reactivity of geometrical isomers 6. Orientation and reactivity in E1 and E2 elimination and factors affecting them 7.Use of Hoffmann and Saytzeff's Orientation as per stereochemistry.
		8 and CH508	Chemistry of Biomolecules	At the end of course student, 1.Understood the Cell types its Biological composition 2.Award with different biomolecules and their stereochemistry 3. Award with types of carbohydrates with examples their chemical and structural properties, their biochemical significance 4. Know to the types of lipids with examples, structure of lipids, properties of lipids 5. Learnt structure and types, properties & structure of amino acids & protein 6. Known to enzymes with subclasses and examples and their industrial applications 7. Learnt Basic concepts of Endocrinology, 8. Student understood the different types of Endocrine glands with their hormones, biological nature and mechanism of action.
		9 and CH509	Organic Chemistry Practical I	At the end of course student, 1.Separate, purify and analyse binary water-soluble and water insoluble mixture. 2.Understand the techniques involving drying and recrystallization by various method. 3. Learn the confirmatory test for various functional groups, special elements.

				4. Systematic working skill in laboratory will be imparted in student. 5.Learn the basic principles of green and sustainable chemistry. 6.Learn the preparations of derivative various functional groups aspects of electrical experiments. 7.Use of Chromatogragraphic techniques in chemical analysis.
		10 and CH510A	Introduction to Medicinal Chemistry	At the end of course student, 1. Award with fundamentals of medicinal chemistry and its importance 2. Understood concept of Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics, metabolites, antimetabolites and therapeutic index 3.Understood overall process of drug discovery & drug mechanism of action 4. Importance of stereochemistry of drugs and receptors for biological effect. 5.Know mechanism of action of drugs belonging to the classes of infectious and noninfectious diseases.
		11 and CH511A	Environmental Chemistry	At the end of course student, 1. Understand importance and conservation of environment, biogeochemical cycles, Hydrological Cycle. 2. Know water resources and water quality parameters 3. Aware of organic and inorganic pollutants, surfactants, toxic chemicals causing water pollution 4. Understand water parameters monitoring techniques and methodology.
	VIth	1 and CH601	Physical Chemistry-II	At the end of course student, 1.Understand concepts in electrochemistry, electrochemical series, electrodes, Primary Batteries, Secondary Batteries, etc. 2.Explain diagram, Construction, representation, working and limitation of primary reference electrode, calomel electrode, glass electrode, silver-silver chloride electrode. 3.Know types of Reversible electrodes with respect to examples, diagram, representation, construction, working

				(electrode reactions) and electrode potential. 4.Explain the term crystallography and laws of crystallography. 5.Understand Radioactivity, types of radioactive decay types and properties of radiations, detectors and application of radioisotopes 6. Solve the problems.
		2 and CH602	Physical Chemistry-III	At the end of course student, 1.Understand meaning of the terms-Solution, electrolytes, non electrolytes and colligative properties, 2.Know application of colligative properties to determine molecular weight of non electrolyte, abnormal molecular weight, 3. Factors affecting on solid state reactions, 4.Explain phenomena of photoconductivity, conductors and insulators, semiconductors 5. Numerical based on cohesive energy.
		3 and CH603	Physical Chemistry Practical –II	At the end of course student, 1.Understand method of analysis by potentiometric titration, pH-metric titration, turbidometry 2.Explain colligative properties of material like polymer. 3.Determine the molecular weight of solute by depression in freezing point method 4.Prepare buffer solutions and measure its pH by pH-metry. 5.Analyze of crystal structure from X-ray diffraction spectra.
		4 and CH604	Inorganic Chemistry –II	At the end of course student, 1. Understand organometallic chemistry, method of synthesis of compounds 2. Know the phenomenon of catalysis, its basic principles and terminologies. 3. Understand the role of metals in non-enzymatic processes. 4. Explain the functions of hemoglobin and myoglobin in O2 transport and storage. 5. Know thy types of Inorganic polymers, comparison with organic polymers, synthesis, structural aspects of Inorganic

				polymers.
		5 and CH605	Inorganic Chemistry –III	At the end of course student, 1. Learn the concept of acid, base and their theories. 2. Know the crystal structures of solids, simple cubic, BCC and FCC structures 3. Know the defects in Ionic solids, differentiate between the defects. 4. Synthase Zeolite and their structure, Know application of zeolites 5. Learn various methods of nanoparticle synthesis 6. Know toxic chemical in the environment, explain biological methylation.
		6 and CH606	Inorganic Chemistry Practical –II	At the end of course student, 1. Volumetric Estimations of Calcium, Cu, Phosphate, Iodine from products 2. Estimation of Na, K by flame photometry by calibration curve method and regression method. 3. Purification of water using cation/anion exchange resin and analysis by qualitative analysis 4. Synthesize nanoparticles of silver, ZnO. 5. Explain UV spectra of nanomaterial.
		7 and CH607	Organic Chemistry –II	At the end of course student, 1. Award with principle & instrumentation in UV, Mass, IR & NMR Spectroscopy. 2. Determine the structure of simple organic compounds on the basis of spectral data such as λ max values, IR frequencies, chemical shift (δ values). 3. Determine λ max value from structure of compound. 4. Read UV, Mass, IR & NMR Spectrum interpret them to determine structure of organic compound 5. Explain stereochemistry of cyclohexane and decalin.
		8 and CH608	Organic Chemistry –III	At the end of course student, 1. Use retrosynthesis for synthesis of target molecule from commercially available synthetic equivalents 2. Aware with the Terms - Disconnection, Synthons, Synthetic equivalence, FGI, TM.

				3. Apply knowledge of Organic Reaction Mechanism in Synthetic of organic compounds 4. Know oxidizing reagents and reducing reagents for synthesis of organic compound. 5. Explain natural products like terpenoids, Alkaloids and their importance.
		9 and CH609	Organic Chemistry Practical –II	At the end of course student, 1. Handling of chemicals & Glassware with safety 2. Able to read infrared spectrum Identify the functional group or groups present in a compound. Interpret IR and NMR spectra 3. Apply learnt Chemistry principles in practical 4. Trained with hands-on experience of modern extraction methods. 5. Able to determine and use chromatography techniques for purification, separation of organic compounds.
		10 and CH610A	Chemistry of Soils and Agrochemicals	At the end of course student, 1.Understood various components of soil and soil properties and their impact on plant growth. 2.Understood the classification of the soil. 3.Explores the problems and potentials of soil and decide the most appropriate treatment for land use. 4.Understood the Reclamation and management of soil physical and chemical constraints. 5.Useful in making decisions on nutrient dose, choice of fertilizers and method of application etc. practiced in crop production. 6.Got experience on advanced analytical and instrumentation methods in the estimation of soil. 7.Understood various Nutrient management concepts and Nutrient use efficiencies of major and micronutrients and enhancement techniques. 8.Proper understanding of chemistry of

				pesticides will be inculcated among the students. 9.Imparts knowledge on different pesticides, their nature and, mode of action and their fate in soil so as to monitor their effect on the environment.
		11 and CH611A	Analytical Chemistry-II	At the end of course student, 1. Define basic terms in solvent extraction, basics of chromatography, HPLC, GC, and AAS and AES. Some important terms are: solvent extraction, aqueous and organic phase, distribution ratio and coefficient, solute remain unextracted, percent extraction, ion association complex, theoretical plate, HETP, retention time, selectivity, resolution, stationary phase, normal and reverse phase, ion exchange, column efficiency, carrier gas, split and spitless injection, packed column, tubular column, atomic absorption and emission spectroscopy, electronic excitation in atoms, nebulization, atomization, reduction of metal ions in flame, absorbance by atoms in flame, flame atomizers, furnace atomizers, interference in AES and FES, HCL, hydride generator, etc. 2. Identify important parameters in analytical processes or estimations. Example: minimum analyte concentration in particular method, reagent concentration for particular analysis, reagent for particular analysis, reaction condition to convert analyte into measurable form, wavelength selection in HPLC with spectrophotometric and fluorometric detector, solvent or carrier gas in HPLC and GC, choice method for the sample preparation in atomic spectroscopic methods,choice of filter and HCL in atomic spectroscopic methods, etc. 3. Explain different principles involved in the analyses using solvent extraction, basics of instrumental chromatography, HPLC, GC, and atomic

				spectroscopic techniques. 4. Perform quantitative calculations depending upon equations students has studied in the theory. Furthermore, student should able to solve problems on the basis of theory. 5. Discuss / Describe procedure for different types analyses included in the syllabus. 6. Select particular method of analysis if analyte sample is given to him. 7. Differentiate / distinguish / compare among the different analytical terms, process and analytical methods. 8. Demonstrate / explain theoretical principles with help of practical. 9. Design analytical procedure for given sample.

KTSP Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Department of Physics

Program Specific Outcome:

PSO1: The students should be able to understand concepts in

- Classical Mechanics (Macroscopic systems)
- Quantum Mechanics (Microscopic systems)
- Electrodynamics (Electric, Magnetic fields and effects)
- Nuclear Physics (Radioactivity, nuclear reactions and applications)
- Programming in C (Flow chart, Algorithm & C programs)
- Electronics (Basic Linear & Digital Electronics)
- Thermodynamics and Statistical Physics (Basics of Kinetic theory of gases)
- Solid State Physics (Crystal structures, Characterization Techniques)
- Mathematical Methods in Physics (Coordinate Systems, Diff. equations)
- Atomic and Molecular Physics (Basics & Spectroscopy)
- Lasers (Basic Principles and types)
- Renewable Energy Sources (Energy sources and applications)

The students should be able to perform Practical's related to these courses and find their applications.

PSO2: The students should be able to understand concepts in

- Mathematical Physics I (Mathematical Basic concepts)
- Electronics I (Basic knowledge of electronic components)
- Oscillations, Waves and sound (Basic concepts of Sound waves and Oscillations)
- Optics (Basic knowledge of Lenses and optical instruments)

The students should be able to perform Practical's related to these courses and find their applications

PSO3: The students should be able to understand concepts in

- Mechanics and Properties of Matter (Newton's Laws of Motion and various properties of Matter)
- Physics principles and Applications (General structure of atom and molecules)
- Heat and Thermodynamics (Basic concept of Thermodynamics and Thermometry)
- Electricity and Magnetism (Basic concept of electricity and magnetism)

The students should be able to perform Practical's related to these courses and find their applications

Course Outcome:

Class	Semester	Paper (No &Code)	Subject	Course Outcome
FYBSc	I	PHY-111	Mechanics and Properties of Matter	1. To demonstrate Newton's laws of motion and methods to explain how to apply these laws in a problem. 2. Apply the equation of motion to one or two dimensions of the system in order to understand kinematics of the body under the various conditions of applied force. 3. Apply the knowledge in construction of beams, bridges, etc. 4. Apply knowledge in understanding the flow of liquid and surface tension applied on the surface of liquid. 5. To demonstrate problem solving skills in all covered topic.
		PHY-112	Physics principles and Applications	1. To understand the history, general structure and composition of atom as well as spectrum of hydrogen atom. 2. To understand the atomic excitation and LASER principles and its properties. 3. To understand the formation of molecules by bonding mechanism and its types. 4. To understand the Electromagnetic waves and EM spectrum. 5. To understand the production, sources and applications of EM waves. 6. To demonstrate problem solving skills in all covered topic.
		PYH-113	Physics Laboratory IA	1. To help students to learn various experimental and computational tools thereby developing analytical abilities to address real world problems. 2. To familiarize with recent scientific and technological developments. 3. To investigate the theoretical background of an experiment.

				4. Setup experimental equipment to implement an experimental approach
	II	PHY-121	Heat and Thermodynamics	1. To understand the fundamentals of thermodynamics. 2. Derive an expression for work done during isothermal and adiabatic change, Van der Waal's equation. 3. Discuss the zeroth, first and second law of thermodynamics. 4. Understand the concept of entropy. 5. Understand Carnot's cycles, heat engine, refrigerators, and air conditioning. 6. Discuss on types of thermometers. 7. Solve the problems related to above concepts.
		PHY-122	Electricity and Magnetism	1. To understand the concept of the electric force, electric field and electric potential for stationary charges. 2. Able to calculate electrostatic field and potential of charge distributions using Coulomb's law and Gauss's law. 3. To understand the dielectric phenomenon and effect of electric field on dielectric. 4. To Study magnetic field for steady currents using Biot-Savart and Ampere's Circuital laws. 5. To study magnetic materials and its properties. 6. Demonstrate quantitative problem solving skills in all the topics covered.
		PHY-123	Physics Laboratory IB	1. To help students to learn various experimental and electrical tools thereby developing analytical abilities to address real human problems. 2. To help students to build-up a progressive and successful in experimental Physics.
SYBSc	III	PHY-231	Mathematical Physics I	1. To understand the Complex numbers according to different forms of complex numbers, Argand diagram, and algebra of complex numbers. 2. To getting the concept of De-Moivre's theorem, and applications of complex numbers to find velocity and

				acceleration in curved motion. 3. To know the concepts of partial differentiation, it's types, and conditions for maxima and minima. 4. To understand vector algebra and analysis with scalar and vectors, dot product and cross product of two vectors. 5. To know the concept of differentiation of vectors, operators, scalar and vector fields and physical significance, and identities. 6. To demonstrate problem solving skills in all covered topic.
		PHY-232	Electronics I	1. Understand Kirchhoff's laws, Thevenin's, Norton's, Superposition and Maximum power transfer theorems. 2. Understand construction and working of UJT, BJT and find their applications. 3. Understand Operational amplifiers and their uses along with oscillators. 4. Understand number systems, logic gates, Boolean algebra and De Morgan's theorems. 5. Solve problems associated with the chapters from the syllabus.
		PHY-233	Physics Laboratory IIA	1. Acquire technical and calculating skills in using laboratory equipment, tools, and Materials 2. Demonstrate a capacity to collect data through study and/or conducting tests and interpreting data. 3. Demonstrate an understanding of laboratory procedures including safety, and technical methods. 4. Demonstrate a deeper understanding of abstract concepts and theories gain by experiencing and visualize them as real phenomena 5. Acquire the corresponding skills of mutual learning and teamwork in laboratory settings.
	IV	PHY-241	Oscillations, Waves and sound	1. To understand the Oscillations of particle according to variations of amplitude, velocity and frequency. 2. To getting the idea of Energy and

				quality factor of oscillations. 3. To understand the electrical oscillations and applications of oscillations like Lissajous figure in cloth industries. 4. To understand the types and formation of waves, energy of wave. 5. To understand the Doppler Effect and its applications. 6. To understand properties and features of sound. 7. To demonstrate problem solving skills in all covered topic.
		PHY-242	Optics	1. Understand lenses, types, magnification, equivalent focal length and concept of cardinal points. 2. Know different aberrations and achromatism. 3. Understand Simple and Compound microscope, Ramsden's and Huygens's eyepieces. 4. Know concepts of interference, diffraction with types and resolution. 5. Understand polarization, different laws and Nicol prism. 6. Solve problems associated with the chapters from the syllabus.
		PHY-243	Physics Laboratory IIB	1. Use various instruments and equipment. Design experiments to test a hypothesis and/or determine the value of an unknown quantity. 2. Investigate the theoretical background of an experiment. 3. Setup experimental equipment to implement an experimental approach. 4. Analyze the data, plot appropriate graphs and reach conclusions from data analysis. 5. Work in a group to plan, implement and report on a project/experiment. 6. Keep a well-maintained and instructive laboratory logbook.
TYBSc	V	PHY351	Mathematical Methods in Physics II	1. Understand Cartesian, Cylindrical, Spherical Polar and Curvininear Coordinates and expressions for Gradient, Divergence, Laplacian and Curl in Orthogonal Curvilinear

				Coordinates. 2. Understand basics of Special Theory of Relativity and problems 3. Solve Partial Differential Equations, understand method of separation of variables and obtain solutions to differential equations using Frobenius method. 4. Understand Special Functions and properties of them
		PHY352	Electrodynamics	1. To understanding of the electric force, field and potential. Work out electrostatic field and potential of simple charge distributions using Coulomb's law and Gauss's law. 2. To understanding of the dielectric and effect on dielectric due to electric field. 3. Demonstrate an understanding of the magnetic field for steady currents using Biot-Savart and Ampere laws and magnetization of materials. 4. Demonstrate quantitative problem solving skills in all the topics covered.
		PHY353	Classical Mechanics	1. To understand the Newton's law of motion, 2. To find the nature charged particle in electric and magnetic field, Centre of mass concept. 3. To understand equation orbit and Kepler's law of planetary motion. 4. To understand the Langrage's and Hamilton's method to solve the problems 5. To understand the concept of elastic and inelastic scattering.
		PHY354	Atomic and Molecular Physics	1. To understand the composition of atom and atomic spectra. 2. To understand the one and two valence electron system also getting ideas about spectral terms and coupling system. 3. To understand the Zeeman Effect and its types. 4. To understand the nature of X-ray and its applications. 5. To understand the Molecular

				spectroscopy and its energy levels. 6. To demonstrate problem solving skills in all covered topic.
		PHY355	Computational Physics	1. To understand concept of algorithm and flowchart.. 2. To understand basic structure of C-Program and all Syntax. 3. To understand the concept of arrays and pointers and user defined functions 4. To see the graphics in C 5. To write C programs for iterative methods and integrations. 6. To understand library functions and user defined functions.
		PHY356D	Renewable Energy Sources I	1. Knows the introduction of Energy sources. 2. To understand basic concept of solar cell and its applications 3. To understand the concept of Photovoltaic applications 4. To understand the concept of I-V Characteristics of solar cell 5. Knows the renewable energy sources.
		PHY- 357	Physics Laboratory-3A	1. Know the general physics practical and its basic concepts. 2. Understand basic concept of electromagnetism through practicals 3. Understand the concept of atomic and molecular physics through practicals.
		PHY- 358	Physics Laboratory-3B	1. Know the electronics practicals and its basic concepts. 2. Understand basic concept of algorithm, flowchart and C-Programming. 3. Know the uses of CRO, Signal generator and other instruments.
		PHY- 359	Physics Laboratory-3C	1. Know to select a problem for project 2. Study the literature associated with problem 3. Finalize the project method
	VI	PHY361	Solid State Physics	1. Understand different types of lattices,Miller indices, Crystal structures, Concept of Reciprocal Lattice 2. Know X ray Diffraction and Experimental

				Methods 3. Understand Free Electron and Band Theory of Metals, Hall Effect, Energy bands in Solids, 4. Understand Diamagnetism, Paramagnetism, Ferromagnetism, Antiferromagnetism, Superconductivity
		PHY362	Quantum Mechanics	1. Know Origin of Quantum Mechanics**,** Matter waves - De Broglie hypothesis and proof Heisenberg's uncertainty 2. To use the Schrodinger equation in various problems 3. Know Applications of Schrodinger Steady state equation like Free particle, Step potential, Potential barrier , Barrier penetration and tunnelling effect, Particle in infinitely deep potential well, Rigid rotator 4. Know Operators in Quantum Mechanics like Hermitian operator, Position, Momentum operator, angular momentum operator, and total energy operator (Hamiltonian), Commutators
		PHY363	Thermodynamics and Statistical Physics	1. To understand basic concept of Transport Phenomenon and Maxwell's equations. 2. To understand elementary concept of statistics. 3. To understand the concept of Statistical distribution of system of particles. 4. To understand the concept of statistical ensemble. 5. To understand Maxwell-Boltzman statistics, Bose-Eienstein statistics, Fermi-Dirac statistics
		PHY364	Nuclear Physics	1. To understand Basic properties of nucleus and its classification. 2. To understand concept of natural and artificial radioactivity and properties of radioactive material. 3. Students also get ideas of properties of nuclear forces, nuclear reactions and nuclear energy. 4. Students understand basic idea of nuclear accelerator and detector. Students also know the type of

				accelerator and detector. 5. Acquire the corresponding skills of mutual learning and teamwork in laboratory settings.
		PHY365	Electronics II	1. To understand LED, photodiode, optocoupler, BJT, and Field effect transistor. 2. To understand applications of semiconductor devices – three pin regulators, switching regulators, and modulation and demodulation. 3. To understands integrated circuits, op-amp, and timer IC-555. 4. To understands combinational and sequential circuits. 5. To solve problems associated with the chapters from the syllabus.
		PHY366S	Lasers	1. Understand basic concept of LASER and laser action. 2. Understand concept of laser oscillator. 3. To understand the concept of laser output. 4. Knows the types of lasers. 5. Knows the applications of Lasers.
		PHY- 367	Physics Laboratory-4A	1. Know the general physics Practicals and its basic concepts. 2. Understand basic concept of Thermodynamics and Statistical Physics Practicals 3. Understand the concept of Nuclear Physics and Quantum Physics Practicals.
		PHY- 368	Physics Laboratory-4B	1. Know the Electronics practical and its basic concepts. 2. Understand basic concept of acoustics through Practicals 3. Understand the concept of LASER Practicals.
		PHY- 369	Project	1. Perform the practical work. 2. Knows the Characterizations and the calculations for various factors 3. Finalize the conclusion,result and report writing .

K. T. S. P. MANDAL'S

Hutatma Rajguru Mahavidyalaya

Rajgurunagar, Pune.

Department of Zoology

(Course Offered B. Sc. I, B. Sc. II, B. Sc. III)

B.Sc. ZOOLOGY DEGREE PROGRAM OUTCOMES

PO1 – Students gain knowledge and develop skill over animal science, understands the interactions among various living organisms.

PO2 – Students are able to study animals of different phyla, their distribution and their relationship with the environment.

PO3 – Students are able to understand internal structure of cell, function of various cellular organelles.

PO4 - Understands the complex evolutionary processes and behavioral pattern of various animals.

PO5 – Students are able to correlate the physiological and biochemical processes of animals.

PO6 – Understanding of ecological factors, environmental conservation processes and its importance, pollution control and biodiversity and protection of threatened species.

PO7 – Gain knowledge about applied fields like Sericulture, fisheries, apiculture, poultry and dairy farms along with tissue preparation, molecular and statistical techniques.

PO8- Understanding various concepts of genetics and its important in human health.

PO9- Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties.

PO10- Apply the knowledge and understanding of Zoology to one's own life and work.

PO11- Develops empathy and love towards the animals

Program Specific Outcomes

POS1 – Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology.

PSO2 – Analyze the relationships among animals with their ecosystems.

PSO3 – Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell Biology, Genetics, Applied Zoology, Clinical Science, tools and techniques of Zoology, Toxicology, Sericulture, Biochemistry, Fish biology, Animal Biotechnology, Immunology and research methodology.

PSO4 – Understand the applications of Zoology in Agriculture, Medicine and daily life.

PSO5 – Gains knowledge about research methodologies, effective communication and skills of problem solving methods.

PSO6 – Contribute the knowledge for Nation building.

Course Outcomes

Class	Semester	Paper (Paper No & Code)	Subject	Course Outcome
F.Y.B.Sc	Sem I	Paper I ZO-111	Animal Diversity I	CO1: The student will be able to understand classify and identify the diversity of animals. CO2: The student understands the importance of classification of animals and classifies them effectively using the six levels of classification. CO3:The student knows his role in nature as a protector, preserver and promoter of life which he has achieved by learning, observing and understanding life.
	Semester I	Paper II, ZO-112	Animal Ecology	CO1: The learners will be able to identify and critically evaluate their taxonomy, own beliefs, values and actions in relation to professional and societal standards of ethics and its impact on ecosystem and biosphere due to the dynamics in population. CO2: To understand anticipate, analyse and evaluate natural resource issues and act on a lifestyle that conserves nature. CO3: The Learner understands and appreciates the diversity of ecosystems and applies beyond the syllabus to understand the local lifestyle and problems of the community.

				CO4: The learner will be able to link the intricacies of food chains, food webs and link it with human life for its betterment and for non-exploitation of the biotic and abiotic components. CO5: The working in nature to save environment will help development of leadership skills to promote betterment of environment.
	Semester I	Zoology Practical PaperZO-113	Animal Diversity I	CO1: Museum Study of phylum Protozoa: Euglena, Paramecium, Amoeba, Plasmodium sp. CO2: Museum study of Phylum Porifera: *Sycon*, *Euplectella, Chalina*, Spongilla. CO3: Museum study of phylum Cnidaria: *Hydra, Physalia, Aurelia, Metridium*. CO4: Museum Study of phylum Platyhelminthes: *Planeria, Faciola hepatica, Taenia solium* CO5: Study of Paramecium: Culture, External morphology, Conjugation and Binary fission. CO6: Study of permanent slides: Spicules and Gemmules in Sponges, T.S. of *Sycon*, T.S. of Hydra, Taeniasolium: Scolex, Gravid proglottid. CO7: Identification of any three museum specimen with help of

				taxonomic identification key. CO8: Visit to Zoological Survey of India (ZSI)/ Museum/ National Park.
	Semester I	Zoology Practical Paper ZO-113	Animal Ecology	CO1: Estimation of Dissolved oxygen from given water sample. CO2: Estimation of Water Alkalinity from given water sample. CO3: Study of animal community structure by quadrate method (Field or Simulation). CO4: Determination of density, frequency and abundance of species by quadrat method. CO5: Study of microscopic fauna of freshwater ecosystem (pond). CO6: Estimation of water holding capacity of given soil sample. CO7: Estimation of dissolved and free carbon dioxide from water sample. CO8: Study of Eutrophication in lake/river.

F.Y.B.Sc	Semester II	Zoology Practical Paper ZO-123	Animal diversity II & Cell biology	CO1: Museum study of Phylum Aschelminthes: *Ascaris lumbricoides*, CO2: Museum study of phylum Annelida: *Neries*, Earthworm, Leech. CO3: Museum study of phylum Arthropoda: Prawn, Cockroach, Centipede, Millipede, Crab CO4: Museum study of phylum Mollusca: *Pila*, *Chiton*, Bivalve, Octopus. CO5: Museum study of phylum Echinodermata: Sea Star, Sea urchin, Brittle Star, sea cucumber. CO6: Study of permanent slides: Mouthparts of Insects- Mandibulate, Piercing and sucking, Chewing and Lapping. CO7: Types of Shells in Mollusca. *Pila*, Bivalve, Chiton, Sepia. CO8: Economic importance of honey bees, Lac insects silk worms, red cotton bug, Anopheles mosquito CO9: Earthworm: vermi composting bin preparation and maintenance. CO10: Visit to a vermi composting unit/ field for insect pest collection and its identification

	Sem II	Paper II ZO-122	Cell biology	CO1: The learner will understand the importance of cell as a structural and functional unit of life. CO2: The learner understands and compares between the prokaryotic and eukaryotic system and extrapolates the life to the aspect of development. CO3: The dynamism of bio membranes indicates the dynamism of life. Its working mechanism and precision are responsible for our performance in life. CO4: The cellular mechanisms and its functioning depends on endo-membranes and structures. They are best studied with microscopy.
S.Y.B.Sc	Sem III & IV	Paper I&II ZO-232 & ZO-242	Applied Zoology I & II	CO1. The learner understands the basics about beekeeping tools, equipment, and managing beehives. CO2. The learner understands the basic information about fishery, cultural and harvesting methods of fishes and fish preservation techniques. CO3. The learner understands the biology, varieties of silkworms and the basic techniques of silk production. CO4. The learner understands the types of agricultural pests, Major insect pests of agricultural

				importance and Pest control practices.
S.Y.B.Sc.	Sem III & IV	Paper III & IV ZO-231 & ZO-241	Animal Diversity III & IV	CO1. The students will be able to understand, classify and identify the diversity of higher vertebrates. CO2. The students will able to understand the complexity of higher vertebrates CO3. The students will be able to understand different life functions of higher vertebrates. CO4. The students will be able to understand the linkage among different groups of higher vertebrates. CO5. The student will become aware regarding his role and responsibility towards nature as a protector, to understand his role as a trustee and conservator of life which he has achieved by learning, observing and understanding life.
T.Y.B.Sc.	Sem V	ZO 351	Pest Management	CO1. Define pest management. CO2. Describe the economic, ecological, and sociological benefits of IPM. CO3. Distinguish positive and negative impacts of pesticide use. CO4. Understand problems resulting from misuse, overuse, and abuse of chemical pesticides. CO5. Define and describe pesticide resistance and how it develops. CO6. Identify ecological and biological characteristics important in development of pest populations.

