Subject	Programme specific Outcomes
CHEMISTRY	The outcome of the course should be as per the objectives outlined for the degree course in chemistry. Through the three years of the degree course the students will be well acquainted with the fundamental topics in physical chemistry, such as thermodynamics, kinetics, catalysis , structure and bonding, phenomena at the atomic, subatomic and the molecular level. In the realm of inorganic chemistry the student should gain the knowledge of the chemistry of the elements and their compounds, the methods of obtaining them, large scale manufacture of bulk and fine chemicals. The preparation and the properties of special materials synthesized and the chemistry of the complexes and their utility in different fields will be explored. The student should be introduced to the concept of the behaviour of the groups of atoms. In chemistry of organic compounds, the student must understand the fundamentals of organic reaction mechanisms and stereochemistry involved in them. The first four semesters of the BSc course introduces the learner to all these necessary fundamentals, and as the learner enters the last two semesters, it is topped up with spectral interpretation of the compounds. Along with this, Greener methods of synthesis and synthetic strategies involved in the synthesis of commercially important compounds are introduced to the learner. Along with the synthetic approach, the learner is also introduced to the biosynthesis of biologically active compounds ; natural product chemistry along with basics of polymer chemistry, thereby equipping the learner with knowledge necessary from the industrial point of view. The student will know the techniques involved in synthesis; both on the laboratory scale and the scaled-up manufacture of the same and the parameters governing this scale up. After having gained sound knowledge about Organic and Inorganic Chemistry, it is imperative that the learner should know the methods involved in the analysis of the same. Over the six semesters, he is initially introduced to the classical methods of analysis (namely volumetry and gravimetry), it is taken further by exposing the learner to the concepts involved in sophisticated methods of analysis like optical methods, electroanalytical methods, thermal methods, chromatography and other relevant separation techniques. The skills acquired in the practical component of the three year course will include the separation techniques, characterisations (Organic and Inorganic Qualitative Analysis), quantitative techniques like volumetry and gravimetry. The student will also get hands on training in the various analytical techniques learnt in the course of three years through experiments designed involving the use of the instruments such as conductometers, potentiometers, colorimeters, pH meters and also the separation techniques (Solvent extraction) and chromatography (Paper Chromatography) The graduate program in Chemistry thus aims at equipping the student in

Course Code	Paper Title	Course Outcomes
RUSCHE101	PHYSICAL CHEMISTRY	**After studying this course, the learner will be able to** • Determine the strengths of solutions using mass based and volume based units of expressing concentration • Differentiate between primary standards and secondary standards. • Compare ideal gas and real gases using the van Der Waals' equation of state. • Comprehend the characteristics of liquid state, physical properties and the concept of viscosity and surface tension and its determination methods. • Know the difference between the rate of reaction and molecularity of a reaction and also the methods involved in determining the molecularity of the reaction. • Draw planes in a given crystal lattice.
RUSCHE102	INORGANIC AND ORGANIC CHEMISTRY	**After studying this course, the learner will be able to:** • Correlate earlier theories pertaining to atomic structure. • Know the significance of quantum numbers. • Differentiate between orbit and orbitals. • Draw the shapes of orbitals. • Understand the historical development of periodic table of elements. • Classify elements depending on entry of valence electrons. • Categorize different types of elements. • Know the trends in periodic properties. • Compare between ionic and covalent bond. • Draw Lewis dot structures for given compound. • Determine shape of the molecule using VSEPR model. • Identify Isoelectronic species. • Write IUPAC name of mono and bi-functional aliphatic compounds including their cyclic analogues. • Draw structures of organic compounds based on their systematic names. • Comprehend the fundamental concepts which govern the structure, bonding, hybridization, bond angles and shapes of molecules. • Know the concept of electronic effects. • Understand the importance of reaction intermediates.
RUSCHE201	ORGANIC CHEMISTRY	**After studying this course, the learner will be able to** • Identify types of isomers of given organic compounds. • Assign stereo-descriptors using CIP rules. • Compare the stability of cycloalkanes. • Draw the spatial arrangement of alkanes. • Know the reactions involved in aliphatic hydrocarbons • Recognise the mechanism involved in electrophilic aromatic substitution reactions. • Understand the effect of nitro group on nucleophilic aromatic substitution reaction. • Know the directing effect of the groups on electrophilic aromatic substitution reactions.

whatever line of career that he / she undertakes after the graduation. It is envisaged that after graduation the student either goes for higher studies or seeks a Job or totally changes the direction of navigation to opt for a totally different shore.

The expected outcome for the same can be under the category of basic knowledge, skills developed and exposure .

1. As far as the basic foundation of the subject is concerned the student is expected to gain the fundamental knowledge of the main branches of chemistry viz. Physical, Inorganic, Organic and Analytical.
2. On the front of the skill development after graduation the student should be able to identify and separate components of organic or inorganic origin and develop the necessary skill for operation and handling of the instruments.
3. In the span of three years the student should take advantage of the certificate courses offered by the department to supplement the gains through the regular theory and practicals.

RUSCHE202	**INORGANIC AND PHYSICAL CHEMISTRY**	**After studying this course, the learner will be able to:** • Compare the properties of main group elements in the respective groups. • Understand Concept of metallic and non metallic character with respect to electropositivity. • Know the methods of preparation of the compounds which are commercially available along with their properties and uses. • Understand different types of oxides and oxyacids of sulphur , nitrogen - their sources and reactions • Balance redox reactions using oxidation number method and ion electron method. • Calculate equivalent weight of oxidizing and reducing agents. • Identify health hazards, environmental implications and remedial measures of oxides of carbon, nitrogen and sulphur. • Identify and signify the basic terms used in thermodynamics. • Apply laws of thermodynamics to various systems. • Derive an expression for first law of thermodynamics for different processes. • Assess thermodynamic application using enthalpy, entropy and free energy.
RUSCHE301	**PHYSICAL AND INORGANIC CHEMISTRY**	**After studying this course, the learner will be able to:** • Understand significance of Gibb's and Helmholtz Free Energy and its applications. • Apply Clapeyron equation to various phase transitions. • Derive van't Hoff's Reaction Isochore and Isotherm. • Derive various Maxwell relations. • Give relationship between conductance, specific conductance, equivalent conductance and molar conductance. • Describe the concept of Transport Number. • Know the applications and Limitations of Valence Bond Theory • Predict geometry of molecules based on Hybridization. • Determine Bond Order, bond energy and magnetic behavior of the compound based on Molecular Orbital Theory.
RUSCHE302	**ORGANIC AND INORGANIC CHEMISTRY**	**After studying this course, the learner will be able to** • Know the reactions of halogenated hydrocarbons. • Assign Nomenclature to organometallic compounds, alcohols, phenols and epoxides.. • Compare the acidic strengths of alcohols and phenols. • Write mechanisms of condensation reactions. • Know the use of active methylene compounds in organic synthesis. • Understand the concept of electron deficient compounds and its correlation with Lewis acidity. • Draw the structure and bonding involved in diborane and tetraborane. • Comprehend the chemistry of Silicon and its compounds.

RUSCHE303	**ANALYTICAL CHEMISTRY**	**After studying this course, the learner will be able to:** • Elaborate on the scope and importance of Analytical Chemistry • Describe and compare a range of classical and instrumental methods and will be able to explain their underlying theoretical principles. • Enlist the advantages/disadvantages of classical & instrumental methods of analysis. • Outline the steps involved in the analysis of a sample. • Choose an appropriate analytical method to prepare , separate and quantify samples from various matrices. • Classify different errors according to their sources • Determine the different kinds of errors involved in chemical analysis. • Suggest methods that can be adopted to minimize the different types of errors. • Apply the scientific process , including statistical treatment of data, in the conduct and reporting of chemical analysis. • Discuss the factors affecting the solubility of a precipitate. • Briefly enumerate the different steps involved in a precipitation gravimetry. • Explain the effect of various experimental factors on the particle size of the precipitate. • Define the various terms involved in titrimetric analysis. • Explain the theory of acid-base indicators and choose a suitable indicator for a particular acid-base titration. • Relate some of the properties of the water to its chemical makeup. • Describe the composition of ground water. • Assess the quality of the water with the help of the parameters learned.
RUSCHE401	**PHYSICAL AND INORGANIC CHEMISTRY**	**After studying this course, the learner will be able to:** • Apply the concepts of Gibbs' and Helmholtz Free Energy to EMF measurements. • Understand the significance of Gibbs' and Helmholtz Free Energy and its applications to EMF measurements. • Describe the types of Electrodes and Electrochemical Cells • Derive Nernst Equation and can give its applications. • Calculate the pH for strong and weak electrolytes and Buffer Action. • Classify solutions on the basis of intermolecular forces. • Determine molecular weight of a component in a given mixture by steam distillation. • Apply phase rule to One-Component and Two-Component systems. • Comprehend various Properties of Transition Metals. • Define basic Terms involved in Co-ordination chemistry. • Apply Werner's Theory to understand the model of co-ordination compounds. • Know the significance of co-ordination compounds. • Describe the nature of the Metal-Ligand Bond
RUSCHE402	**ORGANIC AND INORGANIC**	**After studying this course, the learner will be able to:** • Write reactions of Carboxylic and sulphonic acids and their derivatives

RUSCHE403	**ANALYTICAL CHEMISTRY**	**After studying this course, the learner will be able to** • Categorize the different types of separation methods under physical , chemical , mechanical methods. • Explain the basic principle of the solvent extraction and chromatography techniques. • Define the terms partition coefficient & distribution ratio. • Know the factors that affect extraction efficiency. • Describe the different types of solvent extraction and will be able to enlist the advantages and limitation of each type. • Illustrate the role of chelating agents in solvent extraction. • Develop simple separation schemes and determine the optimal conditions for isolating and separating analyte based on distribution ratios. • Choose an appropriate mobile phase for the effective separation of different components present in a sample. • Develop the chromatogram skillfully and will be able the apply the most suitable method for the detection of the resolved components. • Apply the theoretical principles of chromatography learned to separate and quantify different components present in a sample. • Explain the basic principle involved in quantitative analysis using UV-Vis spectroscopy. • Derive the mathematical expression of Beer-Lambert's law. • Describe the function of the different components of a colorimeter and spectrophotometer. • Distinguish between colorimeters & spectrophotometers. • Recognize the limitations of UV-Vis spectroscopy. • Explain the basic principle involved in different types of conductometric titrations. • Enlist the advantages and limitations of conductometric titrations.
RUSCHE501	**PHYSICAL CHEMISTRY**	**After studying this course, the learner will be able to** • Comprehend the fundamentals of rotational, vibrational and Raman spectra of molecules. • Outline the applications of Galvanic Cells. • Apply Raoult's Law and Clapeyron Equation to study Colligative Properties • Understand reaction dynamics. • Apply principles of Surface Chemistry to Colloids
RUSCHE502	**INORGANIC CHEMISTRY**	**After studying this course, the learner will be able to** • Identify the elements of symmetry. • Assign point groups to molecules. • Correlate between bond angle and molecular orbitals. • Understand band theory and its application to metals. • Depict structure of solids and their defects. • Compare various aspects of lanthanides and actinides. • Describe properties and application of Uranium. • Distinguish between properties of Xenon and other noble gases
RUSCHE503	**ORGANIC CHEMISTRY**	**After studying this course, the learner will be able to:** • Apply fundamentals of Organic Reaction Mechanism to various reactions. • Compare various conformations of some organic compounds • Apply the concepts of stereochemistry to Organic reactions. • Assign IUPAC names to spiro, bicyclo and heterocyclic compounds. • Understand Basics of Polymer Chemistry. • Illustrate basics of Green Chemistry to Organic Synthesis.

RUSCHE504	**ANALYTICAL CHEMISTRY**	**At the end of this course, the learner will be able to:** • Elaborate on the need and importance of sampling and the various methods used for sampling of solid, liquids and gases. • Evaluate the analytical data in terms of statistics. • Interpret the sources of random errors and their effect on analytical results. • State the significance of confidence limits in the error analysis. • Specify the standard deviation of calculated results. • Explain the Q-test for rejection of data. • Outline a procedure for the application of null hypothesis to the data. • Discuss the importance of graphical representation of data. • Describe the different methods used for locating endpoints in precipitation titrations. • Classify the different types of solvents used for nonaqueous titrations with respect to their acid base properties. • Illustrate the effect of dielectric constant and nature of solvent on solute behaviour in nonaqueous titrations. • Explain the basic principle involved in AAS, AES, fluorescence, phosphorescence, turbidimetry and nephelometry. • Describe the function of different components of AAS, flame photometer , Fluorimeter, Phosphorimeter, Turbidimeter and nephelometer. • List the factors affecting fluorescence and phosphorescence and also the factors affecting scattering of light in turbidimetry and nephelometry. • Relate fluorescence intensity with concentration
RUSCHE601	**PHYSICAL CHEMISTRY**	**After studying this course, the learner will be able to:** • Understand the basic principles of Nuclear Magnetic Resonance spectroscopy • Classify polymers based on various parameters • Determine overvoltage and decomposition potential • Illustrate the use of X-rays in the study of solid state • Differentiate between nuclear fission and nuclear fusion processes • Understand the basic operations used in Quantum Chemistry.
RUSCHE602	**INORGANIC CHEMISTRY**	**After studying this course, the learner will be able to** • Compare and contrast between Crystal Field Theory and Valence Bond Theory
RUSCHE603	**ORGANIC CHEMISTRY**	**After studying this course , the learner will be able to** • Classify carbohydrates. • Study reactions shown by Glucose • Illustrate general applications of various catalysts and Reagents • Understand basic principles of Photochemistry • Know basics of Natural Product chemistry- Including Amino acids, nucleic acids etc • Apply Spectral techniques to Structure Determination
RUSCHE604	**ANALYTICAL CHEMISTRY**	**At the end of the course, the learner will be able to** • Outline the basic principles, instrumentation of these advanced separation techniques and electroanalytical methods. • Assess advantages and limitations of these techniques. • Correlate these techniques with industrial applications. • Relate the applications of analytical methods in day-to-day life.
RUSACDD501	**DRUGS AND DYES**	**After studying the course, the learner will be able to -** • Understand various pharmacodynamic agents with respect to their chemical structure, chemical class, therapeutic uses, and side effects. • Understand different routes of drug administration. • Describe the metabolism of drugs inside the human body. • Enlist different routes of drug administration. • Classify dyes based on their constitution and application. • Correlate color and chemical constitution of dyes. • Write the reactions involved in the synthesis of some representative drugs and dye

The graduate learner will learn to appreciate the vista of applications of chemistry as a pure science in the fields of drugs and dyes, both of which have been developed eons ago and will most definitely continue to grow along with the expansion of the human race. The study of a pure science as a theory often leaves the learner unaware of the ways in which the science has, and can be applied to real problems. The purpose of introducing this applied component will be achieved when the learner is cognizant of the important contributions of chemistry in the two fields of drugs and dyes, and is able to apply their knowledge of molecules and the way in which

TY AC (Title : Drugs and Dyes)	they prefer to behave in specific situations.			intermediates.
		RUSACDD601		**At the end of the course, the learner will be able to:** • Classify various chemotherapeutic agents with respect to their chemical structure,chemical class, therapeutic uses and side effects. • Outline the principles involved in drug designing and metabolism of drugs inside the human body. • Compare the relation between color and chemical constitution. • Explore the various textile and non textile applications of dyes. • Write the reactions involved in the synthesis of some representative drug molecule and dye intermediates
TY AC (Title: NCE-WR)	The expectations to be met with the end of this programme is to cultivate a generation of youngsters that are intimately aware of the issues faced by our environment, and the repercussions of its mishandling which they, and their future generations would most suffer from in the coming years. Beyond merely creating awareness, the actions that are needed to reform the society to avert the environmental crisis are also exposed to the learners with emphasis on the value of an individual in the face of large corporations and governments that often place the onus of the situation on the shoulders of the common man. The power of free speech and vote in a democracy such as ours are priceless tools in the hands of the self-same common man, and this course hopes to develop this sense of rights and responsibilities towards the resources that support us. As it is often said, we are the trustees of this beautiful entity called as mother earth and it is our responsibility to transfer it in robust health to the future generations. If the study of this applied component can inculcate the above-mentioned feeling and the awareness that solution to each and every problem begins with oneself in the mind of the graduate learner then we feel that the purpose of introducing this as an applied component will be served.	**RUSACNCE501**	**NON-CONVENTIONAL ENERGY SOURCES AND WASTE RECYCLING**	**After studying this course, the learner will be able to understand-** • Comprehend the need for energyfrom the perspective of man ,& describe the various energy sources . • Define energy efficiency , &correlate the current energy crisis with the energy effiviency gap. • Review different non conventional energy sources such as solar , Wind and Geothermal etc. & assess them critically w.r.t. feasibility & energy value.
		RUSACNCE601		**After studying the course, the learner will be able to understand** • Summerize the Ocean based non conventional energy sources viz. OTEC & appraise them in keeping with the current local and global scenario. • Explain the construction & working of fuel cells & recognize their potential as the solution to the global energy crisis. •Explore the prospects of Hydrogen as a fuel • Outline the use of Biomass in India. • Characterize the Solid Waste w.r.t its sources sources,and disposal methods. • Describe various treatment methods used for three step treatment of liquid Waste in general and their applications in specific industries like fertilizer, food & beverage, petrochemical industry. • Apprreciate the significance of 3 'R's.and examine the governmentpolicies & regulations regarding potable & non potable water

SUBJECT	PROGRAM SPECIFIC OUTCOMES	PAPER CODE	PAPER TITLE	COURSE OUTCOMES
PHYSICS	After successful completion of this course, students would acquire the following knowledge & skills:	**RUSPHY101**	**Mechanics, Optics & Thermodynamics**	After the successful completion of this course, the student will be able to: 1. Understand Newton's laws and apply them in calculations of the motion of simple systems 2. Use the free body diagrams to analyze the forces on the object 3. Understand the concepts of friction and the concepts of elasticity, fluid mechanics and be able to perform calculations using them 4. Understand the concepts of lens system and eyepiece . 5. Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process 6. Demonstrate quantitative problem solving skills in all the topics covered.
	(1) The ability to apply the principles of physics to solve innovative and unfamiliar problems	**RUSPHY102**	**Nuclear Physics & Quantum Mechanics**	After successful completion of the course, the student will be able to: 1. Understand the phenomenon of radioactivity and different equlibrium with applications of radioactivity. 2. Get an understanding about the nucleus and its properties 3. Get an understanding of dual nature of light 4. Study the particle nature of matter with Compton effect . 5) Study of X-rays.
	(2) The ability to explore and deduce quantitative results in the extentsof physics	**RUSPHY201**	**Mathematical Physics & Mechanics**	After successful completion of this course, student will be able to: 1. Understand the basic mathematical concepts and applications of them in physical situations. 2. Demonstrate quantitative problem solving skills in all the topics covered
	(3) The ability to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data	**RUSPHY202**	**Electronics**	After successful completion of this course, a student will be able to: 1. Understand the details of electronics 2. Understand the working of various electronic equipments used in day-to-day life 3. Understand the working behind Logic Gates , rectifires , regulator. 4. Understand the designing of circuit related theorems.
	(4) The ability to communicate scientific results effectively in presentations or posters	**RUSPHY301**	**Mechanics and Thermodynamics**	On successful completion of this course, students will be able to: 1. Understand the concepts of mechanics, oscillations & properties of matter, how to apply them to problems 2. Comprehend the basic concepts of mechnaical forces in the frame work , thermodynamics & its applications in physical situation 3. Learn about situations at low temperature 4. Demonstrate cautious problem solving skills in all above areas
	(5) A comprehensive, quantitative and conceptual understanding of the core areas of physics, including mechanics, optics, modern physics, thermodynamics, electrostatics at a level attuned with graduate programs in physics at peer institutions	**RUSPHY302**	**Vector calculus, Analog and Digital Electronics**	On successful completion of this course students will be able to: 1.Understand the basic concepts of mathematical physics and their applications in physical situations 2. Understand the basic laws of electrodynamics and be able to perform calculations using them 3. Understand the basics of transistor biasing, operational amplifiers, their applications 4. Understand the basic concepts of oscillators and be able to perform calculations using them 5. Demonstrate quantitative problem solving skill in all the topics covered

RUSPHY303	**Applied Physics - I**	On completion of this, it is expected that 1. Students will be exposed to contextual real life situations 2. Students will appreciate the role of Physics in 'interdisciplinary areas related to Materials, Nano-sciences, Acoustics etc. 3. The learner will understand the scope of the subject in Industry & Research 4. Experimental learning opportunities will faster creative thinking
RUSPHY401	**Optics, Applied optics**	On successful completion of this course students will be able to: 1. Study of optical phenomenon of intereference , diffraction and polarization. 2.To learn applications of optics :- thin films, FBG gratings and 3. applications of optical fibres as sensors.
RUSPHY402	**Quantum Mechanics**	On successful completion of this course students will be able to: 1.Understand the postulates of quantum mechanics and to understand its importance in explaining significant phenomena in Physics 2. Demonstrate quantitative problem solving skills in all the topics covered.
RUSPHY403	**Applied Physics – II**	On successful completion of this course, students will be able to: 1. Understand the concepts of mechanics & properties of matter & to apply them to problems 2. Comprehend the basic concepts of thermodynamics & its applications in physical situation 3. Learn about situations in low temperature 4. Demonstrate tentative problem solving skills in all above areas.
TYBSc Physics		
RUSPHY501	**Mathematical Methods in Physics**	On successful completion of this course, students will be able to: 1. Understand concepts - probability, Fourier series 2. Understand the concepts of Statistical mechanics and quantum statistics 4. Apply the laws Statistical mechanics to thermodynamic process 5. Demonstrate quantitative problem solving skills in all the topics covered
RUSPHY502	**Solid State Physics**	After the successful completion of this course, the student will be able to: 1. Understand concepts of Crystal physics 2. Understand the Electrical properties of metals and band theory of Solids. 3. Demonstrate quantitative problem solving skills in all the topics covered
RUSPHY503	**Atomic and Molecular Physics**	On successful completion of this course, students will be able to: 1.Understand the concepts of quantum mechanics & its relative concepts with Atomic physics. 2. Comprehend the basic concepts of molecular spectra and related mathematics.

RUSPHY504	**Electrodynamics**	After the successful completion of this course, the student will be able to: 1.Understand Electrostatics and magetostatics 2. Understand the concepts of polarization, magnetization ,dielectrics 3. Understand the Maxwell's equations and its applications 4. Understand Electro -magnetic wave propagation
RUSPHY601	**Classical Mechanics**	After successful completion of this course, a student will be able to: 1. Understand Motion of simple systems 2. Understand the concepts of Lagrangian technique in solving Mechanics problems 3. Understand motion of fluids, Non-linear mechanics, Chaos idea 4. Demonstrate quantitative problem solving skills in all the topics covered
RUSPHY602	**Electronics**	After successful completion of this course, a student will be able to: 1. Understand the details of different types of diifernt components and characteristic applications. 2. Understand the concept of working of circuirts using practical experimental work. 3. Understand the selection and utilization of componenet for various applications.
RUSPHY603	**Nuclear Physics**	After successful completion of this course, a student will be able to: 1. Understand the details of alpha, beta and gamma deacay 2. Understand the working of various accelerators and fission process. 3. Understand the brief idea of Particle Physics.
RUSPHY604	**Special Theory of Relativity**	On successful completion of this course, students will be able to: 1. Understand Experimental background of special theory of relativity 2. Understand Special Theory of Relativity & Relativistic Kinematics 3. Understand the concepts of Relativistic Dynamics, energy-mass equivalence and be able to perform calculations using them 4. Understand the application of theory of Relativity to field of Electromagnetism and applications to electro-magnetic systems 5. Demonstrate quantitative problem solving skills in all the topics covered
RUSACEI501	**Analog Electronics and Nanotechnology-I**	After successful completion of this course, a student will be able to: 1. Understand the details of different types of Power Suppies which are used in their daily practice. 2. Understand the working of each componentsof CRO,Signal Genrators. 3. Understand the new concepts of Nanotechnology

Upon completion of this course, students would acquire the following knowledge & skills:

a) Understand the basics of Temperature measurements using elements as resistance thermometer, thermocouple Thermistor , their applications b) Understand the basics of Measuring Instruments such as CRO, DMM, Analog meter and able to perform calculations using them c) Understand working of Signal Generation and Signal Conditioning, power supply and demonstrate in experiments. d) Demonstrate quantitative problem solving skill in all the topics covered e) Understand the functional nanomaterials and its properties. f) Synthesis of various nanomaterials. g) Analysis of synthesized nanomaterials. h) Understand the application of nanomaterials	**RUSACEI 601**	**ANOLOG CIRCUITS AND NANOMATERIALS-I I**	On successful completion of this course, students will be able to: a) Understand the basics concept of C++ and benifits of OOP with its applications. b) Understand the tokens , variables declaration , implicit convesion and cast opertaors c) Understand control structures and functions and constant arguments d) Understanding the anaysis techniques and working principles of XRD, SEM , TEM etc. e) Understand the special nanomaterials CNT's and porous silicon and Zeolites. f) charerization of various nanomaterials. g) Applications of nanomaterials.