				CO7. Identify 10 tactics commonly used in IPM and be able to distinguish them. CO8. Understand society's role in IPM decisions. CO9. Describe different groups of pests and compare them to weeds and plant pathogens. CO10. Analyse and compare management tactics to determine the best approach to reducing pest populations, weeds, and disease presence. CO11. Locate appropriate, scientifically valid sources of information on specific tactics to manage insect pests, weeds, and diseases. CO12. Know and how to develop an IPM program.
	Sem VI	ZO 3511	Poultry Management	CO1. The students will be able to understand the Poultry farming practices. CO2. The students will able to understand the poultry breeding techniques. CO3. The students will be able to understand poultry rearing techniques. CO4. The students will be able to understand feeding requirement and food ingredients. CO5. The students will be able to understand the poultry disease and their pathogens. CO6. The students will be able to understand market value of poultry products.

	Sem VI	ZO 361	Medical & Forensic Zoology	CO1. The students will be able to understand the basics principles of Medical and Forensic Zoology. CO2. The students will able to understand scientific methods in crime detection. CO3. The students will be able to understand the advancements in the field of Medical and Forensic Zoology. CO4. The students will be able to understand modern tools, techniques and skills in forensic investigations. CO5. The students will be able to describe the fundamental principles and functions of forensic science and its significance to human society.
	Sem VI	ZO 364	Entomology	CO1. Understand basic concepts in Entomology and its scope. CO2. Learn morphology and anatomy of Insects. CO3. Understand the concept of social organization in Insects. CO4. Understand the development process of Insects. CO5. Identify disease causing insect vectors. CO6. Will be able to design and implement pest controlling methods against pests.

Programme Specific Outcomes (PSOs):

PSO.1.	Students will get thorough knowledge and able to compare different groups of plants such as Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms.
PSO.2.	Students will be aware of application of plants in various industries.
PSO.3.	Students will be able to explain plant functions at gene, genome, cellular and tissue level.
PSO.4.	Students will learn the experimental techniques in the area of specialization in Botany.
PSO.5.	Students will able to understand the research and address practical problem.
PSO.6.	Enable the students to become entrepreneur.
PSO.7.	Equip students with skill related to laboratory and industry based studies.
PSO.8.	Students will be able to apply the knowledge of artificial vegetative propagation methods to establish plant nurseries.

KTSP Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Science faculty – CBCS Pattern

Department of Botany

Course Outcome

Class	Semester	Paper (Paper No. & Code)	Subject	Course Outcome
F.Y.B.Sc.	I	Paper-I; BO 111- Plant Life and Utilization - I	Botany	CO-1. Distinguish between Cryptogams and Phanerogams. CO-2. Identify the general characters of Cryptogams and Phanerogams. CO-3. Know the systematics, morphology and structure of algae, fungi , lichens and bryophytes. CO-4. Identify algae, fungi , lichens and bryophytes. CO-5. Know life cycle pattern of algae, fungi , lichens and bryophytes. CO-6. Know economic importance of algae, fungi , lichens and bryophytes.
		Paper II; BO 112- Plant Morphology and Anatomy		CO-1. Identify the importance of plant morphology and anatomy. CO-2. Explain morphology of reproductive parts of plants. CO-3. Identify the types of inflorescences, flowers and fruits. CO-4. Distinguish between simple, aggregate and multiple fruits. CO-5. Explain types of plant tissues CO-6. Describe the anatomy of Monocot and dicot plants.
		Paper III; BO 113- Practical based on BO 111 & BO 112		CO-1. Recognize the live forms of algae, fungi , lichens and bryophytes. CO-2. Identify the applications of plants for the welfare of human beings. CO-3. Analyze and describe botanical concepts in plant morphology and anatomy. CO-4. Recognize different types of inflorescences, flowers and fruits. CO-5. Categorize the plants into dicots and monocots. CO-6. Illustrate floral parts, fruits and plant tissues.

	II	Paper-I; BO 121- Plant Life and Utilization II		CO-1. Know the systematics, morphology and internal structure of pteridophytes, gymnosperms and angiosperms. CO-2. Identify pteridophytes, gymnosperms and angiosperms. CO-3. Know reproduction and life cycle pattern of pteridophytes, gymnosperms and angiosperms. CO-4. Know economic importance of pteridophytes, gymnosperms and angiosperms. CO-5. Distinguish between Dicots and Monocots. CO-6. Identify the economic importance of angiosperms in the field of food, fodder, fiber, horticulture and medicine.
		Paper-II; BO 122- Principles of Plant Science		CO-1. Understand the definition, importance and scope of plant physiology. CO-2. Understand various processes like diffusion, osmosis, plasmolysis and imbibition and their significance in plant's life. CO-3. Understand phases of growth in plants, factors affecting growth, plant growth regulators and their significance. CO-4. Know the structure of plant cell, differences between prokaryotic and eukaryotic cell, structure and functions plant cell wall, plasma membrane, chloroplast, mitochondria and endoplasmic reticulum. CO-5. Understand the cell cycle in plants, it's importance and the different stages of mitosis and meiosis. CO-6. Understand definition and scope of molecular biology and central dogma. CO-7. Know the structure of DNA and RNA, Chargaff's rule, C-value paradox, packing of DNA into chromosomes, types of chromosomes and RNA, CO-8. Know the process of DNA replication.
		Paper-III; BO 123- Practical based on BO 121 & BO 122		CO-1. Recognize the live forms of pteridophytes, gymnosperms, dicots and monocots. CO-2. Identify the economic importance of pteridophytes and gymnosperms. CO-3. Understand about utilization and economic importance of angiosperms for food, fodder, fiber, horticulture and medicines. CO-4. Identify and differentiate between dicots and monocots and prokaryotic and eukaryotic cells CO-5. Recognize the various stages of mitosis and meiosis. CO-6. Demonstrate the process of osmosis and plasmolysis in plants CO-7. Extract DNA from plants and check its purity. CO-8. Able to estimate Chlorophyll-a & b from plant tissues.

S.Y.B.Sc.	III	Paper-I; BO:231- Taxonomy of Angiosperms and Plant Ecology	Botany	CO-1: Understand concept of plant taxonomy and systematics and about identification, classification and nomenclature. CO-2: Know about the types, with merits and demerits of artificial, natural and phylogenetic system of classification. CO-3: Know about the use of various sources of data for systematic, history and principles of ICN, rules of coining of generic and specific epithets and taxa names, Type specimen and its type. CO-4: Understand the comparative account, distinguishing features and economic importance of angiosperm families. CO-5: Know the definition and concept of ecology, methods of vegetation sampling, ecosystem diversity. CO-6: Understand plant communities and ecological adaptations in plants.
		Paper-II; BO 232- Plant Physiology		CO-1: Understand the definition, importance, scope and applications of plant physiology and contributions of various plant physiologists. CO-2: Understand plants and plant cells in relation to water and various processes like diffusion, osmosis, plasmolysis and imbibition. CO-3: Learn about absorption of water, movement of sap, Transpiration and its significance, Antitranspirants, Guttation, Exudation CO-4: Understand nitrogen metabolism, seed dormancy and flowering physiology.
		Paper-III; BO 233- Practicals Based on BO 231 and 232		CO-1: Describe flowering plants in botanical terms and identify the distinguishing characters of plant families. CO-2: Distinguish Hydrophytes and Xerophytes based on the external and internal characters and identify their adaptive characters. CO-3: Survey the vegetation by list count quadrat method. CO-4: Identify and use different taxonomic tools and ecological instruments. CO-5: Know the phytochemical test for starch and protein. CO-6: Learn the processes like plasmolysis, LPC,DPD, transpiration, curling and imbibition in different plants. CO-7: Know the use and functions of Arc Auxanometer, Spectrophotometer, and Commercial biofetilizers. CO-8: Understand the germination percentage and vigor index.
	IV	Paper-I; BO 241 -Plant		CO-1: Understand the definition and scope of plant

		Anatomy and Embryology		anatomy and about types of tissues. CO-2: Learn about structure, function, types and distribution of epidermal, mechanical and vascular tissue system. CO-3: Know about the process of normal secondary growth and structures like annual rings, periderm, bark, tyloses and lenticels. CO-4: Understand the causes and process of anomalous secondary growth in *Bignonia* ,*Raphanus*, and *Dracaena.* CO-5: Know the definition and scope of Plant embryology and about the structure of microsporangium, process of microsporogenesis and male gametophyte development. CO-6: Understand structure of megasporangium, types of ovules, megasporogenesis and female gametophyte. CO-7: Learn about the process of pollination and fertilization, types of endosperm and structure of monocot and dicot embryo.
		Paper-II; BO 242 -Plant Biotechnology		CO-1: Learn about the definition, concept, scope and interdisciplinary nature of biotechnology. CO-2: Understand about the concept of plant tissue culture, basic techniques with their applications. CO-3: Know about SCP, their need, economic implications and acceptability and their production from *Spirulina* and yeast. CO-4: Know about tools of genetic engineering and its applications in agriculture CO-5: Understand about genomics, proteomics, Bioinformatics, Bioremediation and Biofuel technology.
		Paper-III; BO 243-Practicals Based on BO 241 & 242		CO-1: Prepare slides, observe and understand epidermal tissues, mechanical tissues and their distribution and the process of normal and anomalous secondary growth in different plants. CO-2: Know about tetrasporangiate anther, ovules and embryo in monocots and dicots. CO-3: Understand the techniques in plant tissue culture laboratory. CO-4: Understand the technique of production of SCP from *Spirulina* and Yeast and their commercial products. CO-5: Learn the process of preparation and sterilization of MS medium. CO-6: Know about the transgenic crops viz.Bt-cotton, Golden Rice.

T.Y.B.Sc.	V	Paper I; BO 351- Algae and Fungi	Botany	CO-1: Understand meaning, types and examples of lower Cryptogams. CO-2: Understand the general characters, economic importance and Classification of Algae & Fungi. CO-3 Study the life cycle of *Nostoc, Chara, Sargassum, Oedogonium,Batrachospermum, Penicillium, Saccharomyces, Puccinia, Cercospora, Mucor* with reference to taxonomic position, morphology, anatomy, reproduction, gametophytes and sporophyte.
		Paper II; BO 352- Archegoniate		CO-1: Understand meaning, types and examples of higher Cryptogams. CO-2: Understand the general characters, origin, evolution, economic importance and Classification of Bryophytes and Pteridophytes. CO-3: Study the life cycle of *Marchantia*, *Anthoceros*, *Funaria*, *Psilotum*, *Selaginella* and *Equisetum* with reference to taxonomic position, morphology, anatomy, reproduction, gametophytes and sporophyte.
		Paper III; BO 353- Spermatophyta and Paleobotany		CO-1: Learn the theories on origin of angiosperms. CO-2: Learn about species concept, speciation, endemism and its types. CO-3: Understand a general account, merits and demerits of Cronquist's system of classification and APG IV system and about Plant families. CO-4: Know about the functions of herbarium, important herbaria and botanical gardens in the world. CO-5: Know about Gymnosperms, their general characters, economic importance and classification according to Chamberlain. CO-6: Study the life cycle of *Pinus* and *Gnetum* with reference to distribution, morphology, anatomy, reproduction, gametophyte, sporophyte, seed structure and alternation of generations and their economic importance. CO-7: Understand fossil formation and types of fossils.
		Paper IV; BO 354- Plant Ecology		CO-1: Understand the interrelationship between the living world and the environment, levels of organization, components and dynamism of ecosystem, homeostasis, niche concept, concept of limiting factors and biogeography. CO-2: Learn about population ecology population growth form, r and k selection, community structure, physiognomy, Raunkiaer's life form classification, keystone species, edge and ecotone CO-3: Understand the carbon cycle, Nitrogen cycle, Phosphorus cycle, and Hydrologic cycle

				CO-4: Will acquaint the students to understand the Environmental impact assessment, Concepts, its stages and benefits. CO-5: Able to explain Environmental audit, need and audit protocol. process, certification and personnel environmental audit CO-4: Understand basic principles, process of ecological data acquisition and interpretation, application of remote sensing in ecology and about concepts of ecological management.
		Paper V; BO 355- Cell and Molecular Biology		CO-1: Know about the definition and history of Cell biology and about other biological sciences. CO-2: Understand the unit of measurement of cells. CO-3: Understand the morphology, Ultrastructure, Chemical composition and functions of Cell wall, cell membrane and different cell organelles. CO-4: Learn about morphology and ultrastructure of nucleus and transport of molecules across nuclear envelope. CO-5: Understand about chromosomes and packing of DNA. CO-6: Learn about Cell signaling and Calcium signaling pathway in plants. CO-7: Learn about genetic material and the process of DNA replication in prokaryotes and eukaryotes and its inhibitors. CO-8: Understand the mechanism of transcription and translation in prokaryotes and eukaryotes and gene regulation.
		Paper VI; BO 356- Genetics		CO-1: Know the definition and concept of genetics and the branches and applications of genetics. CO-2: Understand mendelism – about mono and dihybrid cross, laws of inheritance, backcross and test cross and Incomplete dominance. CO-3: Learn about gene interactions, multiple alleles, linkage, recombination and crossing over and mutation. CO-4: Understand Euploidy, aneuploidy and polyploidy and about types and effects of chromosomal aberrations. CO-5: Know about quantitative and cytoplsmic inheritance and sex-linked inheritance.
		Paper VII; BO- 357 Practical based on BO351 and BO352		CO-1: To understand Systematic position, Morphology, and reproduction of *Nosotc, Oedogonium, Chara, Sargassum, Palmaria, Mucor, Saccharomyces, Penicillium, Puccinia,Cercospora,Marchantia,Anthoceros, Funaria, Psilotum, Selaginella* and *Equisetum*

				CO-2: Understand the sporophyte evolution in bryophytes and stelar evolution in pteridophytes.
		Paper VIII; BO 358- Practical based on BO353 and BO354		CO-1: To study the details of plant families namely Nymphaeaceae, Oleaceae, Amaranthaceae and Cannaceae and preparation of artificial botanical keys. CO-2: To study *Pinus* and *Gnetum* with respect to External morphology, anatomy and Structure of male cone, female cone, pollen grains and ovules. CO-3: Understand fossil formations – Impression, Compression and Petrifaction. CO-4: Understand the physicochemical properties of water bodies and know about finding out the BOD of water. CO-5: Know different ecosystems by line/belt transect method/ nested quadrate method
		Paper IX; BO 359- Practical based on BO355 and BO356		CO-1: Learn the techniques of preparation of fixatives and stains. CO-2: Study morphology of chromosomes and various stages of mitosis and meiosis. CO-3: Learn the techniques of nuclei isolation and characterization, DNA isolation, DNA estimation, RNA extraction and estimation, tetraploidy induction and C-metaphase induction and preparation of salivary gland chromosomes. CO-4: Learn about monohybrid and dihybrid crosses and its chi square analysis and about various human genetic traits and structural heterozygotes. CO-5: Develop ability to solve problems on gene mapping, quantitative inheritance and multiple alleles.
		Paper X: BO 3510: Medicinal Botany		CO-1: Understand history, scope and importance of medicinal plants and indigenous medicinal sciences. CO-2: Learn about Ayurveda, Siddha and Unani systems. CO-3: Know about Conservation of endangered and endemic medicinal plants and propagation of medicinal plants. CO-4: Understand about ethnobotany and folk medicines and their applications.
		Paper XI: BO 3511- Plant Diversity and Human Health		CO-1: Understand about plant diversity, Genetic diversity and Species diversity. CO-2: Understand agrobiodiversity - cultivated plant taxa, wild taxa, Ethical and aesthetic values and uses of biodiversity and of microbes. CO-3: Know about loss of biodiversity and management of biodiversity and about organizations like IUCN,UNEP, UNESCO,WWF and NBPGR.

				CO-4: Learn about conservation of Biodiversity, social approaches and biodiversity awareness programmes. CO-5: Know about the role of plants in relation to human welfare.
	Sem VI	Paper I; BO 361- Plant Physiology and Metabolism		CO-1: Know about mechanism of photosynthesis and respiration in plants. CO-2: Understand the composition of phloem and process of translocation of solutes in plants. CO-3: Know about the types and role of mineral elements and their mechanism of transport. CO-4: Understand the process of stomatal opening and role of light on stomatal opening and also on photomorphogenesis and about phytochrome. CO-5: Know about the discovery of plant growth regulators and their physiological role.
		Paper II; BO 362- Biochemistry		CO-1: Know about the origin of cell, and about biomolecules. CO-2: Understand about the properties, structure and polarity of water and weak interactions. CO-3: Able to understand structure, classification, properties and functions of proteins and amino acids. CO-4: Learn about biological disorders of amino acid metabolism and commercial applications of amino acids. CO-5: Know about the Enzymes- Classification, nomenclature, properties and mechanism of action of enzymes and factors affecting enzyme activity and enzyme inhibition. CO-6: Understand the definition, classification, properties, functions and commercial applications of carbohydrates and lipids CO-5: Learn about definition, classification, source and functions of vitamins.
		Paper III; BO 363- Plant Pathology		CO-1: Familiar with the terminologies used in pathlogy i.e Host, Parasite, Pathogen, Inoculum, Penetration, Infection, Incubation, Disease and economic importance of plant diseases. CO-2: Know the contribution of National institute (IARI), International Crop Research Institute for Semi Arid Tropics (ICRISAT), Anton De Bary and Prof. B.B. Mundkur in plant pathology. CO-3: Understand about disease development and defence mechanisms. CO-4: Gain the knowledge of methods of Studying Plant Diseases and types of culture media. CO-5: Know about Fungal, Bacterial, Mycoplasma, Nematodal, Viral and Non Parasitic plant diseases.

				CO-6: Understand the principles of plant disease control.
		Paper IV; BO 364: Evolution and Population genetics		CO-1: Understand about organic evolution, origin of life and theories of evolution. CO-2: Know about the evidences of evolution, process and conditions of fossilization, types of fossils, geographical time scales. CO-3: Understand concept of Mendelian population, Gene Pool and its models, Hardy-Weinberg law of gene frequencies, factors affecting allelic frequency and Genetic polymorphism. CO-4: Learn about speciation and isolating mechanisms.
		Paper V; BO 365- Advanced Plant Biotechnology		CO-1: Understand traditional and modern Biotechnology and Impact of Biotechnology on Health care, Agriculture, and Environment CO-2: Understand the principle and basic protocols for Plant Tissue Culture. CO-3: Know the techniques of Genetic Engineering and Methods of gene transfer in Plants. CO-4: Understand cryopreservation and germplasm conservation. CO-5: Learn about the benefits of biotechnology to the society and about patenting and IPR. CO-6: Understand various aspects of microbial biotechnology and Nano-biotechnology.
		Paper VI; BO 366- Plant Breeding and Seed Technology		CO-1: Know about the scope, objectives and history of plant breeding CO-2: Understand the various techniques and practices of plant breeding and advanced techniques like mutation breeding and tissue culture. CO-3: Learn the details of Seed technology, seed legislation, seed production, seed certification and seed testing. CO-4: Understand about seed pathology, entomology and seed storage.
		Paper VII; BO 367: Practical based on BO361 and BO362		CO-1: Learn to determine osmotic potential of plant cell and stomatal index and stomatal frequency of a mesophyte and a xerophytes, Estimation of total free amino acids by spectrophotometry, iodine number of lipids using Hanus method. CO-2: Learn to demonstrate the activity of catalase, Amylase /invertase /catalase and study the effect of pH and enzyme concentration and process of Bolting, Effect of auxins on rooting, Suction due to transpiration, R.Q and

				Respiration in roots, Qualitative tests for starch, lipids and proteins. CO-3: Study the effect of light intensity and bicarbonate concentration on O2 evolution in photosynthesis, Separation of amino acids by paper chromatography, Comparison of the rate of respiration in any two parts of a plant, Separation of amino acids by paper chromatography. CO-4: Understand to estimate soluble proteins by Lowery *et. al.* method, reducing sugars by DNSA method and Vitamin C (Ascorbic acid) from plants.
		Paper VIII; BO 368: Practical based on BO363 and BO364		CO-1: Understand the preparation of culture media for isolation of plant pathogens and different Culture techniques. CO-2: Study fungal, bacterial and mycoplasma, viral and non-parasitic diseases in plants and Koch's Postulates, Fungicides and Microbial pesticides, CO-3: Learn the preparation of Bordeaux mixture and Bordeaux paste and Jivamruta. CO-4: Know about Geological time scale, types of fossils, evidences of Organic Evolution, Sympatric and Allopatric speciation and Isolation mechanism. CO-5: Develop skills on solving numerical problem on Allele frequency and Genotype frequency, Hardy-Weinberg Equilibrium
		Paper IX; BO 369: Practical based on BO365 and BO366		CO-1: Learn the techniques of Preparation and sterilization of MS Medium and Callus Induction, Production of secondary metabolites, Artificial seed production, Preparation of plant based nano-particles, test seed moisture, Visual examination of dry seeds for disease symptoms and Physical purity analysis of seed sample. CO-2: Know the equipments used in genetic engineering, about Transgenic plants, about Fermentation of fruit juice and wine production, about Hybridization Techniques and Effect of chemical mutagens. CO-3: Learn about pollen viability and floral morphology of crops, germination methods and common seed insect pest. CO-4: Able to solve Problems on genetic engineering.
		Paper X; BO 3610: Nursery and Gardening Management		CO-1: Understand about plant nursery, seeds, seed dormancy, Seed storage, Seed banks and Seed production technology. CO-2: Learn about the various methods of vegetative

				propagation. CO-3: Learn the basics and techniques of gardening, Gardening operations, computer applications in landscaping, Sowing and raising of seeds and seedlings and Transplanting of seedlings, cultivation of different vegetables and Storage and marketing procedures.
		Paper XI; BO 3611: Biofertilizers		CO-1: Understand the Scope and importance of Biofertilizers. CO-2: Learn the basics and techniques of production and applications of Bacterial Biofertilizers, Algal Biofertilizers, Azolla, Fungal Biofertilizers and Compost and Manure. CO-3: Know in detail about Organic Farming, Biocompost making methods, Benefits of vermicompost and their field applications.

Dr. K.M. Nitnaware
Head

K.T.S.P. Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Department of Mathematics

Programme Specific Outcome and Course outcome

Programme Specific Outcome:

PSO 1: Give the students a sufficient knowledge of fundamental principles, methods and a clear perception of innumerous power of mathematical ideas and tools and know how to use them by modeling, solving and interpreting.

PSO 2: To equip the students sufficiently in both analytical and computational skills in Mathematical Sciences.

PSO 3: To develop a competitive attitude for building a strong academic - industrial collaboration, with focus on continuous learning skills.

PSO 4: Enhancing students overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.

PSO 5: Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.

PSO 6: Enabling students to Gauge the hypothesis, theories, techniques and proofs provisionally.

Course Outcome:

Class	Sem	Paper	Subject	Course Outcome
F. Y. B. Sc.	I	Maths-I MT-111	Algebra	By the end of this course students will able to CO1 : Using Euclidean Algorithm find the GCD , also example based on mathematical inductions. CO2:Find inverse of function, also examples based on equivalence relation. CO3: find the congruence relation CO4 : Perform the basic operation on complex number, also find the conjugate, modulus and argument of complex number. also find the n^{th} root of the unity.

				CO5 : Know the definition functions ,one-one function, onto function, inverse function CO6 : use of Fermat's theorem to find the remainder
F. Y. B. Sc.	I	Maths-II MT-112	Calculus I	CO1 : Know properties of real numbers. Also know the Absolute value. CO2 : Know the definition of sequence, the limit of sequence, limit theorems CO3 :Know the concept of convergent sequence, Divergent sequence, Monotone sequence, Oscillatory sequence, Subsequence, Bolzano-Weierstrass theorem, Divergence Criteria. CO4 : Know the definition of function , Find the domain and range of function and their graphs. CO5 : Types of functions with graphs CO6: Definition of limit of function , Cluster point, examples based on ϵ-δ definition of limit. CO7 : Sequential criteria for limits ,Divergence criteria. CO8 : Know the left hand limit and right hand limit, infinite limits. CO9 : Know the definition of continuous function , sequential criterion for continuity, Discontinuity criterion CO10: know the concept of Combination of continuous functions, also composition of continuous functions, continuous functions on intervals CO11: Know the examples of continuous functions , Bolzano's Intermediate value theorem.
F. Y. B. Sc.	I	Maths-III MT-113	Practical	CO1:Know the Operators with Description, Also Assign the numbers by using maxima CO2 : Assign the sets ,also find the set operation such as union, intersection,

				difference, complement ,cardinality of sets, power sets ,equal sets, subsets ,partitions of sets ,Cartesian product by using maxima software. CO3: Find the GCD and LCM ,divisors of integers ,find the remainder by using maxima: Find the square root of integers ,also find the angle of trigonometric functions by using maxima software. CO4: Find the addition, subtraction ,multiplication ,conjugate, real and imaginary part, modulus, argument of complex number by using maxima. CO5: Computing limit of function ,also graphically show that the function is continuous or not by using maxima, also find the terms of the sequence and discuss the convergence of the sequence by using maxima software. CO6:Using Euclidean Algorithm find the GCD , also example based on mathematical inductions. CO7:Find inverse of function, also examples based on equivalence relation. CO8: Perform the basic operation on complex number, also find the conjugate, modulus and argument of complex number. also find the n^{th} root of the unity. CO9:Discuss the continuity of the function, also prove that a function is continuous at a point by using sequential criterion. CO10:Example based on ϵ-δ definition, Evaluating the limit of function. CO11: Find the supremum and infimum of the set, CO12: Using the limit of sequence to show that sequence has limit, or discuss the convergence of sequence also find the

				limit of the sequence.
F. Y. B. Sc.	II	Maths-I MT-121	Analytical Geometry	CO1 : Change of axes-Translation of axes and Rotation of Axes. Also know that equation for translation and equation for rotation . CO2 : Know that General equation of second degree in two variables. CO3 : Know that the types of conic section such as An Ellipse, An Hyperbola ,An Parabola. Also must know the standard equation of Ellipse, Parabola, Hyperbola. CO4 : Determine the Nature of Conics. Also Find the Centre of Conics. CO5 : Translate and rotate the axes and reduce the conic to standard form. CO6: Find the Direction Ratios and Direction cosines, Also know the Relation between d. r. s. and d. c. s. CO7 : Find the equation of plane , Normal form, transform to the normal form, plane passing through three non-collinear points ,intercept form, angle between two planes. CO8 : Know the Distance of a point from a plane ,distance between parallel planes ,two sides of planes, bisector planes. CO9 : Find equation of line in symmetrical and unsymmetrical forms, line passing through two points, angle between a line and a plane. CO10:Know the Perpendicular distance of a point from a plane, condition of coplanarity. CO11: Know the equation of sphere in different form, plane section of sphere ,Equation of circle, sphere through a given circle. CO12: Find the intersection of a sphere and line, equation of tangent plane to

				sphere.
F. Y. B. Sc.	II	Maths-II MT-122	Calculus II	CO1 :Know the definition of the derivative of a function at a point, every differential function is continuous, rules of differentiation, the chain rule, Derivative of inverse function. CO2 : The Mean value theorems and Roll's theorem, Cauchy mean value theorem. CO3 : Know the L Hospital Rule , Taylor theorem , Maclaurin's theorem with Lagrange's form of remainder. CO4 : Know that the successive differentiation, Also know the n^{th} derivative and Leibnitz theorem for successive differentiation CO5 : Ordinary Differential Equations CO6: Know the Linear first order equations , separable equations CO7: Existence and Uniqueness of solution of nonlinear equations. CO8 :Know the definition of Exact differential equations,. CO9 : Find the transformation of nonlinear equations to separable equations. CO10: Find the Integrating factor
F. Y. B. Sc.	II	Maths-III MT-123	Practical	CO1:Determine the nature of the conics by using maxima .also assign the co-ordinates CO2: Draw the plane ,use maxima to find equation of plane passing through three points, also using maxima to show any four points are coplanar. CO3:use maxima to find in symmetrical form of equation of line also find the equation of sphere passing through the points by using maxima, also show that the points are concyclic. CO4:Find the derivative of a function by using maxima also find the derivative by

				chain rule in maxima, also verify the Mean value theorem and Roll's theorem by using maxima, also find Taylor series expansion in maxima CO5:Find the integrating factor using maxima for differential equation to be exact, also determine the given differential function are exact by using maxima, plot the direction field using maxima software. CO7:Example based on Translate and rotate the axes and reduce the conic to standard form. CO8:Examples based on coplanarity, also find the equation of plane passing through the three points. CO9:Obtain the symmetrical form of the equation of line, example based on equation of tangent plane also find the equation of sphere having the circle as great circle. CO10:Calculating the derivative of the functions ,also verify the Mean value ,thm,Roll's value ,Cauchy thm.
F. Y. B. Sc. (Comp. Sci.)	I	Maths I MT-111	Matrix Algebra	CO1 : perform matrix operations CO2 : find the inverse of a matrix CO3 : Obtain row reduction and echelon forms, vector equations CO4 : obtain solution set of linear system CO5 : find partitioned matrices, LU decomposition CO6 : find linear independent vector, the matrix of linear transformation CO7 :find dimension and rank CO8: find the solutions of linear equations by sing cramer's rule , volume and linear transformations
F. Y. B. Sc. (Comp. Sci.)	I	Maths II MTC-112	Discrete Mathematics	CO1 : Know the Propositional Logic, Logical Connectives, Propositional Equivalence.