SUBJECT	Programme specific Outcomes	Course Code
BOTANY	1. Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of Cryptogams and Phanerogams that differentiate them from each other and from other forms of life.	**RUSBOT101**
	2. Students will be able to explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and behaviour of different forms of life.	
	3. Students will be able to explicate the ecological interconnectedness of life on earth by tracing energy and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.	**RUSBOT101**
	4. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history. 5. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology. 6. Students will be able to learn the utilisation of various plant groups, ethnobotanical aspects and medicinal uses of plants with special reference to usage as mentioned in different Pharmacoepia.	
	7. Students will be able to learn the finer aspects of emerging areas such as in instrumentation nanotechnology and Bioinformatics	**RUSBOT102**

8. Students will be able to apply the scientific method to questions in biology by formulating testable hypotheses, gathering data that address these hypotheses, and analyzing those data to assess the degree to which their scientific work supports their hypotheses. 9. Students will be able to present scientific hypotheses and data both orally and in writing in the formats that are used by practicing scientists. 10. Students will be able to access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works. 11. Students will be able to apply fundamental mathematical tools (statistics, calculus) and physical principles (physics, chemistry) to the analysis of relevant biological situations. More emphasis will be given to application, analysis, entrepreneurship and projects at the post graduate level.	**RUSBOT201** **RUSBOT202** **COURSE CODE** **RUSBOT301**

RUSBOT302
RUSBOT303
RUSBOT401
RUSBOT402
RUSBOT403

RUSBOT501
RUSBOT502
RUSBOT503
RUSBOT504

RUSBOT601
RUSBOT602
RUSBOT603
RUSBOT604

TY AC(Title : Horticulture & Gardening)

RUSACHOR501
RUSACHOR601

Paper Title	Course Outcomes
PLANT DIVERSITY I	· Understand the morphological and systematic knowledge about different plant groups.
	· Make use of this knowledge for detailed study in their disciplines.
PLANT DIVERSITY I	· Understand the morphological and systematic knowledge about different plant groups.
	· Make use of this knowledge for detailed study in their disciplines.
FORM AND FUNCTION I	· Understand the basic principles of plant cell organelles and plant ecology and further their knowledge in Mendelian Genetics

	· Students will perform experiments; gather data, test hypotheses, and draw conclusions based on data
	· Understand use of biometrics in biological sciences.
PLANT DIVERSITY II	· Students willbe able to understand the Pteridophyte and Gymnosperm life cycles, Angiosperm families and their economic importance along with their systematic position.
FORM AND FUNCTION II	· Students willbe able to understand the anatomical structure and functions of various tissues System in plants.
	· Understand physiological processes and their importance.
	· Study the basic concept of primary and secondary metabolites.
	· Study about the economic use, morphology, products and uses of several economically important plants.
COURSE OUTCOMES(COs)	
SY B Sc	
PLANT DIVERSITY III	· Students willbe able to identify Algae, Bryophytes and Angiosperms.
	· Appreciate the influence of various fields on taxonomy.
	· Observation, collection of specimens from the nature by themselves
	· Grasp the working and handling of instruments and working on it for the specific practicals.

FORM AND FUNCTION III	· Understand the details of cellular structures, causes and effects of chromosomal aberrations, sex determination and examples of extranuclear genetics. · Have a detailed understanding of the fundamentals of DNA replication and transcription.
CURRENT TRENDS IN PLANT SCIENCES I	· Creating awareness about various pharmacopoeias and understanding the importance of pharmacopoeias in plant identification and standardization. · Understanding forestry and the use of various forest products. · Understanding the economic and commercial value of botanical products · Understanding the industrial relevance of botanicals with respect to current demands of industry
PLANT DIVERSITY IV	· The students will learn to identify and study the life cycles of fungi, fungi causing plant diseases, lichens, Pteridophytes, Gymnosperms, and fossil members mentioned in the syllabus.
FORM AND FUNCTION IV	· students will be able to relatstructure with function by studying different anatomical details · Understand the basic concepts and applications of respiration, photorespiration, photoperiodism and vernalisation. · Grasp the principles governing ecology and environmental biology with reference to biogeochemical cycles, ecological factors, and community ecology.
CURRENT TRENDS IN PLANT SCIENCES II	• Students should be able to explain the various components of plant tissue culture media,techniques, applications and also aout R- DNA technology

	· They will be able to apply the tools of Biostatisticsand Bioinformatics for analysis and problem solving in Botany. Also Basic concepts of research and GLP
TY B Sc	
PLANT DIVERSITY V	· Students will be able to identify various algal, bryophyte specimens and their forms
	· They will be able to culture bacteria, prepare media and isolate pure cultures.
	· Able to apply techniques to subject experimental data to statistical analysis.
PLANT DIVERSITY VI	· Will be able to identify plants from the prescribed families and understand the principles underlying Bentham and Hooker's classification and study ethnomedicinal aspects of plants.
	· Will be able to understand anatomical adaptations and palynological details of plants and reasons for the same.
FORM AND FUNCTION V	· Understand cellular basis of life and molecular genetic machinery for translation.
	· Will gain insight into physiological aspects of plant life with reference to water relations, transport processes and growth as well as environmental clean-up technologies.
	· Understand the Statistical analysis of experimental data.
CURRENT TRENDS IN PLANT SCIENCES III	· Will know the basics of medicinal Botany, contribution of plants in human health, with reference to specific function of antioxidants and phytochemicals as therapeutic agents.

	· Get acquainted with the basics of plant tissue culture, techniques, applications and limitations.
PLANT DIVERSITY VII	· Students will be able to Identify Fungi, plant diseases, Pteridophytes and understand evolutionary relationships of members of these groups.
	· Learn the basic principles of handling and analyzing genetic material and also use molecular techniques to resolve taxonomic problems.
PLANT DIVERSITY VIII	· Students will be able to identify fossil forms according to their structures.
	· Learn life cycles from Gnetopsida and alternation of generations.
	· Use of different sources of taxonomic literature along with identification of different plants and the classical Hutchinson's system of classification.
	· Ccorelate structure with function through ecological anatomy.
	· Understand the basic concepts of embryological studies in plants.
FORM AND FUNCTION VI	· Understand biomolecularstructures, learn about basics of enzyme function, and nitrogen metabolism.
	· Carry out genetic mapping, detect gene mutations and identify metabolic disorders.
	· Make, Use and sell herbal cosmetics so as to encourage entrepreneurship.
CURRENT TRENDS IN PLANT SCIENCES III	· Learn aboutbiodiversity basics and importance of conservation.
	· Learn the use of advanced instruments like UV – spectrophotometer, HPTLC, HPLC for the study of phytochemicals.

	· Understand the parameters of research methodology
HORTICULTURE AND GARDENING –I	· Students will acquire basic knowledge about the fundamental aspects of horticulture.
.	· Will be able to propagate plants by various methods they learnt and will be able to perform different garden operations, organic farming, knowledge about the selection and use of various fertilizers and manures.
HORTICULTURE AND GARDENING –II	· Students will be able to :suggest plants suitable for various locations in a garden, discuss growth and development patterns for fruit and vegetable species, explain production conditions and practices for fruit,vegetable crops and soilless cultivation and compare the various cultural systems
	· Develop management plans for soil fertility, irrigation, and pest control in fruit and vegetable production.Discuss and evaluate horticulture as a business.

ZOOLOGY

SUBJECT	PROGRAM SPECIFIC OUTCOMES	PAPER CODE
ZOOLOGY	1. Students will be able to identify and understand animal diversity and be able to classify them. Students will be able to understand the evolutionary link amongst the animals and also understand the basic classification patterns of invertebrates and vertebrates. They will be able to compare and contrast between the anatomy and physiology of different invertebrates and vertebrate phylum.	**RUSZOO101**
	2. Students will be able to understand the genes, genomes, cells, cell organelles, tissues and histological studies. They will be able to understand the linkage of genes, mechanisms of sex determination, various structures of DNA.	**RUSZOO102**
	3. Students will be able to understand the broad concepts of ecology, food webs, food chains and the interconnectedness of biotic and abiotic factors. Students will be able to understand Population dynamics, communities and its dependence on the ecosystems.	**RUSZOO201**
	4. Students will be able to understand the concepts of Evolution and Population genetics. They will be able to understand and apply the knowledge of genetics to the process of evolution.	**RUSZOO202**
	5. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within Zoology.	**RUSZOO301**

6. Students will be able to understand the aspects of areas such as in instrumentation, applied Zoology, Emerging trends in fisheries, Bioinformatics and biotechnology.	**RUSZOO302**
7. Students will be able to apply knowledge in fields of Biostatistics and research methodology.	**RUSZOO303**
	RUSZOO401
	RUSZOO402
	RUSZOO403

RUSZOO501

RUSZOO502

RUSZOO503

RUSZOO504

RUSZOOACMS501

RUSZOO601

RUSZOO602

RUSZOO603

RUSZOO604

RUSZOOACMS6
01

AND MARINE SCIENCE

PAPER TITLE	COURSE OUTCOMES
LEVELS OF ORGANIZATION: NON-CHORDATES, WONDERS OF ANIMAL WORLD AND BIODIVERSITY AND ITS CONSERVATION	Curiosity will be ignited in the mind of learners, to know more about the classification of invertebrates, fascinating world of animal and treasure of Biodiversity, which will make them, understand significance of its conservation and hence would contribute their best for it.
ANIMAL BIOTECHNOLOGY and INSTRUMENTATION	Learners will be skilled to select and operate suitable instruments for the studies of different components of Zoology and work safely in the laboratory and avoid occurrence of accidents (mishaps). Besides learners would understand recent advances in the subject and their applications for the betterment of mankind.
LEVELS OF ORGANIZATION: CHORDATES, ECOLOGY AND NATIONALVPARKS AND SANCTUARIES OF INDIA	Learners would be enhanced with the knowledge of classification, ecology and ecosystems which will equip them for field experience and will inspire them to explore different components of Ecological interactions including research and choose career options in the field of wild life conservation, research, photography and ecotourism.
NUTRITION, PUBLIC HEALTH AND HYGIENE	Promoting optimum conservation of water and encouragement for maintaining adequate personal hygiene, optimum use of electronic gadgets, avoiding addiction, thus facilitating achievement of the goal of healthy young India in true sense and promptly recognizing stress related problems at initial stages and would help learners to adopt relevant solutions to have psychologically strong mind set along with healthy dietary habits
Genetics, Heredity& Nucleic acids	Understand the principles of inheritance, linkage and crossing over, concept and types of chromosomes, mechanisms of sex determination, nucleic acids and central dogma of life.

Life processes	Learners would understand the increasing complexity of physiology of all life processes and its evolutionary hierarchy and would be able to correlate the habit and habitat with the structures involved in all these processes in different classes of organisms.
Ethology, Parasitology and Economic Zoology	Learners would gain an insight into different aspects of animal behaviour and their role in biological adaptations including the epidemiological aspects of parasites that affect humans along with the study of symptoms of the disease and its treatment. This would equip students with modern techniques in animal husbandry and encourage young learners for self-employment.
Evolution and Population Genetics	Learner will gain insight about origin of life and will know about the different theories of evolution, which would help them understand the forces that cause evolutionary changes in natural populations and comprehend the mechanisms of speciation. In addition, learners will develop research aptitude and understand the ethical aspects of research.
Cell Biology and Biomolecules	Learner would acquire insight of the intricacy of endomembrane system and transport mechanisms for maintenance and composition of cell leading to the interlinking of endomembrane system for functioning of cell, besides they will realize the importance of biomolecules and their clinical significance.
Embryology, Human Reproduction and Pollution	Learner will learn to compare the different pre-embryonic stages, the functional aspects and classification of extra-embryonic membranes and placentae in order to understand human reproductive Physiology along with advances in Artificial Reproductive Technology and related ethical issues. In addition, they will be sensitized about the adverse effects of pollution and its control measures to focus on current environmental issues

Levels of Organisation, Principles of Classification and Animal Type Study	Learners will develop conceptual clarity with regard to the anatomy of animals at different levels and will get an idea of general characteristics and details of invertebrate animal systems. The understanding of working of organs and systems within a single animal would strengthen the learners' comprehension of biological systems. Learning of external morphology and physiology of systems of invertebrate animal will make easy to understand these animals when used in research.
Basic and applied Haematology & Immunology	Learners would be able to comprehend the fundamental concepts in haematology, different terminologies and diagnostic tests performed in a pathological laboratory. Learners would realize the significant role of immune system in giving resistance against diseases. Learners would understand the principle and applications of vaccines. Learners would develop basic understanding of immunology of organ transplantation and cancer treatment.
Molecular Biology, Genetic Engineering, Human genetics and Tissue culture.	The course will get learners acquainted with the vast array of techniques used to interfere genes which can be applied in research. The learners will become aware of the impact of changes occurring at gene level on human health and its diagnosis, new fields of genetic engineering and biotechnology. The knowledge of cell culture will equip them to work in upcoming fields of science and technology.
Integumentary and Endocrine system, Human Osteology & Chick Embryology	Learners will be able to understand the importance of epidermal and dermal derivatives and their functions. Learners would comprehend the types & secretions of endocrine glands and their functions. Learners will develop the conceptual clarity of the structure, types and functions of human skeleton. Learners will become acquainted with the processes involved in embryonic development, comparative embryology and its application.

Oceanography and Sustainable fishery	Learner would understand different zones of sea (marine habitat) and their impact on biodiversity. Learner would get to know physical and chemical parameters of ocean during climate changes and their effect on marine organisms. Learner would become aware of different rules and regulations and the significance of sustainable fishery. Learner would get a basic idea of different techniques being used for sustainable fishery support. Learner will understand recent trends in oceanographic research which will motivate them to initiate research culture and make them aware about the conservation policies and status of Marine flora and fauna.
Animal Type Study: Chordates	To enhance the knowledge about the habitat and economic importance of the Vertebrates. Learning of External morphology and physiology of systems of vertebrate animal will make easy to understand these animals when used in research.
Enzymology, Homeostasis, Histology and General Pathology	Learners will know variations in enzyme activity and kinetics and the therapeutic and clinical application of enzymes. Learners will comprehend the adaptive responses of animals to temperature and ionic changes. Learners would appreciate the organization of tissues and cells in the organ systems. Learners will be familiar with various medical terminologies pertaining to pathological condition of the body caused due to disease. The learners will become acquainted with how and why different animal species are distributed around the globe. The course will prepare learners to develop broad understanding of the various areas and significance of toxicology. The learners will be able to collect, organize and analyse data using parametric and non-parametric. Learners will be able to understand the different factors affecting environment, its impact and laws governing environmental management. Learners will be able to undertake the wildlife habitat projects for animal protection and create awareness about Wildlife Conservation. Learners would enhance the knowledge about the paradigms of discovery and commercialization of biological resources and knowledge gained by self-medication by animals. Learners will be able to correlate the role of useful and harmful insects in human life and gain knowledge about its applications in diverse fields.

Aquaculture, Marine products, Processing and Fish Pathology	Learner will take the first step to become entrepreneur in the field of culture fishery with basic knowledge of marine aquaculture. Learner would be acquainted with various marine products, their nutritional values and economic significance. Learner would acquire knowledge of specific methods of preservation and processing for enhancing the shelf life and commercial value of seafood. Learner would be able to identify causative agents, symptoms and treatment for different fish diseases.

	Department name: Life Science	
SUBJECT	**Programme specific Outcomes**	**Course Code**
Life Science	1) It will give students an all-encompassing knowledge about biological systems across microorganisms, plants and animals. 2) It will give a firm foundation in biosciences for them to continue to Masters in Life Science or to digress into other specialized biological science related fields. 3) It will give students the know- how of the basics on which they can build their career in research as well.	**RUSLSc101**
		RUSLSc102
	Course outcomes	**RUSLSc201**
	● **Life Science Course Outcome UnderGraduate Syllabi:**	**RUSLSc202**
	As a student of Life Science at the end of the entire course the core values expected to develop are:	
	1) A scientific way of thinking, a diverse approach to scientific enquiry towards an idea .	
	2) Comparative study of Developmental processes, Nervous system, Digestive systems, Respiratory system, Excretory systems in different model organisms,allows for curiosity, active learning in areas of biology as a whole. which can later be a choice for higher studies	

	3) Study of macromolecules like the DNA, RNA, Protein, Lipids, Carbohydrates,with their different structural complexities, are designed for peculiar functions.	**RUSLSc301**
	4) Alterations in the structure and functions of the genes provide a random variation that nurtures, the Process of Evolution,explains the form and the structure of the hierarchy of living organisms from unicellular to the multicellular level.	**RUSLSc302**
	5) Assays are used to detect, identify, quantify, proteins while purifying, detecting and characterizing proteins is understood by Centrifugation, Electrophoresis and Chromatography techniques.	
	6) Study on virus classification followed by manipulating the virus vector to introduce genes of interest into cells to in treatment of diseases.	
	7) Study of DNA Cloning, the recombinant DNA molecules formed are then introduced into host cells for replication.The commonly used cloning vectors are *E.coli* plasmids, cosmids, phagemids significance of restriction enzymes are understood.	
	8) Neuroendocrine system maintains homeostasis in the body, it uses the electrical impulses delivered by the nervous and the blood borne hormones that act as carriers of information. The afferent and the efferent pathways determine the response or the course of action. Nervous system with its synaptic communications,autonomic reflexes decide on the conscious behaviour, memory and neural imbalances in a personality.	**RUSLSC303**

	9) Plant biotechnology discusses techniques of the process as to secondary metabolite s from cell culture.plant natural products used in pharmaceutical,agrochemical, food and drink industry. Micropropagation, Mass production,Transgenic plants and their use as a bioreactor to make edible vaccines,immunotherapeutic drugs, high quality seen protein is studied under Life Science to strengthen awareness of areas of greater scope.	
	10) Principle of Fermentation technology and the use of Bioreactors for the production of value based Industrial Enzymes, Food products, Biopesticides, Renewable energies is studied.	**RUSLSc401**
	11) The study of the Immune system enlightens about the body immunity,while disruptions in the immune system can cause Allergies, Autoimmune diseases and Immunodeficiency disorders.	
	12) Animal cell culture is now a most significant field for lifescience, students are made aware of the techniques used media type and the best type of tolerant tissue cell that can be proliferated as a cell line to study cancer cell biology, gene manipulations.	
	13) Interspecific interactions between the autotrophs, heterotrophs including human,the detritivores, in the environment of depleting Natural Resources is understood in the implementation of Laws Regulations set by the Government of India, citizens awareness to oppose under the aegis of NGO, makes apart of Ecology and Conservation Biology, Assessment Management.	
	14) Biological Measurements are statistically analysed, Probable Chance of Occurence, Normal Population, Student’s t-test, Correlation and Regression analysis, Chi-Square test.	**RUSLSC402**

	15) Use of Bioinformatics in the entire study of Life Science adds to more creative ideas to understand the evolution of macromolecules, the genomic status of organisms , to compare the phylogenetic relationships.	
	The end of the three year course in Life Science marks for an enriched student in the field of biology as a whole.	**RUSLSc403**
		RUSLSc501
		RUSLSc502

		RUSLSc503
		RUSLSc504
		RUSLSC601
		RUSLSC602
		RUSLSC603
		RUSLSC604

Paper Title
Molecular and Cellular studies in Life Sciences I
Physiological systems, Genetics and Ecology I
Molecular and Cellular studies in Life Sciences- II
Physiological systems, Genetics and Ecology II

Physiological Systems in Plants and Animals-I
Biochemical Approach to Life Processes in Plants and Animals-I
Evolutionary Biology, Biostatistics and Bioinformatics in Population Studies-I

Physiological Systems in Plants and Animals-II

Biochemical Approach to Life Processes in Plants and Animals-II
Evolutionary Biology, Biostatistics and Bioinformatics in Population Studies-II
Genetics and Immunology-I
Developmental Biology and Neurosciences- I

Biotechnology and Genetic Engineering- I
Ecology, Conservation Biology, Assessment and Management- I
Genetics and Immunology-II
Developmental Biology and Neurosciences- II
Biotechnology and Genetic Engineering- II
Ecology, Conservation Biology, Assessment and Management- II

Course Outcomes

Students will gain insights about following;1) Structures and functions of Amino acids, proteins and nucleic acids.

2) Structure of eukaryotic and prokaryotic cells, cell wall structures, microbial growth,microbial media, microbial preservation techniques, cell cycle and cell division..

3) Structure and function of nucleus and cytoskeletal elements.

Students should get basic idea of Physiological system, Genetics , field visits to see different types of flora fauna and then understand the comparative anatomical and physiological differences at the phyla level.

To know;
Structure and function of cell organelle
transport systems across cell membranes.

1)The concept of homozygous,heterozygous,phenotype, genotype and alleles.

2)Medelian laws, monohybrid and dihybrid ratios with problems and chromosomal inheritance.

3)Interspecific interactions at ecological level and distribution of the population can be related to biodiversity visits

Student will understand; 1)Control systems in homeostasis 2)Nervous system, neurobiology, plant movement and animal behaviour 3)Basis of sex determination in plants and animals. 4)Puberty and regulation of uterine changes in menstrual cycle till menopause
Students will understand;
1) Isolation and purification of Enzymes, their kinetics, concepts of allostery and isoenzymes.
2) Bioenergetics, carbohydrate, lipid and protein metabolism.
3) Their integration into TCA cycle and then Electron Transport chain.
1) Evolutionary biology and genetics reveal the diversity of phyla in different geographic locations; the allelic frequencies that probably operate , correlations and other statistical applications will reveal the changes in population studies.

to know about virtual libraries and databases in Bioinformatics
Students should know;
1) Adaptive mechanism in plant and animal to extreme environmental condition
2) Regulation of energy stores and Various eating disorders
3) Immune system of Vertebrate and Invertebrate
3) Epidemiology,aetiology, pathology, diagnosis , therapy and preventive measures and vaccines for different diseases.

To know;
1) Anabolic pathways of carbohydrates, proteins and lipids.
2) Photosynthetic pathways.
3) DNA replication, transcription , translation and Regulation of gene expression in prokaryotes.
4) DNA replication, transcription , translation and post translational modifications in eukaryotes..

Students should know;human evolution from social to cultural changes , from the Hunter gatherer type to the most sophisticated type of today

1) Genetic code, annotation and comparisons of nucleic acid sequence.

2) Phylogenetic trees, parsimony principle, limitations of molecular phylogenetic trees

The students will understand;
1) Prokaryotic and eukaryotic genetic material, its regulation, inheritance and variation.
2) Genetic recombination
3) Immune system organs, immune cells, their development, activation, maturation.
4) Antigen recognition and Immune effector mechanisms.
5) Antibodies and their reactions.

Role of the ectoderm to form Neural cells, Neural crest cell significance.
Relating communications between the environment and the physical body through the peripheral nervous system the role of glial cells . Communications between the CNS and the PNS with the help of Neurotransmitters for a resultant behaviour

The students should learn; 1) Fermentation technology history, strain improvement, media design, downstream processing. 2) Specific food and beverage production details and Food Quality Assurance. 3) History of Genetic engineering , Molecular cloning technique and cloning vehicle. 4) Cloning of gene and cDNA technology.
Study of the biogeochemical cycles of nature,interaction of the biotic community and the abiotic resources, loss of biodiversity , disturbed ecological web of life. citizens action for conservation , restoration significance in protection GMO, IPR for sustainable living, reducing demands and reducing conflicts.
To know, 1) Genetic recombinations in different eukaryotes 2) Natural mutagenic agents and induced mutations 3) Recombinant DNA technology and its applications. 3) Hypersensitivity and immunodeficiency 4) Tolerance and autoimmunity 5)Vaccines, transplantation and tumor immunology
Sensory organs with their pathways for interpretation of the environmental stimuli and relating to memory, consciousness, perception. in a different state it is taken as disorder
To know; plant tissue culture its media and techniques used in commercial production of crops , used in secondary metabolite production, micropropagation..Animal Tissue culture techniques, media,primary culture secondary culture used for molecular studies maintenance of cell lines. Applications as models for toxicity testing, drug development, genetic screening . 1) Enzyme production, immobilization, applications. 2) Production of biopharmaceuticals, vaccines, Monoclonal Antibodies, Antibiotics and Vitamins. 3) Molecular tools for studying genes and gene activity. 4) Different techniques of molecular biology and its applications in agriculture, Medicines or pharmaceuticals.
To understand the global carrying capacity , depleting the quality of water, air, land ,mineral use, salinisation of lands. citizens awareness of Laws , role of NGO towards critical analysis.

	DEPARTMENT: Microbiology		
SUBJECT	**PROGRAMME SPECIFIC OUTCOMES**	**COURSE CODE**	**PAPER TITLE**
B.Sc. MICROBIOLOGY	1. Students should get introduced to methods of studying of microorganisms. They should be able to appreciate the use of microscopic, culture dependent and culture independent methods for studying microorganisms and should understand principles behind the same.	**RUSMIC 101**	**FUNDAMENTALS OF MICROBIOLOGY**
	2. Students should understand the cellular structure of prokaryotic and eukaryotic cell and biomolecular composition of these cells.	**RUSMIC 102**	**MICROORGANISMS – IN THE LAB AND IN NATURE**
	3. Students should realize and appreciate the diversity observed in the case of microorganisms. They should know characteristics of representative organisms under each group of microorganisms.	**RUSMIC 201**	**MICROBIAL WORLD: TYPES AND INTER-RELATIONS**

	4. Students should understand basic concepts associated with growth and control of microorganisms.	**RUSMIC 202**	**TECHNIQUES IN MICROBIOLOGY**
	5. Students should understand concept of identification and classification of microorganisms. They should realize the difference between the classification scheme used for microbes and higher organisms. They should understand techniques used for identification of microorganisms.	**RUSMIC 301**	**MICROBIAL TAXONOMYAND INTRODUCTION TO GENETICS AND MOLECULAR BIOLOGY**
	6. Students should understand how to design experiments and use biostatistics in the analysis of experimental data. They should realize the importance of data representation and data analysis in biological science.	**RUSMIC 302**	**INTRODUCTION TO EXPERIMENTAL MICROBIAL BIOCHEMISTRY**

	7. Students should understand how to detect and estimate biomolecules present in the microbial cells.	**RUSMIC 303**	**ENVIRONMENTAL MICROBIOLOGY**
	8. Students should know the microorganisms present in the environment and understand how they affect the environment and vice versa.	**RUSMIC 401**	**MICROBE INTERACTIONS AND HOST RESPONSES**
	9. Students should understand how microorganisms cause infection to humans and what mechanisms are present in humans to combat the infection.	**RUSMIC 402**	**INTRODUCTION TO METABOLIC PATHWAYS AND ENZYMOLOGY**
	10. Students should understand the basics of enzymology with respect to kinetics. They should be able to understand the basic concepts involved in metabolism.	**RUSMIC 403**	**APPLIED MICROBIOLOGY**

	11. Students should know applications of microorganisms at industrial level. They should know the industries which involves use of microorganisms for synthesis of product. Students should understand few of these industrial processes.	**RUSMIC 501**	**MICROBIAL GENETICS**
	12. Students should be able to understand genetics of various microorganisms. They should understand the molecular mechanisms of genetic processes like DNA replication, transcription, translation; gene transfer mechanisms like transformation, conjugation and transduction.	**RUSMIC 502**	**MEDICAL MICROBIOLOGY**

	13. Students should understand structure and genetics of viruses. They should understand basic principles of genetic engineering.	**RUSMIC 503**	**MICROBIAL BIOCHEMISTRY: PART- I**
	14. Students should understand use of bioinformatic tools for presentation and processing of data in genetics and molecular biology. They should realize and appreciate contribution and use of bioinformatics in advancement of biological science.	**RUSMIC 504**	**BIOPROCESS TECHNOLOGY**

	15. Students should understand the immune system of humans. They should know the mechanisms associated with development of immune system and its role in preventing infections. Students should know various pathogens infecting humans and mechanisms of processes used by them to breach the immune system of humans.	**RUSMIC 601**	**GENETICS, BIOINFORMATICS & VIROLOGY**
	16. Students should understand biochemical pathways involved in metabolism carried out in microbial and mammalian cells. They should understand metabolic pathways associated with four major macromolecules presents in the cell viz. carbohydrate, proteins, lipids and nucleic acids. They should understand the methods employed for studying these pathways.	**RUSMIC 602**	**IMMUNOLOGY**

	17. Students should understand process of industrial fermentations. Representative processes are to be studied by students. Students should understand ancillary components of industry as well like instrumentation and quality assurance. They should understand the concept of intellectual property.	**RUSMIC 603**	**MICROBIAL BIOCHEMISTRY PART II**
	18. Thus students should understand various parts of microbiology as well as allied and applied components associated with microbiology.	**RUSMIC 604**	**INDUSTRIAL MICROBIOLOGY**
APPLIED COMPONENT		**RUSACBT 501**	**CONCEPTS IN BIOTECHNOLOGY**

		RUSACBT 601	**APPLIED BIOTECHNOLOGY**

COURSE OUTCOMES
Understand evolution of microbes starting from origin of earth with respect to primitive environmental conditions on the planet. Know the history and thus development of microbiology as a field with contributions of important scientists. Realize scope of microbiology and know about its importance in other fields. Understand the subcellular structures of prokaryotic and eukaryotic cell. Understand structure and properties of biomolecules with reference to four important macromolecules viz. carbohydrates, proteins, lipids and nucleic acids.
Understand principle and construction of various microscopes. Understand growth requirements and cultivation methods for microorganisms. Understand pure culture techniques, principle and types of stains. Understand techniques for preservation of cultures and to emphasize the importance of culture collection centers. Understand different phenomena exhibited by microorganisms which affect the nature.
Understand structure and characteristics of Viruses Rickettsia, Actinomycetes Archaea, algae, fungi, yeasts, slime molds, protozoa. Understand the life cycle of representative organism from each of these groups. Knowing different normal flora organisms with respect to different parts in human body. Understanding mechanism of infection in human body. Understanding factors and components of host defense.

Understand growth pattern of microorganisms, mainly for bacteria. Understand different methods of measurement of growth of microorganisms. Understand mechanisms of various physical and chemical antimicrobial agents. Understand the concept of biosafety and biosafety levels. Understand molecular methods of detection of bacteria and other culture independent methods of the same.
Understand the techniques used for studying microbial taxonomy know how to use Bergey‟s manual for biochemical classification of bacteria. Understand the way of constructing phylogenetic tree Strengthen the fundamentals of Mendelian and neo-Mendelian genetics Understand the structure of DNA & RNA Know the central dogma along with the detailed mechanisms of transcription & translation Understand & establish a link of Omics to genetic and metabolic studies.
Understand the apt experimental design & different experimental errors. Know the use of web directories & databases in biochemistry. Understand the different cell disintegration methods and know the working principles of different centrifugation, electrophoretic & chromatographic techniques used in analysis. Know the separation & purification techniques for proteins & techniques to estimate biomolecules.

Describe the sampling, identification and enumeration of microorganisms present in air & also the sanitation techniques used. Understand the freshwater niches and routine water analysis techniques. Understand the marine niches and the physiological abilities of organisms found in these niches. Know the sewage treatment methods and sludge disposal methods Understand the terrestrial environment and the characteristics of organisms found in these niches, the biogeochemical cycles & bioremediation.
Understand the microbial interactions with plants, animals & other microorganisms. Know the commercial, ecological & medical significance of such interactions Understand the way by which a pathogen lodges itself and manifests an infection. Know the components of immune system, the response evoked by the immune system against a specific immunogen.
Understand the concept and types of metabolism Know the concept of metabolic networks & metabolomics. Know classification of enzymes Understand enzymes and their kinetics. Know the laws of thermodynamics and their applications in microbial metabolism.
Understand the fermentation process, inoculum development, fermentation media. Know food spoilage and preservation techniques Understand the regulations & HACCP Concept. Know methods to analyse the quality of milk, pasteurization process, production & spoilage of milk products.

Understand population and quantitative genetics and get introduced to different model organisms used in genetic studies. Understand different natural plasmids and transposons present in prokaryotes Understand the molecular mechanism involved in DNA replication Understand how to identify and classify mutations in DNA followed by mechanism of DNA repair Understand basic concepts of homologous recombination and genetic exchange among prokaryotes
Understand modern alternatives to Koch‘s Postulates and understand Genetic modification and pathogen evolution Study pathogenesis and clinical features of different diseases Comment on the mode of transmission, epidemiology and therefore modes of prophylaxis of these diseases Given a few key clinical features, identify the likely causative agent. Comment on the methods of diagnosis of the disease. Correlate classes of antibiotics with their mechanism of action Comment on drug resistance mechanisms Evaluate drugs and antibiotics for their efficacy

Understand the architecture of the membrane and how solute is transported inside the cell. Describe and explain the electron transport chains in prokaryotes and mitochondria and understand the mechanism of ATP synthesis. Explain bioluminescence mechanism and its significance Discuss the experimental aspect of studying catabolism and anabolism and the various pathways for the breakdown of carbohydrates along with reactions in amphibolic pathways. Describe various other pathways which produce different end products. Describe anabolic reactions in carbohydrate synthesis. Apply the concepts of energetics and catabolism in biodegradation of various substrates.
Describe the applications of microbes and its strain improvement in Industrial Microbiology. Apply kinetic formula to determine growth and productivity parameters of batch and continuous fermentations Describe the design of bioreactors for different applications and its process parameters Design media, growth conditions and techniques for producing and recovering different types of products of commercial value Design an industrial process by keeping in view the strict guidelines for its recovery &disposal Learner will be well –versed with the environmental aspects such as effluent treatment and carbon credits. Understand principle of working of important instruments used in biochemical, microbiological analysis. Get an overview of IPR and types of IP

Understand fundamentals of gene manipulation Use bioinformatics tools for genetic analysis and structure building Correlate structure and function of important cell components of prokaryotic and eukaryotic cells Understand the basic structure, classification, enumeration, cultivation and life cycle of viruses Understand the terms like cancer, prions, viriods and their mechanisms Understand regulation of lambda phage
Conceptualize how the innate and adaptive immune responses coordinate to fight invading pathogens Discuss the role of antigen in initiating the immune response Correlate the structure & functions of immunoglobulin Understand the importance of all the other entities involved i.e. T cells, B cells, NK cells, APCs, Cytokines, MHC, TcR, BcR, Co-receptors, Signalling pathways etc. Understand the effector responses- Humoral Immunity & Cell Mediated Immunity and differentiate between them Acquire an understanding of the role of immune system in disease: Unregulated response resulting in Hypersensitivity Understand the mechanism of Antigen-Antibody interaction & it‘s significance in diagnosis Apply the concept of immunity for protection from disease by development of vaccines

Understand the reactions involved in metabolism of lipids and hydrocarbons. Describe and explain protein catabolism as well as anabolic processes in the cell. Explain nucleic acid metabolism and recycling of nucleotides. Discuss the mechanism of regulation with regards to allosteric proteins, gene expression as well as through other mechanisms like end product inhibition and covalent modification. Describe prokaryotic photosynthesis with respect to photosynthetic pigments, photochemical apparatus and light and dark reactions. Describe metabolism of inorganic compounds and Lithotrophy
Understand the actual process involved in fermentations of important beverages, pharmaceutical and food products. Learn the applications of enzymes in various fields. Understand the principle of bioassays as an analytical technique Learn the salient features of quality management.
Recognize the scope and branches of modern biotechnology explain the principles that form the basis for recombinant DNA technology explain the general principles of generating transgenic plants, animals and microbes apply theprinciples of bioinformatics.

Apply basic principles of biotechnology to fields like food, beverage, pharmaceutical, and dairy industry and explain the role of microbes in their production
Explain the application of microbes as biofertilizers and biopesticides.
Recognize the role of genetically modified plants and animals
Elaborate on the importance of biofuels and their manufacture
Apply the principles of gene manipulation for bioremediation of xenobiotics
Explain the principles underlying working of biochips and biosensors
Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products.

DEPARTMENT: MATHEMATICS

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE	PAPER TITLE
Mathematics	**PSO Description-A student completing bachelor's degree in Science/Arts program in the subject of Mathematics will be able to:**	**RUSMAT101/ RUAMAT101**	**CALCULUS I**
	PSO1: Demonstrate fundamental systematic knowledge of mathematics and its applications in engineering, science technology and mathematical sciences. It should also enhance the subject specific knowledge and help in creating jobs in various sectors.	**(RUSMAT102)**	**ALGEBRA I**
	PSO2: Demonstrate educational skills in areas of analysis, algebra, differential equations, Graph Theory and combinatorics etc.	**RUSMAT201**	**CALCULUS II**
	PSO3: Apply knowledge, understanding and skills to identify the difficult / unsolved problems in mathematics and to collect the required information in possible range of sources and try to analyse and evaluate these problems using appropriate methodologies.	**RUSMAT202/ RUAMAT201**	**LINEAR ALGEBRA**

PSO4: Fulfil one's learning requirements in mathematics, drawing from a range of contemporary research works and their applications in diverse areas of mathematical sciences.	**RUSMAT301**	**CALCULUS III**
PSO5: Apply one's disciplinary knowledge and skills in mathematics in newer domains and uncharted areas.	**RUSMAT302/ RUAMAT301**	**LINEAR ALGEBRA II**
PSO6: Identify challenging problems in mathematics and obtain well-defined solutions.	**RUSMAT303/ RUAMAT302**	**DISCRETE MATHEMATICS**
PSO7: Exhibit subject-specific transferable knowledge in mathematics relevant to job trends and employment opportunities.	**RUSMAT401**	**CALCULUS OF SEVERAL VARIABLES**
	RUSMAT402 / RUAMAT401	**Linear Algebra III**
	RUSMAT403/ RUAMAT402	**ORDINARY DIFFERENTIAL EQUATIONS**
	RUSMAT501 / RUAMAT501	**Integral Calculus**

RUSMAT502/ RUAMAT502	**Algebra II**
RUSMAT503 / RUAMAT503	**Topology of Metric Spaces**
RUSMATE504I / RUAMATE504I	**Graph Theory (Elective I)**
RUSMATE504II / RUAMATE504II	**Number Theory and its Applications (Elective II)**
RUSMAT601 / RUAMAT601	**Basic Complex Analysis**
RUSMAT602 / RUAMAT602	**Algebra III**
RUSMAT603 / RUAMAT603	**Metric Topology**

RUSMATE604I / RUAMATE604I	**Graph Theory and Combinatorics (Elective I)**
RUSMATE604II / RUAMATE604II	**Number Theory and its Applications II (Elective II)**

COURSE OUTCOMES

1. Learner will be able to explain the properties of real numbers. 2. Learner will be able to explain the notions of convergent sequences. 3. Learner will be able to outline the concepts of limits and continuity. 4. Learner will be able to apply the concepts of limits and continuity in the fields of economics, physics and biological sciences.
1. Learner will be able to experiment with divisibility of integers. 2. Learner will be able to explain concept of functions and equivalence relations. 3. Learner will be able to explain the properties of polynomials over R and C.
1. Learner will be able to analyze the properties of continuous functions. 2. Learner will be able to identify differentiable functions. 3. Learner will be able to analyze properties of differentiable functions. 4. Learner will be able to test the convergence of series.
1. Learner will be able to experiment with the system of linear equations and matrices. 2. Learner will be able to identify vector spaces. 3. Learner will be able to explain properties of vector spaces and subspaces. 4. Learner will be able to construct basis for a given vector space. 5. Learner will be able to explain properties of linear transformation.

1. Learner will be able to identify Riemann Integrable functions. 2. Learner will be able to analyze applications of integration. 3. Learner will be able to test the convergence of improper integrals.
1. Learner will be able to examine dimensions of vector spaces. 2. Learner will be able to explain the concept of determinants. 3. Learner will be able to apply the concept of determinants to geometry. 4. Learner will be able to identify inner product spaces. 5. Learner will be able to outline properties of inner products.
1. Learner will be able to examine if given sets are countable. 2. Learner will be able to experiment with addition and multiplication principle. 3. Learner will be able to solve recurrence relations. 4. Learner will be able to extend notions of counting to multisets.
. Learner will be able to compare properties of functions of several variables with those of functions of one variable. 2. Learner will be able to deduce geometrical properties of surfaces and lines. 3. Learner will be able to apply the concept of differentiability to other sciences.
Learner will be able to explain quotient structures on vector spaces. 2. Learner will be able to explain the concepts of orthogonalization. 3. Learner will be able to apply the concepts of eigenvalues and eigenvectors to geometry.
1. Learner will be able to classify the ODE according to degree and order of ODE. 2. Learner will be able to solve an ODE. 3. Learner will be able to apply the concepts of ODE to biological sciences and physics.
1. Learner will be able to apply concepts of multiple integrals in the field of physics. 2. Learner will be able to apply concepts of line integrals in the field of physics. 3. Learner will be able to apply concepts of surface integrals in the field of physics.

Learner will be able to examine properties of groups and subgroups. 2. Learner will be able to identify normal subgroups. 3. Learner will be able to illustrate examples of direct product of groups
1. Learner will be able to construct examples of metrics. 2. Learner will be able to compare properties of open, closed intervals, sequences and completeness on R with an arbitrary metric space. 3. Learner will be able to compare properties of continuity on R with an arbitrary metric space.
Learner will be able to apply the concepts of graphs and trees to the fields of chemistry, physics and biological sciences. 2. Learner will be able to apply the concepts of hamiltonian and eulerian to the fields of chemistry, physics and biological sciences.
Learner will be able to understand various aspects of factorization 2. Lerner will be able to understand importance of cryptography in todays world.
1. Learner will be able to elaborate on properties of complex numbers. 2. Learner will be able to elaborate on properties of Mobius transforms and singularities in subsets of C.
Learner will be able to extend concept of normal subgroup to ideal of the ring R. 2. Learner will be able to elaborate properties of ED, PID and UFD. 3. Learner will be able to find quadratic extensions of field F.
. Learner will be able to compare properties of compact and connected sets on R with an arbitrary metric spaces. 2. Learner will be able to elaborate on properties of sequences and series of functions.

1. Learner will be able to apply the concepts of colorings of graphs and planar graph in the fields of chemistry, physics and biological sciences. 2. Learner will be able to apply the concepts of combinatorics in the field of statistics.
Learner will be able to apply Gauss Lemma in different situations. 2. Learner willbe able to undertsand continuied fractions. 3. Learner will be able to understand and apply theoy of arithmetic functions in simple situations.

DEPARTMENT: STATISTICS

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE
STATISITCS	Understand, condense, visualize, analyze and interpret the data collected in daily walk of life.	**RUSSTA101 & RUASTA101**
	Understand the data generated in various scenarios of scientific, industrial, or social problems.	
	Pursue their higher education programs leading to post-graduate or doctoral degrees.	
	Enhance knowledge of Statistical tools.	
	Enhance the theoretical rigor with technical skills which prepare them to become globally competitive to enter into a promising professional life after graduation.	
	Make a pathway to a range of traditional avenues in Academia and Industry , Govt. Service, IAS, Indian Statistical/ Economic Services, Industries, Commerce, Investment Banking, Banks and Insurance Sectors, CSO and NSSO, Research Personnel/Investigator in Govt. organizations such as NCAER, IAMR, ICMR, Statistical and Economic Bureau & various PSUs., Market Research, Actuarial Sciences, Biostatistics, Demography etc.	
	Seek employment in different sectors like Stock trading, Sports, Politics, Business, Financial services and Media Industry.	**RUSSTA102 & RUASTA301**
		RUSSTA201 & RUASTA201

RUSSTA202 & RUASTA401
RUSSTA301 & RUASTA501
RUSSTA302 & RUASTA502
RUSSTA303 & RUASTA302
RUSSTA401 & RUASTA601

RUSSTA402 & RUASTA602
RUSSTA403 & RUASTA402
RUSSTA501
RUSSTA502
RUSSTA503

RUSSTA504 & RUASTA503
RUSSTA601
RUSSTA602
RUSSTA603

RUSSTA604
RUASTA603
RUACOR501
RUACOR601

PAPER TITLE	COURSE OUTCOMES
DESCRIPTIVE STATISTICS-I	Distinguish between different types of scales. Compare the different types of data and describe the various methods of data collection.
	Compute Yule's coefficient of association Q and Yule's coefficient of Colligation Y and associate two attributes, and relate Q and Y.
	Construct Univariate and Bivariate frequency distribution of discrete, continuous variables and Cumulative frequency distribution. Draw Graphs and Diagrams: Histogram, Polygon/curve, Ogives. Heat Map, Tree map.
	Describe the need of measures of central tendency, Explain the various measures of central tendencies. Relate mean, median and mode. Justify merits and demerits of using different measures.
	Compute and comprehend the measures of dispersion. Compare Absolute and Relative measures of dispersion.
	Relate raw moments and central moments. Understand Skewness and Kurtosis of data. Identify the outliers.
STATISTICAL METHODS-I	Differentiate between random and non-random experiments
	Compute the probabilities of events
	Understand the concept of a random variable, its probability distribution of a random variable (one or two) and its properties
	Apply standard discrete probability distributions based on real life situations
DESCRIPTIVE STATISTICS-II	Compute the numerical measures to identify the direction and strength of linear relationship between two variables using. Also, list their properties.
	Build a simple linear regression model and interpret regression coefficients and coefficient of determination.
	Calculate and interpret various measures of associations between two attributes.

	Identify various components of time series. Apply the appropriate methods to evaluate and eliminate these components.
	Comprehend the concept and construct various index numbers.
	Use the basic mathematical operators in R for different data types. Apply different data management techniques and data visualisation.
STATISTICAL METHODS-II	Obtain a probability density function and cumulative distribution function for continuous random variable
	Apply standard continuous probability distributions to different situations
	Distinguish between point estimation and interval estimation
	Define the various terminologies of testing of hypotheses and apply large sample tests
PROBABILITY DISTRIBUTIONS	Understand different Standard Discrete Probability Distributions.
	Differentiate between the Standard Discrete Probability Distributions, understand their properties.
	Solve problems after identifying the underlying distribution.
THEORY OF SAMPLING	Understand the need of sampling and define the principal concepts in sampling
	Formulate and calculate estimates of population parameters for Simple Random Sampling, Stratified Sampling and Systematic sampling
	Contrast types of probability sampling
	Utilize auxiliary information in survey by means of Ratio and Regression method of estimation
OPERATIONS RESEARCH	Formulate and solve a linear programming problem graphically and using simplex method.
	Obtain dual of a given problem and solve the primal from the optimum solution of a primal.
	Solve a transportation problem and its variants using various methods and optimise it.
	Solve an assignment problem and its variants using Hungarian methods.
	Process sequencing problems using Johnson's Method
PROBABILITY AND SAMPLING DISTRIBUTIONS	Understand different Standard Continuous Probability Distributions.
	Differentiate between the Standard Continuous Probability Distributions, understand their properties and solve problems based on these distributions.

	Apply Standard Continuous Probability Distributions in real life examples.
ANALYSIS OF VARIANCE & DESIGNS OF EXPERIMENTS	Demonstrate analysis of one-way and two-way classification
	Explain the different components of ANOVA Table
	Define fundamental concepts in Designs of Experiment, describe the principles of designs of experiment and list the different types of experimental designs
	Analyse CRD, RBD and LSD using ANOVA
	Construct factorial experiments, analyse them and understand the concept of confounding
PROJECT MANAGEMENT AND INDUSTRIAL STATISTICS	Draw project networks for probabilistic and deterministic time estimates to obtain critical path.
	Crash activities to optimise the project cost and update networks from time to time.
	Construct various control charts for variables and attributes to obtain standard values for future use.
	Design a single sampling plan and obtain its various characteristics and understand the concept of Double Sampling Plan
PROBABILITY AND DISTRIBUTION THEORY	Apply the advanced concepts of Probability theory to various problems
	Identify Trinomial distribution and derive its joint moment generating function and multinomial distribution
	Describe bivariate normal distribution and its properties and test the significance of correlation coefficient of bivariate normal distribution
	Understand the concept of Order Statistics and its applications
THEORY OF ESTIMATION	Understand the concept of estimation and various properties of a good estimator
	Apply Cramer Rao inequality to find Minimum Variance Unbiased Estimator
	Study the various techniques of Estimation
	Obtain the estimator of a parameter using Bayes' approach
	Derive Confidence Interval for different parameters
	Analyse the full rank linear model $Y= X \beta + e$, $e \sim N(0,\sigma^2)$
BIOSTATISTICS	Understand applications of Statistics in Biological Sciences and epidemiology.

	Understand the terminologies of Clinical Trials and Bioequivalence studies and use of statistics in these areas.
ELEMENTS OF ACTUARIAL SCIENCE	**Understand** the functions of Mortality Table and should be able to **relate** them with the rate of mortality and calculate probabilities of living and dyeing
	Differentiate between Nominal and Effective rate of interest. Analyse and evaluate various types of annuities certain, and also calculate the present values and accumulated values
	Distinguish between the Life annuities and Temporary annuities and calculate the present values of various Life and Temporary annuities
	Understand the difference between assurance and insurance. Evaluate the single premiums and level annual premiums for various assurance schemes. Distinguish between the Net premiums and the Office premiums
DISTRIBUTION THEORY AND STOCHASTIC PROCESSES	Use the concept of generating function for defining probability generating function and analyse its properties.
	Understand various stochastic processes and derive its parameters.
	Describe and classify various basic queueing models and derive its measures.
TESTING OF HYPOTHESES	Define various terms in testing of hypotheses.
	Identify the Most Powerful Test using Neyman-Pearson Lemma and obtain a Uniformly Most Powerful Test
	Understand the concept of Likelihood Ratio Test (LRT) and construct LRT under different situations for a normal distribution
	Construct Sequential Probability Ratio Tests for Bernoulli, Binomial, Poisson, Normal, Exponential distributions
	Differentiate between parametric and non-parametric tests and apply various Non-parametric tests
OPERATIONS RESEARCH TECHNIQUES	Understand the various costs of Inventory and derive the economic order quantity and reorder period, for deterministic and probabilistic inventory models
	Obtain the optimum age of replacement of an item for different situations and distinguish between individual and group replacement policies
	Simulate random numbers and random observations for various probability distributions. Apply Monte-Carlo technique to solve problems in Inventory and Queueing Theory.