				CO2 : Predicate, *n*-Place and *n*-ary . CO3 : Identify Universal Quantifier, Existential Quantifier. CO4 : Know the Rules of Inference. CO5 : Types of Relations, Representation of Relations CO6 : Draw Hasse diagram. CO7 : Distinguish between Complemented lattice, Bounded lattice and Distributive lattice. CO8: Transitive Closure and Warshall's Algorithm CO9: Understand Boolean function, Represent Boolean function. CO10 : Understand the Inclusion-Exclusion Principle and Pigeonhole Principle. CO11 : Use Permutation and combination. CO12 : Use Recurrence Relations to find homogeneous solution, Solving Recurrence Relation, particular and total solution.
F. Y. B. Sc. (Comp. Sci.)	I	Maths III MTC-113	Practical	CO1 : Show equivalence by using maxima software CO2 : Find adjacency and incidency matrix by using maxima software . CO3 : Find Conjunctive Normal Form and Disjunctive Normal Form by using maxima software . CO4 : Simplify the boolean expressions by using maxima. CO5: By using maxima software determine permutation and combination. CO5 : Solve the recurrence relation by using maxima software. CO6: Know the operation on matrices by using maxima software . CO7 : Find Column space ,Null space ,Rank and Nullity of matrix by using

				maxima software . C08 : Know the Propositional equivalence ,predicates and quantifiers ,Rules of inference CO9 : Find transitive closure by Warshall's algorithm, know the properties of lattices ,and types of lattices, boolean variable and boolean function CO10 : Know the Inclusion - Exclusion principle , Pigeonhole principle , Permutation and combination CO11 : Solve homogeneous and non homogeneous recurrence relation CO12 : Characterization of invertible matrices ,method of solving linear system ,Row reduction and Echelon forms CO13 : Introduction to Linear transformation , Matrix of linear transformation , properties of determinants, Cramer's rule ,volume and linear transformation .
F. Y. B. Sc. (Comp. Sci.)	II	Maths I MTC-121	Linear Algebra	CO1 : understand vector spaces and subspaces CO 2 : Find Null spaces ,column spaces CO3 : Find Linearly independent sets and basis for vector spaces CO4: Obtain eigenvalues and eigenvectors ,characteristic equation CO5: perform diagonalization of matrices , linear transformations CO6: find inner product , length and orthogonality ,orthogonal sets, Orthogonal projections, Quadratic forms CO7 : Find affine Combinations, Affine independence convex combinations
F. Y. B. Sc. (Comp. Sci.)	II	Maths II MTC-122	Graph Theory	CO1: Understand basic terminologies and results of Graphs, Graphs models. CO2 : Know the types of Graphs ,Types of

				the Diagraphs, Isomorphism of the Graphs CO3 : Calculate Adjacency and Incidence Matrix of a Graph. CO4 : Find subgraphs, induced subgraphs of graph. CO5 : Know the Elementary properties of the Connectedness. CO6 : Perform vertex deletion and edge deletion operation on graph. Counting paths between vertices. CO7 : Find the shortest path by Dijkstra's Algorithm. CO8 : Understand various properties of connected graph, tree and Eulerian and Hamiltonian Graphs. CO9 : Know the Konigsberg bridge problem , Fluery's Algorithm CO10 : Find the shortest path by travelling salesman problem, Chinese Postman Problem . CO11: Understand the concept of union, intersection, product and complement of graph. CO12 : Understand basic terminologies, Properties and applications of trees CO13 : Find the shortest path using Kruskal's Algorithm and Prim's Algorithm
F. Y. B. Sc. (Comp. Sci.)	II	Maths III MTC-123	Practical	CO1 : Find the Matrix representation and elementary result , isomorphism of graphs ,application of special types of graphs. C02 : Shortest path problems , Dijkstra's algorithm CO3 : Find Eulerian path , Hamiltonian path , Travelling salesman problem ,Chinese Postman Problem . CO4 : Examples based on the linearly independence and dependence ,Find basis and dimension of null space , Find the bases for the subspace spanned by the vectors

				CO5 : Find the eigen values and eigen vectors of the matrix, Know the diagonalization process . CO6 : Know the Gram Schmidt process , Orthogonality and symmetric matrices CO7 : Know the Affine combination , Affine independence and convex combination CO8 : Find the number of vertices ,degree of each vertex ,minimum and maximum degree vertex ,minimum and maximum degree vertex by using maxima software CO9 : Identify the types of graphs, Show graph Isomorphism by using maxima software . Determine graphs are connected or not by busing maxima software . CO10 : Find the edge connectivity ,vertex connectivity ,Hamilton path and Hamilton cycle by using Maxima software. CO11 :Find column space and null space ,eigen values and eigen vectors by using maxima software. CO12 :Diagonalize the matrices by using Maxima Software. Compute inner product ,length of the vectors by using maxima software . Determine sets of vectors are orthogonal or orthonormal by using maxima software .
F.Y.B.B.A. (C.A.)	II	CA-203	Business Mathematics	CO1 : Solve basic problems based on gcd ,ratio ,proportion etc. CO2 : Solve problems of Profit, Loss , simple interest ,compound interest. CO3 : Know about shares and annuity. CO4 : Know about matrices and algebra of matrices such as addition subtraction, multiplication , scalar multiplication. CO5 : Find the Inverse of the matrix by adjoint method.

				CO6 : Know the Linear programming problem , graphical method and Formulation of LPP. CO7 : Solve the transportation problem, North West Corner Method , Least Cost Entry Method , Vogel's Approximation Method.
S.Y.B.Sc.	I	Maths I MT -231	Calculus Of Several Variables	CO1 : Find the domain and range of multivariable function. CO2 : Find level curve and plot a graph of function. CO3 : Find simultaneous and repeated limits. CO4 : Calculate partial derivative of higher order. CO5 : Know the concept of differentiability, apply chain rule . CO6 : Apply Lagrange's method for finding extreme vales. CO7 : Calculate Double and triple integral and find area and volume of different surfaces
S.Y.B.Sc.	I	Maths II MT-232(A)	Numerical Methods And It's Applications	CO1 : Rounding off number to n significant digits and n decimal places. CO2 : Calculate absolute, relative and percentage error. CO3 : Apply Bisection, False position, Newton Raphson and iteration methods for finding approximate solution. CO4 : Know the finite difference operators and their relations. CO5 : Apply Newton forward difference, Backward difference interpolation, Lagrange's interpolation and Newton divided difference formulae. CO6 : Feet straight line, quadratic equation, power function and exponential function. CO7 : Use Trapezoidal rule, Simpson's $(1/3)^{rd}$ and Simpson's $(3/8)^{th}$ rule.

				CO8 : Find numerical solution of differential equation by using Euler's method , modified Euler's method and Runge Kutta methods.
S.Y.B.Sc.	II	Maths I MT-241	Linear Algebra	CO1 : Reduce the matrix to row echelon form and solve the system of linear equations. CO2 : Know the concept of Vector Space, subspace , linear dependence and independence. CO2 : Check whether given set is basis or not of vector space. CO3 : Find basis for row space, column space, null space. CO6 : Check linear transformation of function CO7 : Calculate rank and nullity of linear transformation. CO8 : Find inverse of linear transformation and matrix of linear transformation. CO9 : Know the basic matrix transformation in R^2 and R^3.
S.Y.B.Sc.	II	Maths II MT-242	Vector Calculus	CO1 : Calculate limit, continuity, derivative and integration of vector valued function. CO2 : Find Arc Length along curve, speed on a smooth curve and tangent vector. CO3 : Evaluate line integral of vector fields. CO4 : Find work done, flow integrals, circulation for vector field. CO5 : Apply Divergence theorem and Green's theorem. CO6 : Calculate surface integrals of vector fields. CO7 : Apply Stokes' theorem and find Curl and Divergence of vector field.
S.Y.B.Sc.	I	Maths I	Group	CO1 : Know the division algorithm ,

(Comp. Sci.)		MTC-231	and Coding Theory	G.C.D using division algorithm and expressing it as linear combination. CO2 : Understand Euclid's Lemma . CO3 : Identify Equivalence relation , Congruence relation, on set of integers, Equivalence class partition . CO4 : Know the definition of binary operation ,group and elementary properties of group. CO5 : Know the definition of subgroup ,examples ($(Z_n$,+) and ($U(n)$,), order of group , order of an element . CO6 : Find order of group , order of an element. CO7 : Distinguish between Group and Subgroup. CO8: Identify the permutation group ,cyclic group, finding generators of Z_n. CO9: Understand definition and examples of cosets , Lagrange Theorem.
S.Y.B.Sc. (Comp. Sci.)	I	Maths II MTC-232	Numerical Technique	CO1 : Rounding off number to n significant digits and n decimal places. CO2 : Calculate absolute, relative and percentage error. CO3 : Apply Bisection, False position, Newton Raphson and iteration methods for finding approximate solution. CO4 : Know the finite difference operators and their relations. CO5 : Apply Newton forward difference, Backward difference interpolation, Lagrange's interpolation and Newton divided difference formulae. CO6 : Use Trapezoidal rule, Simpson's $(1/3)^{rd}$ and Simpson's $(3/8)^{th}$ rule. CO7 : Find numerical solution of differential equation by using Euler's method , modified Euler's method and Runge Kutta methods.
S.Y.B.Sc.	II	Maths I	Computat	CO1: Understand basic terminologies and

(Comp. Sci.)		MTC-241	ional Geometry	representation of points, transformation and matrices. CO2 : Know the transformation of points , straight lines, mid-point, parallel lines , intersecting lines . CO3 : Know the transformations : rotations, reflections, scaling ,shearing. CO4 : Find transformation of unit square ,solid body transformation , CO5 : Find the translations and homogeneous co-ordinate. CO6 : Perform multiple transformations. CO7 : Find the three dimensional - scaling ,shearing, rotation, reflection ,translation . CO8 :Understand the rotation about- an axis parallel to co-ordinate axis, an arbitrary line . CO9 : Know reflection through- co-ordinate planes, planes parallel to co-ordinate planes, arbitrary plane CO10 : Identify the types of projection : Orthographic projection ,Axonometric projection, Oblique projection, Single-point perspective projection . CO11: Understand the concept of curve presentation and parametric presentation CO12 : Understand parametric representation of circle and generation of circle. CO13 :Understand the definition and properties of the Bezier curve and equation of the curve in matrix form(up to n=3).
S.Y.B.Sc. (Comp. Sci.)	II	Maths II MTC-242	Operation Research	CO1 : Use graphical method to solve LPP, CO2 : Apply simplex method, understand the concept of surplus variable , slack variable and artificial variable. CO3 : convert the problem in dual form. CO4 : Solve the transportation problem by

				using North west corner method , matrix minima method , VAM etc. CO5 : Solve assignment problem by Hungarian method

K.T.S.P Mandal's,

Hutatma Rajguru Mahavidyalaya,

Rajgurunagar Tal-Khed, Dist-Pune.

Department of Statistics

Course Outcomes

Class	Semester	Paper	Subject	Course Outcome
F.Y.B.Sc	I	ST-111 Descriptive Statistics-I	Statistics	• CO1: Acquire basic concepts of Statistics • CO2: Understand various sampling methods • CO3:Compute various measures of central tendency • CO4:Identify the nature of data using skewness and kurtosis measure • CO5: Analyze data pertaining to attributes and interpret the results.
F.Y.B.Sc	I	ST-112 Discrete Probability	Statistics	• CO1: Understand basic concepts of probability • CO2: Understand concept of conditional probability • CO3: Compute probabilities of various events • CO4: Obtain a probability distribution of random variable in the given situations.
F.Y.B.Sc	I	ST-113 Statistics Practical Paper-I	Statistics	• CO1: Do graphical representation and interpretation of data sets • CO2: Do graphical representation of data sets using Ms-Excel • CO3: Compute summary statistics • CO4: Computation of summary statistics using Ms-Excel • CO5: Computation of summary statistics using Ms-Excel • CO6: Interpret summary

				statistics of computer output • CO7: Able to identify the nature of distribution based on coefficient of skewness and kurtosis
F.Y.B.Sc	II	ST-121 Descriptive Statistics-II	Statistics	• CO1: Understand the concept of bivariate data • CO2: Compute and interpret the Correlation coefficient • CO3: Understand the concept of Regression analysis • CO4: Able to fit linear and non linear curves for bivariate data • CO5: Compute and interpret the various index numbers
F.Y.B.Sc	II	ST-122 Discrete Probability Distributions	Statistics	• CO1: Understand various discrete probability distributions and its real life situations • CO2: Understand the properties of discrete distributions • CO3: Link interrelations between discrete distributions
F.Y.B.Sc	II	ST-123 Statistics Practical Paper-II	Statistics	• CO1: Able to fit regression lines and estimate the value of dependent variable using Ms-Excel • CO2: Able to fit non linear equations(second degree curve, exponential curve and pareto curve) • CO3: Fit and compute expected frequencies for Binomial and Poisson distribution • CO4: To generate model sample from Binomial and Poisson distribution

				• CO5: To plot Scatter diagram, compute correlation coefficient **using** Ms-excel • CO6: Fit a linear regression and a non-linear regression **using** Ms-excel
S.Y.B.Sc	III	ST-231 **Discrete Probability Distributions and Time Series**	Statistics	• CO1: Identify the real life situations of negative binomial distribution, multinomial distribution and truncated distributions. • CO2: Compute probabilities related between negative binomial distribution, multinomial distribution and truncated distributions. • CO3: Apply different methods of measurement of time series component and smoothen them. • CO4: Forecast time series values using various methods and compare them.
S.Y.B.Sc	III	ST-232 **Continuous Probability Distributions**	Statistics	• CO1: Obtain summary statistics of a continuous random variable. • CO2: Identify nature of continuous distribution using moments, M.G.F and C.G.F etc. • CO3: Compute probabilities of various events related to continuous random variable. • CO4: Know the applications of uniform, normal and exponential distributions.
S.Y.B.Sc	III	ST-233 **Statistics Practical**	Statistics	• CO1: Fit various discrete and continuous probability distributions. • CO2: Identify the appropriate probability model that can be

				used. • CO3: Apply forecasting and data analysis techniques in case of univariate and multivariate data sets. • CO4: Inculcate the knowledge of statistical software packages. • CO5: Compute probabilities of discrete and continuous probability distributions using MS- Excel.
S.Y.B.Sc	IV	ST-241 **Test of significance and Statistical Methods**	Statistics	CO1: Test various hypotheses of significance like means, proportions, independence of attributes, variance etc • CO2 Construct confidence interval for population mean and proportion. • CO3: Obtain best predicting linear equation when a response variable is a function of two explanatory variables. • CO4 Measure the strength of linear relation between response variable & regressors. • CO5: Know applications of statistics in the field of demography. • CO6: Understand the real life applications of queuing model.

S.Y.B.Sc	IV	ST-242 **Sampling Distributions and Exact Tests**	Statistics	• CO1: Identify the situations where gamma ,chi-square ,student's t and snedecor's F distribution is suitable. • CO2: Compute probabilities corresponding to gamma, chi-square, student's t and snedecor's F distribution. • CO3: Identify the nature of gamma ,chi-square ,student's t and snedecor's F distribution is suitable. • CO4: Understand the interrelations between continuous distributions. • CO5: Apply the test based on Chi-square ,t and F distribution in real life situations in the various fields and draw valid conclusions. • CO6 Construct confidence interval for unknown population parameter with the help of test of significance.
S.Y.B.Sc	IV	ST-243 **Statistics Practical**	Statistics	• CO1 Conduct various tests of significance like averages, population proportions, independence of attributes, variance etc. included in theory (using calculators, software). • CO2 :Compute probabilities of discrete and continuous probability distributions using R software. • CO3: use software for finding basic summary statistics.

K.T.S.P.MANDAL'S
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Department of Computer Science

Program Specific Outcome

PSO 1: Ability to apply knowledge of computing, mathematics, and basic sciences that may Be relevant and appropriate to the domain.

PSO 2: Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.

PSO 3: Ability to design, implements, and evaluate computer-based system, process, component,or program to meet desired needs and to solve computational problem.

PSO 4: An ability to function effectively on teams to accomplish a common goal.

PSO 5: Understanding of professional, ethical, legal, security, social issues and responsibilities.

PSO 6: Demonstrate understanding of the principles and working of the hardware and Software aspects of computer systems.

PSO 7: Ability to analyze the local and global impact of computing on individuals, organizations,and society.

PSO8- To enhance skills and adapt new computing technologies for attaining professional Excellence and carrying research.

PSO 9: Ability to use current techniques, skills, and tools necessary for computing practices.

PSO 10: Ability to use and apply current technical concepts and practices in the core developmentof solutions in the form of Information technology.

Course Outcome

Class	Semester	Paper (Paper no. & Code)	Subject	Course Outcome
F.Y.B.Sc. (Comp. Sci)	I	Computer Science Paper-I (CS-111)	Problem Solving Using Computer And C Programming-I	CO 1: Draw the flowchart and design an algorithm for a given problem by using operators. CO 2: Develop conditional and iterative statement to write C programs. CO 3: Understand user

				defined function to solved real time problems. CO 4: C Programs that use pointers to access arrays. CO 5: String Manipulation and functions. CO 6: Understand user defined data types including structures and union to solve problems.
	I	Computer Science Paper-II (CS-112)	Database Management System	CO 1: Understand terms related to database design and management. CO 2: Understand the objective of the data and information management. CO 3: Understand the database development process. CO 4: To understand the relational model &relational database management system. CO 5: Asses data and information requirements. CO 6: Conceptual data models.
	I	Computer Science Paper-III (CS-113)	Practical based on CS-111 and CS-112	CO 1: Apply the specification of syntax rules for numerical constants and variables, data types. CO 2: To use Arithmetic, Conditional, Logical and Relational operators and other C construct. CO 3: Write a c program using decision making, branching, looping construct. CO 4: Apply and write C Program to implement 1-D and 2-D arrays. CO 5: Write programs using functions. CO 6: Apply basic concept of database system and application. CO 7: Use the basic of SQL and construct queries using SQL in database creation and interaction.
	I	Electronic Science	Semiconductor	CO 1: To analyze basic PN

		Paper-I (ELC-111)	Devices and Basic Electronic Systems	junctions in semi-conductor devices under various conditions CO 2: To design and analyze simple rectifiers and voltage regulators using diodes. CO 3: To describe the behavior of special purpose diodes. CO 4: Do design and analyze simple BJT and MOSFET circuits.
	I	Electronic Science Paper-II (ELC-112)	Principles of Digital Electronics	CO 1: Convert different type of codes and number systems which are used in digital Communication and computer systems. CO 2: The ability to understand, analyze and design various combinational circuits CO 3: To compare different types of logic families which are the basic unit of different types oflogic gates on the basis of cost, capacity, performance and efficiency. CO 4: Design various logic gates and simplify Boolean equations. CO 5: Illustrate reduction of logical expressions using Boolean algebra and k-map method.
	I	Electronic Science Paper-I (ELC-113)	Electronics Practical (Lab-IA)	CO 1: Distinguish between analog and digital systems. CO 2: Identify the various digital ICs and understand their operation CO 3: Apply Boolean laws and K-map to simplify the digital circuits CO 4: Ability to identify basic requirements for a design application and propose a cost effectivesolution. CO 5: The ability to identify and prevent various hazards and timing problems in a

				digital design. CO 6: To develop skill to build, and troubleshoot digital circuits. CO 7: Acquire a basic knowledge in solid state electronics including diodes, MOSFET, BJT, and Operational amplifier.
	I	Mathematics Paper-I- (MTC-111)	Matrix algebra	CO1: perform matrix operations CO 2: find the inverse of a matrix CO 3: Obtain row reduction and echelon forms, vector equations CO 4: obtain solution set of linear system CO 5:find partitioned matrices, LU decomposition
	I	Mathematics Paper-II - (MTC-112)	Discrete Mathematics	CO1: Know the Propositional Logic, Logical Connectives, proportional Equivalence. CO 2: Identify Universal Quantifier, Existential Quantifier. CO 3: Know the Rules of Inference. CO 4: Types of Relations, Representation of Relations CO 5: Draw Hasse diagram.
	I	Mathematics Paper-III - (MTC-113)	Mathematics Practical	CO 1: Show equivalence by using maxima software CO 2: Find adjacency and incidency matrix by using maxima software. CO 3: Find Conjunctive Normal Form and Disjunctive Normal Form by using maxima software. CO 4: Simplify the boolean expressions by using maxima. CO5: By using maxima software determines permutation and combination.
	I	Statistics Paper I-(CSST- 111)	Descriptive Statistics	CO 1: Acquire basic concepts of Statistics CO 2: Compute various measures of central tendency CO 3: Identify the nature of

				data using moments , skewness and kurtosis measure CO 4: Analyze data pertaining to attributes and interpret the results.
	I	Statistics Paper II- (CSST- 112)	Mathematical Statistics	CO 1:Understand basic concepts of probability CO 2: Understand concept of conditional probability CO 3:Compute probabilities of various events CO4: Understand applications of standard discrete distributions
	I	Statistics Paper III- (CSST- 113)	Statistics Practical	CO 1: Tabulate and make frequency distribution of the given data. CO 2: Use various graphical and diagrammatic techniques and interpret. CO 3: Compute various measures of central tendency, dispersion, Skewness and kurtosis. CO 4: Fitting of Binomial and Poisson distributions.
F.Y.B.Sc. (Comp. Sci)	II	Computer Science Paper-I (CS-121)	Advanced C	CO 1: Develop modular programs using control structures, pointers, strings and structures CO 2: Design and develop solutions to real world problems using advanced C. CO 3: Understand user defined data types including structures and union to solve problems. CO 4: Implement C Programs using pointers and to allocate memory using dynamic memorymanagement functions. CO 5: Exercise files concepts to show input and output of files in C.
	II	Computer Science Paper-II (CS-122)	Relational Database Management System	CO1- Design E-R model for given requirements and convert the same into database tables.

				CO2- Use database techniques such as SQL and PL/SQL. CO3- Explain transaction management in relational database system. CO4-Use advanced database programming concepts.
	II	Computer Science Paper-III (CS-123)	Practical based on CS-121 and CS-122	CO 1: Develope program using strings. CO 2: Enabling effective usage of pointers and structures. CO 3: Develop a program using enumerated data type, functions, union and nested structures. CO 4: Implementing the files and command line arguments. CO 5: Designing the basic concept of database. CO 6: Implementing data integrity constraints in database. CO 7: Validating the various fundamental tasks to perform data modeling.
	II	Electronic Science Paper-I (ELC-121)	Instrumentation Systems	CO 1: Working principle of resistive, inductive and capacitive transducers and their applications. CO 2: Understanding of thermo-couples piezoelectric and pyro-electric transducers and theirapplications. CO 3: Understanding of optical sensors and other sensors. CO 4: Understand Various physical parameters of sensors using industry and normalmeasurement applications. CO 5: Understand and analyze the IC741 operational amplifier and its characteristics. CO 6: Design the solution for linear and non-linear applications using IC741.