	Understand the various terminologies of Micro Economics and its applications.
FORECASTING AND RELIABILITY	Understand the concept of Predictive modelling and use techniques like regression analysis, time series for real life situations.
	Understand an important concept of Reliability and the mathematical aspects of computing reliability in different scenarios.
	Apply k-means clustering method of classification.
APPLIED STATISTICS	Understand the concept of Predictive modelling and use techniques like regression analysis, time series for real life situations.
	Simulate random numbers and random observations for various probability distributions. Apply Monte-Carlo technique to solve problems in Inventory and Queueing Theory.
	Understand the various terminologies of Micro Economics and its applications.
ELEMENTS OF OPERATIONS RESEARCH	Formulate and Solve LPP using Graphical method and mathematical methods. Perform Graphical Sensitivity
	Understand the concept of Duality. Perform Sensitivity Analysis.
	Apply network models
	Solve a transportation and its variants using various methods and optimise it. Solve a transhipment problem.
ELEMENTS OF OPERATIONS RESEARCH	Solve a two-sum zero-sum game.
	Apply decision making under various criteria.
	Understand the various terminologies of information theory.
	Apply various methods in investment decisions
	Understand the concept of Mutual Funds and Investment Plans
	Distinguish between security markets and futures, forwards & options

SUBJECT : COMPUTER SCIENCE

SUBJECT	PROGRAM SPECIFIC OUTCOMES	PAPER CODE	PAPER TITLE
COMPUTER SCIENCE	Description A student completing Bachelor's Degree in Science program in the subject of Computer Science will be able to:	**RUSCS101**	**FUNDAMENTALS OF COMPUTER ORGANIZATION &INTRODUCTION TO EMBEDDED SYSTEMS**
	Apply knowledge of computational mathematics ,statistics and programming acquired in the field of Computer Science.	**RUSCS102**	**PROGRAMMINGWITH PYTHON- I**
	Identify , analyze complex problems in the real world and formulate innovative solutions to those problems.	**RUSCS103**	**LINUX FUNDAMENTALS**
	Compare and apply hardware and software technologies for implementing reliable optimized solutions catering to need and available resources.	**RUSCS104**	**ALGORITHMS AND PROGRAMMING WITH C**

Apply domain expertise to pursue higher education and Research in computer science discipline.	**RUSCS105**	**DISCRETE MATHEMATICS**
Apply software development, managerial, Professional and soft skills in industry	**RUSCS106**	**DESCRIPTIVE STATISTICS AND INTRODUCTION TO PROBABILITY**
Understand the global needs and prepare themselves for the changing needs worldwide adapting an ability to engage in life-long learning..	**RUSCS107**	**SOFT SKILLS DEVELOPMENT**
Become a responsible ,ethical citizen and explore environmental issues to develop sustainable solutions for it.	**RUSCS201**	**DATABASE MANAGEMENT SYSTEMS**
Use the techniques, skills and modern computing tools to emerge as a freelancer and entrepreneur in the field.	**RUSCS202**	**PROGRAMMING WITH PYTHON - II**

RUSCS203	**LINUX SERVER ADMINISTRATION**
RUSCS204	**DATA STRUCTURES**
RUSCS205	**CALCULUS**
RUSCS206	**STATISTICAL METHODS**
RUSCS207	**GREEN TECHNOLOGIES**
RUSCS301	**THEORY OF COMPUTATION**
RUSCS302	**CORE JAVA**

RUSCS303	**OPERATING SYSTEM**
RUSCS304	**DATABASE MANAGEMENT SYSTEMS**
RUSCS305	**COMBINATORICS AND GRAPH THEORY**
RUSCS306	**PHYSICAL COMPUTING AND IOT PROGRAMMING**

RUSCS307	**WEB PROGRAMMING**
RUSCS401	**FUNDAMENTALS OF ALGORITHMS**
RUSCS402	**ADVANCED JAVA**
RUSCS403	**COMPUTER NETWORKS**
RUSCS404	**SOFTWARE ENGINEERING**
RUSCS405	**LINEAR ALGEBRA**

RUSCS406	**NET TECHNOLOGIES**
RUSCS407	**ANDROID DEVELOPER FUNDAMENTALS**
RUSCS501	**Artificial Intelligence**
RUSCS502	**Software Testing and Quality Assurance**
RUSCS503	**Information and Network Security**
RUSCS504	**Web Services**

RUSCS505	**Ethical Hacking**
RUSCS601	**Cloud Computing**
RUSCS602	**Cyber Forensics**
RUSCS603	**Information Retrieval**
RUSCS604	**Data Science**
RUSCS605	**Optimization techniques**

COURSE OUTCOMES
Students completing this course will be able to: Understand and explain the underlying principles of computers. Identify various hardware used in the computer. Describe the structure of CPU and Mulitcore systems. Understand how digital circuits are implemented in the computers. Understand how data is transferred between various peripheral devices in the computer.
Upon completion of this course the student should be able to: • Develop Python Programs on their own • Understand File Processing. • Develop GUI. • Understand Client Server Programming.
Upon completion of this course the student should be able to: • Illustrate the working of Open Source ecosystem, it use, importance and impact in the society. • Learn and use the open source software's. • Contribute to the open source software's and open source community.
Upon completion of this course the student should be able to: • Write Algorithms and Flow Charts for any given problem. • Develop Modular programming using function. • Develop Functional Programming. • Develop Handling Pointers. • Develop User Defined Data Types and File Processing.

Upon completion of this course the student should be able to: • Provide overview of theory of discrete objects, starting with relations and partially ordered sets. • Study about recurrence relations, generating function and operations on them. • Give an understanding of graphs and trees, which are widely used in software. • Provide basic knowledge about models of automata theory and the corresponding formal languages
Upon completion of this course the student should be able to: 1. Know descriptive statistical concepts and its use 2. Understand the probability concept required for Computer Science
Upon completion of this course the student should be able to: • Know about various aspects of soft skills and learn ways to develop personality • Understand the importance and type of communication in personal and professional environment. • Provide insight into much needed technical and non-technical qualities in career planning. • Learn about Leadership, team building, decision making and stress management
Upon completion of this course the student should be able to: 1. Evaluate business information problem and find the requirements of a problem in terms of data. 2. Design the database schema with the use of appropriate data types for storage of data in database. 3. Create, manipulate, query and back up the databases.
Upon completion of this course the student should be able to: 1. Develop Basic Python Programs. 2. Perform flow control. 3. Develop function based program. 4. Understand Collection and its type.

Upon completion of this course the student should be able to: 1) Use the knowledge of Linux, from both a graphical and command line perspective 2) Use and implement any Linux distribution easily. 3) Write shell scripts for various purposes. 4) Progress as a Developer or Linux System Administrator using the acquired skill set.
Upon completion of this course the student should be able to: • Learn about Data structures, its types and significance in computing • Explore about Abstract Data types and its implementation • Ability to program various applications using different data structure in Python
Upon completion of this course the student should be able to: . Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions. . Ability to appreciate real world applications which uses these concepts. . Skill to formulate a problem through Mathematical modeling and simulation.
Upon completion of this course the student should be able to: 1. Enable learners to know descriptive statistical concepts 2. Enable study of probability concept required for Computer learners
Upon completion of this course the student should be able to: 1. Learn about green IT can be achieved in and by hardware, software, network communication and data center operations. 2. Understand the strategies, frameworks, processes and management of green IT
Upon completion of this course the student should be able to: • Understand Grammar and Languages • Learn about Automata theory and its application in Language Design • Learn about Turing Machines and Pushdown Automata • Understand Linear Bound Automata and its applications
Upon completion of this course the student should be able to: • Object oriented programming concepts using Java. • Knowledge of input, its processing and getting suitable output. • Understand, design, implement and evaluate classes and applets. • Knowledge and implementation of AWT package.

Students completing this course will be able to: • Understanding the working of operating system, its structures and functioning • Compare various algorithms used in operating systems.
Upon completion of this course the student should be able to: • Learn about using PL/SQL for data management • Master concepts of stored procedure and triggers and its use. • Understand concepts and implementations of Exception handling • To learn and understand Database Programming Paradigms
Upon completion of this course the student should be able to: • Appreciate beauty of combinatorics and how combinatorial problems naturally arise in many settings. • Understand the combinatorial features in real world situations and Computer Science applications. • Apply combinatorial and graph theoretical concepts to understand Computer Science concepts and apply them to solve problems.
Upon completion of this course the student should be able to: • Enable learners to understand System On Chip Architectures. • Introduction and preparing Raspberry Pi with hardware and installation. • Learn physical interfaces and electronics of Raspberry Pi and program them using practical's • Learn how to make consumer grade IoT safe and secure with proper use of protocols.

Upon completion of this course the student should be able to: • To design valid, well-formed, scalable, and meaningful pages using emerging technologies. • Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites • To develop and implement client-side and server-side scripting language programs. • To develop and implement Database Driven Websites. • Design and apply XML to create a markup language for data and document centric applications. Upon completion of this course the student should be able to: • Understand the concepts of algorithms for designing good program • Implement algorithms using Python Upon completion of this course the student should be able to: • Understand the concepts related to Java Technology • Explore and understand use of Java Server Programming
Upon completion of this course the student should be able to: 1. Learner will be able to enumerate the layers functionality of the TCP/IP model. 2. Learner will be familiar with the basic protocols of computer networks, and how they can be used to assist in network design and implementation 3. Learner will acquire knowledge that will help them in Advanced courses and certifications in computer networking.
Upon completion of this course the student should be able to: • Understand the different phases in software development. • Understand project management and risk management process • Able to apply software testing methods
Upon completion of this course the student should be able to: 1. Appreciate the relevance of linear algebra in the field of computer science. 2. Understand the concepts through program implementation 3. Instill a computational thinking while learning linear algebra.

Upon completion of this course the student should be able to: • Understand the .NET framework • Develop a proficiency in the C# programming language • Develop ASP.NET web applications on any given scenario. • Use ADO.NET and LINQ for data persistence in a web application
Upon completion of this course the student should be able to: • Understand the requirements of Mobile programming environment. • Learn about basic methods, tools and techniques for developing Apps • Explore and practice App development on Android Platform • Develop working prototypes of working systems for various uses in daily lives.
After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems. The learner should also get acquainted with different learning algorithms and models used in machine learning.
Understand various software testing methods and strategies. Understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given Software. Design SQA activities, SQA strategy, formal technical review report for software Quality control and assurance.
Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for a given application. Understand various protocols for network security to protect against the threats in a network
Emphasis on SOAP based web services and associated standards such as WSDL. Design SOAP based / RESTful / WCF services Deal with Security and QoS issues of Web Services

Learner will know to identify security vulnerabilities and weaknesses in the target applications. They will also know to test and exploit systems using various tools and understand the impact of Hacking in real time machines.
After successfully completion of this course, learner should be able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing using open source technology. Learner should be able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. They should explain the core issues of cloud computing such as security, privacy, and interoperability.
The student will be able to plan and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, report them in a way that would be acceptable in the court of law.
After completion of this course, learner should get an understanding of the field of information retrieval and its relationship to search engines. It will give the learner an understanding to apply Information retrieval models.
After completion of this course, the students should be able to understand & comprehend Data science problem; and should be able to provide analytical solution to it.
After successful completion of the course, student will be able to understand importance of optimization of industrial process management .Student will learn ways of solving optimization problems that are too hard, too large for direction solution and how to solve optimization problems faster when speed is essential.

SUBJECT	PROGRAM OUTCOME	Course Code
BIOTECHNOLOGY	**PROGRAM OUTCOME**At the end of program the students would be able to 1. Adept in basic sciences along with a thorough understanding of chemical sciences and biotechnological principles 2. Equipped with basic understanding of various aspects of biological systems which would create a foundation to take up higher studies in any of the desired fields and have the touch of interdisplinary approach. 3. Perform , analyze and interpret data for investigating the problem in fields of biotechnology and solve the biological problems critically 4. Undertake any responsibility as an individual and as a team in a multidisciplinary environment. 5. Possess knowledge of biological processes from the molecular and cellular perspectives. 6. Engage in effective scientific communication skills as individuals and as team members by listening, speaking, writing and presenting in oral and poster format.	**RUSBTK101**

PROGRAME SPECIFIC OUTCOME 1.Gain knowledge on the basic domains and fundamentals of biotechnology for developing a strong foundation which enable them to understand their applications in industry and research

2. Exposing the students to the technological knowhow by assigning them survey

researches to understand interdisciplinary domains of biotechnology .

3. Insights into the domain of research writing, students would be able to communicate scientifically for writing research proposals and project their innovative ideas.

RUSBTK102
RUSBTK103
RUSBTK104

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RUSBTK601

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RUSBTK604
RUSBTKAC601

Paper Title	Course Outcomes
Basic chemistry I	The student will be able to:

	1) Perceive the concept of mole and its relation with molar mass and do the calculations based on that.
	2) Understand and apply the units of volume and mass based units of concentration and understand the concept of stoichiometry and will be able to solve the problems on it.
	3) Understand the concept of standardization and its significance, kinetic theory of gases and various gas laws, the difference between real gas and ideal gas, the characteristics of liquid state, physical properties and the concept of viscosity and surface tension and its determination and rate of reaction and determination of molecularity of a reaction.
Bioorganic Chemistry	The students will be able to gain knowledge of Classification, Structure and Characterization of Biomolecules.
Biodiversity and cell biology	By the end of this course student must be able to:
	1. Understand importance of taxonomy and distinguish between various living groups.
	2. Know the function of various cellular organelles.
	3. Understand and distinguish between various types of living cells and also know the differences in their ultrastructures.
Microbial techniques	By the end of the course student should be able to:

	1. Understand and use the basic microscope and other microbiology lab instruments
	2. Perform experiments while maintaining sterile environment
	3. Suggest and use appropriate sterilization techniques depending on the need of the experiment
	4. Enrich, Culture, maintain various microorganisms
	5. Be able to enumerate and conclude about the growth statistics of a given organism
	6. Suggest appropriate culture medium and suitable growth condition parameters for a given organism.
Introduction to Biotechnology	1. Define biotechnology and its growth over time
	2. Enlist and explain its major applications and areas under research
	3. Link major allied sciences to this field
	4. Focus on major application areas of healthcare, food, beverage and drug industry
	5. Enlist and distinguish its past and existing commercial products from major biotech industries
Molecular Biology-II	1. Understand basic molecular biology terms and definitions
	2. Understand the molecular model of DNA and its replication in various ways
	3. Define mutations and predict their outcomes
	4. Enlist various possibilities and probable reasons which may lead to mutations
	5. Explain certain medical conditions related to one's genetics.
	6. Elucidate the concept of heredity and passing of information from generation to other.
Societal Awareness	To impart knowledge of Society and make students aware about the Problems in Society
Basic Chemistry-II	After studying these topics, the students will be able to know :
	1) Isomerism and its types.
	2) CIP Rules and E-Z notations.
	3) Types of cycloalkanes and their relative stability with energy.

	4) Electrophilic aromatic substitutions.
Physical Chemistry	1) Do the comparison of the properties of main group elements in the respective groups.
	2) Understand Concept of metallic and non metallic character with respect to electropositivity.
	3) Know The methods of preparation of the compounds which are commercially available along with their properties and uses.
	4) Understand different laws of thermodynamics and their applications.
Physiology and Ecology	1) Understand basic life processes of plants and animals and understand important chemical reactions and pathways involved in major processes of plants and animals.
	2) Have knowledge about hormones and other chemical/ non chemical factors that affect the plant and animal growth characteristics, knowledge about the basic anatomy of organs and their systems along with their linkage to one another
	3) Understand the role and function of organism at a larger level in its environment
	4) Link connections between various organisms and their environment.
Genetics	1) Explain the patterns of breeding and cross breeding, the concept of alleles, their dominant and recessive nature, unusual patterns of inheritance and deviations from the normal laws, inheritance with respect to microorganisms.
	2) Understand different mechanisms of transfer of information between microoragisms.
	3) Relate the effect of population study and its impact on the entire ecosystem.
Tissue Culture & Scientific Writing and Communication Skills	1) Understand behaviour of cellular growth *in vitro* and to enlist requirements for establishing and maintaining cell culture in laboratory.
	2) Specify strict sterility measures to be followed in the animal and plant tissue culture laboratories.
	3) Select appropriate glassware/ plastic ware and other basic equipment and to understand the current trends in plant and animal tissue culture.
Enzymology, Immunology and Biostatistics	1) Define immunology and explain its basic concepts, Familiarize with basic cells of the immune system

	2) Define enzymology and explain its basic concepts, Familiarize with different enzymes and the cascade they work in.
	3) Develop a link between the immune and the endocrine system
	4) Define biostatistics, understand and be able to select appropriate calculation method to approach a given problem
	5) Distinguish between different statistical methods and apply them for given biological calculations.
Globalization,Ecology and Sustainable Development	To impart knowledge of Globalization and make students aware about the Problems in Society.
Biophysics	1) Develop an understanding of the different aspects of classical Physics.
	2) Be able to relate principles of Physics to applications and techniques in the field of Biology such as Microscopy, Spectroscopy and Electrophoresis
Applied Chemistry- I	1) Scope and importance of analytical chemistry.
	2) Concept of accuracy and precision.
	Chemistry of water and various aspects of assessment of quality of water.
Immunology	1) Understand the role of different types of Cells, Effector Molecules and Effector Mechanisms in Immunology.
	2) Understand the principles underlying various Immuno-techniques.
Cell Biology and Cytogenetics	1) Develop an understanding of the Cytoskeleton and Cell Membrane., the structure of Chromosomes and types of Chromosomal Aberrations.
	2) Discuss the principles underlying Sex Determination, Linkage and Mapping
Molecular Biology	1) Discuss the mechanisms associated with Gene Expression at the level of Transcription and Translation.
	2) Discuss the mechanisms associated with Regulation of Gene Expression in Prokaryotes and Eukaryotes.
Bioprocess Technology	1) Develop an understanding of the various aspects of Bioprocess Technology, develop skills associated with screening of Industrially Important Strains.
	2) Understand principles underlying design of Fermenter and Fermentation Process.
Research Methodology	1) Understand basic principles of Research Methodology and identify a Research Problem, understand a general definition of Research Design.

	2) Identify the overall Process of Designing a Research Study from its inception to its Report.
Biochemistry	Discuss the Metabolic Pathways of Carbohydrates, Amino Acids, Lipids and Nucleotides.
Applied Chemistry- II	1) Types of electrodes and electrochemical cells, Nernst equation and its importance.
	2) Calculation of pH for strong and weak electrolytes.
Medical Microbiology	1) List the factors playing a role in causing a disease.
	2) Discuss the various aspects of Systemic Infections including Causative Agents, Symptoms and Prophylaxis.
Environmental Biotechnology	1) Gain an understanding of the types of renewable sources of energy and its production.
	2) Study the different xenobiotic compounds and its degradation and discuss the various bioremediation strategies.
Biostatistics and Bioinformatics	1) Gain an understanding of the basic concepts of Bioinformatics and Biostatistics.
	2) Understand the tools used in Bioinformatics and apply the various Statistical tools for Analysis of Biological Data
Molecular Diagnostics	1) Gain an understanding of the basic Principles used in Molecular Diagnosis.
	2) Gain critical thinking and analytical skills to understand new Diagnostic Methods and apply the knowledge and skills gained in the course should be useful in developing new Diagnostic Kits
Entrepreneurship Development	1) Develop an understanding of the systematic process and to select and screen a Business Idea.
	2) Design strategies for setting up successful business ideas and creation of unique ideas for business development.
Cell Biology	1) Comment on the overall cell cycle
	2) Elucidate the role of apoptosis
	3) Get an overall outlook about cancer biology

Biochemistry	1) Understand the metabolism of carbohydrates and fates of various intermediate and end products
	2) Understand protein structure and comment on different types of protein interactions.
	3) Understanding the mechanisms of hormones
Genetics and Molecular Biology	1) Perform statistical analysis and predict maps of gene sequences
	2) Predict causes of unexpected outcomes of a given gene exchange study
	3) Comment on various segments of a gene involved in regulation of the expression of a given gene product
	4) Enlist various types of naturally available as well as artificially synthesized vectors that can be used to transfuse genes from one cell to the other
	5) Comment on appropriate methods and parameters to be followed for selecting a genetic vector
	6) State the use of vectors in storage materials of genetic libraries.
Industrial Biotechnology	1) Suggest an appropriate fermenter for a desired biological product
	2) Comment on dairy and brewing technology
	3) Suggest specific process parameters to be followed and maintained throughout the process
	4) Enlist various commercial fermentation products and also know their production procedures
	5) Set up mini fermentation units in their laboratories for lab scale fermentation or demo.
Biosafety	1) Enlist potential hazards in laboratory or workplace
	2) To prepare SOPs of instruments, document GMP practices and to study quality assurance and quality control
Immunology, Virology and Instrumentation	1) Discuss the ongoing and future implications of immunology
	2) Talk about the host interactions with reference to viral attacks

	3) Comment on different types of viruses and their distinguishing characteristics
	4) Enlist various essential instruments used regularly in Biotechnology related work and state it's applications and understand the working and principles of these instruments
Developmental biology and transgenesis	1) Understand basics of gametogenesis, fertilization, post fertilization events
	2) State the methods used for transgenesis of plants and animals
	3) Comment on the vectors used for transgenesis and understand the applications of transgenic organisms
Pharmacology	1) Elucidate the concepts of pharmacology
	2) Comment on causes of allergic reactions with response to drug or poison and obtain clarity about mechanism of absorption of drugs from different tissues.
	3) State the mechanism of action of different antimicrobials
Environmental and Plant biotechnology	1) Set up reactor system for biogas, biofuel, biodiesel and Set up mini water treatment plant.
	2) To study biodegradation of waste using treatment plants and comment on different techniques and their uses in plant biotechnology and produce biofertilizer and biopesticide in laboratory
Marine biotechnology and aquaculture	1) Obtain clarity on the functioning of marine ecosystem and elucidate on the use of marine organisms and tl
	2)Talk about the types and process of aquaculture andunderstand the use of fish oil and fish foods and the useof

heir applications in industry.

marine bio resources

Departmen

Subject	Programme Specific Outcomes	Course Code
		UNDE
FYBSc Biochemistry	The overall goal of this FYBSc course is for the student to gain a basic working knowledge of biochemical concepts and techniques which will be necessary for future scientific endeavors.	**RUSBCH101**
		RUSBCH102
		RUSBCH201
		RUSBCH202

SYBSc Biochemistry	The overall goal of this SYBSc course is to introduce the student to the fields of enzymology, plant biochemistry, genetics, endocrinology, clinical biochemistry, industrial biotechnology, and pharmacology.	**RUSBCH301** **RUSBCH302** **RUSBCH303** **RUSBCH401** **RUSBCH402** **RUSBCH403**
TYBSc Biochemistry	The overall goal of this TYBSc course is to familiarize the students to the fields of physiology, metabolism, instrumentation, environmental science, genetics, immunology, nutritional	**RUSBCH501**

	biochemistry, biostatistics, pharmacology and bioinformatics.	
		RUSBCH502
		RUSBCH503
		RUSBCH504
		RUSBCH601
		RUSBCH602
		RUSBCH603
		RUSBCH604

ıt of Biochemistry

Paper Title
ERGRADUATE
Biomolecules and Nutrition
Cell biology, Physiology and Microbiology
Biomolecules and Nutrition
Introduction to cell biology, Physiology and Microbiology

Enzymology, Physiology & Tools of Biochemistry
Fundamentals of Genetics and Physiology
Industrial Biotechnology & Pharmacology
Enzymology, Physiology & Tools of Biochemistry
Fundamentals of Genetics and Physiology
Industrial Biotechnology & Pharmacology
Metabolism & Analytical Techniques - I

Environmental Science & Cell Biology
Advanced Genetics & RDT
Immunology & Pathophysiology - I
Metabolism & Analytical Techniques - II
Nutrition & Pharmacology
Biostatistics & Bioinformatics
Immunology & Pathophysiology - II

Course Outcomes

Upon completion of the FYBSc course, the students are able to understand the following:
1) The basic scientific terms in the field of Biochemistry.
2) Enumeration of the biochemical functions of water, acids, bases & buffers.
3) The chemistry & structures of biomolecules (Carbohydrates, Proteins and Lipids), their classification and functions in living organism, structure-function relationship of biomolecules with their importance at molecular level. As these basic concepts form the basis for understanding metabolic fate of different biomolecules at the TYBSc level.
4) The Concept of the origin of life, basic cell structure and functions of cell organelles which is important for cytogenetics study and techniques associated with it.
5) An introduction to Microscopy which is included in the first semester of FYBSc. They will gain expertise to handle the microscope, helping them with the various microbial staining techniques which are a part of their practicals as well. This will also help them to understand the basics of microbiology included in the second semester.
6) The nucleic acids topic will lay the foundation to introduce them to the field of genetics.
7) Knowledge of physiological processes (Digestion, Absorption, Excretion etc.) and nutrition will enable them to understand metabolic and nutritional needs of the body which forms the basis of clinical and nutritional biochemistry.
8) All the practicals have been rearranged in accordance with the theory papers at each semester.
9) Students will learn to examine, assess, interpret and communicate data acquired performing laboratory experiments related to biochemistry.

Upon completion of the SYBSc course, the students would understand the following:
1) Enzymology which forms the core of Biochemistry. Enzyme immobilization to study a different aspect of enzyme kinetics.
2) Plant Biochemistry which will introduce the students to metabolism and enable them to study metabolism in plants.
3) Acids, Bases, Buffers and Ionic Equilibria& pH meter; hormones; membrane biochemistry and physicochemical principles which will help them to further understand the biochemical processes of the body.
4) Mendelian Genetics, variations over Mendelian Genetics, Genes and Chromosomes topics which will introduce them to the field of genetics.
5) Haematopoiesis and Body fluids topics to help them understand the basics of clinical biochemistry.
6) Concept of sterilization and disinfection, ATC, PTC & fermentation to enable them to understand the various microbial processes & techniques.
7) Tools of Biochemistry which includes basic instrumentation like Colorimetry, Spectrophotometry, Flame photometry, Fluorimetry and Flow Cytometry.
8) The applied aspects of Biochemistry through Biotechnology, Industrial Biosynthesis, Bioresources and their management.
9) General pharmacology, Pharmacodynamics and Adverse Drug Reactions (ADRs) will introduce the students to pharmacology.
10) All the practicals have been rearranged in accordance with the theory papers at each semester.
11) New experiments are added to cover the practical aspects of the newly added theoretical topics. E.g. colorimetric experiments like Glucose by DNSA method, Proteins by Biuret method and Demonstration of spectrophotometer.
12) Research project has been introduced in Semester IV Practical III to inculcate research culture in the students. This will familiarize them with Research methodology i.e. reference work, experimental work, analysis of experimental data, interpretation of results obtained, writing of project or work and compilation of bibliography in proper order.

Upon completion of the TYBSc course, the students would understand the following:
1) Metabolism (Carbohydrates, amino acids & proteins, lipids, nucleic acids) & integration of metabolisms. Bioenergetics & oxidative Phosphorylation which will enable them to understand the

energetics of various metabolisms.
2) Biochemistry of senses topic which includes the study of sensory system of humans.
3) Analytical techniques like chromatography, centrifugation, electrophoresis, protein purification techniques, etc
4) Environmental Science which include topics like air pollution; water pollution; soil & noise pollution; and Energy, Industrial Pollutants & Environmental Monitoring.
5) Nutritional Biochemistry comprising of topics like Nutrition & Diet Management; Vitamins and Co-enzymes & their deficiency disorders.
6) Pharmacokinetics and Bioassay; Therapeutic drugs & Drugs acting on haemopoietic systemwill help them to understand pharmacology in more depth.
7) The important genetic processes namely, DNA replication, transcription, translation & Recombinant DNA Technology increasing their knowledge of molecular biology.
8) Biostatistics which will help them to interpret results and draw conclusions in the research.
9) Bio-informatics and applications of computers in Bio-chemistry.
10) Basics of human immune system, detailed study of various cells and organs involved.
11) Tumour immunology, apoptosis, virology, AIDS, Ageing, Alzheimers, transplant immunology and vaccines which will furtherincrease their understanding of Human immune system in a better way.
12) All the practicals have been rearranged in accordance with the theory of each paper at each semester.
The over-all syllabus at the Under-Graduation level has been designed such that the student is well prepared to appear for competitive examinations held all over.

SUBJECT - BIOANALYTICAL SCIENCES

SUBJECT	PROGRAM OUTCOME	Course Code	Paper Title
BIOANALYTICAL SCIENCES	**PSO:** This course will impart high quality science education in a vibrant academic ambience with the faculty of distinguished teachers and scientists. It will also equip students for the future who will take up the challenge of doing quality research and teaching and also contribute to industrial production and R & D in the fields of Bioanalysis, Bioinformatics and Nutraceutical Sciences. It will amalgamate classical analytical chemical techniques with modern genomic and proteomic technologies of manufacturing and analysis to better characterize the products useful as medicines as well as nutraceuticals.	**RUSBAS101**	**BIOLOGICAL SCIENCES I**
		RUSBAS102	**BIOLOGICAL SCIENCES II**
		RUSBAS103	**CHEMICAL SCIENCES I**
		RUSBAS104	**CHEMICAL SCIENCES II**

RUSBAS105	**COMPUTATIONAL SCIENCESI**
RUSBAS106	**COMPUTATIONAL SCIENCES II**
RUSBAS107	**FOUNDATION COURSE I**
RUSBAS201	**BIOLOGICAL SCIENCES I**
RUSBAS202	**BIOLOGICAL SCIENCES II**
RUSBAS203	**CHEMICAL SCIENCES I**
RUSBAS204	**CHEMICAL SCIENCES II**
RUSBAS205	**COMPUTATIONAL SCIENCES I**

RUSBAS206	**COMPUTATIONAL SCIENCES II**
RUSBAS207	**FOUNDATION COURSE II**
RUSBAS301	**BIOLOGICAL SCIENCES III**
RUSBAS302	**BIOLOGICAL SCIENCES IV**
RUSBAS303	**CHEMICAL SCIENCES III**
RUSBAS304	**CHEMICAL SCIENCES IV**
RUSBAS305	**COMPUTATIONAL SCIENCES III**

RUSBAS306	**COMPUTATIONAL SCIENCES IV**
RUSBAS307	**ENVIRONMENTAL SCIENCES**
RUSBAS401	**BIOLOGICAL SCIENCES III**
RUSBAS402	**BIOLOGICAL SCIENCES IV**
RUSBAS403	**CHEMICAL SCIENCES III**
RUSBAS404	**CHEMICAL SCIENCE IV**

RUSBAS405	**COMPUTATIONAL SCIENCES III**
RUSBAS406	**COMPUTATIONAL SCIENCES IV**
RUSBAS407	**TECHNICAL COMMUNICATIONS SKILLS**
RUSBAS501	**ENTREPRENEURSHIP SKILLS I**
RUSBAS502	**BIOLOGICAL SCIENCES V**
RUSBAS503	**CHEMICAL SCIENCES V**
RUSBAS504	**CHEMICAL SCIENCES VI**

RUSBAS505	**COMPUTATIONAL SCIENCES V**
RUSBAS601	**ENTREPRENEURSHIP SKILLS II**
RUSBAS602	**BIOLOGICAL SCIENCES V**
RUSBAS603	**CHEMICAL SCIENCES V**
RUSBAS604	**CHEMICAL SCIENCES VI**

RUSBAS605	**COMPUTATIONAL SCIENCES V**

Course Outcomes

Students should realize the importance of type specimens and in-vivo models in the field of bioanalytical sciences. They will understand basic concepts of microbiology. They should be able to successfully perform aseptic transfers. They should learn operation of simple light microscope.
Students will appreciate versatility and dynamic nature of carbon. Students should be able to draw correct structures of biomolecules and understand structure-function correlation. They should be able to schematically represent and explain various physiological processes in plants and animals.
Students should be able to prepare buffers and operate pH meter. They should accurately name and identify aromatic compounds. They should understand the concepts of molecular bonding.
Students should analyze conductometric, pH metric and acid-base titration curves to predict the chemical nature of titrant and titrate. They should realize the importance of calibration in science. They should be able to demonstrate mechanisms of organic reactions and identify the similarities between organic and biochemical reactions.

Students should be adept in basic arithmetic calculations. They should apply the mathematical equations to find solutions to given problems.
Students should appreciate the extensive applications of optics in analytical instrument like colorimeter and spectrophotometer. Students should grasp the fundamental concepts of crystal geometry and X-ray diffraction.
Students should be aware about their constitutional rights and current socio-political scenario of India.
Students should comprehend fundamental concepts of genetics. They should realize the significance of enzymes with respect to drug design. They should learn the properties and dynamics of plasma membrane as a prerequisite to study transport of drug molecules.
Students should appreciate the efficient manner in which cells perform their biological functions while strictly obeying the laws of thermodynamics. They should be able to calculate entropy, enthalpy and free energy change for biochemical reactions. They should accurately demonstrate metabolic pathways in a sequential manner. They should study metabolic pathways with the perspective of their applications in drug design.
Students should precisely draw and identify stereoisomers. They should realize the applications of stereochemistry for assessment of safety and potency of pharmaceuticals. They should be able to solve problems based on chemical kinetics and thermodynamics.
Students should grasp the functioning and handling of basic instruments in bioanalytical laboratory. They should realize the need and importance of automation in bioanalysis. They should realize that correct choice of sampling and minimization of error is essential for the success of scientific experiments.
Students should be able to choose the correct statistical test to analyze biological data.

Students should be able to use basic functions of Microsoft office. They should effectively use web browsers and search engines. They should be able to design a webpage.
Students should be aware of the current trends in globalization. They should realize the importance of stress management to live a healthy life. They should be aware about basic human rights.
Students should comprehend central dogma of molecular biology as a prerequisite to study techniqueslike cloning, PCR, RFLP, etc. They should understand the applications of ethanobotany and pharmacognosy in drug development.
Students should be able to classify viruses with respect to their properties. They should be able to describe autoimmune disorders. They should be able to correctly interpret the results of diagnostic tests like VIDAL, VDRL and ELISA. Students should realize the importance of sterility with respect to biopharmaceuticals. They should be able to perform and interpt sterility tests.
Students should apply theoretical principles of electrochemistry in analysis of solutions using pH meter and Conductometer. Students should be adept in operation of these two instruments. They should perform organic synthesis with minimal use of resources and apply greener methods of synthesis.
Students should comprehend the fundamentals of spectroscopy and separation methods which will be useful to study advanced instrumentation in these fields. Students should correctly demonstrate the structures and organic reactions of heterocyclic compounds.
Students should effectively use algorithms and graphs for analysis and representation of biological data. They should be able to solve problems based on numerical methods.

Students should analyze significance and validity of experimental results with statistical tests such as correlation, regression and hypothesis testing. They should comprehend the concepts of probability theory as a prerequisite to study advanced biostatistics.
Students should inculcate greener approach in their daily life. They should prepare themselves for prompt and efficient management of disasters.
Students should be able to describe inborn errors of metabolism and genetic disorders with respect to mutation, physiology, symptoms, diagnosis and cure. They should be aware of gene therapy as an emerging field to treat these disorders. They should be able to describe the functioning of nerve and muscles and understand the importance of neurotransmitters as potential target for drugs.
Students should understand the theory, advantages and disadvantages of RIA, ELISA and Immunohistochemistry. They should be able to choose the most suitable technique as per the nature of sample and objective of analysis. They should understand wide range of the applications of these techniques in research and diagnostics. Students should grasp the complex nature, co-ordination and integration of biochemical pathways. They should be able to design animal and plant tissue culture laboratories.
Students should study pharmaceutical chemistry and bio-organic chemistry with the perspective of their applications in Bioanalytical sciences. They should be aware of the advances in biopolymers and biomaterials.
Students should grasp the concept of radioactivity and understand its applications in diagnostics and therapeutics. Students should understand importance of inorganic metals in maintenance of health. They should comprehend basics of separation techniques as a prerequisite to study advanced and hyphenated separation techniques.

Students should apply statistical tests like ANOVA to analyze biological data. They should understand the basic concepts of experimental design with relevant examples in Bioanalytical sciences.
Students should effectively use bioinformatics databases and tools to study DNA and protein sequences, protein structure and metabolic pathways.
Students should know the expected format and standards of professional writing. Students should be adept and confident in writing skills like letters, resume, abstract, bookreview, etc.
Students will be motivated to start their own enterprise. They should be aware of the required skillset for an entrepreneur and also realize the challenges in this area.
Students will be able to design basic cloning experiments to obtain genetically modified organisms. They should be sensitized regarding ethical guidelines of cloning. They should realize the importance of phytochemicals as possible drug candidates and learn the techniques to extract phytochemicals from plants.
Students will be introduced to theory and instrumentation of HPLC and GC. They should be able to analyze and interpret simple chromatograms. They should realize the importance of safe handling of biomatrices. They should be familiar with routine diagnostic tests and advanced instrumentation in pathological testing.
Students will be introduced to basic concepts of pharmaceutical chemistry and understand the importance of a bioanalyst in pharmaceutical industry. Students should realize the problems involved in analyzing trace elements and complex matrices and learn to choose the suitable bioanalytical method for their analysis. Students should apply techniques learned in bioanalysis for characterization of nutritional value of a food sample.

Students will comprehend the logic behind dynamic programming algorithms. Students should effectively use bioinformatics algorithms like BLAST and FASTA for sequence alignment and phylogenetic studies.
Students will be keenly interested in developing innovative ideas which may be commercially viable. They should start building knowledgebase and skill set which will be useful to start a new enterprise in future.
Students will learn Phytochemistry with an emphasis on its applications in pharmaceuticals and bioanalysis. They should be able to perform and interpret qualitative tests for phytochemicals. They should be able to interpret results of molecular biology experiments like PCR and RFLP. They should appreciate and study biopharmaceuticals as an upcoming branch in pharmaceuticals.
Students will get familiar with the basic concepts of atomic and molecular spectroscopy and their applications in bioanalysis. They should be able to choose the correct method for analysis based on chemical property of analyte and objective of analysis. They should study applications of thermal analysis for characterization of pharmaceutical products.
Students will be able to interpret simple IR and NMR spectra. They should be introduced to basic concepts of hyphenated techniques which will be useful in studying advanced instrumentation. Students should understand advantages and limitations of biochemical techniques like SDS-PAGE, native PAGE, 2D-gel electrophoresis etc. and choose suitable technique as per the biochemical properties of analyte and objective of analysis. They should familiarize with the concept of microarrays and biochips as advanced methods of diagnostics.

Students will comprehend the programming logic for protein structure prediction, Cheminformatics and drug design. They should effectively use bioinformatics tools like Modeller, MarvinSketch and iGemDock for basic structural characterization.

SUBJECT	Programme specific Outcomes
English	Exhibit their acquired academic competency, think innovatively and articulate their ideas with required professional proficiency, language skills i.e. LSRW, grammatical accuracy etc at both local and global scenario.
	Develop a rational and optimistic approach towards life, face challenges in life with confidence, understand causality and take wise decision during any familiar or unprecedented emergency/crisis.
	Apply their knowledge and aptitude acquired through literature and literary translations to understand the new domains of life in terms of language, culture, ethos and morality across the globe.
	Understand significance of the vibrant biosphere of this planet and the urgent need of its sustainability so as to make the life more inclusive and conducive.
	Appreciate world literature, art and critical/philosophical theories that have shaped and fostered human civilization, understand historical perspective of socio-political and literary movements, schools and genres and thereby develop a strong sense of oneness/brotherhood and global citizenship.
	Excel in higher studies and do research at premier schools/universities in India and abroad with acquaintance to trans-disciplinary rubrics of humanities.
	Display all round/multifaceted personality traits i.e. cognitive, affective and behavioural etc. Think beyond one's caste, creed, colour, religion, sexuality, region etc., and develop a strong faith in universal values such as national integrity, democracy, diversity, heterodoxy, freedom, fraternity, love and equanimity.
	Use intelligently and rationally ideas, methods, strategies and advanced technology to make meaningful contribution in the knowledge creation and dissemination system.
	Understand basic principles, theories, modes and trends that have been developed in mass communication and journalism over a period of time. Recognise the significance of media in strengthening democracy and developing peace and harmony

Course Code	Paper Title
RUACSK101	Communication Skills in English
RUACSK201	Communication Skills in English
RUAENG101	Introduction to Literature
RUAENG201	**Introduction to Literature**
RUAENG301	Indian Literature in English
RUAENG401	**Indian Literature in English**
RUAENG302	American Literature
RUAENG402	**American Literature**
RUAACMSC301	Mass communication
RUAACMSC401	**Mass communication**

RUAACJOU301	Journalism
RUAACJOU401	**Journalism**
RUAENG501	**Elizabethan and Jacobian**
RUAENG601	Restoration and Neoclassical age
RUAENG502	**Literary Theory and Practical Criticism**
RUAENG602	Literary Theory and Practical Criticism
RUAENG503	**Translation Studies**
RUAENG603	**Translation Studies**
RUAENG504	**Romantic Age**
RUAENG604	**Victorian Age**
RUAENG505	**20th Cent British Literature**
RUAENG605	20th Cent British Literature
RUAENG506	**Literature and Gender**
RUAENG606	**Literature and Gender**

Course Outcomes
Recognizing the significant elements of Communication Skills
Enlisting basic language skills
Recognize various elements and terms of Fiction writing
Locating the features in the prescribed texts through reading
Recognize various elements and terms of poetry and drama
Locating the features in the prescribed texts through reading
Attempt a textual analysis based on the learning
Enlisting the characteristic features of poetry and drama in Indian English Literature
Understanding of American, African American and Multicultural sensibilities
Evaluating cross-cultural perspectives and discussions on American Fiction and Short Stories
Understanding of American, African American and
Defining the characteristic features of Mass Communication
Recognizing the role of Mass Media in Indian Context

Describe the relation between Mass communication and the idea of Nation
Evaluating Media-related Laws in Indian Context.
Categorizing and implementing the Functions of media personnel in society.
Designing a model for report writing
Understanding the basics of Editing
Defining E- Journalism
Recognise the historical and political context of the Elizabethan and Jacobean Ages
Recognise the historical and political context of the Restoration Era
Locate the writers within the age and identify the influences on their thinking
Analyse the writing trends and the themes present throughout the decades
Evaluate and compare the writing trends with other eras of English Literature
Identify different notions of literary theory
Identify different notions of literary theory
Assess critical approaches with suitable illustrations
Gain primary knowledge of the discipline of translation
Evaluate various theories of translation both west and indian
Demonstrate the understanding throug analysis of translated texts
Locate the characteristics of translation in other mediums
Formulating their views on the practice of translation
Understand an historical perspective of Romantic English literature
Understand an historical perspective of Victorian English literature
Enumerate different components in the Victorian novel
Define different concepts of modern English literature
Define different concepts of modern English literature
Understand different elements of modern short story
Critically examine short story with suitable illustrations
Define the basic concepts of Gender Studies
Understand the foundation of Feminist Literary Criticism

Recognise and locate Queer Literature in India
Analyse the normative notions of Masculinities and the relation between men and patriarchy
Apply feminist theories and methodologies to various texts

DEPARTMENT - HINDI

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE	PAPER TITLE
HINDI	हिन्दी विषय की उत्पत्ति और उसकी मूल अवधारणा को समझना ।		
	हिंदी विषय और उसकी शाखाओं का महत्त्व..		
	हिंदी साहित्य के विभिन्न पहलुओं को समझने के लिए उसकी प्रक्रिया की विधि के साथ-साथ उसकी नई विधाओं और दिशाओं को जानना ।		
	हिन्दी से संबद्ध विभिन्न क्षेत्रों और सिद्धांतों को समझने का प्रयास करना ।		
	हिंदी साहित्य के बारे में जानने के लिए उसकी जड़ों, विधाओं और उसके दृष्टिकोण को समझना ।		
	हिंदी साहित्य के दार्शनिक विचारों और विधियों को विस्तार से समझना ।		
	अतीत से वर्तमान तक की हिंदी की अवधारणा का मूल्यांकन कर, साहित्य के माध्यम से समाज को एक दूसरे के निकट लाना ।		
	भक्तिकालीन साहित्य के माध्यम से सामाजिक और सांस्कृतिक विचारधारा का विकास ।		

हिन्दी के वैविध्यपूर्ण पाठ्यक्रम के माध्यम से कौशल विकास |
विविध क्षेत्रों में रोजगार के विकल्प ।

RUACHN101 and 201	अनिवार्य हिन्दी **Hindi compulsory**
RUAHIN101 and 201	ऐच्छिक हिन्दी **Ancillary Hindi**

RUAHIN301 and 401	आधुनिक हिन्दी साहित्य **Modern Hindi Literature**
RUAHIN401 and 402	प्रयोजनमूलक हिंन्दी **Functional Hindi**

RUAHIN501 and 601	हिन्दी साहित्य का इतिहास **History of Hindi literature**

RUAHIN502 and 602	मध्यकालीन एवं आधुनिक हिन्दी साहित्य **Medieval and modern Hindi Literature**
RUAHIN503	प्रयोजनमूलक हिन्दी --- अनुवाद और पत्रकारिता **Translation and Journalism**

RUAHIN603	साहित्य की वैचारिक पृष्ठभूमि **Ideological background of modern Hindi Literature**
RUAHIN504 and 604	साहित्य, समीक्षा, छंद एवं अलंकार **Literary Criticism, Prosody and Rhetorics**

RUAHIN505 and 605	भाषाविज्ञान, हिन्दी भाषा और हिन्दी व्याकरण
RUAHIN506 and 606	जनसंचार माध्यम Mass Media

COURSE OUTCOMES

1) कविता और कहानी का अंतर समझकर इन दोनों साहित्यिक विधाओं को समझेंगे . पत्र लिखना सिख जायेंगे . वाक्य रचना भी समझ जायेंगे .
२) यह पाठ्यक्रम पढ़कर विद्यार्थी समाज में एकदूसरे के साथ बंधु भाव रखेंगे . भाईचारे की भावना निर्माण होगी।
३) सामाजिक एकता का महत्व समझ जायेंगे।
४) राष्ट्रीय एकात्मता समझ जायेंगे।
५) आपसी प्रेम की भावना का निर्माण होने में सहायता होगी।
१) यह पाठ्यक्रम पढ़कर निश्चित रूप से विद्यार्थी का बौधिक विकास होगा .
२) समाज में एकदूसरे के साथ किस तरह का व्यवहार करना चाहिए इस बात की अनुभूति हो जाएगी।
३) सामाजिक एकता का महत्व समझ जायेंगे।
४) राष्ट्रीय एकात्मता समझ जायेंगे।

५) आपसी प्रेम की भावना निर्माण होने में सहायता होगी। भाईचारे की भावना निर्माण होगी।
६) अपनी कल्पना से कहानी नाटक/ एकांकी लिखने की प्रेरणा मिलेगी . संवेदनशील मुद्दों के प्रति जागरूक बनेंगे .
१. छात्रकविताकोलयबद्धतरीकेसेपढ़नेलगताहै।
२. छात्रकवितामेंअभिव्यक्तसंवेदनाकोसमझनेलगताहै।
३. छात्रकवितामेंआएरस, छंदऔरअलंकारकोव्यक्तकरनेमेंसक्षमहै।
४.छात्रपौराणिकपात्रोंसेपरिचितहोताहै।
५. छात्रआधुनिकसमाजकोसमझनेमेंसक्षमहै।
6. छात्रआधुनिक कविताकोलयबद्धतरीकेसेपढ़नेलगताहै
7. छात्रआधुनिक कवितामेंअभिव्यक्तसंवेदनाकोसमझनेलगताहै
8. छात्र आधुनिककवितामेंआएरस, छंदऔरअलंकारकोव्यक्तकरनेमेंसक्षमहै।
9. छात्रपौराणिक नाटक के पात्रों को आधुनिक संदर्भ से जोड़ता है।
10. छात्र पौराणिक नाटक के माध्यम से आधुनिकसमाजकोसमझनेमेंसक्षमहै
१)प्रयोजन मूलक हिंदी सीखने के बाद विद्यार्थी भाषा के और हिंदी के अनेक रूपों को समझ जायेंगे.
२) रेडिओ की हिंदी टेलीविजन की हिंदी कार्यालयीन हिंदी सामान्य हिंदी आदि में प्रयोग की जानेवाली हिंदी को समाज सकेंगे .
३) प्रयोजनमूलक हिंदी और सामान्य हिंदी के अंतर को समझेंगे . इसके साथ-साथ हर हिंदी की विशेषता को समझ
कर व्यवहार में उपयोग कर सकेंगे।

४)हिंदी के पारिभाषिक शब्द सिख कर विद्यार्थी व्यवहार में सहायता होगी.
५) इस भाषा की समझ बढाकर विद्यार्थियों को रोजगार के अनुकूल बनाना .
6) परम्परागत शिक्षा से हटकर शिक्षा ग्रहण करेंगे. जनसंचार माध्यमों में हिंदी का प्रयोग किस प्रकार हुआ है यह
विद्यार्थी समझ जायेंगे.
7) अलग-अलग जनसंचार माध्यमों में हिंदी का उपयोग कैसे किया जाता है यह समझ जायेंगे.
8) जनसंचार माध्यमों की भाषा को समझकर उपयोग करना जान जायेंगे .
9) इस भाषा को पढ़ाकर विद्यार्थियों को रोजगार के अनुकूल बनाना .
10) विद्यार्थी अलग-अलग प्रकार के आवेदन पत्र लिखना सिख जायेंगे
1) हिंदी साहित्य का इतिहास पढ़कर विद्यार्थी तत्कालीन साहित्य को समझ जायेंगे.
२) यह साहित्य पढ़कर विद्यार्थी तत्कालीन साहित्य की विशेषताओं को समझ जायेंगे .
३) तत्कालीन समाज की सामाजिक धार्मिक, आर्थिक सांस्कृतिक परिस्थिति को समझ सकेंगे .
४. इस साहित्य को पढ़कर आज के सन्दर्भ में इस साहित्य की प्रासंगिकता को समझ जायेगे .
५) यह पाठ्यक्रम पढ़कर निश्चित रूप से विद्यार्थी समाज में एकदूसरे के साथ किस तरह का व्यवहार करना चाहिए इस बात की अनुभूति हो जाएगी। सामाजिक एकता का महत्व समझ जायेंगे ।राष्ट्रीय एकात्मता समझ जायेंगे। आपसी प्रेम की भावना निर्माण होने में सहायता होगी। भाईचारे की भावना निर्माण होगी। संतों का महत्व समझ जायेंगें। ज्ञानी और अज्ञानी का अंतर समझ जायेंगे।
6) हिंदी साहित्य आधुनिक काल पढ़ाने के पीछे हमारा उद्देश यह है कि विद्यार्थियों को हिंदी साहित्य का विकासक्रम पता चले।

7) तत्कालीन साहित्यिक राजनैतिक, सामाजिक, सांस्कृतिक परिवेश को समझकर, उस समय की साहित्यिक विशेषताओं को समझकर आज के जीवन को किस तरह सुखकर बनाया जा सकता है इसका बोध हो जायेगा।
8) विद्यार्थियों को सामाजिक मूल्यों की पहचान हो जाएगी।
9) तत्कालीन कवि की विचारधारा समझ सकेंगे.
10) जीवन में कविता के महत्व को समझ सकेंगे .
.छात्रहिंदीसाहित्यकेउपन्यासविधासेपरिचितहोतेहैं।
२. छात्रउपन्यासकेउद्देश्यकोसमझनेमेंसक्षमहोतेहैं
३. छात्रउपन्यासकेपात्रोंकीमानसिकस्थितिकोसमझनेमेंसक्षमहै।
४. छात्रहिंदीसाहित्यकीगद्यविधाकोसमझनेमैंसक्षमहै।
५. छात्रगद्यमेंव्यक्तसामाजिकस्थितिकोसमझनेमेंसक्षमहै
१. छात्र प्राचीन काव्य सेपरिचितहोतेहैं।
२. छात्र प्राचीन काव्य में अभिव्यक्त संवेदना को समझनेमेंसक्षमहैं
३. छात्र प्राचीन काव्य में प्रयुक्त रस, छंद और अलंकारोंकोसमझनेमेंसक्षमहै।
४. छात्रहिंदीसाहित्य के निबंध विधाकोसमझनेमैंसक्षमहै।
५. छात्र निबंधों केमाध्यमसेसामाजिकस्थितिकोसमझनेमेंसक्षमहै
1. छात्रों में अनुवाद के संबंध में समज पैदा हुई।
2. छात्र अनुवाद के प्रकार को अभिव्यक्ति करते हैं।
3. छात्र एक भाषा से दूसरी भाषा में अनुवाद करने लगते हैं।
4. छात्र में पत्रकारिता की समझ विकसित हुई।

5. छात्रा भूमंडलीकरण को समझने लगते हैं ।
1. छात्र में किसी रचना की आलोचना करने की समझ विकसित हुई ।
2. छात्र नवजागरण व गाँधीवादी विचारधारा को समझने लगते हैं ।
3. छात्र मार्क्सवाद व मनोविश्लेषणवाद को समझने लगते हैं ।
4. छात्र साहित्य में स्त्री विमर्श और दलित विमर्श को समझने लगते हैं
१) इस पाठ्यक्रम को पढ़ने के बाद विद्यार्थी भारतीय एवं पाश्चात्य काव्य शास्त्र को समझ जायेंगे .
२) भारतीय आचार्यों के चिंतन का ज्ञान प्राप्त होगा .
३) काव्यशास्त्रीय सिद्धांतों को समझ सकेंगे .
४) साहित्य का अन्य कलाओं के साथ सम्बन्ध को समझ सकेंगे
५) काव्य के विविध रूपों को समझ जायेंगे. काव्य में प्रयोग होनेवाले छंद को समझ सकेंगे .
६) इसे पढ़ाने से शास्त्रीय दृष्टि से साहित्य को समझने का ज्ञान हो जायेगा। भाषा का प्रयोग किस तरह से किया जाना चाहिए यह समझ जायेंगे।
१) इस पाठ्यक्रम को पढ़ने के बाद विद्यार्थी भाषा में शब्द शक्ति के महत्व को समझ जायेंगे.
२) विद्यार्थी साहित्य में रस के महत्व को समझ सकेंगे .
३) इस पाठ्यक्रम को पढ़ने के बाद विद्यार्थी नाटक, कहानी, उपन्यास के तत्वों से परिचित हो जायेंगे , साथ ही निबंध की विशेषताओं की समझ आ जाएगी .
४) विद्यार्थी अलंकारों के लक्षण से परिचित हो जायेंगे .