	II	Electronic Science Paper-II (ELC-122)	Basics of Computer Organisation	CO 1: Understand the theory and architecture with functionality of central processing unit. CO 2: Analyze sum of the design issues in terms of speed, technology, cost and performance. CO 3: Analyze the performance of various classes of memories, Build large memories usingsmall memories for better performance. CO 4: Implement and verify the truth tables of various flip-flops. CO 5: Design and implement the counters CO 6: Design and implement the sequential circuits such as registers and sequence generators. CO 7: Design and analyze Synchronous and Asynchronous sequential circuits using flip-flop. CO8: Identify the basic forms of data movement in shift registers.
	II	Electronic Science Paper-I (ELC-123)	Electronics Practical (Lab-IB)	CO 1: Design and Construct flip-flops, counters and shift registers. CO 2: Simulate synchronous and asynchronous up down counters. CO 3: Use of OPAMP as comparator and its use in DC motor driving. CO 4: Use of OPAMP as comparator and its use in DC motor driving. CO 5: Build and test Inverting and non -inverting amplifier using OPAMP. CO6-Build and test adder and subtractor circuits using OPAMP.
	II	Mathematics Paper-	Linear Algebra	CO 1: understand vector

		I- (MTC-121)		spaces and subspaces. CO2: Find Null spaces, column spaces. CO 3: Find Linearly independent sets and basis for vector spaces. CO4: Obtain eigenvalues and eigenvectors, characteristic equation. CO5: perform diaginalization of matrices, linear transformations.
	II	Mathematics Paper-II - (MTC-122)	Graph Theory	CO1: Understand basic terminologies and results of Graphs, Graphs models. CO 2: Know the types of Graphs ,Types of the Diagraphs, Isomorphism of the Graphs CO 3: Calculate Adjacency and Incidence Matrix of a Graph. CO 4: Find Sub-graphs, induced sub-graphs of graph. CO 5: Know the Elementary properties of the Connectedness. CO 6: Perform vertex deletion and edge deletion operation on graph. Counting paths betweenvertices.
	II	Mathematics Paper-III - (MTC-123)	Mathematics Practical	CO 1: Find the Matrix representation and elementary result, isomorphism of graphs , applicationof special types of graphs. CO 2: Shortest path problems , Dijkstra's algorithm CO 3: Find Eulerianpath , Hamiltonian path , Travelling salesman problem ,Chinese PostmanProblem .
	II	Statistics Paper I-(CSST- 121)	Methods of applied Statistics	CO 1: Understand the concept of bivariate data CO 2: Compute and interpret Correlation coefficient CO 3: Understand the concept of Regression analysis CO 4: Understand the

				concept of multiple regression, multiple and partial correlation.
	II	Statistics Paper II- (CSST- 122)	Continuous probability distributions and testing of hypothesis	CO 1: Understand the concept of standard continuous probability distribution CO 2: Identify the situations where Uniform ,Exponential and Parato and Normal distribution canbe used CO 3: Compute probabilities corresponding to Uniform, Exponential and Parato and Normaldistribution
	II	Statistics Paper III- (CSST- 123)	Statistics Practical	CO 1: Understand the relationship between two variables using scatter plot. CO 2: Compute coefficient of correlation, coefficient of regression. CO 3: fitting of various regression models and to find best fit. CO 4: fitting of Normal distribution.
S.Y.B.Sc. (Comp. Sci)	I	Computer Science Paper-I (CS-231)	Data Structures and Algorithms-I	CO 1:To use well-organized data structures in solving various problems. CO 2:To differentiate the usage of various structures in problem solution CO 3:Implementing algorithms to solve problems using appropriate data structures.
	I	Computer Science Paper-II (CS-232)	Software Engineering	CO 1:Compare and chose a process model for a software project development. CO 2:Identify requirements analyze and prepare models. CO 3: Prepare the SRS, Design document, Project plan of a given software system.
	I	Computer Science Paper-III (CS-233)	Practical course on CS 231 (Data Structures and Algorithms I) and CS 232	CO 1: Select appropriate data structures as applied to specified problem definition. Implementoperations. CO 2: like searching,

			(Software Engineering)	insertion, and deletion, traversing mechanism etc. on various linear datastructures. CO 3: Students will be able to implement Linear structures. CO 4: Implement appropriate sorting/searching technique for given problem CO 5: Determine and analyze the complexity of given Algorithms.
	I	Electronic Science Paper-I (ELC-231)	Microcontroller architecture & Programming	CO 1: To write programs for 8051 microcontroller CO 2: To interface I/O peripherals to 8051 microcontroller CO 3: To design small microcontroller based projects
	I	Electronic Science Paper-II (ELC-232)	Digital communication& Networking	CO 1: Define and explain terminologies of data communication CO 2: Understand the impact and limitations of various digital modulation techniques CO 3: communication To acknowledge the need of spread spectrum schemes. CO 4: Identify functions of data link layer and network layer while accessing communication link CO 5: To choose appropriate and advanced techniques to build the computer network
	I	Electronic Science Paper-III (ELC-231)	Practical Course	CO 1: To design and build his/her own microcontroller based projects. CO 2: To acquire skills of Embedded C programming CO 3: To know multiplexing and modulation techniques useful in developing wireless Application CO 4: Do build and test own network and do settings.
S.Y.B.Sc. (Comp. Sci)	II	Computer Science Paper-I (CS-241)	Data Structures and Algorithms-II	CO 1: Implementation of different data structures efficiently CO 2: Usage of well-

				organized data structures to handle large amount of data CO 3: Usage of appropriate data structures for problem solving
	II	Computer Science Paper-II (CS-242)	Computer Networks-I	CO 1: Have a good understanding of the OSI and TCP/IP Reference Models and in particularhave a good knowledge of Layers. CO2: Understand the working of various protocols. CO 3: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
	II	Computer Science Paper-III (CS-243)	Practical course on CS 241 (Data Structures and Algorithms II) and CS 242 (Computer Networks-I)	CO 1: Implement operations like searching, insertion, and deletion, traversing mechanism etc. on trees data structures. CO 2: Students will be able to implement Non-Linear data structures. CO 3: Design advance data structure using Non-Linear data structure.
	II	Electronic Science Paper-I (ELC-241)	Embedded System Design	CO 1: To understand the difference between general computing and the embedded systems. CO 2: To know the fundamentals of embedded systems. CO 3: Understand the use of Single board Computer (Such as Raspberry Pi) for an embeddedsystem application. CO 4: Familiar with the programming environment to develop embedded systems and theirinterfaces with peripheral devices. CO 5: To develop familiarity with tools used to develop in an embedded environment.
	II	Electronic Science Paper-II (ELC-242)	Wireless Communication	CO1: Know working of wireless technologies such as

			and Internet of Things(IoT)	Mobile communication, GSM, GPRS. CO 2: Become familiar with 3G and 4G Cellular Network Technologies for Data Connections. CO3: Understand working principles of short range communication application CO 4: Get introduce to upcoming technology of Internet of Things CO 5: Explore themselves and develop new IoT based applications
	II	Electronic Science Paper-III (ELC-241)	Practical Course	CO 1: To design and develop own smart applications using Raspberry-Pi. CO 2: To write Python program for simple applications. CO 3: To build own IoT based system.
T.Y.B.Sc. (Comp. Sci)	I	Computer science paper I(CS-351)	Operating Systems-I	CO 1: Processes and Thread Scheduling by operating system CO 2: Synchronization in process and threads by operating system. CO 3: Memory management by operating system using with the help of various schemes
	I	Computer science Paper II(CS 352)	Computer Networks – II	CO 1: Student will understand the different protocols of Application layer. CO 2: Develop understanding of technical aspect of Multimedia Systems CO 3: Develop various Multimedia Systems applicable in real time. CO 4: Identify information security goals
	I	Computer science Paper VII(CS 357)	Practical course based on CS 351	CO 1: Process synchronization CO 2: Processes and Thread Scheduling by operating system

				CO 3: Memory management by operating system using with the help of various schemes
	I	Computer Science Paper III (CS 353)	Web Technologies -I	CO 1: Understand how to develop dynamic and interactive Web Page
	I	Computer Science Paper IV (CS 354)	Foundations of Data Science	CO 1: Perform Exploratory Data Analysis CO 2: Obtain, clean/process, and transform data. CO 3: Detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization. CO 4: Demonstrate proficiency with statistical analysis of data. CO 5: Present results using data visualization techniques.
	I	Computer Science Paper VIII (CS 358)	Practical course based on CS 353 and CS 354	CO 1: Understand how to develop dynamic and interactive Web Page CO 2: Prepare data for use with a variety of statistical methods and recognize how the quality of the data may affect conclusions. CO 3: Perform exploratory data analysis
	I	Computer Science Paper V (CS 355)	Object Oriented Programming using Java - I	CO 1: Understand the concept of classes, object, packages and Collections. CO 2: To develop GUI based application
	I	Computer Science Paper VI (CS 356)	Theoretical Computer Science	CO 1: Understand the use of automata during language design. CO 2: Relate various automata and Languages.
	I	Computer Science Paper VI (CS 359)	Practical Course based on CS 355	CO 1: Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

				CO 2: Read and make elementary modifications to Java programs that solve real-world problems. CO 3: Validate input in a Java program
	I	Computer Science Paper X (CS 3510)	Python Programming	CO 1: Develop logic for problem solving. CO 2: Determine the methods to create and develop Python programs by utilizing the data CO 3: structures like lists, dictionaries, tuples and sets. CO 4: To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc. CO 5: To write python programs and develop a small application project
	I	Computer Science Paper XI (CS 3511)	Blockchain Technology	CO 1: Learn the fundamentals of Blockchain Technology. CO 2: Learn Blockchain programming CO 3: Basic knowledge of Smart Contracts and how they function.
T.Y.B.Sc. (Comp. Sci)	II	Computer Science Paper I (CS 361)	Operating Systems – II	CO 1: Management of deadlocks and File System by operating system. CO 2: Scheduling storage or disk for processes. CO 3: Distributed Operating System and its architecture and the extended features in mobile OS.
	II	Computer Science Paper II (CS 362)	Software Testing	CO 1.To understands various software testing methods and strategies. CO 2. To understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software. CO 3. To design test cases and test plans, review reports of testing for qualitative software. CO 4. To understand latest testing methods used in the

				software industries.
	II	Computer Science Paper VII (CS 367)	Practical course based on CS 361	CO 1: Management of deadlocks by operating system CO 2: File System management CO 3: Disk space management and scheduling for processes
	II	Computer Science Paper III (CS 363)	Web Technologies – II	CO 1: Build dynamic website. CO 2: Using MVC based framework easy to design and handling the errors in dynamic website.
	II	Computer Science Paper IV (CS 364)	Data Analytics	CO 1: Use appropriate models of analysis, assess the quality of input, and derive insight from results. CO 2: Analyze data, choose relevant models and algorithms for respective applications CO 3: Understand different data mining techniques like classification, prediction, clustering and association rule mining CO 4: Apply modeling and data analysis techniques to the solution of real world business problem
	II	Computer Science Paper VIII (CS 368)	Practical course based on CS 363 and CS 364	CO 1: Build dynamic website. CO 2: Using MVC based framework easy to design and handling the errors in dynamic website.
	II	Computer Science Paper V (CS 365)	Object Oriented Programming using Java - II	CO 1: To access open database through Java programs using Java Data Base Connectivity (JDBC) and develop the application. CO 2: Understand and Create dynamic web pages, using Servlets and JSP. CO 3: Work with basics of framework to develop secure web applications.
	II	Computer Science Paper VI (CS 366)	Compiler Construction	CO 1: Understand the process of scanning and parsing of source code. CO 2: Learn the conversion code written in source language to machine language. CO 3: Understand tools like

				LEX and YACC.
	II	Computer Science Paper IX (CS 369)	Practical Course based on CS 365	CO 1: To Learn database Programming using Java CO 2: Understand and Create dynamic web pages using Servlets and JSP. CO 3: Work with basics of framework to develop secure web applications
	II	Computer Science Paper X (CS 3610)	Software Testing Tools	CO 1: To understand various software testing methods and strategies. CO 2: To understand a variety of software metrics and identify defects and managing those defects for improvement in quality for given software. CO 3: To design test cases and test plans, review reports of testing for qualitative software. CO 4: To understand latest testing tools used in the software industries.
	II	Computer Science Paper XI (CS 3611	Project	CO 1: To understand how to do the project in IT Industry. CO 2: Using this small project student understand how to do. CO 3: Understand how to present project and how to design it.

Prof. A.P.Kulkarni
Department of Computer Science

Department of Commerce

PSOs and Cos for the A.Y. 2021-2022

PROGRAMME SPECIFIC OUTCOMES FOR BACHELORS OF COMMERCE (B.COM)

❖ COST & WORKS ACCOUNTING

After successfully completion of this programme the students will be able to :

- Develop analytical skills
- Get job opportunities in the field of cost accounting
- Prepare budgets in real life situations
- Use cost control techniques like marginal costing, standard costing, budgetary control etc. for the purpose of controlling cost
- Utilize cost accounting standards while analyzing cost statements
- Identify different cost accounting record rules u/s 148 of the company's act 2013

❖ BUSINESS ADMINISTRATION

After successfully completion of this course the students will be able to:

- Study the Conceptual Business Environment.
- Study the concept of Administration, Management & Organisation.
- Grab various opportunities available in Small Business and Advertising field.
- Improve the performance or management of the business
- Improve decision making
- Bring out the hidden leader among them
- Organize the people or other resources

COURSE OUTCOMES –

Class	Semester	Paper (Paper No. & Code)	Subject	Course Outcome
F.Y.B.Com	I	114 (A)	BUSINESS MATHEMATICS AND STATISTICS – I	After successfully completion of this course the students will be able to: 1. Apply concepts of interest and annuities to calculate EMI 2. Prepare amortization schedule, calculate insurance, premiums etc. 3. Calculate dividend, brokerage on shares and mutual funds. 4. Identify the contribution of shares and mutual funds in systematic investment plans and to select the best investment options. 5. Recognize and classify different types of data. 6. Calculate measures of central tendency and dispersion.
F.Y.B.Com	II	114 (A)	BUSINESS MATHEMATICS AND STATISTICS – I	After successfully completion of this course the students will be able to: 1. Apply the theory of matrices to solve business and economic problems. 2. Represent business and economic optimization problems involving two variables as LPP. 3. Use of graphical method to solve the LPP. 4. Predict the type of relationship between bivariate data 5. Compute different index numbers and cost of living.
F.Y.B.Com	I	115(B)	**BANKING AND**	After successfully completion of this

			FINANCE	course the students will be able to: 1. Study evolution of banking in world. 2. Study the fundamentals of banking. 3. Create awareness about various banking concepts. 4. Get acquainted different methods of remittance. Conceptualize banking operations.
F.Y.B.Com	II	115(B)	**BANKING AND FINANCE**	After successfully completion of this course the students will be able to: 1. After successfully completion of this course the students will be able to : 2. Study of the Lending Principles of the Bank. 3. Get Acquainted format of Balance Sheet of the Bank. 4. Create awareness about various Negotiable Instruments. 5. Study the different types of endorsements. 6. Get acquainted different kinds of Technologies in Banking.
F.Y.B.Com	I	126(D)	**CONSUMER PROTECTION AND BUSINESS ETHICS**	After successfully completion of this course the students will be able to : 1. Develop General Awareness of the consumerism. 2. Understand the consumer rights, responsibility and role of United Nations. 3. Get acquainted about Existing law on

				consumer protection in India. 4. Study the Dispute Redreessal Machinery and basic procedure for handling consumer dispute. 5. Get acquainted about the issues relating to e-commerce, e-banking emerging issues and internet regulation. 6. Study the consumer education –Need and Importance.
F.Y.B.Com	II	126 D	**CONSUMER PROTECTION AND BUSINESS ETHICS**	After successfully completion of this course the students will be able to : 1. Create awareness about different business Ethics. 2. Get acquainted about corporate social Responsibility. 3. Understand dimension of Corporate Social responsibility. 4. Study the Corporate Governance and Business Ethics. 5. Develop General Awareness of Sustainable Development.
F.Y.B.Com	I	122	**Financial Accounting**	After successfully completion of this course the students will be able to: 1. Study Accounting Concepts, Conventions & Principals. 2. Study the Dissolution of Partnership & Partnership Firms. 3. Study the Conversion of

				Accounts form Incomplete Records. 4. Understand the Goods & Service Tax & its Features.
F.Y.B.Com	II	122	**Financial Accounting**	After successfully completion of this course the students will be able to: 1. Understand the various software used in accounting. 2. Study how to prepare final accounts of charitable trusts. 3. Understand how to do valuation of intangible assets. 4. Study how to prepare accounting for leases.
F.Y.B.Com	I	126(E)	**Business Environment & Entrepreneurship**	After successfully completion of this course the students will be able to: 1. Understand the concept of Business Environment and its aspects 2. Make students aware about the Business Environment issues and problems of Growth 3. Examine personality competencies most common to majority of successful entrepreneurs and to show how these competencies can be developed or acquired 4. Understand the difference between Entrepreneurial and non-Entrepreneurial behavior
F.Y.B.Com	II	126(E)	**Business Environment & Entrepreneurship**	After successfully completion of this course the students will be able to: 1. Study Entrepreneurial Behavior.

				2. Study Importance of Entrepreneurship. 3. Study the Institutions working for promoting entrepreneurship. 4. Understand the journey of various entrepreneurs.
F.Y.B.Com	I	125(A)	**Organization Skill Developments**	After successfully completion of this course the students will be able to: 1. Understand the emerging changes in the modern office environment. 2. Develop the conceptual, analytical, technical and managerial skills of student's efficient office organization and records management. 3. Develop the organizational skills of students. 4. Develop Technical skills among the students for designing and developing effective means to manage records, consistency and efficiency of work flow in the administrative section of an origination. 5. Develop employability skills among the students.
F.Y.B.Com	II	125(A)	**Organization Skill Developments**	After successfully completion of this course the students will be able to: 1. Understand the qualities of a good manager and develop the necessary skill sets. 2. Develop the technical skills of the students to keep up with the technological advancements and digitalization. 3. Develop the communication

				skills of students and introducing them to the latest tools in communication. 4. Develop writing, presentation, interpersonal skills of the students for effective formal corporate reporting. After successfully completion of this course the students will be able to: 1. Develop conceptual understanding about various Accounting Standards and its applicability in corporate accounting. 2. Analyze and Bifurcate Pre-Incorporation and Post-Incorporation period also be able to develop analytical skills with respect to allocation ad apportionment of incomes and expenses for Pre and Post Incorporation. 3. Understand revised format of financial statements along with practical application 4. Analytical skills enhancement and Decision making skills of students will be developed
S.Y.B.COM	IV	242	**CORPORATE ACCOUNTING**	After successfully completion of this course the students will be able to: 1. Understand the difference between Holding company and Subsidiary Company 2. Know the accounting procedure followed in terms of Absorption of companies 3. Understand the process of Liquidation of the companies 4. Acquire knowledge about forensic accounting and be able

				to identify financial frauds
S.Y.B.COM	III	126(A)	**Business Communication**	After successfully completion of this course the students will be able to: 1. Study meaning of communication as well as Importance & Principals of communication. 2. Study the Meaning and Importance & Essentials of Business letter. 3. Study the Meaning, Need, Importance, Elements of soft skills. 4. Study the Introduction, essential elements of Bio data, how to write Resume, Curriculum Vitae.
S.Y.B.COM	**IV**	126(A)	**Business Communication**	After successfully completion of this course the students will be able to: 1. Understand the Meaning and Significance; Structure of Reports. 2. Study the Recent Trends in Business Communication. 3. Understand the Types and Drafting of Business Letters. 4. Study how to write Formal Mails and Blog writing.
S.Y.B.COM	III	244	**Business Management**	After successfully completion of this course the students will be able to: 1. Student can get basic knowledge and understanding about various concepts of Business Management. 2. To help the students to develop cognizance of the importance of management principles. 3. Understand the various

				functions of management. 4. To Study the tools and techniques to be used in the performance of the managerial job.
S.Y.B.COM	IV	244	**Business Management**	After successfully completion of this course the students will be able to: 1. Study the Meaning, Importance and Theories of motivation. 2. Study the Meaning, Importance, Qualities and Functions of a leader. 3. Study the Meaning and need of coordination and control 4. Study the Emerging trends in Business management.
S.Y.B.COM	III	245	**ELEMENTS OF COMPANY LAW**	After successfully completion of this course the students will be able to : 1. Understand the Types, Formation, and Incorporation of a company. 2. Get acquainted about the documents relating to Incorporation and raising of capital. 3. Study the concept of capital of company. 4. Study about forfeiture, surrender & transfer of shares. 5. Analyze E-Governance and E-Filing.
S.Y.B.COM	IV	245	**ELEMENTS OF COMPANY LAW**	After successfully completion of this course the students will be able to: 1. Know Information of Management Of Company. 2. Study about the Key Managerial Personnel Of Company. 3. Get acquainted the company

				meetings. 4. Study the concept of E-Governance. 5. Understand The Methods Of Winding Up Of the Company
S.Y.B.COM	III	246(E)	**Cost and Works Accounting –I**	1.Understand the concept of Cost Costing &Cost Accountancy 2.And Understanding the Cost Sheet.
S.Y.B.Com	IV	246(E)	**Cost and Works Accounting –I**	1. Calculate wage payment and incentives. 2. Understand the process of job analysis, job evaluation and merit rating. Get Insight into recent processes used for cost reduction.
S.Y.B.COM	III	236(A)	**Business Administration**	After successfully completion of this course the students will be able to: 1. To get the knowledge about various forms of business organizations. 2. To acquaint the students about business environment and its implications thereon. 3. Understand the recent trends in business. 4. Study the Stages in business promotion.
S.Y.B.COM	IV	236(A)	**Business Administration**	After successfully completion of this course the students will be able to: 1. To get the basic knowledge about Compliance of legal requirements in promoting business unit. 2. Study the Meaning, Importance & measurements of productivity. 3. Study the Interface between

				business and government, society and natural environment. To study concept and characteristics of Public Private Partnership
T.Y.B.Com	V	352	**ADVANCED ACCOUNTING**	**1.** Developing understanding on applicability of various Accounting Standards **2.** Knowledge about of the Accounting for Capital Restructuring **3.** Conceptual Clarity and Practical understanding of preparation of final accounts of banking companies. **4.** Developing knowledge about Investment Accounting
T.Y.B.Com	VI	352	**ADVANCED ACCOUNTING**	**1.** Practical understanding of preparation of final accounts of Co-operative Societies **2.** Knowledge about of the Accounting for Branches **3.** Conceptual Clarity about new trends like forensic accounting, accounting for CSR activities, derivative contracts and artificial intelligence **4.** Analytical skills enhancement and Decision making skills of students will developed.
T.Y.B.Com	V	361	**Business Regulatory Framework–**	1. To equip the students with procedure and practices about negotiable instruments and liabilities of parties in case of dishonor of negotiable

				instruments. 2. To acquaint students about regulatory mechanism of Consumer Protection and Procedural aspect of Redressal of Consumers' grievances. 3. To acquaint students about regulatory mechanism of Consumer Protection and Procedural aspect of Redressal of Consumers' grievances. 4. To be able to appreciate the emerging developments in the area of intellectual property Laws and their impact on the Indian businesses
T.Y.B.Com	VI	361	**Business Regulatory Framework**	**1.** Acquaint knowledge and maturity to understand Contract Law. **2.** To acquaint knowledge and application of Partnership Deed. **3.** To get training to face emerging issues relating Sale of Goods Act. **4.** To give Comprehensive insight about the emerging trend of Arbitration and conciliation and its regulatory mechanism
T.Y.B.Com	V	363(A)	**Indian & Global Economic Development**	**1.** Students will understand concepts of international economics **2.** Will know various theories of international trade. **3.** Will understand the difference between Free Trade Policy and Protection policy **4.** Will understand the concept of

				terms of trade, also able to know the factors affecting on terms of trade
T.Y.B.Com	VI	363(A)	**Indian & Global Economic Development**	1. Will be able to critically evaluate status of India as compared to world. 2. Will understand the concepts of Foreign Capital 3. Will understand the concepts of Balance of Trade and Balance of Payment 4. Will understand the importance of International Financial Institutions.
T.Y.B.Com	V	354	**Auditing**	**1.** Acquaint with knowledge and maturity to understand concept of Auditing, types of Audit and Audit Process. **2.** Conceptual Clarity and Practical understanding of Vouching Verification and valuation and Types of Audit Report. **3.** Practical knowledge about appointment, reappointment and other related provision. Practical knowledge about Tax Audit as per I.T. Act 1961 (Form 3CA, 3CB & 3CD) **4.** Understanding new concepts under Audit of Computerized Systems & Forensic Audit
T.Y.B.Com	VI	354	**Auditing & Taxation**	1. Acquaint with knowledge and maturity to understand The Income Tax Act, 1961. 2. Conceptual Clarity and Practical understanding of sources of

				income 3. To understand the calculation of total income and tax payable for individual assessee 4. Understanding latest amendment of the act and impact on the person
T.Y.B.Com	V	365(E)	**Cost and Works Accounting –II**	**1.** To remember and understand the concept of overhead and classification of overheads **2.** Understanding the significance of overheads in the total cost of product/service. **3.** 1) Ability to understand the stages in the process of accounting overheads. 2) Application of accounting treatment for under and over absorption. Knowledge about detection of overheads to different activities
T.Y.B.Com	VI	365(E)	**Cost and Works Accounting –II**	1. Understand the basic methods of costing. 2. Develop the ability to calculate the profit of an incomplete contract. 3. The student will be able to prepare Process Account Development of knowledge about cost sheets in service Industries
T.Y.B.Com	V	366(E)	**Cost and Works Accounting –III**	1. Development of overall outlook of Marginal Costing. 2. Develop the knowledge about preparation of various

				types Budgets 3. Understand the implementation n of Inter-firm comparison 4. Understand the implementation n of modern costing environment
T.Y.B.Com	VI	366(E	**Cost and Works Accounting –III**	1. Development of overall outlook of Standard Costing. 2. Develop knowledge about Pricing and pricing strategies 3. Understand the basics of Cost Accounting Standards and recent changes in Cost Management 4. Conceptual understanding of Cost Records and Cost Audit Reports.
T.Y.B.Com	V	365(A)	**Business Administration - II**	**1.** To acquaint the student with knowledge about various Concepts , Objectives of the Human Resource Function , to identify the difference between Human Resource Management and Human Resource Development **2.** To update the students on the emerging trends in the area of Human Resource Management **3.** To develop understanding among the students the process of Recruitment and Selection, understanding the various means and methods associated with the Recruitment and Selection function **4.** To educate the students on the

				importance of Training and Development and its impact on Career Planning and Development.
T.Y.B.Com	VI	365(A)	**Business Administration - II**	1. Developing understanding about Marketing , Learning the difference between Marketing and Selling. Understanding the various markets in operation 2. Conceptual Clarity and Practical understanding 3. Conceptual Clarity and Practical understanding Creative and Imaginative Skills Innovation 4. Analytical skills Decision making skills Creative and Imaginative Skills Innovation
T.Y.B.Com	V	366(A)	**Business Administration – III**	**1.** Conceptual understanding and Conceptual Clarity **2.** Conceptual Clarity and Practical understanding Technical Knowledge **3.** Conceptual Clarity and Practical understanding **4.** Analytical skills Decision making skills Technical skills
T.Y.B.Com	VI	366(A)	**Business Administration – III**	1. Will be able to understand functions of production department **2.** Conceptual Clarity and Practical understanding **3.** Conceptual Clarity and Practical understanding Technical

				Understating Awareness on Latest Trends **4.** Analytical skills Practical understanding Technical Understating Awareness on Latest Trends

KTSP MANDAL'S

HUTATMA RAJGURU MAHAVIDYALAYA, RAJGURUNAGAR

DEPARTMENT OF BBA(CA)

A.Y .2021-22

Program Specific Outcomes

PSO 1 : To learn and practically use various programming languages.

PSO 2 : To learn and create database using Access and SQL Server.

PSO 3 : To understand basics of statistics and business mathematics.

PSO 4 : To implement concept of Object Oriented Software Engineering through UML.

PSO 5 : To understand software testing and current trends in IT.

PSO 6 : To understand and apply software engineering concepts in software project development through teamwork.

PSO 7 : To get domain knowledge related to areas like accounting, organisational behavior, and human resource management.