५) इसे पढ़ने से शास्त्रीय दृष्टि से साहित्य को समझने का ज्ञान हो जायेगा। भाषा का प्रयोग किस तरह से किया जाना चाहिए यह समझ जायेंगे। विद्यार्थी साहित्य लिखने में प्रवृत हो जाएंगे। भाषा के प्रयोग में सक्षम हो जायेंगे।
१. छात्रोंमेंभाषाविज्ञानकीपरिभाषाऔरविशेषताओंकीसमझपैदाहुई।
२. छात्रबोली, भाषा, राष्ट्रभाषा, राजभाषाऔरसंपर्कभाषाकेबीचअंतरकोसमझनेमेंसक्षमहुए।
३. छात्रभाषाविज्ञानकेकारणोंकोसमझनेमेंसक्षमहोजाताहै
४. छात्रभाषाविज्ञानकीप्रमुखशाखाओंकोसमझनेमेंसक्षमहै .
५. छात्रव्याकरणकोसमझनेमेंसक्षमहोतेहैं।
१. छात्रोंमेंभाषास्वरूप और विकास से परिचित होते हैं ।
२. छात्र हिन्दी बोलियों के सामान्य अंतरकोसमझते हैं ।
३. छात्र देवनागरी लिपि की विशेषताओं को समझने लगे हैं ।
४. छात्रव्याकरणकोसमझनेमेंसक्षमहैं
1. छात्रों ने जनसंचार के संबंध में जानकारी प्राप्त की ।
2. छात्र परंपरागत जनसंचार माध्यमों से परिचित हुए ।
3. छात्रों ने इंटरनेट के संबंध में जानकारी प्राप्त की ।
4. छात्रों ने कम्प्यूटर के प्रयोग संबंधी**जानकारी प्राप्त की ।**
1. छात्र वृत्तचित्र व लघुफिल्म के बीच के अंतर को समझते हैं ।
2. छात्र फिल्म प्रभाग से परिचित हुए ।
3. छात्र इलेक्ट्रानिकमाध्यमसंबंधीलेखन को समझते हैं।
4. छात्र विविध विज्ञापन लेखनों से परिचित हुए ।

DEPARTMENT : MARATHI

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE	PAPER TITLE
MARATHI	PSO1: Acquire and apply conceptual knowledge of Marathi Literature, Linguistics, Forms of various Literatures and the co-relation of culture & society with Literature and Language.	**RUACMR101**	**Compulsory Marathi** अनिवार्य मराठी
	PSO2: Comprehend and research various social, political, economical, environmental related issues through literature.	**RUACMR201**	**Compulsory Marathi** अनिवार्य मराठी

	PSO3: Gain critical insights and address issues in cross-culture and diversity, social responsibility and ethics and prepare for global excellence.	**RUAMAR101**	**Optional Marathi ऐच्छिक मराठी**
	PSO4: To practical life situation by using the wisdom learn from literature, can inculcate modern value system.	**RUAMAR201**	**Optional Marathi ऐच्छिक मराठी**
	PSO5: Critically investigate the problems of society and learn to resolve them through the literature point of view.	**RUAMAR301**	**कादंबरी : एक वाङ्मयप्रकार (मराठी १)**

	PSO6: Acquire the ability to abstract thinking & learn to apply the knowledge & value learnt through Literature. Can adopt scientific tempore.	**RUAMAR302**	**भाषा आणि भाषाभ्यास (मराठी २)**
	PSO7: Can explore it's creative skills and create a masterpiece of any literary form. Plus we will learn the critical evaluative ability.	**RUAMAR401**	**आत्मकथन : एक वाङ्मयप्रकार (मराठी १)**

	PSO8: This course provides them the ability to think uniquely to appreciate with good taste, learn different soft skills. They can improve their employability with it.	**RUAMAR402**	**मराठीच्या बोलींचा अभ्यास (मालवणी बोली) (मराठी २)**
		RUAMAR501	**मध्ययुगीन मराठी वाङ्मयाचा इतिहास**

		RUAMAR502	**भारतीय आणि पाश्चात्य साहित्यशास्त्र**
		RUAMAR503	**साहित्य आणि समाज**
		RUAMAR504	**भाषाविज्ञान आणि मराठी व्याकरण**

		RUAMAR505	**आधुनिक मराठी साहित्य**
		RUAMAR506	**व्यवसायाभिमुख मराठी**

		RUAMAR601	**मध्ययुगीन मराठी वाङ्मयाचा इतिहास**
		RUAMAR602	**भारतीय आणि पाश्चात्य साहित्यशास्त्र**

		RUAMAR603	**साहित्य आणि समाज**
		RUAMAR604	**भाषाविज्ञान आणि मराठी व्याकरण**
		RUAMAR605	**आधुनिक मराठी साहित्य**

		RUAMAR606	**व्यवसायाभिमुख मराठी**

COURSE OUTCOMES
विविध भाषांमधून शालेय शिक्षण घेतलेल्या विद्यार्थ्यांना मराठी भाषेतून वाचन करण्याची गोडी निर्माण होते. त्याप्रकारचे सर्जनशील लेखन आपणही करावे असे वाटू लागते. तसेच राजभाषा या दृष्टीने मराठी भाषेतून प्रशासकीय, कार्यालयीन स्वरूपाचा औपचारिक व्यवहार आपण प्रसंगी करू शकतो असा आत्मविश्वास विद्यार्थ्यांमध्ये निर्माण होतो. मराठी लेखनाचे नियम व विरामचिन्हे, भाषांतर, वृत्तांतलेखन, वर्तमानपत्रासाठी वृत्तलेखन, इतिवृत्त लेखन, जाहिरात लेखन, अर्जलेखन सारांश लेखन या कौशल्यांचा विकास होतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.
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विद्यार्थ्यांना मराठी साहित्यातीन नाटक आणि कविता या प्रमुख वाङ्मयप्रकारांची सैद्धांतिक ओळख होते. या दोन प्रकारांतर्गत नेमलेल्या साहित्यकृतींच्या प्रकारलक्ष्यी अभ्यासातून वाङ्मयप्रकाराची संकल्पना अधिक सुस्पष्ट होते. त्या वाङ्मयप्रकारामध्ये अधिकाधिक वाचन करण्याची प्रेरणा मिळते. नाटक या साहित्यप्रकाराचे स्वरूप, व्याख्या, प्रकार, ठळक टप्पे, महत्त्वाचे नाटककार यांचा परिचय होतो. तसेच कविता या साहित्यप्रकाराचे स्वरूप, व्याख्या, प्रकार, ठळक टप्पे, महत्त्वाचे कवी आणि कवयित्री यांचा परिचय होतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

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विद्यार्थ्यांची भाषेबद्दलची जिज्ञासा जागृत होते. बुद्धिवादी आणि वैज्ञानिक दृष्टिकोणातून भाषेबद्दल विचार करणे, भाषेविषयीच्या गैरसमजूती दूर होऊन भाषेबद्दलचा विशुद्ध दृष्टिकोण निर्माण होणे, एखाद्या भाषेचा अभ्यास कसा करावा याची दिशा विद्यार्थ्यांना मिळणे हे या अभ्यासक्रमाद्वारे साध्य होते. तसेच आधुनिक काळात अनेक क्षेत्रांमध्ये महत्त्वाच्या ठरत असलेल्या भाषाविज्ञान या ज्ञानशाखेच्या पुढील अभ्यासाच्या दृष्टीने विद्यार्थ्यांची पार्श्वभूमी तयार होते. तसेच बोलींविषयीची रास्त समजूत निर्माण होऊन बोलींचा अभ्यास करताना आवश्यक असणाऱ्या तांत्रिक ज्ञानाची किमान तोंडओळख विद्यार्थ्यांना होते. विद्यार्थ्यांमध्ये विविध बोलींविषयी आणि संबंधित संस्कृतीविषयी कुतूहल निर्माण होते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.
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आधुनिक मराठी वाङ्मयामागे उभी असलेली मध्ययुगीन मराठी वाङ्मयाची समृद्ध परंपरा विद्यार्थ्यांना समजते. मध्ययुगीन मराठी वाङ्मयातील संत (विविध पंथीय वाङ्मय) – पंत – तंत या ठळक वाङ्मयीन प्रवृत्ती परिचित होतात. इस्लाम धर्मियांनी आणि ख्रिस्ती धर्मियांनी त्या काळात निर्माण केलेल्या साहित्यकृतींचा परिचय होतो. तसेच त्यामागील सांस्कृतिक – राजकीय – सामाजिक कारणांची उकल होते. बखर साहित्याचे स्वरूप – प्रकार आणि वैशिष्ट्ये यांचा परिचय होतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते. मध्ययुगीन विविध कलाप्रकारांचे सादरीकरण देखील प्रकल्पांतर्गत विद्यार्थी करू शकतात.

मराठी साहित्य परंपरेचे प्राचीन – मध्ययुगीन संस्कृत साहित्यपरंपरेशी आणि पाश्चात्य साहित्यपरंपरेशी असलेले नाते विद्यार्थ्यांना परिचित होते. ठळक साहित्यशास्त्रीय संकल्पनांविषयी त्यांना स्पष्टता येते. पुढील समीक्षात्मक वाटचालीचा पाया तयार होतो. साहित्याचे स्वरूप आणि व्याख्या यांचा परिचय होतो. साहित्यभाषेचे स्वरूप आणि तिचे कार्य सविस्तर समजते. साहित्याची निर्मिती प्रक्रिया आणि साहित्याचा प्रयोजन विचार उलगडतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.
या विषयपत्रिकेतून साहित्याकडे पाहण्याच्या लौकिकतावादी समीक्षापद्धतीचा प्रत्यय विद्यार्थ्यांना येतो. साहित्यनिर्मिती ही गोष्ट किती व्यामिश्र आहे, त्याचे साहित्यिकाशी, समाजाशी आणि रसिकाशी नाते कसे गुंतागुंतीचे असते हे त्यांना उलगडते. तत्कालीन जगण्याचे विविध प्रश्न साहित्यातून कसे हाताळले जातात याचे भान विद्यार्थ्यांमध्ये रुजवता येते. स्त्रीवादी, महानगरीय, ग्रामीण आणि दलित या नव्या वाङ्मयप्रवाहात निर्माण होणाऱ्या कलाकृतींविषयी स्वागतशील दृष्टिकोण विद्यार्थ्यांमध्ये विकसित होतो. साहित्याची समाजावर परिणाम करण्याची क्षमता विद्यार्थ्यांना प्रत्ययास येते आणि या तऱ्हेचे सर्जनशील लेखन करण्याची प्रेरणा उत्पन्न होऊ शकते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.
विद्यार्थ्यांना भाषेकडे वैज्ञानिक दृष्टिकोणाने पाहण्याचे महत्व कळते. भाषेचा केवळ भाषालक्ष्यी अभ्यास कसा करता येतो याचा, तसेच भाषाभ्यासाची विविध क्षेत्रांचा परिचय होतो. भाषाविषयक आणि भाषाभ्यासविषयक गैरसमजूती दूर होतात. मराठी भाषेच्या व्याकरणाविषयी सुस्पष्टता येते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

~~आधुनिक मसठी साहित्याविषयी विद्यार्थ्यांचे भान वाढते. प्राचीन आणि मध्ययुगीन~~ मराठी वाङ्मयापेक्षा आधुनिक साहित्यातील आशयाचे आणि अभिव्यक्तीचे निराळेपण विद्यार्थ्यांच्या लक्षात येते. साहित्याच्या विकासप्रक्रियेविषयी सजगता निर्माण होते. आधुनिक कथा, कादंबरी, कविता आणि नाटक यांचे प्रातिनिधिक स्वरूप परिचित होऊन त्या तऱ्हेच्या सर्जनशील लेखनाची उमेद निर्माण होते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

या विषयपत्रिकेद्वारे विविध भाषिक कौशल्यांचा विद्यार्थ्यांना परिचय आणि सराव झाल्यामुळे मराठीतील अनेक कार्यक्षेत्रांची माहिती विद्यार्थ्यांना होऊन आपल्या मानसिक कलानुसार त्या क्षेत्रात आत्मनिर्भर होण्यासाठी त्यांना चालना मिळते. भाषांतराचा सैद्धांतिक परिचय होऊन अनुवाद, रुपांतरण आणि अर्वाचिनीकरण यांच्या स्वरूप-भेदांचा परिचय होतो. मध्ययुगीन मराठीचे अर्वाचिनीकरण करण्याची संधी मिळते. हिंदी – इंग्रजी उतारा भाषांतरित करण्याचा अनुभव घेता येतो. मुलाखत कशी घ्यावी याचा तात्विक परिचय होऊन मुद्रितशोधनाचे कौशल्य आत्मसात करता येते. वाङ्मयीन निबंधाची संकल्पना स्पष्ट होऊन त्याप्रकारचा निबंध लिहिण्याचा आत्मविश्वास मिळतो. ग्रंथपरीक्षण, नाट्य परीक्षण आणि चित्रपट परीक्षण अशा व्यवसायाधारित कौशल्यांचा परिचय प्राप्त होऊन प्रकल्पांतर्गत त्याचे प्रत्यक्ष उपयोजन करण्याची संधी मिळते.

आधुनिक मराठी वाङ्मयामागे उभी असलेली मध्ययुगीन मराठी वाङ्मयाची समृद्ध परंपरा विद्यार्थ्यांना समजते. मध्ययुगीन मराठी वाङ्मयातील संत (विविध पंथीय वाङ्मय) – पंत – तंत या ठळक वाङ्मयीन प्रवृत्ती परिचित होतात. इस्लाम धर्मियांनी आणि ख्रिस्ती धर्मियांनी त्या काळात निर्माण केलेल्या साहित्यकृतींचा परिचय होतो. तसेच त्यामागील सांस्कृतिक – राजकीय – सामाजिक कारणांची उकल होते. बखर साहित्याचे स्वरूप – प्रकार आणि वैशिष्ट्ये यांचा परिचय होतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते. मध्ययुगीन विविध कलाप्रकारांचे सादरीकरण देखील प्रकल्पांतर्गत विद्यार्थी करू शकतात.
मराठी साहित्य परंपरेचे प्राचीन – मध्ययुगीन संस्कृत साहित्यपरंपरेशी आणि पाश्चात्य साहित्यपरंपरेशी असलेले नाते विद्यार्थ्यांना परिचित होते. ठळक साहित्यशास्त्रीय संकल्पनांविषयी त्यांना स्पष्टता येते. पुढील समीक्षात्मक वाटचालीचा पाया तयार होतो. साहित्याचे स्वरूप आणि व्याख्या यांचा परिचय होतो. साहित्यभाषेचे स्वरूप आणि तिचे कार्य सविस्तर समजते. साहित्याची निर्मिती प्रक्रिया आणि साहित्याचा प्रयोजन विचार उलगडतो. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

या विषयपत्रिकेतून साहित्याकडे पाहण्याच्या लौकिकतावादी समीक्षापद्धतीचा प्रत्यय विद्यार्थ्यांना येतो. साहित्यनिर्मिती ही गोष्ट किती व्यामिश्र आहे, त्याचे साहित्यिकाशी, समाजाशी आणि रसिकाशी नाते कसे गुंतागुंतीचे असते हे त्यांना उलगडते. तत्कालीन जगण्याचे विविध प्रश्न साहित्यातून कसे हाताळले जातात याचे भान विद्यार्थ्यांमध्ये रुजवता येते. स्त्रीवादी, महानगरीय, ग्रामीण आणि दलित या नव्या वाङ्मयप्रवाहात निर्माण होणाऱ्या कलाकृतींविषयी स्वागतशील दृष्टिकोण विद्यार्थ्यांमध्ये विकसित होतो. साहित्याची समाजावर परिणाम करण्याची क्षमता विद्यार्थ्यांना प्रत्ययास येते आणि या तऱ्हेचे सर्जनशील लेखन करण्याची प्रेरणा उत्पन्न होऊ शकते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

विद्यार्थ्यांना भाषेकडे वैज्ञानिक दृष्टिकोणाने पाहण्याचे महत्व कळते. भाषेचा केवळ भाषालक्ष्यी अभ्यास कसा करता येतो याचा, तसेच भाषाभ्यासाची विविध क्षेत्रांचा परिचय होतो. भाषाविषयक आणि भाषाभ्यासविषयक गैरसमजूती दूर होतात. मराठी भाषेच्या व्याकरणाविषयी सुस्पष्टता येते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

~~आधुनिक मराठी साहित्याविषयी विद्यार्थ्यांचे भान वाढते. प्राचीन आणि मध्ययुगीन~~ मराठी वाङ्मयापेक्षा आधुनिक साहित्यातील आशयाचे आणि अभिव्यक्तीचे निराळेपण विद्यार्थ्यांच्या लक्षात येते. साहित्याच्या विकासप्रक्रियेविषयी सजगता निर्माण होते. आधुनिक कथा, कादंबरी, कविता आणि नाटक यांचे प्रातिनिधिक स्वरूप परिचित होऊन त्या तऱ्हेच्या सर्जनशील लेखनाची उमेद निर्माण होते. या अभ्यासपत्रिकेत शिकवल्या गेलेल्या तात्विक भागाचे उपयोजन प्रकल्पांतर्गत विद्यार्थ्याला करता येते आणि त्यामुळे त्याची विषयाची समज दृढ होण्यास मदत होते.

या विषयपत्रिकेद्वारे विविध भाषिक कौशल्यांचा विद्यार्थ्यांना परिचय आणि सराव झाल्यामुळे मराठीतील अनेक कार्यक्षेत्रांची माहिती विद्यार्थ्यांना होऊन आपल्या मानसिक कलानुसार त्या क्षेत्रात आत्मनिर्भर होण्यासाठी त्यांना चालना मिळते. भाषांतराचा सैद्धांतिक परिचय होऊन अनुवाद, रुपांतरण आणि अर्वाचिनीकरण यांच्या स्वरूप-भेदांचा परिचय होतो. मध्ययुगीन मराठीचे अर्वाचिनीकरण करण्याची संधी मिळते. हिंदी – इंग्रजी उतारा भाषांतरित करण्याचा अनुभव घेता येतो. मुलाखत कशी घ्यावी याचा तात्विक परिचय होऊन मुद्रितशोधनाचे कौशल्य आत्मसात करता येते. वाङ्मयीन निबंधाची संकल्पना स्पष्ट होऊन त्याप्रकारचा निबंध लिहिण्याचा आत्मविश्वास मिळतो. ग्रंथपरीक्षण, नाट्य परीक्षण आणि चित्रपट परीक्षण अशा व्यवसायाधारित कौशल्यांचा परिचय प्राप्त होऊन प्रकल्पांतर्गत त्याचे प्रत्यक्ष उपयोजन करण्याची संधी मिळते.

DEPARTMENT- SANSKRIT

SUBJECT	PROGRAMME SPECIFIC OUTCOMES
SANSKRIT (FYBA-ANCILLARY)	Sanskrit language is our great national heritage which is to be preserved and utilized further for our benefit. It is the language that consists of vast and varied treasure of knowledge. This syllabus aims to get the students acquainted with this language on the one hand, and with Indian knowledge systems on the other. This curriculum is proposed with a view to bring enhancement in the study of Sanskrit regarding content, relevance, quality and pattern of teaching-learning-evaluation process, so that it should meet the needs of society and nation in present day context. Thus it would encourage the students to synthesize ancient texts and modern branches of knowledge. The curriculum is designed also with a view that the students should not only be able to read and understand Sanskrit language, but they should also achieve skills of creative writing and speaking in Sanskrit. Further, it would promote self-study and develop research attitude. At the same time it would seek to highlight human values and inculcate them in the student community. The curriculum provides an opportunity to the students to get acquainted with ancient and modern research methodology, which will help to broaden the reach of Sanskrit language and will also provide new avenues of career opportunities to students. The students should get themselves introduced to electronic and computational facilities available in the modern era. With this view, this course intends to introduce the field of digital humanities to students. The curriculum is designed to prepare students to acquire career opportunities as well as to prepare them for the field related competitive examinations. To encourage the students to get involved in research activities and to opt for add on courses, this curriculum aims to provide extra credits to the students.
SANSKRIT (FYBA-COMPULSORY)	
SANSKRIT (SYBA)	

SANSKRIT (SYBA)

SANSKRIT (TYBA)

SANSKRIT (TYBA)

SANSKRIT (TYBA)

SANSKRIT (TYBA)

SANSKRIT (TYBA)

SANSKRIT (TYBA)

COURSE CODE	PAPER TITLE	COURSE OUTCOMES
RUASAN101/201	**Selections from Sanskrit Literature and Sanskrit Grammar**	● The students will be more familiar to language & literature. ● They will enjoy the elegance & beauty of Sanskrit language. They will notice the changes in Sanskrit writing skills from Vedic era to modern Sanskrit writing as the topics selected are from Vedic era to modern times.
RUACSS101/201	**Epics, Story Literature and Poetry (Selected portion)**	● The students will be more familiar to language & literature. ● They will apply the language and Grammar skills to appreciate the elegance & beauty of Sanskrit language. They will get acquainted with ancient society, culture & wisdom.
RUASAN301/401	**Sanskrit Literature and Indian Culture (Selected portion)**	● The students will be more familiar to language & literature. ● They will enjoy the elegance & beauty of Sanskrit language. They will get acquainted with ancient society, culture & wisdom.

RUASAN302/402	**Ancient Indian Philosophy &Poetics**	● Bhagavad-Gita will inculcate the ideals of human life in students. It will help students to develop the necessary qualities and discipline to progress in life. ● The understanding of concepts of Sanskrit literary criticism will show them how to analyse & relish literature & art.
RUASAN501/601	**Philosophical Literature**	● The students will be able to know fundamental concepts in Indian philosophy. ● They will learn Indian Logic and argumentation which is very useful even in routine life.
RUASAN502/602	**History of Vedic & Classical Sanskrit Literature**	● The students will get acquainted with society, religion, literature in Vedic period. ● They will get historical information regarding Sanskrit literary tradition & learn how to appreciate literature.
RUASAN503/603	**Ancient Indian State- Craft**	● The students will be able to view how political theories were implemented in actual political administration in ancient times. ● They will be able to compare between ancient & modern political thoughts.
RUASAN504/604	**Vedic Literature**	● The students will be introduced to Vedic Culture, language & literature. ● They will be aware of vast scope for research regarding Vedic period.
RUASAN505/605	**Grammar and Language Skills**	● The students will be able to read, understand & write Sanskrit. ● They will be able to learn application of tools provided by Linguistics which will enhance their ability of learning any language, Indian or foreign.

RUASAN506/606	**Sciences related to Sanskrit and Modern Sanskrit Literature**	● The students will get acquainted with various branches of knowledge related to the study of Sanskrit which will help them to choose carrier options in future. ● They will be able to relate ancient scientific concepts to those in modern era. ● Students will be adopted to modern techniques which will help them while perusing their further studies. ● The students will know the great capacity of Sanskrit language to coin the words to suit to modern era. ● They will enjoy reading modern literature in Sanskrit as well as creative writing in Sanskrit.

SUBJECT -FRENCH

Subject	Programme specific Outcomes	Course Code	Paper Title
French	The first year students will be acquainted to four basic language skills of Level A2. To equip students with basic French grammar.	**RUACFR101/102 & RUAFRE101/102**	**Complusory French & French Ancillary**
	To develop basic translation skills (French to English- simple texts).Learners will acquire the basic language/ communication skills in French with general understanding of French culture and civilization. Understanding of simple audio clips such as advertisements, announcements, personal dialogues in different contexts in French.Interactions in French on personal & interactions in French on personal and general topics such as schools, friends, vacations, buying and selling of goods. Learners will acquire skills to read, understand and analyze poems and short stories in French along with the basic understanding of French literary movements and important conteurs. Learners will be equipped with basic reading, writing, speaking and understanding skills in commercial & professional French. The second year students will enhance and develop vocabulary and structure related to professional French. Learners will be equipped with the intermediate level (B1) of Professional French.	**RUAFRE301/302 & RUAFRE401/402**	**Semester III- Introduction to Short Stories & Professional French & Semester IV- Introduction to XX Century Poems & Professional French**

And the third year students will have higher level speaking skills (C1 level). They can now speak like the natives. Learners learn appreciation of French paintings, professional French vocabulary, knowledge over contemporary French society, advanced French listening skills, translation of texts from French to English and appreciation of literary novels	**RUAFRE501/502/503/504/505/506** **RUAFRE601/602/603/604/605/606**	**Semester V- 17th Century French Literature (RUAFRE501/601), Introduction to French Paintings (RUAFRE502/602), Contemporary France (RUAFRE503/603), 19th Century French Literature (RUAFRE504) 18th Century French Literature (RUAFRE604), Advanced French (RUAFRE505/605), Professional French (RUAFRE506/606)**

Course Outcomes

Learners will acquire the basic language/ communication skills in French with general understanding of French culture and civilization. Understanding of simple audio clips such as advertisements, announcements, personal dialogues in different contexts in French. Interactions in French on personal & interactions in French on personal and general topics such as schools, friends, vacations, buying and selling of goods. Learners will acquire skills to read, understand and analyze poems and short stories in French along with the basic understanding of French literary movements and important conteurs.

The second year students will enhance and develop vocabulary and structure related to professional French. Learners will be equipped with the intermediate level (B1) of Professional French.

The third year students will have higher level speaking skills (C1 level). They can now speak like the natives. Learners will learn appreciation of French paintings, professional French vocabulary, knowledge over contemporary French society, Advanced French listening skills, translation of texts from French to English and appreciation of literary novels.

DEPARTMENT OF ECONOMICS

SUBJECT	Programme specific Outcomes	Course Code	Paper Title	Course Outcomes
Economics	Students graduating with a BA degree in Economics will be able 1. To use economic theory to analyse any economic scenario 2. To use data to gain insight into an economic relationship 3. To use economic history and/or the history of economic ideas for a comprehensive understanding of a current economic perspective or event 4. To integrate other disciplinary perspectives with economic analysis to produce a critical assessment of a social problem 5. To formulate an economic research question and produce a review of the relevant scholarly economic literature as part of an independent research project.	**FYBA-RUAECO101/ FYBSc-RUSECO101FYBA- RUAECO201/ FYBSc-RUSECO201**	**MICROECONOMICS- I & II**	After completing this course 1. The student should be able to use these concepts to understand the relevance of microeconomics to the real world. 2.The student should be able to build on these concepts in the future to develop deeper understanding of the Economy.
		SYBA-RUAECO301/ FYBSc-RUSECO102	**MACROECONOMICS- I & II**	After completing this course 1.The students will be able to apply the formal macroeconomic principles they learned to real world issues. 2. They will be able to think intuitively about economic problems.
		SYBA-RUAECO302	**Indian Economy: Contemporary Concerns (Economic Survey of the Government of India**	After completing this course, a student will be able to 1. Understand functioning of the Indian Economy 2. Understand different policies related to the Indian Economy 3. Understand future trends in the Indian economy.
		SYBA-RUAECO402	**Global Economy: Contemporary Concerns (World Development Report**	After completing this course, a student will be able to 1. Understand functioning of the Global Economy 2. Understand different policies related to the Global Economy 3. Understand future trends in the Global Economy.
		SYBA-RUAACINV301 & RUAACINV401	**Applied Component-INVESTMENT ANALYSIS- I & INVESTMENT ANALYSIS- II**	After completing this course, a student will be able to 1. Understand different types of investment opportunities 2. Understand different types of markets and financial instruments 3. Understand different types risks associated with investment decisions 4. Understand different types of tools to assess the risk and return parameters on investment 5. Gain knowledge to identify right investment strategy based on risk appetite of an investor.
		TYBA RUAECO501	**MICROECONOMICS- III**	After completing this course 1. The students will be able to apply the formal microeconomic principles they learned to real world issues. 2. They will be able to think intuitively about economic problems. 3. They will be able to identify how individual economic agents make rational choices and know how to optimize the use of resources at hand
		TYBA RUAECO502	**GROWTH AND DEVELOPMENT**	After completing this course 1. The students will be able to apply the formal growth principles they learned to real world issues. 2. They will be able to think intuitively about development issues of different regions. 3. They will be able to understand major national and international issues and debates on development.
		TYBA RUAECO503	**Economic Thought**	After completing this course, a student will be able to 1. Understand importance of learning economic thought 2. Understand and compare different schools of economic thought 3. Understand influence of economic thought on economic policies.

		TYBA RUAECO504A & RUAECO604A	**Mathematics for Economics- I & Mathematics for Economics- II**	Students should be able to use different mathematical techniques for the analysis and interpretation of economic theory.
		TYBA RUAECO504B & RUAECO604B	**Research Methodology- I & Research Methodology- II**	After completing this course, a student will be able to 1. Understand various steps involved in research 2. Understand and use different research tools 3. Undertake a research project.
		TYBA RUAECO505A & RUAECO605A	**Econometrics- I & Econometrics- II**	1. The student should be able to gain an understanding of basic econometric tools. 2. The student should be able to apply these tools for empirical estimation of various economic theories.
		TYBA RUAECO505B	**INDIAN FINANCIAL SYSTEM**	The study of this paper will give the students a better understanding of the financial system, its components and the latest reforms introduced in them.
		TYBA RUAECO506	**Urban Development & Policy**	1. The course will equip the student with the basic theoretical premises and analytical tools (borrowed from the standard micro and Macroeconomics) that are used by an urban economist. 2. It will help the students to have a specialised knowledge of analysing and dealing with specific issues of urban areas.
		TYBA RUAECO601	**MACROECONOMICS- III**	After completing this course 1.The students will be able to apply the formal macroeconomic principles they learned to real world issues. 2.They will be able to think intuitively about economic problems
		TYBA RUAECO602	**INTERNATIONAL ECONOMICS**	After completing this course 1. The students will be able to understand the current trends and tendencies of the global macro-economy and international relations. 2. They will be able to understand international movements of factors and the most relevant destinations. 3. They will be able to analyse trade policy tools and their effects.
		TYBA RUAECO603	**DEVELOPMENT EXPERIENCE OF COUNTRIES**	After completing this course, a student will be able to 1. Understand importance of learning economic history 2. Understand and compare functioning of different economies 3. Understand influence of socio-political factors on economic development.
		TYBA RUAECO605B	**BEHAVIOURAL ECONOMICS**	The students will learn the basic of Behavioural Economics and its applications.
		TYBA RUAECO606	**Corporate Finance**	It will equip the students with the required skills to take up jobs in Corporate Sector.

SUBJECT	Programme specific Outcomes	Course Code	Paper Title	Course Outcomes
HISTORY	A student completing Bachelor's Degree in BA program in the subject of HISTORY will be able to:	RUAHIS101	HISTORY OF MODERN INDIA (1857 C.E. – 1947 C.E.)	Learners will acquire a deeper and more inclusive understanding of landmark events, personalities and themes in the modern Indian history.
	PSO 1 Develop ability to analyse historical and current events			
	PSO 2 Acquaint them with various ideas, institutions, forces and movements that contributed to the transformation of society	RUAHIS201	HISTORY OF MODERN INDIA (1857 C.E. – 1947 C.E.)	Learners will acquire a deeper and more inclusive understanding of Socio-economic changes, personalities and themes in the modern Indian history.
	PSO 3 Have adequate theoretical base and understanding of the internal dynamics of continuity and change from Ancient to colonial to Contemporary History of India and the World			
	PSO 4 Articulate their own views, re-examine existing concepts leading to research and finding solutions to societal problems	RUAHIS301	Landmarks in Global History (1453 C.E. – 1919 C.E.)	Learners will acquire a deeper and more inclusive understanding of landmark events, personalities and themes in theGlobal history.
	PSO 5 Develop ethical and social values and be sensitive to the environment, heritage and tradition of their own country and the others			
	PSO 6 Acquire basic skill in research Methodology and research writing			
	PSO 7 Obtain job opportunities in travel and tourism, heritage, media and archival management industries through exposure to skill based courses	RUAHIS302	History of Ancient India (From Earliest Times to 1000 A.D.)	Student will have better understanding of ancient period of Indian history .they will be able to trace the continuity and change in historical perspective. It will introduce students to history of India in chronological framework.
		RUAHIS401	Landmarks in Global History (1919 C.E. – 1945 C.E.)	Understand the process of modernization in West Asia and Soviet Union in early twentieth century under the leadership of Mustafa Kemal Pasha, Reza Shah and Joseph Stalin Trace the factors and events leading to the Chinese Revolution, 1911 with special emphasis on the role of Dr. Sun Yat Sen. Explain the concept of Zionism and its role in the creation of the State of Israel and gain knowledge about the Ideology and Origin of Arab Nationalism, Obtain insights into the concept of features of fascism in Europe and explain the nature, domestic reforms and the failure of the totalitarian governments in Italy and Germany under the dictatorship of Benito Mussolini and Adolf Hitler, Analyse the factors that led to the rise of militarism in Japan, Gain insights into the technology, military strategies and the causes, consequences of the second world war
		RUAHIS402	History of Ancient India (From Earliest Times to 1000 A.D.)	The course will enable the students to study the history of ancient India from an analytical perspective. It will acquaint the student with various approaches and interpretations of ancient history of India.
		RUAHIS501	History of Medieval India (Sultanate Period .)	Student will be able to understand transition of Indian history from ancient to medieval period in chronological framework. Students will learn medieval polity, society and culture in historical perspective.
		RUAHIS 502	MODERN INDIA (1857 C.E. – 2000 C.E.)	Learners will acquire a deeper and more inclusive understanding of landmark events, personalities and themes in the modern Indian history
		RUAHIS503	ACHAEOLOGY AND HERITAGE TOURISM	Learners will acquire a deeper and more inclusive understanding of Archaeology and heritage tourism.

RUAHIS504	**History of The Marathas**	**:** Student will learn significance of regional history and It will enhance their perception of 17th century India in context of Maratha history.
RUAHIS505	**History of Contemporary World (excluding Asia) (1945 -2000 A.D)**	The students will have deeper understanding of the events, personalities and movements in the contemporary world.
RUAHIS506	**General Knowledge and Current Affairs**	It will prepare the students to participate in various competitive examinations.
		It will enhance students general knowledge and acquaint them with current events in India and globally.
RUAHIS601	**History of Medieval India**	Student will be able to understand and interpret history of medieval India analytically and examine its impact on present-day Indian Polity and society.
	(Mughal India)	
RUAHIS602	**Contemporary India (1947 C.E. – 2000 C.E.)**	Learners will acquire a deeper and more inclusive understanding of landmark events, personalities and themes in the contemporary Indian history.
RUAHIS603	**MUSEOLOGY, ARCHIVAL AND LIBRARY SCIENCES**	Learners will acquire a deeper and more inclusive understanding of Museology, Archival science and Library science. Students will be aware of various career options
RUAHIS604	**History of The Marathas (Peshwa Period**	students will be able to analyze the Marathas policy of expansionism and its consequences. They will understand the role played by the Marathas in the 18th century India.
RUAHIS605	**History of Asia (1945-2000)**	**The students will have deeper understanding of the events, personalities and movements in the contemporary world.**
RUAHIS606	**General Knowledge and Current Affairs**	It will prepare the students to participate in various competitive examinations.
		It will enhance students general knowledge and acquaint them with current events in India and globally.

SUBJECT	Programme specific Outcomes	Course Code	Paper Title	Course Outcomes		
Political Science	Political Science students will be able to	**RUAPOL 101/201**	**INDIAN POLITICAL SYSTEM**	The students will be able to comprehend contemporary politics as a relationship between political institutions and political process		
	Comprehend the basic structures and processes of government systems and/or theoretical underpinnings.			The students will be able to critically evaluate the role of social factors on governance		
	Analyse political problems, arguments, information, and/or theories.	**RUAPOL 301/401**	**POLITICAL THEORY**	The students will be able to critically discuss the basic questions and issues related with our social, political and economic life such as liberty, equality, justice, role of civil society etc.		
	Apply methods appropriate for accumulating and interpreting data applicable to the discipline of political science.			The students will also understand various political ideologies and their relevance.		
	Critically assess the actions of actors in the political process and determine their motives.	**RUAPOL 302/402**	**PUBLIC ADMINISTRATION AND INDIAN ADMINISTRATION**	The students understand the key public issues and the ethical framework within which the political institutions operate, understand the interactive role of government organizations with business and non-profit sectors in planning and implementing public policies. The students also apply leadership theories and techniques to understand Government institutions.		
	Understand the decisions human beings make in political settings, including those regarding the forms of government available and understand the philosophical underpinnings of political systems, major ideologies, and political parties.					
		RUAACGAN301/401	**APPLIED COMPONENT PAPER- GANDHIAN THOUGHT**	Students will be able to demonstrate the knowledge and understanding of		
				· key features of the Gandhian philosophy of non-violence		
				· Gandhi's critique of Liberalism and Capitalism		
				· the impact of Gandhian political thought on Indian and global politics		
		RUAPOL501/601	**INTERNATIONAL RELATIONS**	The students develop a comprehensive approach to International Relations		
		RUAPOL502/602	**POLITICAL PROCESS IN MODERN MAHARASHTRA**	The students get the knowledge of significant issues in Maharashtra politics		
		RUAPOL503/603	**POLITICAL THOUGHT**	The paper helps to get an exposure to the rich treasure of both Western and Indian Political Thought.		
		RUAPOL504/604	**POLITICAL SOCIOLOGY**	The students understand how various political institutions and processes that creates a long reaching impact on a society. The Students also learn the impact of modernization and development on the social and political currents of a state.		

		RUAPOL505/605	UNDERSTANDING POLITICS THROUGH FILMS	The students will be able to analyse political concepts and events, public policy, political behaviour and visions of politics and society as presented in films. It will help develop critical thinking the skills of description, appreciation and interpretation and promote independent thinking		
		RUAPOL506/606	AMERICAN POLITICAL SYSTEM	The students will be able to understand how US constitution started working and how different branches of the government work		

DEPARTMENT PHILOSOPHY

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE	PAPER TITLE	COURSE OUTCOMES
PHILOSOPHY	1. Understand and appreciate the framework of morality in the Indian and western context 2. Critically analyze daily life situations and problems and come up with efficient solutions Comprehend the underlying moral dimensions of any given situation, analyze them and make morally sound judgements 3. Appreciate the deep rooted heritage of Indian and western philosophical thought and it's influence on the society. 4. Imbibe the values of tolerance, secularism, acceptance, objectivity and respect to other A4 faiths, beliefs, opinions and different. 5. Cultivate a spirit of rationality and logical thinking by enhancing argumentative and analytical skills involved in philosophical reasoning. 6. Bring various theoretical and philosophical concepts to the realm of reality and learn their implications to real life. 7. Develop an ethical understanding about different contemporary issues concerning the current society.	**RUAPHI101/201**	**Moral Philosophy**	•To familiarize students with significant contributions from the history of moral philosophy •To inculcate in students a sense of moral reasoning based on analytical reasoning rather than on dogmatic assertion •To provide students with an ethical framework for assessing moral decisions in different areas of life. •To encourage students to appreciate the relevance of different moral cultures and outlooks in a globalized world
		RUAPHI301/401	**Philosophy of Religion**	•To familiarize the students with philosophical aspects and issues that arise in of philosophy of religion. •To encourage and develop in students an analytical and critical attitude in assessing theories in the philosophy of religion. •To acquaint the students of the important approaches and challenges to religion. •To make a critical review of philosophically relevant questions in religion. •To develop a philosophical framework within which religious pluralism and the possibility/impossibility of Universal religion can be explored.
		RUAPHI302/402	**Indian / Western Philosophy**	•To introduce and acquaint students with Indian philosophical system •To acquire a basic understanding of the thrust philosophical ideas and questions that arise in Indian philosophical systems •To enhance students' ability to critically reflect, analyze and evaluate such views •To acquaint students with the basic philosophical questions that philosophers in the Greek and medieval tradition have addressed. •To equip students with argumentative and analytical skills involved in philosophical reasoning. •To encourage a spirit of rationality in philosophizing while appreciating and respecting differing philosophical systems and perspectives.

RUAPHI501/601	**Indian Philosophy**	•To introduce and acquaint students with Indian philosophical system beginning with Nyaya darsana, Vaisesika, Samkhya, Purva & Uttara Mimamsa. •To acquire a basic understanding of the thrust philosophical ideas and questions that arise in Indian philosophical systems •To enhance students' ability to critically reflect, analyze and evaluate such views •To introduce and acquaint students with philosophers beginning with rationalism of Rene Descartes to analytic philosophy of Wittgenstein •To acquire a basic understanding of the main philosophical ideas and questions that arise especially in metaphysics and epistemology during this period •To enhance students' ability to critically reflect, analyze and evaluate philosophical arguments
RUAPHI502/602	**Philosophy of Religion**	•To familiarize the students with philosophical aspects and issues that arise in of philosophy of religion. •To encourage and develop in students an analytical and critical attitude in assessing theories in the philosophy of religion. •To acquaint the students of the important approaches and challenges to religion. •To make a critical review of philosophically relevant questions in religion. •To develop a philosophical framework within which religious pluralism and the possibility/impossibility of Universal religion can be explored.
RUAPHI503/603	**Living Ethical Issues**	•To acquaint students with the different religious and secular approaches to the environment; •To develop in students an understanding of the underlying principles and implications of the different approaches for making decisions about the environment; •To introduce students to the ethical issues that arises in media/ journalism and how to assess the strengths and weakness of philosophical positions in that regard. •To introduce students to identify ethical issues that arise in contemporary society in the area of health, medical technology and sexuality; •To learn by examining critically and analytically the philosophical arguments for and against different positions in these areas; •To develop students' competence for ethical reflection based on rational arguments
RUAPHI504/604	**Philosophy of Bhagvad Gita**	•To achieve an understanding of the overall structure, purpose and content of Bhagavad Gita •To explore and interpret philosophical ideas of Gita through reading of the text •To relate Gita's social, political and ethical ideas within a contemporary context. •To achieve an understanding of the overall structure, purpose and content of Bhagavad Gita •To explore and interpret philosophical ideas of Gita through reading of the text •To relate Gita's social, political and ethical ideas within a contemporary context.
RUAPHI505/605	**Logic**	•To introduce various techniques involved in traditional and formal logic. •To master the theory underlying these techniques •To equip the student with knowledge while enabling him/her to appear for any competitive examination involving logic.

RUAPHI506/606	**Philosophy of Yoga**	•To eradicate misconceptions about Yoga •To acquaint students with the tenets of Patanjala-Yoga •To provide the theoretical structure for the practice of Yoga •To explore various applications of Yoga •To sensitize the learners about the advantages of taking up Yoga •To bring out how yoga enables to lead Quality-Life of Purity and Integrity •To develop ethico-spiritual perspective among learner

T.Y.B.A. -PSYCHOLOGY

PROGRAMME OUTCOMES	PROGRAMME SPECIFIC OUTCOMES	PAPER CODE	PAPER TITLE	COURSE OUTCOMES
(1) Student will be able to understand behaviour from the bio-psycho-social perspective.				
	(1) Students will be able to scientifically understand the Concepts related to psychology	**RUAPSY501, RUAPSY601**	**PSYCHOLOGICAL TESTING AND STATISTICS**	(1) Students are able to explain the basic concepts related to Psychological testing.
(2) Student will be able to evaluate the different theories underlying behaviour.			**Part I and Part II (Paper I)**	
	(2) Student will be able to Demonstrate the skills to administer, score and interpret psychological tests			(2) Students are able to evaluate the different types of reliability, validity, norms, sampling and other characteristics of psychological tests.
(3) Student will be able to apply the implications of different theories to understanding of the behaviour of others as well as their own behaviour.				
	(3) Student will be able to think critically of the different theories in psychology			(3) Students are able to discuss the nature and issues related to intelligence and personality testing.
(4) Student will be able to analyse the social situations using the different psychological principles.				
	(4) Student will be able to conduct independent research and analyse data.to draw appropriate conclusions on topics related to psychology			(4) Students are able to explain the use of statistics and different statistical methods in psychology.
(5) Students will be able to conduct independent research to understand the factors underlying different behaviour.				
	(5) Student will be able to communicate effectively the various concepts and theories of different areas of Psychology.			(5) Students are able to use basic statistical procedures used in psychology.
(6) Students will be able to apply the theories of behaviour to deal with problems faced by themselves as well as others.				
	(6) Student will be able to demonstrate information literacy regarding different concepts related to sub-fields of Psychology like Psychological testing, Industrial Psychology etc.	**RUAPSY502, RUAPSY602**	**ABNORMAL PSYCHOLOGY**	(1) Students are able to explain the meaning of abnormality and the different perspectives of abnormality.
			Part I and Part II (Paper II)	
	(7) Student will be able to critically evaluate and implement ethical principles of counselling and research			(2) Students are able to understand the major psychological disorders, their symptoms, factors and the interventions to deal with them.
	(8) Student will be able to apply psychological knowledge and skills to areas like industries and clinical set up			(3) Students are able to discuss and evaluate the different theories and intervention strategies for different psychological disorders.
		RUAPSY503, RUAPSY603	**INDUSTRIAL PSYCHOLOGY**	1. Students are able to explain the nature of basic concepts in and various facets of Industrial and Organizational Psychology
			Part I and Part II (Paper III)	
				2. Students are able to explain the different psychological factors and processes in the world of work
				3. Students are able to explain and analyse the concepts of research methods used in Industrial and Organizational Psychology
		RUAPSY504, RUAPSY604	**COGNITIVE PSYCHOLOGY**	1. Students are able to explain the nature of the fundamental concepts of Cognitive Psychology and the basic Cognitive processes
			Part I and Part II (Paper III)	
				2. Students are able to explain the applications of Cognitive processes in everyday life.
				3. Students are able to analyse the different theories of cognitive
		RUAPSY505, RUAPSY605	**PRACTICALS IN COGNITIVE PROCESSES AND PSYCHOLOGICAL TESTING**	1. Students are able to explain the basic concepts and process of Experiments like --experimental designs, methodology and conduct of experiments, statistical analysis, interpretation and discussion of data.
			Part I and Part II (Paper V)	
				2. Students are able to administer, score and interpret different psychological tests.
				3. Students are able to conduct and write a report on manually conducted and computer-based experiments (Coglab)

		4. Students are able to independently conduct a research related to human behaviour and write a report on the same.
RUAPSY506, RUAPSY606	**COUNSELING PSYCHOLOGY**	1. Students are able to explain the nature, process, goals, techniques, ethical issues related to counselling.
	Part I and Part II (Paper VI)	
		2. Students are able to analyse and synthesize the major theories in Counseling Psychology
		3. Students are able to apply the principles of counselling to different areas of human life.
		4. Students are able to explain the various issues related to Counseling as a career.

COMMERCE

2019-20 SYLLABUS

SUBJECT	Programme specific Outcomes	Course Code	Paper Title	Course Outcomes
COMMERCE	Ø Gain insights into the key concepts of business and financial sectors and evaluate the challenges of the changing business environment.	**RUACOM101**	**Introduction to Business Organisation**	After completing this course a student will be able to
	Ø Develop entrepreneurial skills to identify business opportunities and apply analytical perspectives to take fitting decisions using ethical approach.			Ø Identify different types of business organizations
	Ø Identify and apply novel practices in leveraging the role of business corporations in the context of sustainability and social responsibility.			Ø Outline the rules related to forms of business organizations
	Ø Demonstrate leadership qualities to conduct team work, manage and solve problems creatively in complex business scenario.			Ø Outline the nature of business organizations
	Ø Develop and sharpen communicative competencies pertinent in modern business settings.			
COMMERCE	Ø Acquire conceptual knowledge of current marketing practices and identify and design tools and techniques of marketing.	**RUACOM201**	**Introduction to Business Sector**	After completing this course a student will be able to
	Ø Design strategies to manage human resource effectively and facilitate organization development.			Ø Identify different types of banks
	Ø Recognize the role of financial management and analyze the financial information of business corporations.			Ø Equip the students with the knowledge of banking functions
	Ø Identify export opportunities in terms of products and markets, track sources of information for export business and apply export procedures.			Ø Outline the factors affecting the current business environment
				Ø Analyse the retail industry prospects
COMMERCE		**RUACOM301**	**Financial Management**	After completing this course a student will be able to
				Ø Identify different types of sources of funds
				Ø Outline the determinants of capital structure and financial planning
COMMERCE		**RUACOM302**	**Introduction to Marketing**	After completing this course a student will be able to
				Ø Be proficient and knowledgeable about the contemporary marketing practices
				Ø Analyseconsumers'behaviour and use them in designing marketing strategies
				Ø Evaluate the environment of marketing and apply the STP of marketing (segmentation, targeting, positioning)
COMMERCE		**RUACOM401**	**Financial Management**	After completing this course a student will be able to
				Ø Identify factors and approaches of working capital
				Ø Identify methods of marketing securities
				Ø Recognize and apply the concepts of mutual funds and FDI
COMMERCE		**RUACOM402**	**Introduction to Marketing**	After completing this course a student will be able to:
				Ø Planning, designing and implementing marketing strategy to achieve the long-term objectives
				Ø Equip the students with frameworks and in enhancing the effectiveness of marketing programmes
COMMERCE		**RUACOM501**	**Introduction to Management**	After completing this course a student will be able to
				Ø Identify and describe the theories of Management
				Ø To work as contributing members of a team utilizing these functions of management.
				Ø Practice the process of management's functions: planning, organizing, decision making and delegating.
				Ø Evaluate managerial skills and the ways in which these might be developed.