Course Outcome:

Class	Semester	Paper (Paper No. & code)	Subject	Course Outcome
F.Y. BBA(CA)	Sem I	Paper CA-101	Business Communication	CO 1:Become adept to communicate and write effectively. CO 2:Developing and delivering effective presentations. CO 3:Create awareness among students about Methods and Media of communication. CO 4:Make students familiar with information technology and improve job seeking skills.
F.Y. BBA(CA)	Sem I	Paper CA-102	Principles of Management	**CO 1:**Practice the process of management's four functions: planning, organizing, leading, and controlling **CO 2:**Evaluate leadership styles to anticipate the consequences of each leadership style. **CO 3:**Understand the working of business organization **CO 4:**inculcate Entrepreneurial skills
F.Y. BBA(CA)	Sem I	Paper CA-103	C Language	**CO 1:**To Understand how to use programming in day to day Applications **CO 2:**Improve the problem solving ability **CO 3:**Understand and develop well-structured programs using C language **CO 4:**Learn how to apply logic for problems. **CO 5:**Enhance their programming skills.
F.Y. BBA(CA)	Sem I	Paper CA-104	Database Management System	**CO 1:**To understand the file structure and its organization. **CO 2:**An introduction about Database

				management system **CO 3:**Helps student to learn different types of data models **CO 4:**Student gets knowledge about designing relational database **CO 5:**Understand database concepts and structures. **CO 6:**Understand the objectives of data and information management. **CO 7:**Construct and normalize conceptual data models. .
F.Y. BBA(CA)	Sem I	Paper CA-105	Statistics	**CO 1:**To understand the power of excel spreadsheet in computing summary statistics. **CO 2:**To understand the concept of various measures of central tendency and variation and their importance in business. **CO 3:**To understand the concept and applications of probability, probability distributions in real life situations. **CO 4:**To understand simulations in business world and decision making.
F.Y. BBA(CA)	Sem II	Paper CA-201	Organizational Behavior	**CO 1:**Helps the students to understand the impact that individual, group & structures have on their behavior within the organizations. **CO 2:**Enhance and apply the knowledge they have received for the betterment of the organization. **CO 3:**Helps in understanding the basics related to individual behavior and its impact on their performance
F.Y. BBA(CA)	Sem II	Paper CA-202	Financial Accounting	**CO 1:**Learn basic concepts of accounting **CO 2:**Getting the knowledge about recording of transactions and preparation

				of final accounts **CO 3:**To acquaint the students about accounting software packages
F.Y. BBA(CA)	Sem II	Paper CA-203	Business Mathematics	**CO 1:**Develops formal reasoning. **CO 2:**Creates habit of raising questions. **CO 3:**Helpful in formulating questions.
F.Y. BBA(CA)	Sem II	Paper CA-204	Relational Database management System	**CO 1**:Develop a clear understanding of the conceptual frameworks and definitions of specific terms that are integral to the Relational Database Management Systems **CO 2:**Develop clear concepts about Relational Model. **CO 3:**Understand the basic concepts of Concurrency Control & database security **CO 4:**Understand the basic concept how storage techniques are used to backup data and maintain data access performance in peak hours **CO 5:**Evaluate options to make informed decisions that meet data storage, processing, and retrieval needs.
F.Y. BBA(CA)	Sem II	Paper CA-205	Web Technology	**CO 1:**Understand the various steps in designing Creative and dynamic website. **CO 2:** Write HTML, JavaScript, CSS and PHP. **CO 3:** Understand hierarchy of object oriented programming **CO 4:** Create PHP scripts that use object-oriented PHP
S.Y. BBA(CA)	Sem III	CA - 301	Digital Marketing	**CO 1:** The aim of this syllabus is to give knowledge about using digital marketing in and as business. **CO 2:**To make SWOT analysis, SEO optimization and use of various digital

				marketing tools.
S.Y. BBA(CA)	Sem III	CA 302	Data Structure	**CO 1:** To understand the concepts of ADTs **CO 2:** To learn linear data structures – lists, stacks, and queues **CO 3:** To understand sorting, searching and hashing algorithms **CO 4:** To apply Tree and Graph structures
S.Y. BBA(CA)	Sem III	CA 303	Software Engineering	**CO 1:** To understand System concepts. **CO 2:** To understand Software Engineering concepts. **CO 3:** To understand the applications of Software Engineering concepts and Design in Software Development.
S.Y. BBA(CA)	Sem III	CA 304 (Open)	Angular - JS	**CO 1:** By the end of this course, the students should be able to Understand Client Side MVC and SPA **CO 2:** Explore AngularJS Component **CO 3:** Develop an AngularJS Single Page Application **CO 4:** Create and bind controllers with Javascript **CO 5:** Apply filter in AngularJS application
S.Y. BBA(CA)	Sem III	CA-304 (Option) :	PHP	**CO 1:** Understand how server-side programming works on the web. **CO 2:** Using PHP built-in functions and creating custom functions **CO 3:** Understanding POST and GET in form submission. **CO 4:** How to receive and process form submission data. **CO 5:** Read and process data in a MySQL database.
S.Y.	Sem III	CA-305	Big Data	**CO 1:** To enable learners to develop

BBA(CA)		(Option)		expert knowledge and analytical skills in current and developing areas of analysis statistics, and machine learning **CO 2:** To enable the learner to identify, develop and apply detailed analytical, creative, problem solving skills. **CO 3:** Provide the learner with a comprehensive platform for career development, innovation and further study.
S.Y. BBA(CA)	Sem III	CA-305 (Option)	Block Chain	**CO 1:** Understand how blockchain systems (mainly Bitcoin and Ethereum) work, **CO 2:** To securely interact with them, **CO 3:** Design, build, and deploy smart contracts and distributed applications, **CO 4:**. Integrate ideas from blockchain technology into their own projects.
S.Y. BBA(CA)	Sem III	(Add-On) Courses AECC	Course Title: - (M)Basic Course in Environmental Awareness	**CO 1:** To provide an opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment . **CO 2:** To develop conscious towards a cleaner and better managed environment.
S.Y. BBA(CA)	Sem IV	CA 401	Networking	**CO 1:** To know about computer network. **CO 2:** To understand different topologies used in networking **CO 3:** To learn different types of network. **CO 4:** To understanding the use of connecting device used in network
S.Y. BBA(CA)	Sem IV	CA 402	Object Oriented Programming Using C++	**CO 1:** Familiarization with a widely used programming concept – Object Oriented Programming. **CO 2:** Develop logical thinking.

				CO 3: Skill to write codes in C++ by applying concept of OOP, such as Objects, Classes, Constructors, Inheritance etc., to solve mathematical or real world problems **CO 4:** Ability to isolate and fix common errors in C++ programs.
S.Y. BBA(CA)	Sem IV	CA 403	Operating System	**CO 1:**Gain extensive knowledge on principles and modules of operating systems. **CO 2:**Understand key mechanisms in design of operating systems modules. **CO 3:** Understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks. **CO 4:** Compare performance of processor scheduling algorithms - produce algorithmic solutions to process synchronization problems.
S.Y. BBA(CA)	Sem IV	CA 404	Node –JS	**CO 1:** Create basic web applications with Node.js **CO 2:** Automate tasks with Gulp **CO 3:** Build an HTTP server using the core modules in Node.js **CO 4:** Use stream I/O to efficiently serve the web pages **CO 5:** Create modules to organize the server **CO 6:** Test the reliability of the application with unit tests
S.Y. BBA(CA)	Sem IV	(Add-On)	JQuery	**CO 1:** jQuery is an easy to learn JavaScript library, which makes

		Courses AECC		JavaScript programming very easy. **CO 2:** jQuery takes a lot of common tasks that require many lines of JavaScript code to accomplish, and wraps themϖ into methods that you can call with a single line of code. **CO 3:** jQuery also simplifies complicated tasks like AJAX calls and DOM manipulation. **CO 4:** jQuery will run the same and produce same output in all major browsers. **CO 5:** jQuery is continuously upgraded, maintained and documented by a dedicated community of great developers. This ensures high quality and support on the internet.
T.Y. BBA(CA)	Sem V	CA-501	Cyber Security	**CO 1:** Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. **CO 2:** Design, develop, test and evaluate secure software. **CO 3:** Develop policies and procedures to manage enterprise security risks. **CO 4:** Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training. **CO 5:** Interpret and forensically investigate security incidents.
T.Y. BBA(CA)	Sem V	CA-502	Object Oriented Software	**CO 1:** To Understand concept of system design using UML. **CO 2:** To understand system

			Engineering.	development through object-oriented techniques.
T.Y. BBA(CA)	Sem V	CA-503	Java Programming.	**CO 1:** To learn the basic concept of Java Programming. **CO 2:** To understand how to use programming in day to day applications.
T.Y. BBA(CA)	Sem V	CA-504	MangoDB (Option)	**CO 1:**Differentiate database categories. **CO 2:**Learn MangoDB design goals **CO 3:**List MangoDB tools **CO 4:**Describe JSON and BSON **CO 5:**Install MangoDB on Windows,Linux,MAC OS etc.
T.Y. BBA(CA)	Sem V	CA-504	Python	**CO 1:** To acquire programming skills in core Python. **CO 2:** To acquire Object Oriented Skills in Python **CO 3:** To develop the skill of designing Graphical user Interfaces in Python 4. To develop the ability to write database applications in Python
T.Y. BBA(CA)	Sem VI	CA-601	Recent Trends in IT	**CO1:** To introduce upcoming trends in Information technology. **CO2:** To study Eco friendly software development Course Code
T.Y. BBA(CA)	Sem VI	CA-602	Software Testing	**CO1:** To know the concept of software testing. **CO2:** To understand how to test bugs in software. **CO3:** To develop programming logic.

T.Y. BBA(CA)	Sem VI	CA-603	Advanced Java	**CO1:** To know the concept of Java Programming. **CO2:** To understand how to use programming in day to day applications. **CO3:**To develop programming logic.
T.Y. BBA(CA)	Sem VI	CA-604	Android Programming	**CO1:** Creating robust mobile applications and learn how to integrate them with other services **CO2:** Creating intuitive, reliable mobile apps using the android services and components **CO3:** Create a seamless user interface that works with different mobile screens.
T.Y. BBA(CA)	Sem VI	CA-604	Dot Net Programming (Option)	**CO1:**Design web application with varity of controls. **CO 2:**Access the data using in built data access tools. **CO 3:**Use Microsoft ADO.NET to access data in web application. **CO 4:**Develop secured web application.

Prof.A.S.Tanpure.

HOD of BBA(CA)

KTSP Mandal's

Hutatma Rajguru Mahavidyalaya

Rajgurunagar

A.Y. 2021-22

Programme Outcomes –

Arts - (B.A.)

PO1: Acquired the knowledge with facts and figures concerned with the subjects such as Marathi, English, Economics, Geography, Political sciences and History.

PO2: Understood the basic concepts, fundamental principles and various theories in Languages and mental and moral sciences.

PO3: Realization of human values.

PO4: Comprehended the importance of literature in terms of aesthetic, mental, moral, and intellectual development of an individual.

PO5: Sense of social service.

PO6: Responsible and dutiful citizen.

PO7: Critical ability and temper.

Dr. S.D. Shinde
Vice Principal

Dr. S.S. Pingale
Principal

Programme Outcomes (Undergraduate Level)

Faculty Arts (B. A.)

After completing graduation in the faculty of Arts the students will be able to:

PO1	Acquired knowledge of facts and figures concerned with the subjects such as Marathi, English, Economics, Geography, Political sciences and History.
PO2	Understood the basic concepts, fundamental principles and various theories in Languages and mental and moral sciences.
PO3	Realization of human values.
PO4	Comprehended the importance of literature in terms of the aesthetic, mental, moral,and intellectual development of an individual.
PO5	Sense of social service.
PO6	Responsible and dutiful citizen.
PO7	Critical ability and temper.

DEPARTMENT OF ENGLISH

PROGRAMME SPECIFIC OUTCOME (PSO)

Students offering special and functional at the UG level

PSO 1: Realize the significance of the English language in the context of globalization

PSO 2: Use English in formal and informal situations

PSO3: Acquire the dynamics of communication in English

PSO:4 Think independently and imbibe core human values

PSO:5 Understand, interpret and criticize English literature

PSO:6 Use English creatively

PSO:7 Be a master of phonetics and phonology

COURSE OUTCOME (CO)

1) **F.Y.B.A. COMPULSORY ENGLISH (Sem I-11001 & Sem II-12001) Prescribed text: Literary Gleam: An Anthology of Prose and Poetry)**

Completion of this course will enable the students to

1) Realize the beauty and communicative power of the English language
2) Seek human values to become responsible citizens
3) Seek employment by developing linguistic competence and communicative skills
4) Revise and reinforce the skills already acquired
5) Think independently and critically

2) **F.Y.B.A. OPTIONAL (ADDITIONAL) ENGLISH (Sem I-11331 & Sem II-12331) Prescribed Text- Initiations: Minor Literary Forms & Basics of Phonology)**

Completion of this course will enable the students to

1) Understand the basics of language and literature
2) Get acquainted with minor forms of English literature
3) Speak English paying attention to proper pronunciation
4) Seek jobs by improving language skills
5) Develop an integral view of language and literature

3) F.Y. B.A. FUNCTIONAL ENGLISH PAPER I AN INTRODUCTION ENGLISH LANGUAGE AND WRITING SKILLS IN ENGLISH (Sem I- 11851 & Sem-11951)

Completion of this course will enable the students to

1) Be aware of the features of spoken English
2) Use English according to the situations and contexts
3) Overcome common problems of Indian speakers of English
4) Use grammatically correct language
5) Write effectively

4) F.Y. B.A. FUNCTIONAL ENGLISH PAPER II ORAL COMMUNICATIONIN ENGLISH (Sem I-11852 & Sem II-11952)

Completion of this course will enable the students to

1) Know the dynamics of oral communication in English
2) Describe familiar things, persons, pictures
3) Describe/ narrate simple events a n d routine activities of oneself and others
4) Use the computer in learning English and written communication
5) Prepare PowerPoint presentations

5) S.Y.B.A. COMPULSORY ENGLISH (Core Course-CC) (Sem III-23001 & Sem IV-24001) Prescribed Text-Panorama: Values and Skills through Literature)

Completion of this course will enable the students to

1) Develop competence for self-learning
2) Study and analyze excellent pieces and poetry to realize the beauty andcommunicative power of English
3) Develop a n interest in reading literary pieces
4) Expose themselves to native cultural experiences and situations in order to develophuman values and social awareness
5) Develop overall linguistic competence and communicative skills

6) S.Y.B.A. SKILL ENHANCEMENT COURSE- ADVANCED STUDY OF ENGLISH LANGUAGE (Sem III-23333 & Sem IV-24333)

Prescribed Text- Linguistics: An Introduction

Completion of this course will enable the students to

1) Understand the various components of language
2) Understand the basics of the short story as a form of literature
3) Know various types of the short story in English
4) Understand literary merits, beauty and creative use of language
5) Understand technical aspects of language and their practical usage
6) Develop an integrated view of language and literature
7) Develop their overall linguistic competence

7) S.Y.B.A. DISCIPLINE SPECIFIC COURSE- APPRECIATING DRAMA (Sem III-23331 & Sem IV-24321)

Completion of this course will enable the students to

1) Understand the basics of Drama as a form of literature
2) Apply the terminology used in appreciating and analyzing Drama
3) Interpret and analyze plays independently
4) Understand the aesthetics of drama
5) Differentiate between various types of drama

8) S.Y.B.A. DISCIPLINE SPECIFIC COURSE- APPRECIATING POETRY (Sem III-23332 & Sem IV-24332)

Completion of this course will enable the students to

1) Understand the basics of poetry as a form of literature
2) Apply proper terminology while analyzing poetry
3) Appreciate the aesthetics of poetry
4) Differentiate between various types of poetry
5) Appreciate and evaluate poetry independently

9) S.Y. B.A. FUNCTIONAL ENGLISH III: ADVANCED WRITING SKILLS AND INTRODUCTION TO ELECTRONIC MEDIA (Sem III-23851 & Sem IV-24851)

Completion of this course will enable the students to

1) Enhance their ability to communicate in a written mode
2) Write in different formats

3) Improve their reference work
4) Know career potions in Media
5) Change language according to Media.
6) Improve research abilities

10) S.Y. B.A. FUNCTIONAL ENGLISH IV: ORAL COMMUNICATION IN ENGLISH: INTERMEDIATE AND KEY COMPETENCY MODULES (PRACTICAL PAPER) (Sem III-23852 & Sem IV-24852)

Completion of this course will enable the students to

1) Be confident in communication in English
2) Use proper English in formal and informal situations.
3) Develop voice quality for effective oral communication
4) Use proper body language during oral interactions in visual media
5) Improve overall personality through key competency modules

11) S.Y.B.A. SKILL ENHANCEMENT COURSE- A CERTIFICATE COURSE IN SKILL DEVELOPMENT (Sem III-23333 & Sem IV-24334)

Completion of this course will enable the students to

1. Enhance their skill of using English for everyday communication
2. Know the verbal and nonverbal communication
3. Get exposure to speaking in various contexts
4. Understand soft skills
5. Develop their interaction in English

12) T.Y.B.A. COMPULSORY ENGLISH (CORE COURSE-CC) (Sem V-35001 & Sem VI-36001) Prescribed Text: Exploring New horizons

Completion of this course will enable the students to

1) Know the best use of language in literature
2) Enhance the communicative power
3) Become competent users of English in real situations
4) Understand various cultural experiences expressed through literature
5) Improve the soft skills

13) T.Y.B.A. SKILL ENHANCEMENT COURSE (SEC-1C & SEC 1D) ENHANCING EMPLOYABILITY SKILLS (Sem V-35333 & Sem VI-36333) Prescribed Text- Aspirations: English for Careers

After studying the paper successfully, the learners will be able:

1) To get awareness of career opportunities available to them.

2) To identify the career opportunities suitable to them.

3) To understand the use of English in different careers.

4) To develop competence in using English for the career of their choice.

5) To enhance skills required for their placement.

6) To use English effectively in the career of their choice.

7) To exercise verbal as well as nonverbal communication effectively for their career.

14) T.Y.B.A. DISCIPLINE SPECIFIC COURSE- APPRECIATING NOVEL (Sem V-35331 & Sem VI-36331)

Completion of this course will enable the students to

1) Understand the basics of the novel as a form of literature

2) Know the historical development and nature of the novel

3) Get exposed to various types and aspects of the novel

4) Develop literary sensibility and realize cultural diversity

5) Analyze some of the best examples of novel

15) T.Y.B.A. DISCIPLINE SPECIFIC ELECTIVE- INTRODUCTION TO LITERARYCRITICISM (Sem V-35332 & Sem VI-36332)

Completion of this course will enable the students to

1) Know the basics of literary criticism

2) Understand the nature and historical development of literary criticism

3) Expose themselves to significant critical approaches and literary terms

4) Interpret literary works in English in the light of various critical approaches

5) Develop critical aptitude

16) T.Y.B.A. FUNCTIONAL ENGLISH PAPER V- INTRODUCTION TO PRINT MEDIA AND WRITING FOR MASS MEDIA &KEY COMPETENCY MODULES (Sem V-35851 & Sem VI-36852)

Completion of this course will enable the students to

1) Find careers in a language like translations and, technical writing. Writing for mass media, advertising, freelancing

2) Know the changes in writing skills according to various media
3) Improve their analytical abilities
4) Collect basic data required for media

17) T.Y. B.A. FUNCTIONAL ENGLISH PAPER VI: ENTREPRENEURSHIP DEVELOPMENT, PROJECT REPORT & ORAL COMMUNICATION IN ENGLISH: ADVANCED (PRACTICAL PAPER) (Sem V-35852 & Sem VI-36851)

Completion of this course will enable the students to

1) Find out the possibility of self–employment
2) Shape them up for self-employment
3) Achieve overall personality development through key competency modules
4) Do independent research
5) Get exposed to the work environment through visits and field visits

18) T.Y.B.A. SKILL ENHANCEMENT COURSE- MASTERING LIFE SKILLS AND LIFE VALUES (Sem V-35334 & SemVI-36334)

Completion of this course will enable the students to

1. Learn social and interpersonal skills
2. Think critically
5. Know stress management and positive thinking.
6. Get leadership qualities
7. Develop their overall personality

19) F.Y.B.COM COMPULSORY ENGLISH Prescribed Text: Success Avenue (Sem V-111 & Sem VI-121)

Completion of this course will enable the students to

1) Realize the beauty and communicative power of the English language along with its practical application
2) Realize the socio-economic ethos of contemporary life by being exposed to a variety of topics prescribed
3) Develop oral and written communicative skills to improve employability
4) Improve overall linguistic competence

20) S.Y.B.SC. ENGLISH (ABILITY ENHANCEMENT COMPULSORY

COURSE-AECC) Prescribed Text-Horizons: English in Multivalent Contexts (Sem V-23321 & Sem VI- 24321)

Completion of this course will enable the students to

1) Improve English language skills as means of oral and written communication
2) Understand and analyze English prose, poetry and short stories
3) Enrich vocabulary
4) Improve presentations skills

20) S.Y. B.S.C (COMPUTER SCIENCE) ENGLISH: LANGUAGE COMMUNICATIONABILITY ENHANCEMENT COMPULSORY COURSE-AECC) (Sem V-23922 & Sem VI-24922)

Completion of this course will enable the students to

1) Improve English language skills as means of oral and written communication
2) Understand and analyze English prose poetry and short stories
3) Enrich vocabulary
4) Improve presentations skills

M.A. ENGLISH PART I&II (PROGRAMME SPECIFIC OUTCOME)

Students offering special and functional at PG level Completion of this course will enable the students to

PSO 1: Know the major movements, authors, and poets of the periods prescribed for study.

PSO 2: Enhance their literary sensibilities

PSO 3: Analyze the literary texts from post-colonial perspectives.

PSO 4: Recognize distinctive ways in which the writers differ in ideological positions fromtheir contemporary authors.

PSO 5: Know England's political, social and cultural developments during the prescribed period.

PSO 6: Respond to universal values reflected in literature.

PSO 7: Explain the canonical relevance of texts.

PSO 8: Identify research areas.

PSO 9: Enhance proficiency in English.

COURSE OUTCOME (CO)

MA ENGLISH PAPER I ENGLISH LITERATURE FROM 1550 TO 1798 (Sem I-10601 & Sem II-20601)

Completion of this course will enable the students to

1) Know the major movements and authors, poets and movements from theRenaissance to the Romantic period of English literature
2) Relate the literature of the period to the ideological and political developments of
3) the period
4) Understand the development of various literary forms such as drama, prose andpoetry.
5) Appreciate different styles of expression

2)PAPER II ENGLISH LITERATURE FROM 1798 TO THE PRESENT (Sem I-10602 & Sem II- 20602)

Completion of this course will enable the students to

1) Know the major movements and authors, poets and movements from theVictorian period to the present
2) Relate the literature of the period to the ideological and political developments ofthe period
3) Understand the development of various literary forms such as drama, prose Poetry, novel
4) Appreciate different styles of expression

5) Realize various ways of interpretation of the texts

3) PAPER III CONTEMPORARY STUDIES IN ENGLISH LANGUAGE (Sem I- 10603 & Sem II-20603)

Completion of this course will enable the students to

1) Know the basic tools for the systematic study of language
2) Understand and use the basic concepts in Linguistics
3) Get acquainted with sub-disciplines of Linguistics
4) Apply the linguistic skills in real-life situations
5) Know the syntactic features of the English language
6) Know the regional features of English pronunciation

4)PAPER IV LITERARY CRITICISM AND THEORY (Sem I-10604 & Sem II-20604)

Completion of this course will enable the students to

1) Know the nature, function and relevance of literary criticism and theory
2) Know various important critical approaches and their tenets
3) Deal with highly intellectual and radical content and develop their logicalthinking and analytical ability
4) Develop sensibility and competency in them for practical applications

M.A. ENGLISH PART II

PAPER V INDIAN WRITING IN ENGLISH (Sem III-30601 & Sem-40601)

Completion of this course will enable the students to

1) Understand major movements and figures of Indian Writing in English
2) Be sensible to respond to and appreciate literary texts
3) To appreciate the variety and diversity of Indian Writing in English.
4) Understand and appreciate the artistic and innovative use of language employedby the writers
5) Imbibe human values
6) Enhance their literary and linguistic competence

PAPER VI INDIAN LITERATURES IN ENGLISH TRANSLATION (Sem III-30604 & Sem-40604)

Completion of this course will enable the students to

1) Know the significant Indian regional language writers of various periods and their works.
2) Compare the features and peculiarities of Indian society's cultures and languages.
3) Understand the different literary techniques employed by various Indian regional language writers.
4) Understand the vast possibilities of translating literary texts from their languages into English.

PAPER VII AMERICAN LITERATURE (Sem III- 30606 & Sem IV- 40606)

Completion of this course will enable the students to

1) Know the major texts that led to the evolution of American literature.
2) Gain a broad historical view of the entire period from the time of the early settlers, through the westward movement to the contemporary period.
3) Understand the religious, socio-political, literary and cultural movements of America.
4) Know the rich diversity of American writing.

PAPER VIII WORLD LITERATURE IN ENGLISH (Sem III-30608 & SemIV-40608)

Completion of this course will enable the students to

1) Know some of the important literary texts of the world
2) Gain some insights into the socio-cultural aspects of the regions from where the texts are chosen.
3) Compare the authors of the world with Indian writers in English or the writers in their languages.
4) Be able to carry out research in comparative literature

K.T.S.P.Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Department of Economics
Programme Outcomes and Course Outcomes

(New Syllabus)

Program Outcome: B.A.

PO 1: Acquire knowledge with facts and figures related concerned subjects such as Economics, Politics, History etc.

PO 2: Identify with Basic Concepts, Fundamental Principles and various theories in the said subjects.

PO 3: Understand how issues in social science influence literature and how literature can provide solutions to the social issues.

Program Specific Outcomes – BA Economics

PSO 1. Knowledge of Economic System: An ability to understand economic theories and the functioning of basic microeconomic and macroeconomic analysis.

PSO 2. Statistical and Mathematical Skills: Acquaint with collection, organization, tabulation and analysis of empirical data. Ability to use basic mathematical and statistical tools to solve real economic problems.

PSO 3. Environmental Strategy and Management: This course emphasizes environmental problems emerging from economic development. Economic principles are applied to the valuation of environmental quality, quantification of environmental damages, and tools for evaluation of environmental projects.

Course Outcomes:

Class	Semester	Paper (No &Code)	Subject	Course Outcomes
F.Y.B.A.	**Sem.I**	**11151**	**Indian Economic Environment I**	• Ability to develop an understanding of the economic environment and the factors affecting the economic environment. • Ability to develop awareness of the

				various new developments in the different sectors of an economy – agriculture, industry, services, banking, etc.
F.Y.B.A.	**Sem.II**	**12151**	**Indian Economic Environment II**	• Ability to compare and contrast the Indian Economy with other world economies. • At the end of the course, the student should be able to discuss and debate on the various issues and challenges facing the Indian Economic Environment.
S.Y.B.A.	**Sem.III**	**23151 DSE - 1A**	**Micro Economics I**	• Understand Meaning, Nature, Scope, Importance of Micro economics, Basic Economic Problems, Tools of economic analysis, Variables. • Demonstrate Theory of Consumer Behaviour, Theory of Demand, Law of supply, Law of Variable Proportions, Law of Returns to Scale. • Understand the Cost and Revenue concept. • Understand the Market Structure and Classifications of Market Structure, Short & Long Run Equilibrium of firm and Industry in various market structure. •
S.Y.B.A.	**Sem.III**	**23152 DSE - 2A**	**Macro Economics I**	• Understand Meaning, Nature and Scope, Importance and Limitations of Macro Economics, difference between Micro Economics and Macro Economics. • Understand National Income, Circular Flow of National Income, Concepts of National Income, Methods of National Income Measurement, Difficulties in the Measurement of National Income. • Demonstrate Theory of Employment and Output, Classical Theory of Employment , Say's Law of Market, Keynes' Criticism on Classical Theory, Keynesian Theory of

				Employment, Aggregate Demand Price, Employment Determination. • Understand Consumption Function, Saving - APS, MPS, Investment Meaning, Types, Marginal Efficiency of Capital, Factors Influencing Consumption Function, The Concept of Multiplier,.
S.Y.B.A.	**Sem.III**	**23153 CC -1C**	**Financial System- I**	• To understand fundamentals of modern financial system. • To understand the recent trends and developments in banking system
S.Y.B.A.	**Sem.III**	**23154 SEC 2 A**	**Basic Concepts of Research Methodology-I**	• Demonstrate his/ her understanding of sampling methods and the ability to use a collection of data. • Identify the appropriate sample techniques for different kinds of research questions. •
S.Y.B.A.	**Sem.IV**	**24151 DSE - 1B**	**Micro Economics II**	• Understand the theory of Factor Pricing. • Understand distribution theories, theories of Wages, Interest, Rent and Profit. • Understand the concept of Welfare Economics, Pigovian Welfare Economics, Thought of • Amartya Sen on Welfare Economics.
S.Y.B.A.	**Sem.IV**	**24152 DSE - 2B**	**Macro Economics II**	• Understand the Meaning and Functions of money, Value of Money, Cash Balance Approach, and Supply of Money. • Understand the Quantity Theory of Money. • Understand the meaning and types of inflation, Causes and effect of Demand Pull and Cost Push Inflation, Measures to Control Inflation, – Meaning, Causes and Effects Deflation, Philips Curve, Stagflation. • Understand the Meaning, Features and Phases of Business Cycle, Causes and Effects of Business Cycle, Keynes' Theory, Monetary and Fiscal

				Controls for business cycle. • Understand Macroeconomic Policies, Objectives of Macroeconomic Policies, Monetary Policy, Fiscal Policy.
S.Y.B.A.	**Sem.IV**	**24153 CC -1D**	**Financial System II**	• To understand fundamentals of modern financial system. • To understand the recent trends and developments in banking system. • To understand the role of the Reserve Bank of India in Indian financial system. • To provide the knowledge of various financial and non-financial institutions. • To provide the students the intricacies of Indian financial system for better financial decision making.
S.Y.B.A.	**Sem.IV**	**24154 SEC 2 B**	**Basic Concepts of Research Methodology-II**	• Identify the appropriate source of data in relation to the collection of research data. • Able to classify and present the collected data in the form of graph, bar diagram, chart etc.
T.Y.B.A.	**Sem.V**	**35151 DSE 1 C**	**International Economics I**	• To relate and recall the concepts of International Economics and International Trade. • To describe and apply the theories of international trade. • To explain and comprehend the issues relating to Terms of trade and Balance of Payment.
T.Y.B.A.	**Sem.V**	**35152 DSE 2 C**	**Public Finance I**	• To relate and recognize the Nature and Scope of Public Finance. • To describe and analyze the concept of Public Revenue and its components. • To explain types of Public Expenditure and reasons for rising Public Expenditure. • To explain the types of Public Debt and its effects.
T.Y.B.A.	**Sem.V**	**35153 CC 1 E**	**Indian Economic Development-I**	• To relate and recognize the concept and indicators of Economic Development. • To describe and analyze the concept

				and indicators of Human Development. • To explain the characteristics of Developing and Developed Countries. • To describe the constraints to the process of Economic Development.
T.Y.B.A.	**Sem.V**	**35154 SEC 2 C**	**Business Management I**	• Ability to attain Management of Business. • Business planning and decision making • Leadership Skills- Ability to work in teams at the same time, ability to show leadership qualities
T.Y.B.A.	**Sem.VI**	**36151 DSE 1 D**	**International Economics II**	• Ability to relate and explain the concept of Exchange Rate and Foreign Exchange Market. • Ability to describe the trends in Growth, Composition and Direction of India's Foreign Trade. • Ability to comprehend the issues relating to Foreign Capital and Regional and International Co-Operation.
T.Y.B.A.	**Sem.VI**	**36152 DSE 2 D**	**Public Finance II**	• To explain and assess the components and instruments of Fiscal Policy. • To relate to the concepts of Budget and its components. • To describe and analyze the concept of Deficit Financing and its effects. • To describe and explain the Centre and State Financial Relationship.
T.Y.B.A.	**Sem.VI**	**36153 CC-1 F**	**Indian Economic Development II**	• To describe and explain the process of Economic Planning. • To describe and examine the changing structure of planning process in India. • To describe and explain the relation between Economic Development and Environment.
T.Y.B.A.	**Sem.VI**	**36154 SEC-2 D**	**Business Management II**	• Analytical Skills – Ability to analyze data collected and interpret in the most logical manner • Project Report Writing Skills- Ability to comprehend and illustrate/demonstrate findings • Presentation Skills – PPT/Poster-

				Ability to illustrate findings in the most appealing manner • Leadership Skills: Ability to show leadership skills with business ideas or work on business ventures as a practical example

Prof. Dr. R. S. Shirasi

Head Department of Economics

KTSP Mandals

Hutatma Rajguru Mahavidyalaya Rajgurunagar

Department of Political Science

Academic Year – 2021-22

Programme Outcomes and Course Outcomes

Programme Outcomes (B.A.)

PO1 Acquire knowledge with facts and figures related concerned subjects such as Political Science, History, Geography, Economics, Languages, etc.

PO2 Identify with the basic concepts, fundamental principles, and various theories in the above mentioned subjects.

PO3 Understand how issues in social science influence literature and how literature can provide solutions to the social issues.

Course Outcomes (B.A.-Political Science)

The Department of Political Science was established in 1983 with a UG Program with the following objectives:

1. To create awareness about Indian Constitution, rules and laws.
2. To develop responsible citizenship.
3. To create a pool of academia with in-depth understanding of national as well as international political scenario.
4. To make students learn political scenario at regional and local level.
5. To promote an understanding about local state as well as central level governance.
6. To develop an understanding of democracy and democratic values.

With the above objectives the department continued with UG program. In 2008, the department expanded its feathers and started PG Programmes also. The department uses wide variety of Teaching Resources to impart instructions which include Conference, Seminar, Workshop, Excursion etc.

Class	Semester	Paper (Paper No. & Code)	Subject	Course Outcome
FYBA	I & II	**G1** Introduction to Indian Constitution (Sem. I-1161) (Sem. II-1162A)	Political Science	CO 1 : To understand the history of Indian Constitution. CO 2 : To study Indian Political Process. CO 3 : To acquaint students with the important features of the Constitution of India and with the basic framework of Indian government. CO 4 : To familiarize students with the working of the Constitution of India.
SYBA	III & IV	**G2** CC-1C An Introduction To Political Science (Sem. III - 23163) CC-1D An Introduction To Political Science (Sem.IV-24163)	Political Science	CO 1 : Important sub themes of Political Science as a discipline CO 2 : Approaches to study Political Science CO 3 : Basic Concepts and Values in Political Science
SYBA	III & IV	S1Western Political Though (Sem. III-23161) (Sem. IV-23162)	Political Science	CO 1 : To understand the western political thought. CO 2 : Major traditions of thought that have shaped political discourse in different parts of the world. CO 3 : The great diversity of social contexts and philosophical visions. CO 4 : The history of political thought as a series of critical, interconnected and open-ended conversations about the ends and means of the good life.
SYBA	III & IV	**S2** DSE-2A Political Journalism (Sem. III-236162) DSE-2B Political Journalism- (Sem. IV -24162)	Political Science	CO 1 : Complex relationship between the communication, media and power politics. CO 2 : Critical appraisal of practices of political image management, campaigns, propaganda and censorship. CO 3 : Indian context of political Journalism
TYBA	V & VI	**G3** CC-1E Local Self Government In Maharashtra (Sem. V-35164) CC-1F Local Self Government In Maharashtra (Sem. VI-36164)	Political Science	CO 1 : To introduce the evolution of Local Self Government in Maharashtra CO 2 : To make students aware about 73rd and 74th Constitutional Amendments CO 3 : To introduce the students the structure of Local Self Government CO 4 : To make students aware about composition, power and functions of local bodies
TYBA	V & VI	**S3** Public Administration (Sem. V-) (Sem. VI-)	Political Science	CO 1 : This paper is an introductory course in Public Administration. CO 2 : The essence of Public Administration lies in its effectiveness in translating the governing

				philosophy into programmes, policies and activities and making it a part of community living. CO 3 : The paper covers personnel public administration in its historical context thereby proceeding to highlight several of its categories, which have developed administrative salience and capabilities to deal with the process of change. CO 4 : The recent developments and particularly the emergence of New Public Administrations are incorporated within the larger paradigm of democratic legitimacy. CO 5 : The importance of legislative and judicial control over administration is also highlighted
TYBA	V & VI	**S4** DSE-2C International Relations (Sem. V-35162) DSE-2D International Relations (Sem. VI-36162)	Political Science	CO1: This paper deals with concepts and dimensions of International Relations and makes an analysis of different theories highlighting the major debates and differences within the CO2 : different theoretical paradigms. CO3: To understand the concepts, theories and dimensions of international relation CO4: To understand the various debates in I.R. CO5: To understand the concept of 'Power' in international perspective CO6 : To understand the aspects of balance of power in International Politics CO7 : It's highlights various aspects of conflict and conflicts resolution, collective security and in the specificity of the long period of the post second world war phase of the cold war, of Detent and Deterrence leading to theories of rough parity in armaments.

KTSP Mandals

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Department of Geography

Programme Outcomes and Course Outcomes

Academic Year 2022-2023

B. A. Geography Programme Outcomes

After successfully completing B.A. Geography Programme students will be able to:

PO1: Apply qualitative and quantitative research techniques to gather and analyse data on social, cultural, and ecological problems.

PO2: Apply clear written and oral communication skills to communicate results of research.

PO3: Demonstrate connections between everyday life at the local scale and the larger economic, social, and/or environmental forces that network them into a global community.

PO4: Evaluate cultural, social, and environmental processes with a particular focus on space and place, critical theory, practical application, analysis and/or social justice.

PO5: Think in spatial terms to explain what has occurred in the past as well as using geographic principles to understand the present and plan for the future.

PO6: Present completed researches, including an explanation of methodology and scholarly discussion, both orally and in written form and, wherever possible, utilize cartographic tools and other visual formats.

PO7: Demonstrate general understanding of how the physical environment, human societies, and local and global economic systems are integral to the principles of sustainable development.

PO8: Demonstrate acquisition of Weather chart/map, map aerial photograph and Image reading skill.

PO9: Apply Remote sensing concepts, techniques and their application.

PO10: Serve as a Geographer and work as a surveyor in various Govt. Departments.

PO11: Work as a teacher in schools and high schools.

PO12: Serve as conservator in forest, Soil, Agri, Departments.

PO13: Work in disaster and water resources management.

PO14: Serve in forest department as forest conservator.

PO15: Serve in cartographer in map making divisions of Government and work in NGOs.

PO16: Can Prepare for Competitive exams.

Programme Outcomes of B. A. Geography

After completing B. A. Geography programme will have

PSO1: Demonstrate and understanding of principles and theories of Geography. This include Geomorphology, Economic Geography, Human Geography, Agriculture Geography.

PSO2: Apply Statistical Techniques of Spatial Analysis.

PSO3: Demonstrate ability to apply knowledge learned in classroom to set and perform simple laboratory experiments in geography.

PSO4:- The student develops theoretical, applied and computational skills.

PSO4:- Be able to use and analyze maps.

PSO5 :- Students will understand global and regional patterns of cultural, political, economic and agricultural institutions.

PSO6:- Students will have a general understanding of the various theoretical and methodological approaches in both physical and human geography and be able to develop research questions and critically analyze both qualitative and quantitative data to answer those questions.

PSO7:- To understand the scope and content of commercial geography in relation to the spatial distribution of resources.

PSO8: Develop research questions and critically analyse both qualitative and quantitative data to answer those questions using various theoretical and methodological approaches in both physical and human geographies.

PSO9: Develop a general understanding of global human population patterns, factors influencing the distribution and mobility of human populations including settlement and economic activities and networks, and human impacts on the physical environment.

PSO10: Read, interpret, and generate maps and other geographic representations as well as extract, analyse, and present information from a spatial perspective

Course outcomes – Geography syllabus

Class	Semester	Paper	Subject	Course Outcome
FYBA	**I**	**DSE (Discipline Specific Elective) - I Geography**	**Geography**	**CO1.** To introduce the students to the basic and latest concepts in Physical geography. **CO2.** To acquaint the students

		Physical Geography		with the utility and application of Physical geography in different regions and environment. **CO3.** To make the students aware about Earth system (Lithosphere, Atmosphere, Biosphere and Hydrosphere) **CO4.** Students will understand the concept of place and how it is connected to people's sense of belonging to the physical environment, landscape and culture. **CO5.** Students will be exposed to the nature of physical systems such as geomorphologic processes and natural hazards. **CO6.** Students will be able to read and interpret information on different types of physical features. **CO7.** The geographical maturity of students in their current and future courses shall develop. **CO8.** Describe what Geography and Physical Geography are. **CO9.** Understand the physical principles and processes governing the circulation and characteristics of the atmosphere **CO10.** Understand the principles of geomorphology and the processes that shape the

				landscape. **CO11.** Understand the directional and location systems employed on the surface of the Earth **CO12.** To understand the dynamics of the atmosphere, the ocean and the overall climatologically system.
FYBA	**I**	**DSE (Discipline Specific Elective) - II Human Geography**	**Geography**	**CO1.** Students will develop a concrete understanding of the concepts of “space," “place” and “region” and their importance in explaining world affairs. **CO2.** Students will understand general demographic principles and their patterns at regional and global scales. **CO3.** Students will be able to locate on a map major physical features, cultural regions, and individual states and urban centers. **CO4.** Students will acquire an understanding of and appreciation for the relationship between geography and culture. **CO5.** Students will have a general understanding of global human population patterns, factors influencing the distribution and mobility of human populations. **CO6.** Students will be able to think in spatial terms to explain

				what has occurred in the past as well as using geographic principles to understand the present and plan for the future. **CO7.** Students can Describes what geography and human geography are and also understand population dynamics and migration pattern. **CO8.** Students will understand the settlement pattern of Rural and Urban settlements. **CO12.** Students can understand the urbanization process, theories of urbanization respective to India and Maharashtra. **CO9.** Students will able to understand types of agriculture. **CO10.** Students will be analyzing the factors affecting on agricultural activity. **CO11.** Students will be able to understand the problems of farmers and Indian Agriculture
FYBCOM	**I**	**Commercial Geography – I**	**Geography**	**CO1.** To acquaint the students with the dynamic nature of commercial geography. **CO2.** To acquaint the students with the dynamic nature of Trade and Transport. **CO3.** To make students aware of the relationships between geographical factors and

				economic activities. **CO4.** The geographical maturity of students in their current and future courses shall develop. **CO5.** To make students of the Commerce faculty aware of the correlations between Economic activities and Geographical factors. **CO6.** To acquaint the students with various economic activities in Geographical Environment. **CO7.** To acquaint the students with the dynamic aspects of resources and need for their conservation. **CO8.** To make the students aware about the role and dynamics of population in Commerce. **CO9.** To understand the human resources and concepts of population.
FYBCOM	**II**	**Commercial Geography – II**	**Geography**	**CO1.** To understand the scope and content of commercial geography in relation to the spatial distribution of resources. **CO2.** To acquaint the students with the dynamic nature of commercial geography. **CO1.** To acquaint the students with the dynamic nature of Trade and Transport.

				CO3. To make students aware of the relationships between geographical factors and economic activities. **CO4.** To make students of the Commerce faculty aware of the correlations between Economic activities and Geographical factors. **CO5.** To acquaint the students with the Industrial sector and the pollution associated with it. **CO6.** To make the students aware of the changing role of transport and communication in Trade and Commerce. **CO7.** To make the students aware of the role of tourism in development
SYBA	**III**	**Environment Geography- I, Subject Code: Gg.210 (A)**	**Geography**	**CO1.** the student are awareness about dynamic environment. **CO2.** students aware about fundamental concepts of environment geography for development in different areas. **CO3.** The students should be able to integrate various factors of Environment and dynamic aspect of Environmental geography. **CO4.** To make aware the students about the problems of environment, their utilization and

				conservation in the view of sustainable development **CO5.** Students are aware about dynamic environment. They get knowledge about environment and importance on environment for Human and other life. **CO6.** Student acquaints the fundamental concepts of environment Geography for development. **CO7.** The students are able to integrate various factors of environmental aspects. **CO8.** Students are aware about problems of environment, there utilization and conservation in the view of sustainable development. **CO9.** Students are assimilate concept of biodiversity, its economic potential, loss and conservation of biodiversity **CO10.** Students are understood the concept of pollution, its types, causes, effects, and control measures
SYBA	**III**	**Population Geography – I Subject Code: Gg.220**	**Geography**	**CO1.** Students can understand the history of population. **CO2.** Students are able to introduce the basic concepts in Population Geography. **CO3.** Students are aware and understand the types of Population

				data. **CO4.** Student can understand the uses of census data and type of census data. **CO5.** Students are able to graphical presentation of population data on various types of map. **CO6.** Students are aware about various computer software those are analyzing and presenting the population data. **CO7.** Students are aware about growth of population and factors affecting on population growth. **CO8.** To understand the concept of fertility and mortality and there causes and effects on society. **CO9.** Students can understand the composition of population and related concepts.
SYBA	**III**	**Scale and Map Projection - 1, Subject Code: Gg. 201**	**Geography**	**CO1.** Students can aware about basic concepts in Practical Geography **CO2.** Students are enabling to use various Scales and Projection Techniques in Geography. **CO3.** Students are acquainting with the utility of various Projections in Geographical knowledge. **CO4.** Students are explaining the elementary and essential

				principles of practical work in Geography. **CO5.** Students are able to practical skill and use of map scale and projection. **CO6.** Students are aware of the new techniques, accuracy and skills of map making.
SYBA	**III**	**Applied Course Of Disaster Management SEC – A**	**Geography**	**CO1.** Students are understood the basic concepts and fundamental structure of Disaster Management (DM). **CO2.** Students are critically thinking and problem-solving abilities on disaster management. **CO3.** Students are enable to assess the situation and design plan for Disaster management. **CO4.** Students can differ between disaster and hazard. **CO5.** Students can understand the phenomena manmade Disaster and Natural Disaster. **CO6.** Students can understand the Phases of Disaster, Management and Role of Geographers and various organizations **CO7.** Students are aware about Concept of Mitigation, Preparedness, Response, Recovery, and Rehabilitation. **CO8.** Students are understand the pattern, type, causes and effect of

				earthquake, flood and epidemics like Covid-19. **CO9.** Students are able to assess the data related to disaster.
SYBA	**IV**	**Environment Geography- II, Subject Code: Gg.210 (A)**	**Geography**	**CO1.** Students realize and aware about dynamic environment **CO2.** Students acquainted the fundamental concepts in environmental Geography. **CO3.** Students acquaint about the past, presents and future utility and potentials of natural recourses **CO4.** Students are aware about the problems of environments, its utilization and conservation in the view of sustainable development. **CO5.** Students are known about environmental disaster, its meaning, and classification **CO6.** Students are comprehended about environmental problems, like global warming, Ozone depletion, acid rain etc. **CO7.** Students are assimilated meaning and need of planning and management, types of management, and environmental impact assessment. **CO8.** Students are understood environmental education and Kyoto protocol.
SYBA	**III**	**Population Geography – II**	**Geography**	**CO1.** Students can understand the difference between the

		Subject Code: Gg.220		Population Policy of India and China. **CO2.** Students can understand the Health indicator in India. **CO3.** Students can acquaint students with the concept of urbanization in population geography. **CO4.** Students can understand population theories. **CO5.** Students can understand the concepts of population like over, optimum and under population. **CO6.** Students are aware about explosion of population and there cause and effects. **CO7.** Students are able to understand the population problems of India. **CO8.** They are understood the contemporary issues of population. **CO9.** Students are able to find out how the population becomes a resources and social capital. **CO10.** Students are aware about the human development index and health indicators of India. **CO11.** Students can understand the trends of population growth of world, nation and remedies about population growth.

SYBA	**IV**	**Cartographic Techniques, Surveying and Excursion / Village / Project Report , Subject Code: Gg. 201**	**Geography**	**CO1.** Students are understand the the basic and contemporary concepts in Cartography. **CO2.** Students are able to the utility and applications of various Cartographic Techniques. **CO3.** Students are able to understand the concepts regarding the modern cartography in the field of Geography. **CO4.** Students are explaining the elementary and essential principles of practical work in Geography. **CO5.** Students aware about knowledge and application of cartographical techniques. **CO6.** Students aware of the new techniques, accuracy and skills of Map Making.
SYBA	**III**	**Applied Course of Travel & Tourism SEC – B**	**Geography**	**CO1.** Students can understand the various elements of tourism management. **CO2.** Students are evaluating the role of transport in travel and tourism industry. **CO3.** Students are developing the skills like to arrange, manage and implement various types of tours. **CO4.** Students will be able to perform online as well as offline booking and cancellation

				procedures for different available modes of travel and tourism. **CO5.** Students will be able to acquire earning skills in tourism industry **CO6.** Students will be able to Basic skills like Communication, Time Management, Computer operating, online booking, Net banking, Cancellation of booking and ticket, etc. **CO7.** Students are framing the tour plan (Itinerary): Budget (Costing), Duration, Insurance, Route and other requirements for individual, family, group and mass level tours. **CO8.** Students are able to Plan for educational tour (long or short): Permission for tour, ticket booking, student's concession and ticket cancellation, etc.
TYBA	**V**	**Geography of Tourism - I, Subject Code: Gg.310 (A**	**Geography**	**CO1.** To understand the history of Tourism **CO2**. To introduce the students to the basic concepts in Tourism Geography. **CO3**. To understand the types of Tourism **CO4**. To gain knowledge different aspects of Tourism Geography. **CO5**. Students can understands the Determinants of Tourism Development **CO6**. To understand the importance of tourism. **CO7**. To understand the context of nature and scope of tourism geography.

				CO8. To understand the role of geography in tourism development. **CO9**. To describe the relationship between Physical elements and tourism. **CO10**. To understand the impact of social and cultural factors on tourism. **CO11**. To understand the impact of political policies on tourism. **CO12**. To aware about developing concept of tourism in modern times. **CO13**. To understand the role of transport in tourism development. **CO14**. to know about the impact of different media of communication on tourism. **CO15**. To understand the Role of various tourism organization in tourism development.
TYBA	**V**	**Geography of India - I, Subject Code: Gg.320 (A)**	**Geography**	**CO1.** To make the student aware of the magnitude of problems and Prospects at National level. **CO2.** To help the students to understand the inter relationship between the subject and the society. **CO3.** To help the students to understand the recent trends in regional studied **CO4.** To understand the History of India. **CO5. To** realized India's place in the world and geopolitical importance. **CO6.** Aware about International borders of India and related problems. **CO7.** To adequate the information about the states and union territories of India. **CO8.** Students can understand the geographical/Physical structure of India in depth. **CO9.** To Described the river system of India and its importance in the economic and social development of India.

				CO10. To understand the climate of India and the impact of climate on human life. **CO11.** To understand the different soil types and their distribution in India. **CO12.** To aware about the causes of soil degradation and methods of soil conservation. **CO13.** To studied the types of forests in India and their distribution in India.
TYBA	**V**	**Practical Geography – I (Techniques of Spatial Analysis)** **Subject Code: Gg.301 (A)**	**Geography**	**CO1.** To introduce the basic concepts and techniques of Geographical Analysis. **CO2.** To introduce the students with SOI Toposheets and acquire the Knowledge of Toposheet interpretation. **CO3.** To introduce the students with Weather Maps and acquire the Knowledge of its interpretation. **CO4.** To introduce the students with Aerial Photographs and Satellite Images and acquire knowledge to interpret it . **CO5.** To acquaint students with the spatial and structural characteristics of Practical Geography. **CO6.** To acquire the knowledge of different methods of relief representation in Indian topographical maps. **CO7.** Students can read the Indian Topographical maps, and the art of gathering information will be learned with help of SOI maps. **CO8.** Actual site visits will inform methods of acquiring knowledge of landforms and other geographical features. **CO9.** The Knowledge of various weather factors will develop the knowledge of weather forecasting in students. **CO10.** The Knowledge of observation of air pressure lines will be acquired, and will help to

				understand its effect on various climate phenomena. **CO11.** Knowledge of modern information systems such as GIS and Remote Sensing will be developed. **CO12.** The art of deploying data contained in geographic information systems will be learned. **CO13.** To aware about GIS and Remote Sensing related open source software will be available on computer. **CO14.** To explain the elementary and essential principles on field of practical work.
TYBA	**V**	**Research Methodology –I Subject Code: SEC – 2C**	**Geography**	**CO1.** To develop the understanding of the basic concept of research **CO2.** To develop the understanding of the basic framework of sampling and data collection **CO3.** To develop the understanding of various sampling methods and techniques. **CO4.** To understand the steps of research process. **CO5.** Students can design the good research proposal. **CO6.** To aware about different types of research.
TYBA	**VI**	**Geography of Tourism - II, Subject Code: Gg.310 (A**	**Geography**	**CO1.** Students can realize the importance of accommodation in tourism development. **CO2.** To know about different types of accommodation. **CO3.** To Understand the role of tourism in economic development. **CO4.** To understand the impact of tourism on the environment. **CO5.** To describe the the impact of tourism on social and cultural factors. **CO6.** Students can learn about the functions of World Tourism Organization and its role in tourism development.

				CO7. Students can know the functions of Indian Tourism Development Corporation and its role in tourism development. **CO8.** To understand the functions of Maharashtra Tourism Development Corporation and its role in tourism development can be known. **CO9.** To know about various tourist places of India and their importance in economic development.
TYBA	**VI**	**Geography of India - II, Subject Code: Gg.320 (A)**	**Geography**	**CO1.** It will help to understand the scio-cultural setup of India. **CO2.** To know about Distribution of languages, and religions in India. **CO3.** To gain Knowledge about major tribes of India, their distribution and their problems. **CO4.** To acquire Information about the role of transport in regional development in India. **CO5.** To understand the different types/modes of transportation and their distribution in India. **CO6.** It will help to understand the importance of communication in regional development. **CO7.** To know the information regarding the distribution of energy resources and other resources in India. **CO8.** To describe importance of agriculture in the Indian economy. **CO9.** Can be known about distribution and importance of agricultural industries in India like sugar industry, textile industry **CO10.** To gain information about the various revolutions that have taken place in the agricultural in India.
TYBA	**VI**	**Practical Geography – II (Techniques of Spatial**	**Geography**	**CO1.** To understand the various types of data and basic analysis of data. **CO2.** Students can handle and collect various types of primary and secondary data.

		Analysis) Subject Code: Gg.301 (A)		**CO3.** To understand meaning and description of central tendency. **CO4.** Students can use the methods of central tendency for various types of geographical data. **CO5.** To understand types of hypothesis and proper use in geographical research. **CO6.** Student can understand the concept of correlation and regression. **CO7.** Skill of data acquiring enhancing in students. **CO8.** Observation skills of physiographic features has increases in students. **CO9.** Students can communicate the peoples by various field survey methods. **CO10.** To write a good report of field visit or social surveys.
TYBA	**VI**	**Research Methodology – II Subject Code: SEC – 2C**	**Geography**	**CO1.** To identify various sources of information for data collection. **CO2.** Understanding of the conducting survey on various issues and develop the Report writing skill of students **CO3.** To know and handle the primary data sources. **CO4.** To aware about secondary data sources. **CO5.** Students can write the Dissertation and Thesis, Research paper, review article. **CO6.** To understand the ccharacteristics of Good Research and Report Writing.

Prof. Dilip Muluk
Head of Department (Geography)

KTSP Mandals

HUTATMA RAJGURU MAHAVIDYALAYA, RAJGURUNAGAR

HISTORY DEPRTMENT

AY 2021-2022

Programme Outcomes and Course Outcomes

Programme Outcomes (B.A.)

PO1 Acquire knowledge with facts and figures related concerned subjects such as History, Geography, Economics, Languages, etc.
PO2 Identify with the basic concepts, fundamental principles, and various theories in the above mentioned subjects.
PO3 Understand how issues in social science influence literature and how literature can provide solutions to the social issues.

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Course Outcomes (B.A.- History)

Class	Semester		Subject (Course)	Outcomes
F.Y.B.A.	**I & II**	General Paper-1 (G1) **(11171/12171)**	(SEM-I) EARLY INDIA: FROM PREHISTORY TO THE AGE OF THE MAURYAS (SEM-II) EARLY INDIA: POST MAURYAN AGE TO THE RASHTRAKUTAS	CO1.To understand the history of early India from the prehistoric times to the age of the Mauryas. CO2.To attempts to highlight the factors and forces behind the rise, growth and spread of civilization and culture of India. CO3.To help the students to understand the contribution of Early Indians to polity, art, literature, philosophy, religion and science and technology. CO4.To understand the developments in early India after the Mauryas. CO5.To introduce students to the developments in different parts of India through a brief study of regional kingdoms up to the tenth century C.E. CO6.To attempts the highlight the consequences of the foreign invasions, particularly on the polity, economy, society and art and architecture. The attempt is also to instill the spirit of enquiry among the students.
S.Y.B.A.	**III & IV**	General Paper-2 (G2) CC-1(3) CC-2(3) **(23174/24174)**	(SEM-III) HISTORY OF THE MARATHAS (1630-1707) (SEM-IV) HISTORY OF THE MARATHAS (1707-1818)	CO1. Student will develop the ability to analyse sources for Maratha History. CO2. Student will learn significance of regional history and political foundation of the region. CO3. It will enhance their perception of 17th century Maharashtra and India in context of Maratha history. CO4. Appreciate the skills of leadership and the administrative system of the Marathas CO5. Students will be able to analyze the Marathas policy of expansionism and its consequences.

				CO6. They will understand the role played by the Marathas in the 18th century India. CO7. They will be acquainted with the art of diplomacy in the Deccan region. CO8. It will help to enrich the knowledge of the administrative skills and profundity of diplomacy.
T.Y.B.A.	**V & VI**	General Paper-3 (G3) CC-3(3) CC-4(3) **(35174/36174)**	(SEM-V) INDIAN NATIONAL MOVEMENT (SEM-VI) INDIA AFTER INDEPENDENCE	CO1. It will enable students to develop an overall understanding of Modern India. CO2. It will increase the spirit of healthy Nationalism, Democratic Values and Secularism among the Students. CO3. Students will understand various aspects of the Indian Independence Movement and the creation of Modern India. CO4. It will enable students to develop an overall understanding of the ContemporaryIndia. CO5. To increase the spirit of healthy Nationalism, Democratic Values and Secularismamongthe students. CO6. Students will understand various aspects of India's domestic and foreign policies that shaped Post-Independence India

Department of History

K.T.S.P Mandal's

HUTATMA RAJGURU MAHAVIDYALAYA

RAJGURUNAGAR,TAL.KHED,DIST.PUNE 410505

Department of Commerce

Course outcome for M.Com Part – I (2019 CBCS Pattern)

Class	Semester	Paper (Paper no & Code)	Subject	Course Outcome
MCom Part - 1	I	101	**Management Accounting**.	1. To understand the concept of Financial Accounting and its limitations, emergence of Management Accounting and Cost Accounting, its advantages and distinction between Management Accounting and Cost Accounting 2. To understand the concept of Marginal Costing, its applications, different techniques of managerial cost accounting and Fixed and Variable Cost Analysis in decision making process. 3.To understand the concept of budget and budgetary control, types of budgets and preparation of functional budgets in an

				organization 4. To understand the concept of Working Capital Management, determination of working capital, components of working capital and accounts receivable and inventory management.
MCom Part - 1	I	102	**Strategic Management**	1. Introduce the emerging changes in the modern business environment. 2. Develop the analytical, technical and managerial skills in the various areas of Business Administration. 3. Empower with necessary skill to become effective future managers and leaders. 4. Develop technical skills for designing and developing effective Functional strategies for growth and sustainability of business.
MCom Part - 1	I	103	**Advanced Accounting & Taxation-I** **Income Tax**	1. Understand the History of Income Tax Act Of India. 2. Study How to decide Residential Status of Assessee. 3. Get acquainted different

				Heads of Income. 4. Know the different Deductions, Exemptions, and Relief, Set off under different heads of Income. 5. Compute of Taxable Income Clubbing of income-Set off and carry forward of losses from Gross Total Income.
MCom Part - 1	I	104	**Advanced Accounting & Taxation Special Paper I** **Advanced Accounting**	1. Lay a theoretical foundation of Accounting & Accounting Standards. 2. Gain ability to solve problems relating to Corporate Accounting. 3. Do valuation of Shares and Goodwill.

Course outcome for M.Com Part – II (2019 CBCS Pattern)

Class	Semester	Paper (Paper no & Code)	Subject	Course Outcome
MCom Part-2	**III**	**302**	**RESEARCH METHODO-LOGY FOR BUSINESS**	1. Understanding of basic knowledge of Business Research, Research Process, ethical issues and modern practices in research. 2. Learning the formulation of Research Problem, Hypotheses, Research Design and Sampling 3. Gaining knowledge of Sources of Data Collection Measurement & Scaling, Processing of Data 4. Understanding the procedure of Research Report and mode of citation and bibliography
MCom Part-2	**III**		**Advanced Auditing**	1. Study meaning Introduction and Standard on Auditing. 2. To enable the students to acquire knowledge of

				Auditing. 3. To make the students appropriate application and uses of Auditing. 4. Study the Special aspects of CIS Audit Environment
MCom Part-2	**III**		**Specialized Auditing**	1. To understand the concept, need, importance, utility of Auditing in special field. 2. To develop the skills of students to face the modern world of Auditing. 3. To create awareness among the students to face the modern world of Auditing. 4. Student will be able to understa the audit process of Co-operativ Societies.
MCom Part-2	**III**		**Business Finance**	1.Study The Financial System Of India. 2.Get acquainted about the LongTerm Financing. 3.Analyze the Risk in Capital

				Budgeting and different Capital Theories. 4.Solve the Practical Problems related to Working Capital management. 5.Understand the concept of Corporate Securities and Sources of long term Finance
MCom Part-2	**IV**		**Recent Advances in Accounting, Taxation & Auditing.**	1. To enable the students to be abreast with the latest advances in the field of Accounting. 2. To acquaint students with the latest trends of accounting adopted by large and small entities worldwide. 3. To enable students to realize the need for up gradation of technology based accounting skills. 4. Understand the Emerging Trends in Accounting.
MCom Part-2	**IV**		**Industrial Economic Environment**	1. To provide knowledge about basic issues in Industrial Economic Environment to students. 2. To make students aware about Industrial pattern and growth in

				India and Industrial policies of India since independence. 3. To study the progress and current problems of major industries in India. 4. Understand the Importance of Major Industries in India.
MCom Part-2	**IV**		**Capital Market and Financial Services**	❖ Understand the Concept of Capital Market and Trends in Indian Capital Market. ❖ Study the different types of Stock Market in the World. ❖ Get acquainted about Primary Market and Secondary Market of India. ❖ Study the listing of Securities and Background Of SEBI ❖ Understand the concept of Merchant Banking ,Mutual Fund and Credit Rating

KTSP Mandal's

Hutatma Rajguru Mahavidyalaya,

Rajgurunagar

DEPARTMENT OF MARATHI

A.Y. 2021-22

Course Outcome & Program Specific Outcome

Program Specific Outcome –

B.A. MARATHI

PSO 1 : Students are enabled to understand, to taste and analyze the literature.

PSO 2 : Availing the job opportunities in translation, transformation, media and creative writing.

PSO 3 : Understand the relation between Society and Literature.

PSO 4 : Illustrating the nature of literary forms like one-act-play, travelogue and short story.

PSO 5 : Understand various types of Marathi literature.

PSO 6 : Able to understand language fully and use it appropriately

PSO 7 : Prepared different kinds of documents in Marathi

M.A. MARATHI

PSO 1 : Develop linguistic skills to meet the requirements in the age of globalization.

PSO 2 : Understand social, religious and cultural motivations in folk Marathi literature.

PSO 3 : Understand period, society, personality, culture and motivation of special author

PSO 4 : Knowledge of historical background of specific literary period and the nature and Motivation behind it.

PSO 5 : To develop critical sensibilities and linguistic competence

PSO 6 : Understand research activity, methods and types of research.

PSO 7 : Illustrating the nature of literary forms like one-act-play, travelogue and short story

PSO 8 : Acquiring the skill of translation.

PSO 9 : Students able to write story, poem ext.

Course Outcomes –

Class	Semester	Paper	Subject	Course Outcome
FYBA	प्रथम सत्र	**[CC-1A]**	मराठी साहित्य : कथा आणि भाषिक कौशल्यविकास	CO1: मराठी भाषा, मराठी साहित्य आणि मराठी संस्कृती यांचे अध्ययन करणे CO2: साहित्यविषयक आकलन, आस्वाद आणि मूल्यमापन क्षमता विकसित करणे. CO3: साहित्याभ्यासातून जीवनविषयक समज विकसित करणे. CO4: मराठी भाषेची उपयोजनात्मक कौशल्य विकसित करणे.
	द्वितीय सत्र	**[CC-1A]**	मराठी साहित्य : एकांकिका आणि भाषिक कौशल्यविकास	CO1: एकांकिका या साहित्यप्रकारची ओळख करून घेणे. CO2: एकांकिका या साहित्यप्रकारचे स्वरूप घटक आणि प्रकार यांची ओळख करून घेणे CO3: मराठी साहित्यातील निवडक एकांकिकांचे अध्ययन करणे. CO4: भाषा कौशल्यविकास करणे.
FYBCOm	प्रथम सत्र	**117**	भाषा, साहित्य आणि कौशल्यविकास	CO1: विविध लेखनप्रकारांचा अभ्यास व प्रत्यक्ष लेखनाची कौशल्ये वापरण्यास सक्षम करणे. CO2: विविध क्षेत्रातील कर्तृत्ववान व्यक्तींच्या कार्याची व विचारांची ओळख करून देणे CO3: विद्यार्थ्यांमध्ये नैतिक, व्यावसायिक व वैचारिक मूल्यांची जोपासना करणे.
	द्वितीय सत्र	**117**	भाषा आणि कौशल्यविकास	CO1: विविध क्षेत्रातील भाषा व्यवहाराचे स्वरूप व गरज समजावून देणे. CO2: या व्यवहार क्षेत्रातील मराठी भाषेचे स्थान स्पष्ट करणे व त्यातील मराठीच्या प्रत्यक्ष वापराचा अभ्यास करणे. CO3: विविध क्षेत्रीय मराठी भाषेच्या वापराची कौशल्ये विकसित करणे.
SYBA	प्रथम सत्र	**MIL 2(2)**	मराठी भाषिक संज्ञापनकौशल्ये	CO1: प्रगत भाषिक कौशल्यांची क्षमता विकसित करणे. CO2: प्रसारमाध्यमांतील संज्ञापनातील स्वरूप आणि स्थान स्पष्ट करणे.

MIL				CO3: व्यक्तिमत्व विकास आणि भाषा यांच्यातील सहसंबंध स्पष्ट करणे CO4: लोकशाहीतील जीवन व्यवहार आणि प्रसारमाध्यमे यांचे परस्पर संबंध स्पष्ट करणे CO5: प्रसारमाध्यमांसाठी लेखनक्षमता विकसित करणे
	द्वितीय सत्र	**MIL 2(2)**	नवमाध्यमे आणि समाज माध्यमांसाठी मराठी	CO1:संज्ञापनातील नवमाध्यमे आणि समाजमाध्यमांचे स्वरूप आणि स्थान स्पष्ट करणे. CO2: भाषा, जीवनव्यवहार आणि नवमाध्यमे, समाजमाध्यमांचे परस्परसंबंध स्पष्ट करणे CO3:नवमाध्यमे आणि समाजमाध्यमांसाठी लेखनक्षमता विकसित करणे. CO4:नवमाध्यमे आणि समाजमाध्यमांविषयक साक्षरता निर्माण करणे. CO5:नवमाध्यमे आणि समाजमाध्यमांचा वापर आणि परिणाम याबद्दल चर्चा करणे.
SYBA G2	प्रथम सत्र	**[CC-1C(3)]**	भाषिक कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार : कादंबरी	CO1: कादंबरी या साहित्यप्रकारचे स्वरूप, घटक, प्रकार आणि वाटचाल समजून घेणे. CO2: नेमलेल्या कादंबरीचे आकलन, आस्वाद आणि विश्लेषण करणे. CO3: भाषिक कौशल्यविकास करणे.
	द्वितीय सत्र	**[CC 1D (3)]**	भाषिक कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार : ललितगद्य	CO1: ललितगद्य या साहित्यप्रकाराचे स्वरूप, घटक, प्रकार आणि वाटचाल समजून घेणे. CO2: नेमलेल्या अभ्यासपुस्तकातील ललित गद्याचे आकलन, आस्वाद आणि विश्लेषण करणे. CO3: भाषिक कौशल्यविकास करणे.
SYBA S1	प्रथम सत्र	**[DSE 1A (3)]**	आधुनिक मराठी साहित्य : प्रकाशवाटा	CO1: आत्मचरित्र या साहित्यप्रकाराचे स्वरूप, संकल्पना समजावून घेणे CO2: आत्मचरित्र या साहित्यप्रकाराच्या प्रेरणा आणि वाटचाल यांची ओळख करून घेणे. CO3: ललित गद्यातील अन्य साहित्यप्रकारांच्या तुलनेत आत्मचरित्राचे वेगळेपण समजावून घेणे CO4: नेमलेल्या या आत्मचरित्राचे आकलन, आस्वाद आणि विश्लेषण करणे.

	द्वितीय सत्र	**[DSE 2A (3)]**	मध्ययुगीन मराठी साहित्य : निवडक मध्ययुगीन गद्य, पद्य	CO1: मध्ययुगीन गद्य-पद्य साहित्यप्रकारांची ओळख करून घेणे. CO2: नेमलेल्या अभ्यासपुस्तकातील मध्ययुगीन गद्य-पद्याचे आकलन, आस्वाद आणि विश्लेषण करणे.
SYBA S2	प्रथम सत्र	**[DSE 1B (3)]**	साहित्यविचार	CO1: भारतीय आणि पाश्चात्य साहित्यविचाराच्या आधारे साहित्याची संकल्पना, स्वरूप आणि प्रयोजनविचार समजावून घेणे. CO2: साहित्याची निर्मितीप्रक्रिया समजावून घेणे CO3: साहित्याची भाषा आणि शैलीविषयक विचार समजावून घेणे.
	द्वितीय सत्र	**[DSE 2B (3)]**	साहित्य समीक्षा	CO1: साहित्य समीक्षेची संकल्पना, स्वरूप यांचा परिचय करून घेणे. CO2: साहित्य आणि समीक्षा यांचे परस्पर संबंध समजावून घेणे व अभ्यासणे. CO3: साहित्यप्रकारानुसार समीक्षेचे स्वरूप समजावून घेणे व अभ्यासणे. CO4: ग्रंथपरिचय, परीक्षण व समीक्षण यातील फरक समजावून घेणे.
SYBA SEC	प्रथम सत्र	**[SEC 2A (2)]**	प्रकाशक व्यवहार आणि संपादन	CO1: प्रकाशनव्यवहार आणि संपादन यासाठी आवश्यक कौशल्य मिळविणे CO2: प्रकाशनव्यवहार आणि संपादन यासाठी आवश्यक प्रशिक्षण घेणे CO3: प्रकाशन व्यवहार आणि संपादन यासाठी प्रात्यक्षिकासह उपयोजनाची कौशल्य मिळविणे CO4: प्रकाशन संस्था, जाहिरात संस्था, छापखाने, वृत्तपत्र कार्यालये, वितरण संस्था, ग्रंथ विक्री दुकाने, फ्लेक्स निर्मिती केंद्र, वार्ताहर यांना भेटी देऊन प्रशिक्षण घेणे.
	द्वितीय सत्र	**[SEC 2B (2)]**	उपयोजित लेखनकौशल्य	CO1: जाहिरात, मुलाखतलेखन आणि संपादन यासाठी आवश्यक कौशल्य मिळविणे. CO2: जाहिरात, मुलाखतलेखन आणि संपादन यासाठी आवश्यक प्रशिक्षण घेणे. CO3: जाहिरात, मुलाखतलेखन आणि संपादन यासाठी प्रात्यक्षिकासह उपयोजनाची कौशल्य

				मिळविणे.
SYBSc	प्रथम सत्र	**[AECC-2A (2)]**	उपयोजित मराठी	CO1: मराठी भाषा, साहित्य आणि यांच्या परस्परसंबंधाची जाणीव करून देणे CO2: मराठी भाषेचा परिभाषासापेक्ष आणि शैलीसापेक्ष विकास विद्यार्थ्यांच्या लक्षात आणून देणे मराठी भाषेची उपयोजनात्मक कौशल्य विकसित करणे.
	द्वितीय सत्र	**[AECC-2B (2)]**	मराठी साहित्य	CO1: मराठी साहित्यविषयक अभिरुची विकसित करणे. CO2: मराठी भाषा, साहित्य आणि यांच्या परस्परसंबंधाची जाणीव करून देणे CO3: साहित्यविषयक अभ्यासातून जीवनविषयक समज विकसित करणे. CO4: विज्ञानसाहित्यविषयक आकलन क्षमता वाढविणे
TYBA G3	प्रथम सत्र	**[CC-1E (3)]**	भाषिक कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार : प्रवासवर्णन	CO1: मुद्रित माध्यमांसाठी लेखन कौशल्य आत्मसात करणे. प्रवासवर्णन या साहित्यप्रकाराचे स्वरूप, प्रेरणा, प्रयोजने, वैशिष्ट्ये आणि वाटचाल समजून घेणे. CO2: नेमलेल्या प्रवासवर्णनाचे आकलन, आस्वाद आणि विश्लेषण करणे.
	द्वितीय सत्र	**[CC- 1F (3)]**	भाषिक कौशल्यविकास आणि आधुनिक मराठी साहित्यप्रकार : कविता	CO1: मराठी साहित्य, भाषिक कौशल्यविकास आणि शासनव्यवहार यांची माहिती घेणे. CO2: कविता या साहित्य प्रकाराचे स्वरूप, वाटचाल, प्रेरणा, प्रवृत्ती आणि वैशिष्ट्ये समजून घेणे. CO3: नेमलेल्या अभ्यासपुस्तकातील निवडक कवितांचे आकलन, आस्वाद आणि विश्लेषण करणे. CO4: कविता या साहित्य प्रकारातील विविध आविष्कार व भाषा रूपांची अभ्यास पुस्तकातील कवितांचे आधारे ओळख करून घेणे.
TYBA S3	प्रथम सत्र	**[DSE 1C (3+1)]**	मध्ययुगीन मराठी वाङ्मयाचा स्थूल इतिहास प्रारंभ ते इ.स.१६००	CO1:वाङ्मयेतिहास संकल्पना, स्वरूप, प्रेरणा, प्रवृत्ती समजून घेणे CO2:मध्ययुगीन कालखंडाची सामाजिक, सांस्कृतिक पार्श्वभूमी समजून घेणे
	द्वितीय सत्र	**[DSE 1D**	मध्ययुगीन मराठी	CO3:मराठी भाषा साहित्याची कालखंडानुरूप

		(3+1)]	वाङ्मयाचा स्थूल इतिहास - इ.स.१६०० ते १८१७	इतिहास समजून घेणे.
TYBA S4	प्रथम सत्र	**[DSE 2C (3+1)]**	वर्णनात्मक भाषाविज्ञान : भाग १	CO1: भाषा स्वरूप, वैशिष्ट्ये व कार्य समजून घेणे. CO2: भाषा अभ्यासाची आवश्यकता स्पष्ट करणे. CO3: भाषा अभ्यासाच्या शाखा आणि विविध पद्धतींचा थोडक्यात परिचय करून घेणे. CO4:वागिंन्द्रियाची रचना, कार्य आणि स्वननिर्मितीची प्रक्रिया समजावून घेणे. CO5: स्वनविज्ञान, स्वनिमविचार आणि मराठीची स्वनिमव्यवस्था समजावून घेणे
	द्वितीय सत्र	**DSE 2D (3+1)]**	वर्णनात्मक भाषा विज्ञान भाग :२	CO1: रूपविन्यास आणि मराठीची रूपव्यवस्था समजावून घेणे वाक्यविन्यास आणि वाक्यरचनेचा मराठी भाषेच्या संदर्भात परिचय करून देणे. CO2: अर्थविन्यास या संकल्पनेचा भाषा वैज्ञानिक अंगाने परिचय करून देणे.
TYBA SEC	प्रथम सत्र	**[SEC 2 C (2)]**	कार्यक्रम संयोजनातील भाषिक कौशल्य : भाग १	CO1: कार्यक्रमांचे स्वरूप आणि प्रकार समजून घेणे. CO2: कार्यक्रम संयोजनातील भाषिक कौशल्य प्राप्त करणे.
	द्वितीय सत्र	**[SEC 2 D (2)]**	कार्यक्रम संयोजनातील भाषिक कौशल्ये : भाग २	CO1: कार्यक्रम संयोजनातील लेखन कौशल्य संपादन करणे. CO2: कार्यक्रम संयोजनातील भाषिक कौशल्ये प्राप्त करणे. CO3: आभासी कार्यक्रमांचे भाषिक कौशल्य संयोजन करणे.

Course Outcome – M.A.

Class	Semester	Paper	Subject	Course Outcome
M.A. Part 1	प्रथम सत्र	**CC – 1 (4)**	भाषाव्यवहार आणि भाषिक कौशल्ये : भाग १	CO1: पदव्युत्तर पातळीवरील विद्यार्थ्यांच्या वाङ्मयीन आणि जीवनविषयक जाणिवा समृद्ध करणे. CO2: साहित्यकृतींच्या चिकित्सक अभ्यासाची प्रवृत्ती वृद्धिंगत करणे CO3: भाषिक जाणिवा विकसित करून कौशल्यात्मक उपयोजनासाठी सिद्ध करणे. CO4: विविध जीवनक्षेत्रातील भाषाविषयक कौशल्य ग्रहण केल्यानंतर रोजगार क्षमतांची आणि प्रावीण्यांची निर्मिती करणे. CO5: वाङ्मयीन मूल्यांचे आणि जीवनमूल्यांचे संस्कार करणे. CO6: विशिष्ट कालखंडातील साहित्यनिर्मितीच्या प्रेरणा व प्रवृत्ती लक्षात घेऊन साहित्याचे नेमके आकलन करणे. CO7: लेखकाच्या समग्र अभ्यासातून लेखकाच्या साहित्यकृती आशयसूत्रे, भाषिक प्रयोग, जीवनदृष्टी इत्यादींचे वाङ्मयीन प्रवाहातील मूल्यमापन व स्थान निर्धारण करणे. CO8:तौलनिक अभ्यास, भाषांतर मीमांसा, प्रभाव अभ्यास, आंतर्विद्याशाखीय दृष्टी, परभाषेतील समकालीन साहित्यकृती, वाङ्मयेहास, संस्कृती अभ्यास, भाषिक अभ्यास याद्वारे साहित्याच्या अभ्यासाला परिपूर्णता आणून देण्याचा प्रयत्न करणे. CO9:पौर्वात्य व पाश्चात्य साहित्यविचार, साहित्यसिद्धांत, समीक्षा, साहित्यविमर्श, विविध वाङ्मयीन संप्रदाय, वेळोवेळी उद्भवणाऱ्या जीवनविषयक व वाङ्मयीन चर्च, संकल्पना यांचा पैसे विद्यार्थ्यांना परिचित होणे CO10: वाचन, आस्वादन, विश्लेषण, वर्गीकरण, मूल्यनिर्णयन या प्रक्रियेतून विद्यार्थ्यांचीवाङ्मयीन आकलनाची क्षमता वृद्धिंगत करणे CO11: साहित्य, कला व इतर कला यांच्या वाचनातून अभिरुची वृद्धिंगत करणे. CO12: साहित्य आणि संस्कृती यांचा परस्पराश्रयी संबंध जागतिक परिप्रेक्ष्यात लक्षात घेण्याची क्षमता व कौशल्ये
	द्वितीय सत्र	**CC – 5 (4)**	भाषाव्यवहार आणि भाषिक कौशल्ये : भाग २	
M.A. Part 1	प्रथम सत्र	**CC – 2 (4)**	अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ.स.१८१८ ते इ.स.१९२०)	
	द्वितीय सत्र	**CC – 6 (4)**	अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ.स.१९२१ ते इ.स.२०१०)	
M.A. Part 1	प्रथम सत्र	**CC – 3 (4)**	ऐतिहासिक भाषाविज्ञान	
	द्वितीय सत्र	**CC – 7 (4)**	समाजभाषाविज्ञान	
M.A. Part 1	प्रथम सत्र	**CBOP – 5 (4)**	ग्रामीण साहित्य	
	द्वितीय सत्र	**CBOP – 8 (4)**	दलित साहित्य	

				निर्माण करणे.
M.A. Part 2	तृतीय सत्र	**CC – 9 (4)**	प्रसारमाध्यमांसाठी लेखनकौशल्ये : भाग १	CO1: प्रसारमाध्यमांकरीता लेखन कौशल्य आत्मसात करणे. CO2: प्रसारमाध्यमांचे समाजातील महत्त्व विशद करणे. CO3: प्रसारमाध्यमांच्या स्वरूपाचे ज्ञान करून देणे. CO4: दृकश्राव्य नवमाध्यमांसाठी लेखन करण्याची क्षमता विकसित करणे.
	चतुर्थ सत्र	**CC – 13 (4)**	प्रसारमाध्यमांसाठी लेखनकौशल्ये : भाग २	
M.A. Part 2	तृतीय सत्र	**CC – 10 (4)**	साहित्य समीक्षा	CO1: साहित्य, समीक्षाव्यवहाराच्या क्षमता विकसित करणे. CO2: समीक्षेची संकल्पना समजावून घेणे CO3 : समीक्षाव्यवहारातील मूल्यकल्पनांचा परिचय करून देणे. विविध समीक्षापद्धतीन मागील विचारव्यूह, दृष्टी समजावून घेणे. CO4: मराठी साहित्यसमीक्षकांची व संशोधकांची परंपरा समजावून घेणे. CO5: समीक्षा करण्याची दृष्टी व क्षमता विकसित करणे. CO6: संशोधनाची संकल्पना, प्रयोजने आणि विविध संशोधन पद्धती समजावून घेणे. CO7:वाङ्मयीन संशोधनाच्या विविध अभ्यास क्षेत्रांचा परिचय करून घेणे. CO8: आंतरविद्याक्षेत्रीय संशोधनाचे स्वरूप आणि महत्त्व लक्षात घेणे. CO9: संशोधन करण्याची दृष्टी व क्षमता विकसित करणे.
	चतुर्थ सत्र	**CC – 14 (4)**	साहित्य संशोधन	
M.A. Part 2	तृतीय सत्र	**CC – 11 (4)**	नेमलेल्या मध्ययुगीन साहित्यकृतींचा अभ्यास : भाग १	CO1: मध्ययुगीन कालखंडातील साहित्यप्रकार, संकल्पना व स्वरूप लक्षात घेणे. CO2: साहित्यकृतींचे वैशिष्ट्ये जाणून घेणे CO3: साहित्यकृतींतील वाङ्मयीनमूल्ये आणि जीवनमूल्ये जाणून घेणे. CO4: कालखंड आणि साहित्यकृतीच्या निर्मितीचा अनुबंध शोधणे.
	चतुर्थ सत्र	**CC – 15 (4)**	नेमलेल्या मध्ययुगीन साहित्यकृतींचा अभ्यास : भाग १	
	तृतीय सत्र	**CBOP –12 (4)**	लोकसाहित्याची मूलतत्त्वे आणि मराठी लोकसाहित्य :	CO1: लोकसाहित्याच्या मूलतत्त्वांची ओळख करून देणे. CO2: मराठीतील लोकसाहित्याच्या संकलन, संशोधन व मूल्यनास चालना देणे. CO3: लोकसाहित्याचे स्वरूप, व्यापकता व

			भाग १	सर्वसमावेशकता लक्षात आणून देणे. CO4: लोकसाहित्यातील विविध प्रकार, स्वरूप व विशेष समजावून घेणे. CO5: लोकसाहित्यातील सामाजिक, धार्मिक, सांस्कृतिक जाणिवा स्पष्ट करणे. CO6: लोकसाहित्याच्या अभ्यासक्षेत्राची व्याप्ती समजावून घेणे. CO7: लोकसाहित्याचे कलात्मक सौंदर्य व कालाविष्काराचे स्वरूप जाणून घेणे. CO8: लोकसाहित्याच्या अभ्यासकांचे लोक साहित्यातील योगदान अभ्यासणे.
M.A. Part 2	चतुर्थ सत्र	**CBOP– 16 (4)**	लोकसाहित्याची मूलतत्त्वे आणि मराठी लोकसाहित्य : भाग २	

Dr. S.D. Shinde
HOD

Dr. S.S. Pingale
Principal

K.T.S.P. Mandal's

Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Department of Economics
Program Outcomes and Course Outcomes

M.A. Economics

Program Specific Outcomes

PSO-1. To impart in-depth knowledge to students about an economic theory regarding utilization and allocation of resources including labour, natural resources and capital.

PSO -2. To develop students understanding of how markets for goods and services function and how income is generated and distributed.

PSO-3. To give students in-depth knowledge into special fields of choice like agricultural economics, industrial economics, financial market, development economics, and international trade.

PSO- 4. Students would know how the economy is influenced by economic policy, technological advances and demographic conditions.

Class	Semester	Paper (No &Code)	Subject	Course Outcomes
M.A. Part I	**Sem. I**	**12301**	**Micro Economics Analysis- I**	• Ability to apply the concepts of micro economics such as demand, supply, revenue, cost, elasticity, etc. • Ability to analyze and demonstrate knowledge of the basic theories/laws in economics- law of demand, law of supply, production function, etc.
M.A. Part I	**Sem. I**	**12302**	**Public Economics - I**	• Ability to recognize, apply and analyze concepts and theories in public economics. • Ability to appraise and assess the theory of public economics in real life situations.
M.A.	**Sem. I**	**12303**	**International**	• Ability to understand the concepts of

Part I			**Trade**	international economics such as comparative cost, terms of trade, trade policies and trade agreements. • Ability to interpret and apply theory relating to understand international trade. • Ability to discuss and debate the effects of trade policy, trade agreements, • Ability to discuss exchange rate policies on the world economy/trade.
M.A. Part I	**Sem. I**	**12304**	**Agricultural Economics**	• Ability to analyze and evaluate the subject with reference to various aspects of agrarian economies. • Ability to develop an understanding of agriculture with its intricacies and imperfections and to be able to constructintellectual dialogue on the challenges of agriculture.
M.A. Part I	**Sem. II**	**22301**	**Micro Economic Analysis–II**	• Ability to apply the concepts of micro economics such as demand, supply, revenue, cost, elasticity, etc. • Ability to compare and contrast various market structures and understand concept of equilibrium, price determination. • At the end of the course, the student should be able to evaluate microeconomic concepts, models and its use in real life situations.
M.A. Part I	**Sem. II**	**22302**	**Public Economic II**	• Ability to understand, apply and analyze concepts-public debt, budget, fiscal policy in public economics. • Ability to interpret the theories relating to public economics in real life situations.

				• Ability to discuss and debate on the public finance and policies.
M.A. Part I	**Sem. II**	**22303**	**International Finance**	• Ability to understand and interpret the concepts such as Balance of Payments, Exchange Rates, Foreign Exchange transactions, International capital flows, etc. • Ability to critically analyze the effects of deficits, exchange risk, role of foreign capital on the world economy/trade. • Ability to discuss and debate on subjects related to international trade and finance.
M.A. Part I	**Sem. II**	**22304**	**Labour Economics**	• Ability to analyze and evaluate the subject with reference to various aspects of Labour economics. • Ability to develop an understanding of the labour with its intricacies and imperfections and to be able to construct intellectual dialogue on them challenges of labour the Indian Economy.
M.A. Part II	**Sem. III**	**32301**	**Macro Economics Analysis I**	• Ability to analyze and demonstrate knowledge of the basic theories/laws inmacroeconomics. • At the end of the course, the student should be able to evaluate macroeconomic concepts, models and its use in real life situations.
M.A. Part II	**Sem. III**	**32302**	**Growth and DevelopmentI**	• Ability to apply the concepts of economic growth and compare international comparisonof economic development, etc. • Ability to analyze and demonstrate knowledge of the economic growth

				and development theories of economic growth and development
M.A. Part II	**Sem. III**	**32303**	**Research Methodology I**	• Ability to develop, demonstrate and examine topics under Economics to pursue research. • Ability to evaluate and examine subject areas in economics and explore possibilities of research.
M.A. Part II	**Sem. III**	**32307**	**Industrial Economics**	• Ability to develop, demonstrate and examine various topics under IndustrialEconomics. • Ability to evaluate and examine subject areas in economics bringing out the relationto industry and industrial development.
M.A. Part II	**Sem.IV**	**42301**	**Macro Economics Analysis II**	• Ability to analyze and demonstrate knowledge of the basic theories/laws in economics- general equilibrium psychological law of consumption, etc. • At the end of the course, the student should be able to evaluate macroeconomic concepts, models and its use in real life situations.
M.A. Part II	**Sem.IV**	**42302**	**Growth and Development II**	• Ability to analyze and demonstrate knowledge of the economic growth and developmenttheories of economic growth and development. • Ability analyze, evaluate and apply the growth and development concepts, role of human capital, etc. in real life situations.
M.A. Part II	**Sem.IV**	**42303**	**Research Project**	• Ability to develop the report writing skill. • Ability to develop an art of

				presentation. • Ability to undertake economic and social research field work.
M.A. Part II	**Sem.IV**	**42306**	**Economics of Environment**	• Ability to analyze and evaluate the subject with reference to various aspects of the economics of environment. • Ability to develop an understanding of the economics of environment and various analytical tools to comprehend environmental issues.

Prof. Dr. R. S. Shirasi

Head Department of Economics

M.A.
POLITICAL SCIENCE

OUTCOME OF PAPERS

PART -II
MA-SEM-III
PO-C7 Modern Political Thought

- The purpose of this course is to introduce to the student political ideas, views and concerns of leading Indian thinkers.
- The course encourages students to understand and decipher the diverse and often contesting ways in which the ideas of nationalism, democracy and social transformation were discussed in pre and post-independence India.

PO-C8: Political Sociology

- This Course will introduce the overall scope of the sub-discipline of political sociology.
- The focus of the course will be on the political sociology of power.
- The emphasis is on the nature of power in modern societies-more in the form of organizations and social formations than as individual power. Students are also expected to understand different forms of justifications of power and the role of ideology in this regard.
- State will be studied as a repository of power in society while class and patriarchy are two instances of how the nature of power is shaped by social factors.

PO-C9 World Politics-New Developments

- The objectives of this course are to introduce the students to the contemporary issues and debates in the world politics.
- The students would also be made aware of the dimensions of the making of the foreign policy as well as the role of Non- State Actors in World Politics.
- They would also learn about the emerging New World Order and the challenges to it.

PO-O10 Political Thought of Dr. Babasaheb Ambedkar

- This course aims at training the students to study one political thinker in depth.
- It also expects students to know the anti-caste thinking in Indian context.
- The course is also expected to relate the thinking of Dr. Babasaheb Ambedkar to contemporary problems.

MA-SEM-IV

PO-C10 Fundamentals of Political Theory

- This course introduces the students to the evolution, importance to the study of Political Theory.
- It introduces Political Theory as a distinctive area of inquiry. It is the integral area to the study of politics. It highlights debates in the field and places them in a historical perspective.

PO-C11 Political Process in India

- The course will introduce to the student the key issues and details of the political process in post independence India.
- It will also try to develop among students a perspective to understand and analyse Indian politics.
- The aim is to help students understand the expansive meaning of political process as it shapes in the arena of electoral and party politics, in the form of mass mobilizations and as politics of interests.

PO-C12 Politics and Society

- This Course expects students to understand the interface of politics with social structures and processes and how the nature of power is shaped by social factors.

PO-O15 Election Studies

- This course has a dual purpose. It seeks to introduce to the students the methods of studying elections.
- It also seeks to acquaint the student with the practice of studying elections in India and issues involved in it.
- The course expects students to understand the different methods of election study.
- Taking off from the history and evolution of election studies, the course further dwells on key issues in India's electoral politics.

K.T.S.P.Mandal's

HUTATMA RAJGURU MAHAVIDYALAYA

Rajgurunagar, Tal.-Khed, Dist.-Pune

M.Sc. I (Organic Chemistry)

Programme Outcomes (PO's)

1. Broaden students' professional foundations through activities such as teaching, internship & fellowships.

2. Enable students to communicate scientific results in writing & in oral presentation.

3. Acquire the basic tools needed to carry out independent research.

4. Make students proficient in their specialized area of chemistry & successfully complete an advanced research project.

5. Explain why chemistry is an integral activity for addressing social, economic & environmental problems.

6. Develop skills in problem solving, critical thinking & analytical reasoning as applied to scientific problems.

Programme Specific Outcomes (PSO's)

1. Get and apply basic knowledge of the various aspects of Chemistry in real life Situations

2. Understand the experimental skills, designs and their implementation in novel synthetic methods.

3. Develop an aptitude towards academic and professional skills; understand the basic concepts of structural elucidation with hyphenated techniques in Chemistry.

4. Familiarize with fundamental biological processes and create rationale towards computer assisted drug designing.

Class	Semester	Paper no. & code	Subject	Course outcome
M.Sc.-I	Sem.-I	CHP-110	Fundamentals of Physical Chemistry	**Semester I CCTP - 1 CHP-110** **Physical Chemistry – I** At the end of course student, CO1. Understand the concept of state function, path function, exact differential and inexact differential internal energy and enthalpy, Reversible and irreversible adiabatic expansion, entropy. CO 2. Knowledge about applications of Quantum Chemistry CO 3. Understand Collision theory of biomolecular gas phase reactions, diffusion controlled and activation controlled reaction in solution, activated complex theory of reaction rate, Eyrings equation. CO 4. Explain reaction dynamics of complex reactions. CO 5. Understand enzyme catalysis with mechanism.
M.Sc.-I	Sem.-I	CHI-130	Molecular Symmetry & Main Group Elements	**Semester I CCTP - 2 CHI-130** **Inorganic Chemistry – I** At the end of course student, CO 1. Understand the concept of symmetry, point group, product of symmetry operation, SALC and able

				to pass various symmetry elements through the molecule. CO 2. Apply the concept of point group for determining optical activity and dipole moment. CO 3. Understand the importance of Orthogonality Theorem, projection operator CO 4. Learn the advance chemistry of boranes, fullerene, zeolites, polymers etc. CO 5. Understand organometallic chemistry of some important elements from the main groups and their applications
M.Sc.-I	Sem.-I	CHO-150	Organic Chemistry	**Semester I CCTP - 3 CHO-150** **Organic Chemistry – I** At the end of course student, CO 1. Understand the criteria for aromaticity in non-benzenoid molecules and other advanced polycyclic aromatics CO 2. Understand the chemistry of monocyclic hetrocycles, nomenclature and reactions CO 3. Understand the role of various reaction intermediates like carbocation, carbanion, carbenes, radicals, and nitrenes in organic reactions; concept of NGP CO 4. Describe mechanism of different rearrangement reactions.

				Appreciates the various steps involved in the molecular rearrangements. CO 5. Understand the chemistry of Ylides and study Ylides and their reaction 6. Use synthetic reagent of oxidation and reduction for solving the problems.
M.Sc.-I	Sem.-I	CHG-190	General Chemistry	**Semester I CCOP - 1 CHG-190 General Chemistry - I** **Section I: Elective Option-A: Introduction to Solid State of Matter** At the end of course student, CO 1. Explain bonding in solids – band theory CO 2. Know electronic conductivity, Semiconductors, photoconductivity, Non-stoichiometry, defects and types of defects in solids CO 3. Understand Ionic conductivity and their applications CO 4. Explain superconductivity and theory of superconductivity CO 5. Describe method of synthesis of solids
M.Sc.-I	Sem.-I	CHP-107	Basic Practical Chemistry-I	**Semester I CCPP - 1 CHP – 107: Practical Course-II** At the end of course student,

				CO 1. Get the idea about monitoring of organic reactions using TLC technique CO 2. Understand about importance of quality of product by TLC and physical constant CO 3. Knowledge about purification and separation techniques CO 4. Knowledge about importance of green reagents and methods in organic synthesis. CO 5. Knowledge about single stage synthesis.
M.Sc.-I	Sem.-I	CHG-190	General Chemistry practical	**Semester I CBOP - 1 CHG-190 General Chemistry - I** **Section II: Elective Option-A: Inorganic Material Analysis, Synthesis and Applications** At the end of course student, CO 1. Do quantitative analysis of ore and alloys. CO 2. Synthesize of Colloidal silver nanoparticles and determine band gap by absorption spectroscopy CO 3. Synthesize nanoparticles of Zn, Fe, Ti, etc. CO 4. Characterize nanoparticles by absorption spectra. 5. Get knowledge about solid state character of material.

M.Sc.-I	Semester-II	CHP-210	Molecular Spectroscopy & nuclear Chemistry	**Semester II CCTP - 4 CHP-210: Physical Chemistry – II Course Outcomes:** CO 1. Knowledge about types of molecules on the basis of moment of inertia and rotational spectra of di- and polyatomic molecules CO 2. Explain the Quantum and Classical theory of Raman effect , pure rotational Raman Spectra , Vibrational Raman Spectra CO 3. Explain the principle , instrumentation , and Applications of Mossbauer Spectroscopy CO 4. Knowledge about Interaction of radiation with matter, Interaction of gamma radiation with matter, units for measuring radiation absorption.
M.Sc.-I	Semester-II	CHI-230	Coordination & Bioinorganic Chemistry	**Semester II CCTP – 5 CHI-230-Inorganic Chemistry – II** At the end of course student, CO 1. Get knowledge about find out the no of microstates and meaningful term symbols, construction of microstate table for various configurations with help of Hund's rules. CO 2. Understand inter-electronic repulsion & concept of weak and strong ligand field.

				CO 3. Interpretation of electronic spectra for spin allowed oh and td complexes using Orgel diagram. CO 4. Understand the various terms involved in magnetochemistry. CO 5. Understand the various Quenching of orbital angular momentum. CO 6. Importance of bioinorganic chemistry-role of metals in Metalloprotein, metalloenzymes and importance and transport of metal ions.
M.Sc.-I	Semester-II	CHO-250	Organic Chemistry	**Semester II CCTP - 6 CHO-250 Organic Chemistry – II** At the end of course student, CO 1. Understand free radicals formation, stability and reactivity and should also be able to use the basic understanding in writing probable reaction mechanisms. CO 2. Draw MO diagram for various olefinic compounds and should able to predict the products, the stereochemistry as well as should able to understand the preferred reaction pathways. CO 3. Know various key factors responsible for the spectroscopic data acquisition and should able to solve Problems based on UV, IR, MS, 1H-NMR,13C-NMR.

				CO 4. Understand MOT and will be able to extend this in predicting reaction mechanism and stereochemistry of electrocyclic reactions. CO 5.Understand the basic principle of spectroscopic methods and their applications in structure elucidation of organic compounds using given spectroscopic data or spectra.
M.Sc.-I	Semester-II	CHG-290	Organometallic and Inorganic Reaction Mechanism	**Semester II CHG-290** **General Chemistry - II** **Elective Option-A: Material Characterization Technique** At the end of course student, CO 1. Know different characterization technique of solids. CO 2. Understand principle of XRD, instrumentation of powder XRD, Brags law, applications of XRD for crystal structure determination, numerical problems. CO 3. Explain principle of SEM, instrumentation of SEM and interpretation of surface morphology of solid from SEM. CO Principle of TEM, instrumentation of TEM and interpretation of TEM images. CO 5. Basics of X-rays, Principle of XRF, types of XRF, instrumentation,

				qualitative and quantitative analysis, numerical.
M.Sc.-I	Semester-II	CHP-227	Basic Practical Chemistry (Compulsory)	**Semester II CCPP - 2 CHP – 227: Practical Course-II** **Learning Outcomes:** CO 1. Synthesize of coordination complexes. CO 2. Student will able to measure the conductance of metal complexes. CO 3. Making derivatives of organic compounds will help them in industry or while doing research in medicinal chemistry for Drug development. CO 4. This practical course is also designed to make student aware of green chemistry and role of green chemistry in pollution reduction. CO 5. The students learn how to avoid solvents and do solvent free reaction. CO 6. Students are trained to different purification techniques in organic chemistry like recrystallization, distillation, steam distillation and extraction. CO 7. Students are made aware of safety techniques and handling of chemicals. CO 8. Students are made aware of carrying out different types of reactions and their workup methods.

M.Sc.-I	Semester-II	CHG-290	Elective Option-A Inorganic material analysis ,Synthesis & applications	**Semester II CCOP–2 CHG-290: General Chemistry – II** **Elective Option-A: Electrochemical Methods of Analysis** At the end of course student, CO 1. Introduce fundamental concepts in Electrochemical Analysis. CO 2. Students will be able to explore new areas of research in chemistry and electrochemical fields of science and technology. CO 3. Students will be able to understand statistical treatment of experimental data. CO 4. Explain polarographic method of analysis elements.

M. Sc. (II) Organic Chemistry

Programme Specific Outcome

PSO1 Familiar with the different branches of chemistry like Stereochemistry, Spectroscopy, Medicinal, Asymmetric Synthesis, Carbohydrate Chemistry Heterocyclic Chemistry

PSO2 Able to designing organic syntheses in feasible and economically cheaper method

PSO3 Able to prepare sample for solution preparation, prepare solution of various Concentration for synthesis and analysis purpose

PSO4 Able to find procedure form literature to synthesize separate & purify compounds in laboratory and characterize using proper instrumentation techniques.

PSO5 Awarded with use of Organometallic Reagents in Organic Synthesis

PSO6 Learnt Use of Chemistry software's useful in future career such as Research, Industries & Academia

PSO7 Develop synthetic methods to maximize rate of reaction along with reduction in Byproducts

PSO8 Able to use spectroscopic methods for structure determination of Organic Compounds

PSO9 Able to retrosynthetic approach to design organic syntheses

PSO10 Learnt methods for preparation of specific groups of heterocyclic systems.

M. Sc. (II) Organic Chemistry

Course Outcome

M.Sc.-II	Semester-III	CHO-350	Organic Reaction Mechanism and Biogenesis	**Semester III: CCTP-7** **CHO-350: Organic Reaction Mechanism and Biogenesis** At the end of course student will able to CO 1. Write reaction mechanism by understanding basic terminologies like electrophile, nucleophile, solvent effects, structural effects, etc CO 2. Know methods of generations of free radicals, stability of free radicals, their reactions and applications. CO 3. Understand Hammet equation, Hammett plot, reaction constant, Taft equation and solvent effect. CO 4. Define terpenes, Isoprene rule, MVA pathway, classification of terpenes and biogenesis of terpenoids which involve 1,2 methyl shift, 1,3 methyl shift, Wagner meerwein rearrangement, oxidative coupling reaction, role of SAM, oxidation and reduction. CO 5. Define Alkaloids, classification of alkaloids, process involved in biogenesis of alkaloids like decarboxylation, Schiff base formation, Trans amination reaction. CO 6. Understand shikimic acid pathway.

M.Sc.-II	Semester-III	CHO-351	Structure Determination of Organic Compounds by Spectroscopic Methods	**Semester III: CCTP-8** **CHO-351: Structure Determination of Organic Compounds by Spectroscopic Methods** At the end of course student, CO 1. Recognize spectroscopy in H1 NMR, CMR and Mass Spectrometry CO 2. Learn to interpret H1 NMR, CMR, DEPT, COSY, HETCOR & Mass spectra CO 3. Students trained to solve combined spectra problems CO 4. Understand concepts of 2D NMR Spectrometry, different types of spectra & Applications 5. Understand Principles and Applications of Mass spectroscopy
M.Sc.-II	Semester-III	CHO-352	Stereochemistry and Asymmetric Synthesis of Organic Compounds	**Semester III: CCTP-9** **CHO-352: Stereochemistry and Asymmetric Synthesis of Organic Compounds** At the end of course student will able to – CO 1. Draw conformations of different polysubstituted cyclohexane compounds and calculate their potential energy by considering butane gauche effect, steric effect. CO 2. Understand stereochemical principles involved in reaction of six

				membered ring and other than six membered rings. CO 3. Describe methods of formation of racemization and resolution of racemic mixture. CO 4. Apply crams rule, crams dipolar model, Felkin-Anh model in diastereoselective reaction. CO 5. Define asymmetric synthesis, chiral pool and chiral auxiallary. CO 6. Understand transition metal catalyzed homogenous asymmetric hydrogenation, epoxidation, dihydroxylation. CO 7. Solve problems based on diastereoselectivity by using models.
M.Sc.-II	Semester-III	CHO-353(B)	Designing Organic Syntheses and Heterocyclic Chemistry	**Semester III: CCOP-3** **CHO-353(B): Designing Organic Syntheses and Heterocyclic Chemistry** At the end of course student, CO 1. Knowledge of the retrosynthetic approach to plan organic syntheses CO 2. Knowledge of the key reactions in organic chemistry including substitution reactions of heterocycles, enols and enolate's. CO 3. To equip students with the skills to plan how to prepare Organic molecules

				CO 4. Knowledge of retrosynthetic method for the logical disconnection of complex organic molecules and synthetic organic methods CO 5. Understand heterocyclic Chemistry which includes various methods for ring synthesis CO 6. Knowledge of methods for the preparation of specific groups of heterocyclic systems.
M.Sc.-II	Semester-III	CHO-354	Practical-I Solvent Free Organic Synthesis	**Semester III: CCPP-3** **CHO-354: Practical-I Solvent Free Organic Synthesis** At the end of course student, CO 1. Student familiar with solvent free synthesis methods CO 2. Need of environmentally friendly synthesis processes CO 3. Think to develop compounds by of sustainable methods CO 4. Understand toxicity and volatile nature of many organic solvents CO 5. Use of clays, zeolites, silica, alumina or other matrices in organic synthesis CO 6. Use techniques to achieve high degree of stereoselectivity in the products, CO 7. Develop synthetic methods to maximize rate of reaction along with reduction in byproducts.

M.Sc.-II	Semester-IV	CHO-450	Chemistry of Natural Products	**Semester IV: CCTP-10** **CHO-450: Chemistry of Natural Products** At the end of course student, CO 1. Students should able to learn total synthesis and retrosynthesis of various natural products CO 2. Predict stereochemistry of the intermediate formed in synthesis of drugs CO Understand role of different reagents and reaction mechanism CO 4. Knowledge about importance of drugs , their synthesis ,regio and stereoselectivity CO 5. Knowledge about different techniques for isolation of natural products.
M.Sc.-II	Semester-IV	CHO-451	Organometallic Reagents in Organic Synthesis	**Semester IV: CCTP-11** **CHO-451: Organometallic Reagents in Organic Synthesis** **Course outcome** CO 1. Knowledge about the stability and reactivity of the various types of Organometallic compounds CO 2. Knowledge about transition metal complexes on organic synthesis

				CO 3. Knowledge about carbon – carbon , Carbon – Oxygen , Carbon-Nitrogen Bond formation reactions CO 4. Knowledge about geometrical isomerism that is Syn and anti-stereochemistry CO 5. Knowledge about catalytic cycles for C-O, C-C, C-N bond formation reactions. CO 6. Well known about Reagents in Organic Chemistry.
M.Sc.-II	Semester-IV	CHO-452	Concepts and applications of Medicinal Chemistry	**Semester IV: CBOP-4** **CHO-452(A): Concepts and Applications of Medicinal Chemistry** At the end of course student, CO 1. Learnt Chemistry of peptides and proteins , nucleic acids, cofactors/coenzyme CO 2. Learnt Chemistry of TPP, PLP, Folic Acid and other vitamins CO 3. Understood the Chemistry of diseases, Principle of drug design and development CO 4. Learnt Peptides, synthesis , sequencing and their applications in therapeutics CO 5. Understood use modern techniques for biomolecules and disease diagnosis.

				CO 6. Learnt Case Study: Design of Oxamniquine & Statins CO 7. Understood the concepts Pharmacokinetics and Pharmacodynamics of drug CO 8. Use of Structure and activity Relationship i.e. QSAR in drug development CO 9. Developments, SAR, Mode of action, limitations and adverse effect of medicines.
M.Sc.-II	Semester-IV	CHO-453	Practical-III Section-I: Ternary Mixture Separation Section-II: Carbohydrates Synthesis and Isolation Natural Products	**Semester IV: CBOP-5** **CHO-453: Practical-III** **Section-I: Ternary Mixture Separation** **Section-II: Carbohydrates Synthesis and Isolation Natural Products** At the end of course student, CO 1. Get the idea about monitoring of organic reactions using TLC technique. CO 2. Student will able to learn how to separate ternary mixture. CO 3. Understand about importance and method of synthesis of carbohydrates. CO 4. Knowledge about Various methods for isolation of natural products.

				CO 5. Student will able to handle equipment required for isolation of natural products.
M.Sc.-II	Semester-IV	CHO-454	Practical-II: Convergent and Divergent Organic Syntheses	**Semester IV: CCPP-4** **CHO-454: Practical-II: Convergent and Divergent Organic Syntheses** At the end of course student, CO 1. Get the idea about monitoring of organic reactions using TLC technique CO 2. Understand about importance of quality of product by TLC and physical constant CO 3. Knowledge about purification and separation techniques CO 4. Knowledge about importance of green reagents and methods in organic synthesis. CO 5. Knowledge about single stage synthesis, Convergent and Divergent synthesis.