COMMERCE		**RUACOM502**	**Human Resources Management**	After completing this course a student will be able to
				Ø Identify relevant issues in human resource management.
				Ø Design a training program using a useful framework for evaluating training needs
				Synthesize information regarding the effectiveness of recruiting methods and the validity of selection procedures and make appropriate staffing decisions
COMMERCE		**RUACOM601**	**Introduction to Management**	After completing this course a student will be able to
				Ø Identify and apply key management skills in communication and controlling
				Ø Determine the core features of production and materials management
COMMERCE		**RUACOM602**	**Human Resources Management**	After completing this course a student will be able to
				Ø Identify the issues and Laws Relating to Human Resource Management
				Ø Evaluate leadership styles to anticipate the consequences of each leadership style
				Ø Observe and evaluate the current practices of human resource management.
COMMERCE		**RUACOM503**	**Export Management**	After completing this course a student will be able to
				Ø Assessment of export opportunities and international markets analysis.
				Ø Developing and implementing export plans and programs effectively
				Ø Identify relevant issues in export trade.
		RUACOM603	**Export Management**	After completing this course, as student will be able to
				· To identify products for exports and prepare export plans
				· To recognize practices and procedures in exports.
				· To identify and assess the foreign markets and sources of financing for export business

Department : Communication and Media

SUBJECT	Programme specific Outcomes	Course Code	Paper Title	Course Outcomes
Communication and Media	A student completing Bachelor's Degree in Arts program in the subject of Communication and Media will be able to:	**RUACM101**	**Effective Communication Skills**	To make the students aware of functional and operational use of language in media.
	Learners will be able to interpret the knowledge of journalism in filed reporting.			To equip or enhance students with structural and analytical reading, writing and thinking skills.
	Learners will be able to use explore scope in content generation through practical assignments.			
	Learners will be able to work practically in making of newspaper/magazine as per the industry requirement.			To introduce key concepts of communications
	Recognize and appreciate the role various socio- economic, political and cultural institutions.			
	Understand the present day problems and challenges and its implications on development in media & society.			To equip students with structured and analytical thinking skills
	Learners will be able to develop reading habits that keep them aware of current affairs, local, national, and world.			
	Learners will be able to gain a perspective on the evolution of media in the last 25 years and on key current trends.			To teach presentation skills and effective use of presentation aids in Marathi, Hindi and English
		RUACM102	**Foundation Course I**	To introduce students to the overview of the Indian Society. Students will be aware of current political scenario To help them understand the constitution of India. To acquaint them with the socio-political problems of India.
		RUACM103	**Visual Communication**	To provide students with tools that would help them visualize and communicate. Understanding Visual communication as part of Mass Communication To acquire basic knowledge to be able to carry out a project in the field of visual communication

		To acquire basic knowledge in theories and languages of Visual Communication The ability to understand and analyze visual communication from a critical perspective
RUACM104	**Fundamentals of Mass Communication**	To introduce students to the history, evolution and the development of Mass Communication in the world with special reference to India. To study the evolution of Mass Media as an important social institution. To understand the development of Mass Communication models To develop a critical understanding of Mass Media. To understand the concept of New Media and Media Convergence and its implications.
RUACM105	**Current Affairs**	To provide learners with overview on current developments in various fields. To generate interest among the learners about burning issues covered in the media To equip them with basic understanding of politics, economics, environment and technology so that students can grasp the relevance of related news. Twenty minutes of newspaper reading and discussion is mandatory in every lectur
RUACM106	**History of Media**	Learner will be able to understand Media history through key events in the cultural history To enable the learner to understand the major developments in media history. To understand the history and role of professionals in shaping communications. To understand the values that shaped and continues to influence Indian mass media. Learner will develop the ability to think and analyze about media. To sharpen the reading, writing, speaking and listening skills that will help the students to understand the development of Media
RUACM201	**Effective communication –II**	To make the students aware of use of language in media and organization. To equip or enhance students with structural and analytical reading, writing and thinking skills To introduce key concepts of communications.
RUACM202	**Foundation course –II**	To introduce students to the overview of the Indian Society. To help them understand the constitution of India. To acquaint them with the socio-political problems of India.
RUACM203	**Content Writing**	To provide students with tools that would help them communicate effectively. Understanding crisp writing as part of Mass Communication The ability to draw the essence of situations and develop clarity of thought.
RUACM204	**Introduction to Advertising**	To provide the students with basic understanding of advertising, growth, importance and types. To understand an effective advertisement campaigns, tools, models etc. To comprehend the role of advertising , various departments, careers and creativity To provide students with various advertising trends, and future

		Students will learn the basics of Advertising Students will gain the knowledge of global advertising Students will learn about cultures and ethics of advertising in various societies
RUACM205	**Introduction to Journalism**	To give students an understanding of the history and development of journalism in the global and the Indian context Introduce students to concepts related to news and journalistic practice To help media students to acquaint themselves with an influential medium of journalism that holds the key to opinion formation & to create awareness
RUACM206	**Media, Gender & Culture**	To discuss the significance of culture and the media industry. To understand the association between the media, gender and culture in the society. To stress on the changing perspectives of media, gender and culture in the globalised era.
RUAMM301	**Creative Writing**	To encourage students to read stories, poems, plays to develop further and build upon the writing and analytical skills acquired in Semesters I and II
		To acquaint students with basic concepts in literary writing
		To familiarize students with the creative process
RUAMM302	**Introduction to Culture Studies**	To introduce students to a set of approaches in the study of culture To examine the construction of culture To understand how the media represents culture
RUAMM303	**Introduction to Public Relations**	Students will be aware of person to person communication Students will have sensibilities to utilise public relations in corporate communication To prepare students for effective & ethical public communication on behalf of organisations4. To help students acquire basic skills in the practical aspects of Media Relations & Crisis Management To equip students with basic skills to write & develop Press Release& other PR communication.
		To design a PR campaign.
RUAMM304	**Media Studies**	Students will be familiar with media theories Students will understand the process of media evolutions Students will be able to draw a relationship between theories and reality To expose students to the well developed body of media theory and analysis To foster analytical skills that will allow them to view the media critically
RUAMM305	**Undestanding Cinema**	Students will view Cinema as a medium of Mass Communication and help them to become critical viewers of movies today. a. From A Personal Point Of View b. From A Social Point Of View c. From A Business Point Of View (in context of Box Office Success) The students should get to study the similarities and differences between various movie cultures. (Have a contextual understanding)

		The students should get to study Indian cinema through its similarities and differences with both Indian & Western traditions of art and culture.
RUAMM306	**Advance Computers**	Students will learn the technical aspects of media. Students will utilize the software for practical purpose To equip the students with a understanding of industry knowledge required to make a career in the field of print and Advertising, Digital Marketing, Television media, Film etc. To train them with the software knowledge required in the above mentioned Industries.
RUAMM401	**Introduction to Advertising**	Students will learn the basics of Advertising Students will gain the knowledge of global advertising Students will learn about cultures and ethics of advertising in various societies To provide the students with basic understanding of advertising, growth, importance and types. To understand an effective advertisement campaigns, tools, models etc. To comprehend the role of advertising , various departments, careers and creativity To provide students with various advertising trends, and future
RUAMM402	**Introduction to Journalism**	To give students an understanding of the history and development of journalism in the global and the Indian context Introduce students to concepts related to news and journalistic practice To help media students to acquaint themselves with an influential medium of journalism that holds the key to opinion formation & to create awareness
RUAMM403	**Mass Media Research**	Students will understand the importance of data research in media Students will understand the basic research methods being used in media research To introduce students to debates in Research approaches and equip them with tools to carryon research To understand the scope and techniques of media research, their utility and limitations
RUAMM404	**Organizational Behaviour**	Students will learn the types of various media organisations Students will understand organisational ethics and culture Orienting students to issues in organizational functioning To introduce students to the concepts given below at a preliminary level
RUAMM405	**Radio and Television**	The course will make students aware of the evolution of broadcast media Students will undergo a practical experience of generating broadcast media content To introduce the basic terms and concepts of broadcasting To give an overview of the structure and function of the broadcast industry To create an awareness of the development of broadcast media and current trends
RUAMM406	**Print Production and Photography**	Students will get familiar with the technical aspects of camera and photography Students will learn about the various techniques to handle camera

		Students will be able to converge the practical and theoretical knowledge of print and photography To help students understand the principles and practice of photography To enable students to enjoy photography as an art.
RUAMMJ501	**Reporting**	The subject will make students aware of basic principles of Reporting Students will get more familiar with ethics of Reporting Students will be able to analyse the reality of world media reporting Certain basic principles: Accuracy, Objectivity, Clarity and speed The need to verify news. On the spot coverage, checking with the sources, double checking for controversial stories Understanding New Values
RUAMMJ502	**Editing**	Students will learn the important aspects of editing Students will learn various methods of editing which they will be utilising in their professional life Students will be familiar with the media technicalities To allow improvement in language skills To impart skills required of a sub-editor
RUAMMJ503	**Features and Opinion**	Commenting on differences between reporting and feature writhing, the special skills needed for feature / Opinion writing Role of opinion writing the need for mature thinking and professional experience
RUAMMJ504	**Journalism and Public Opinion**	The course targets at making students aware of various media theories and their evolution with respect to historical perspective This subject will enlighten the students to draw the parallel between media content and public opinion To examine critically the relationship between the media and public, how much does the media influence public opinion Which are the agencies manipulating this process of influencing public opinion
RUAMMJ505	**Indian Regional Journalism**	The course aims to make students aware of the contribution of vernacular press in India It exhibits the diversity of India's regional press and its importance in history and in contemporary times. Study the evolution, growth and role in modern-day India of Indian newspapers other than in English Case studies of Hindi, Marathi, Telugu and Urdu newpapers Role of language papers in fostering socio – cultural development in their areas of circulation Study intimacy between readers and language newspaper
RUAMMJ506	**Newspaper and Magazine Making**	Understanding technical aspects is equally important as writing or producing news The journalism students in this course will not only learn to produce the content; but, they will also be able to design and publish their magazine They will be aware of A to Z aspects of news media – from gathering news to designing the final product.

		This paper shall introduce the students to the art of newspaper and magazine design and will orient them towards the practical aspects of newspaper - magazine making.
RUAMMA501	**Advertising in Cotemporary Society**	Understand the contemporary changes in post globalization trends in advertising. Capture differences between culture of various regions, study the aspects related to marketing. Study market segmentation & its use in campaign. To recognize the roles of advertising in modern society To understand the current developments and problems concerning advertising as an economic and social force. Appreciate the increasingly international nature of advertising. To analyze the interdependent nature of advertising and popular culture
RUAMMA502	**Copywriting**	Develop creative aspect of advertising. Write advertising campaign. Write creative brief and prepare practical content in print and digital advertising. To familiarize the students with the concept of copywriting as selling through writing To develop their inherent writing skills To train students to generate, develop and express ideas effectively To familiarize students with contemporary advertising techniques and Practices
RUAMMA503	**Brand Building**	To provide an introduction to the concepts and practices of contemporary brand management. To understand the appropriate strategies and tactics to build, measure and manage Brand Equity. To learn to plan an effective advertising campaign Understand the process of branding of a product. Design and learn advertising campaign. Study various brand building strategies.
RUAMMA504	**Consumer Behaviour**	To introduce the students to the complexities of consumer behaviour Understand the connection between psychology and advertising. Follow Components, Process of Marketing Communication. Study Social& Cultural aspects of Marketing & its impact on Consumer Behaviour.
RUAMMA505	**Media Planning and Buying**	To develop knowledge of major media characteristics and buying advertising space in them to develop an understanding of procedures, requirements, and techniques of media planning. Study function of Media planning in advertising. Follow Digital Media Buying policies. Study selection of media vehicles
RUAMMA506	**Advertising Design**	To expose students to the creative and technical aspects of art direction Understand Design as a language of emotions/ Communication.

		Design Logo as a company face/ Brand identity/ Character/ Class Develop process of Idea generation (Brainstorming/Mind-mapping)
RUAMMJ601	**Press Laws and Ethics**	The students will be aware of legal aspects involved in journalism They will also understand the limitations and shortcomings involved in the field Free press comes with certain ethical issues.
RUAMMJ602	**Broadcast Journalism**	The course will attempt to make students aware of the evolution of television media It will enable them to generate content for broadcast media including script writing To understand the development of broadcast journalism in India ¾ Lean skills and techniques required for broadcast journalism ¾ To learn how to handle equipment- a camcorder and recorder – for a story ¾ Regional language broadcast journalism to be examinaed as a growing and flourishing field Learn skills and techniques required for broadcast journalism To learn how to handle equipment- a camcorder and recorder – for a story Regional language broadcast journalism to be examinaed as a growing and flourishing field
RUAMMJ603	**News Media Management**	The course will enable students to view media from the entrepreneurial perspective It will make students aware of the financial and other management issues involved in media understanding To make students aware of the structure, functioning and responsibilities of managements of media orgainsations To create awareness of laws governing media orgainsations and their complexities in a globalised world in the wake of an information explosion.
RUAMMJ604	**Issues In Global Media**	The course outlines the distinction between national and international press It will help the students to view socio-economic-political issues from local to global perspective The course outlines the distinction between national and international press Examine global journalism as a newly emerging reality – it's implications, strengths and weakness To examine the journalistic scene in S.Asia ¾ Learning about the Internet as a news medium Equipping stuetns with basic skills required for internet reporting and editing
RUAMMJ605	**Business and Magazine Journalism**	The course will take journalism students beyond the clichés of contemporary media It will explore a very niche media world of magazine journalism The students will also be aware of very basic economic issues and media coverage of them.
RUAMMJ606	**Contemporary Society**	To sensitise students to the environment around them Developing a perspective towards issues related to the marginalized sections of the society The students will review various current issues concerning the planet

		Students will be made aware of the role of media in creating an awareness regarding such issues
RUAMMJ607	**Digital Media**	This is a new subject that deals with new media Students will learn about the various tools of new media and their technical aspects Students will utilise these tools to promote their own content.
RUAMMMJ601	**Advertising and Marketing Research**	Understand Need and Importance, Scope of Research Design. Study Advertising Research Develop techniques of good report writing. To discuss the foundations of research and audience analysis that is imperative to successful advertising.
RUAMMJ602	**Legal Environment and Advertising Ethics**	Understand the legal aspect related to advertising. Study ethical aspect of advertising. Study Laws pertaining to Media To provide a perspective on the Legal Environment in India. To guide students of media through the various ethics connected to Advertising. Maharashtra state centric cases to be discussed in class as the situation demands.
RUAMMJ603	**Fianancial Management for Marketing and Advertising**	Study how to do Financial Planning for a Marketing Unit Study the relevance of costing in marketing decision making. Read and understand various Financial statements
RUAMMJ604	**Agency Management**	Understand the role, Functions of an advertising agency. Study Advertising campaign management Develop Promotion Management techniques. To expose students to the business of advertising To familiarize students with the different aspects of running an ad agency
RUAMMJ605	**The Principles and Practice and Direct Marketing**	Study the customers mix and management of the Key customers Study Relationship of IMC with Direct Marketing Develop Direct Marketing Strategies. What Direct marketing is, including direct marketing terminology How direct marketing differs from “traditional marketing” Direct marketing techniques
RUAMMA606	**Contemporary Society**	To sensitise students to the environment around them Developing a perspective towards issues related to the marginalized sections of the society The students will review various current issues concerning the planet Students will be made aware of the role of media in creating an awareness regarding such issues
RUAMMA607	**Digital Media**	This is a new subject that deals with new media Students will learn about the various tools of new media and their technical aspects Students will utilise these tools to promote their own content.

The students are trained to develop hands-on skills that will significantly boost their industrial acceptability and employability. The aim is to ensure that the Higher Education system incorporate the requirements of various Industries in an innovative and flexible manner, to ensure that the graduates have adequate knowledge and skills for Employment and Entrepreneurship. The students are assessed by the Agriculture Skill Council , Govt. of India on regular basis and are awarded certificates accordingly. The department has successfully produced a good number of entrepreneurs, consultants as well as students working in various organizations. This programme aims at producing skilled entrepreneurs and skilled informed personnel for jobs.		
SUBJECT	**Programme specific Outcomes**	**Course Code**

GREEN HOUSE MANAGEMENT	The global population is constantly in the rise. This has created a constant demand for food. The loss of land to urbanization, migration of the rural population to cities in search of livelihood has taken a toll in the agricultural produce particularly in countries like India. Increase in excessive use of fertilizers, pesticides and insecticides leading to the loss of fertility of land, increase in various diseases after consumption of food containing pesticide residues calls for growing clean food. This course focuses on empowering the students to grow clean food using various techniques of conventional, non- conventional as well as alternate methods for growing food both in urban and rural areas. The aim of the program is to produce entrepreneurs and / or employees who would be able to assist growers to grow food scientifically.	
		RUVGHM101
		RUVGHM102
		RUVGHM103

		RUVGHM104
		RUVGHM105
		RUVGHM106
		RUVGHM201
		RUVGHM202
		RUVGHM203
		RUVGHM204
		RUVGHM301

		RUVGHM302
		RUVGHM303
		RUVGHM304
		RUVGHM305
		RUVGHM306
		RUVGHM401
		RUVGHM402
		RUVGHM403
		RUVGHM404

		RUVGHM501
		RUVGHM502
		RUVGHM503
		RUVGHM504
		RUVGHM505
		RUVGHM506
		RUVGHM601
		RUVGHM602
		RUVGHM603

Paper Title

FYBVoc, GHM /DIPLOMA GHM
SOIL AND WATER MANAGEMENT - I
INTEGRATED NUTRIENT MANAGEMENT - I
INTEGRATED PEST MANAGEMENT - I

INTRODUCTION TO PROTECTED CULTIVATION - I
COMMUNICATION SKILLS – I & ICT SKILLS – I AND BUSINESS SKILLS – I
ENVIRONMENTAL STUDIES - I
PROTECTED CULTIVATION - I
HARVESTING - I
COMMUNICATION SKILLS – II & ICT SKILLS – II
BUSINESS SKILLS – II & MANAGERIAL SKILL - I
SYBVoc, GHM /ADVANCED DIPLOMA GHM
SOIL AND WATER MANAGEMENT - II

INTEGRATED NUTRIENT MANAGEMENT - II
PROTECTED CULTIVATION - II
INTEGRATED PEST MANAGEMENT - II
COMMUNICATION SKILLS – III & ICT SKILLS – III
BUSINESS SKILLS – III & MANAGERIAL SKILL - II
PROTECTED CULTIVATION - III
HARVESTING - II
ACCOUNTING - I
MARKETING - I & SUPPLY CHAIN MANAGEMENT - I

TYBVoc, GHM / BVoc GHM
SOIL AND WATER MANAGEMENT - III
INTEGRATED NUTRIENT MANAGEMENT - III
PROTECTED CULTIVATION - IV
POST- HARVEST MANAGEMENT & VALUE ADDITION
MANAGERIAL SKILLS - III
MARKETING - II & SUPPLY CHAIN MANAGEMENT - II
PROTECTED CULTIVATION - V
ACCOUNTING - II
MARKETING - III

Course Outcomes

As an outcome of the course, the students find jobs in many hydroponics start up companies. They also find job as per the job roles prescribed by the ASCI (Agriculture Skill Council of India). Firms engaged in Nursery Management are eager to recruit our students because of their skills in the field of plant propagation techniques both natural, artificial and also through plant tissue culture.
To identify the different types and properties of soil and prepare the soil as per plant requirement.
To identify various deficiency symptoms and be able to rectify it.
To understand the concept of plant pathology , importance of insects and diseases.

To understand the concept, principles, importance, construction, designing and costing of greenhouse.
Also be able to manage a full fledged nursery.
To be able to write their cv, appear for interview. Formal application letters and be aware of the basics of a business organization , its types , merits and demerits of sole trading concern, partnership and joint stock companies.
To be able to understand the adverse environmental impact and impact of fertilizers / pesticides on human health, Reading pesticide labels
To be able grow specific crops under protected cultivation and propagate plants through various artificial means
To be able to indentify the harvesting indices, harvesting implements. Have knowledge about post harvest handling
To be able to keep records, write reports and have basic knowledge of ICT.
To be able to manage meetings, gain certain managerial skills.
To be able to have a thorough knowledge of installation of drip irrigation system and selection of irrigation system as per the crop requirements.

To be able identify symptoms of deficiency, functions of the major plant nutrients and will be able to calculate the dosage of fertilizer and nutrient.
To be able to grow leafy vegetables in the greenhouse both in soil and soilless, on their own.
To be able toidentify and control the infecting disease and infesting pest, follow the IPM rules, to scout for diseases and pests in the greenhouse and suggest a control measure. They will also be well versed with all the quarantine rules
To be able to communicate effectively, appear for interviews confidently, MS office outlook, Power point presentation, email
To be able tomake their own business plan, have knowledge of different government policies. They will also have the knowledge of the basics of managerial skills.
To have sound knowledge of different harvesting techniques required to harvest the crops grow in the greenhouse
To be able to select the appropriate techniques required to harvest the plants they have grown.
To be able to understand and do some basic accounting, maintain journals and ledger.
To be able to understand the various aspects of marketing and chain supply management.

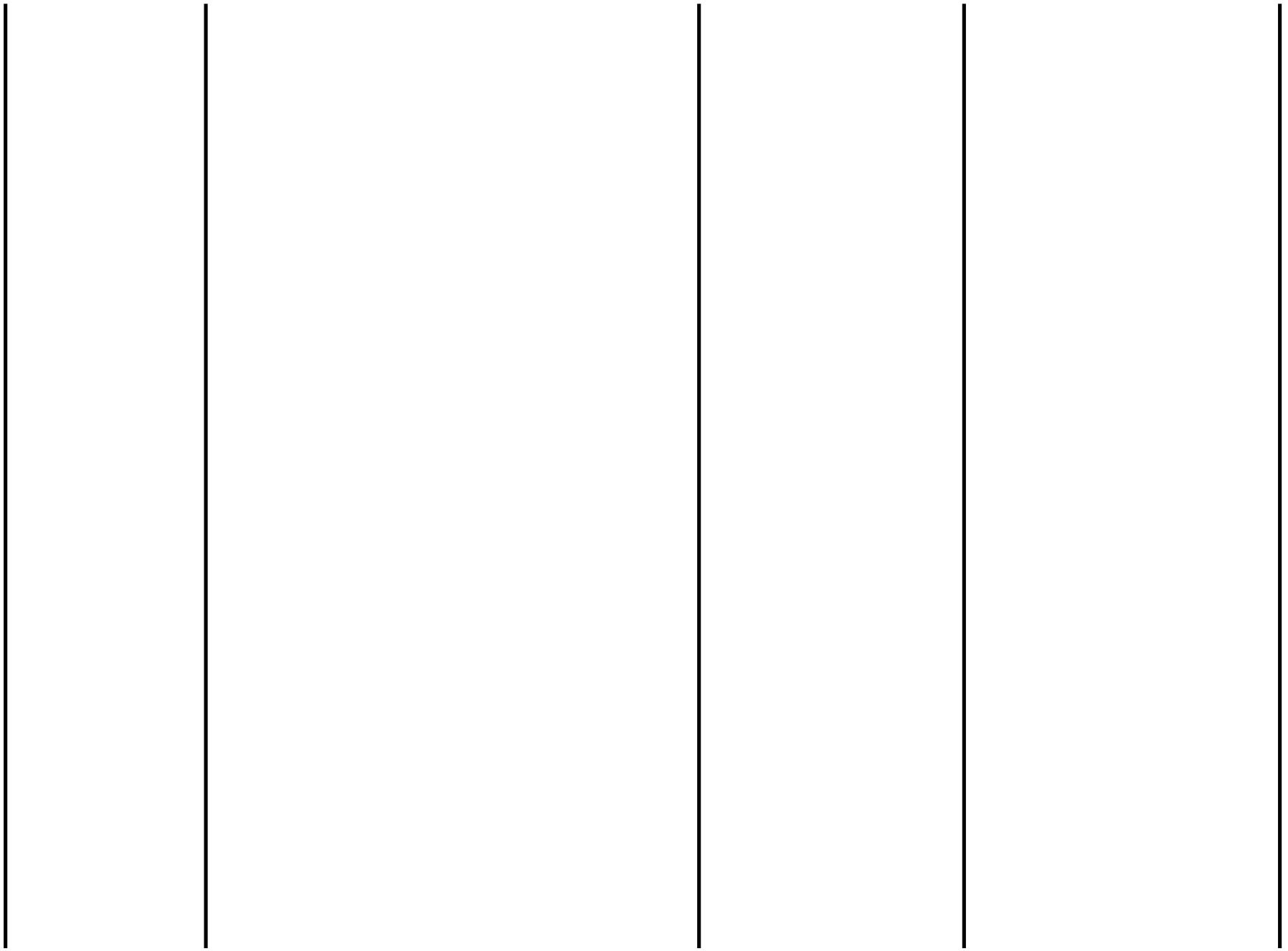
To be be able to suggest an appropriate irrigation system for a given crop ,site and climatic condition. They should be able to reclaim the land of an abundant greenhouse and also able to install and maintain the sprinkler irrigation system.
To be able to suggest appropriate fertilizer for the right crop.
To be able to cultivate cut flowers in greenhouse and also learn the alternative means of cultivation
To be able to acquire the skill of packing, storing, grading and also preparing various value added products
To be be able to be trained in various types of communication skills required for building up a business, make them aware about the required management skills and their individual as well as business social responsibilities.
To be able to understand the market of their products and also be able to use computers for business promotion.
To be able to cultivate vegetable crops under protected cultivation and manage any given greenhouse.
To be able to learn the basics of accounting. Taxing , patenting.
To be able to understand and practise the various means of marketing their products including advertising, budgeting.

DEPARTMENT **B.Voc Tourism and Travel Management**

SUBJECT	PROGRAMME SPECIFIC OUTCOMES	COURSE CODE	PAPER TITLE
B.Voc Tourism and Travel Management	Develop knowledge, understanding and expertise in their chosen field of Tourism and Travel Management (through theory and practical components). Understand theoretical concepts and niche tourism concepts for sustainable growth of tourism activities. Contextualize tourism within broader cultural, environmental, political and economic dimensions of society. Exhibit effective oral communication through personal interaction as well as classroom presentations, individually or as part of a group, to a larger audience. Demonstrate critical thinking and analytical skills through writing and verbal assessments. This shall enable the candidates for developing leadership and entrepreneurship qualities for job prospects	RUVTTM101 to RUVTTM106 & RUVTTM201 to RUVTTM206 Semester: I & II 1st year: Diploma (Tour Management and MICE),	Introduction to History Foundation Course Basic Communication Skills Tourism Overview Indian Tourist Attraction I Tour Management Introduction to Indian Culture Communication Skills II Computer Application Documentation Indian Tourist Attractions II MICE

B.Voc Tourism and Travel Management	Develop knowledge, understanding and expertise in their chosen field of Tourism and Travel Management Develop an understanding of tourism-based concepts and its impact on environment and economy Understand theoretical concepts and niche tourism concepts for sustainable growth of tourism activities.	RUVTTM301 to RUVTTM306 & RUVTTM401 to RUVTTM405	Principles of Management Human Resource Management World Heritage Studies

	Understand tour management, operations, aviation industry and global distribution systems and their use for practicing in the industry. Contextualize tourism within broader cultural, environmental, political and economic dimensions of society. Critique tourism practices for their implications locally and globally. Apply relevant tourism technology and software for the creation and management of tourism experiences. Sensitize students to take up research-based activities and methods for interpretation of tourism data to understand travel trends, tourism promotion, destination management and city concepts Provide opportunities to excel in academics, research and industry.	Semester: III & IV 2nd year: Advanced Diploma (Tour Planner)	Tourism Planning Domestic Tour Operations World Geography Research Methodology GK and current Affairs Business Communication Skills Introduction to GDS Internship Paper



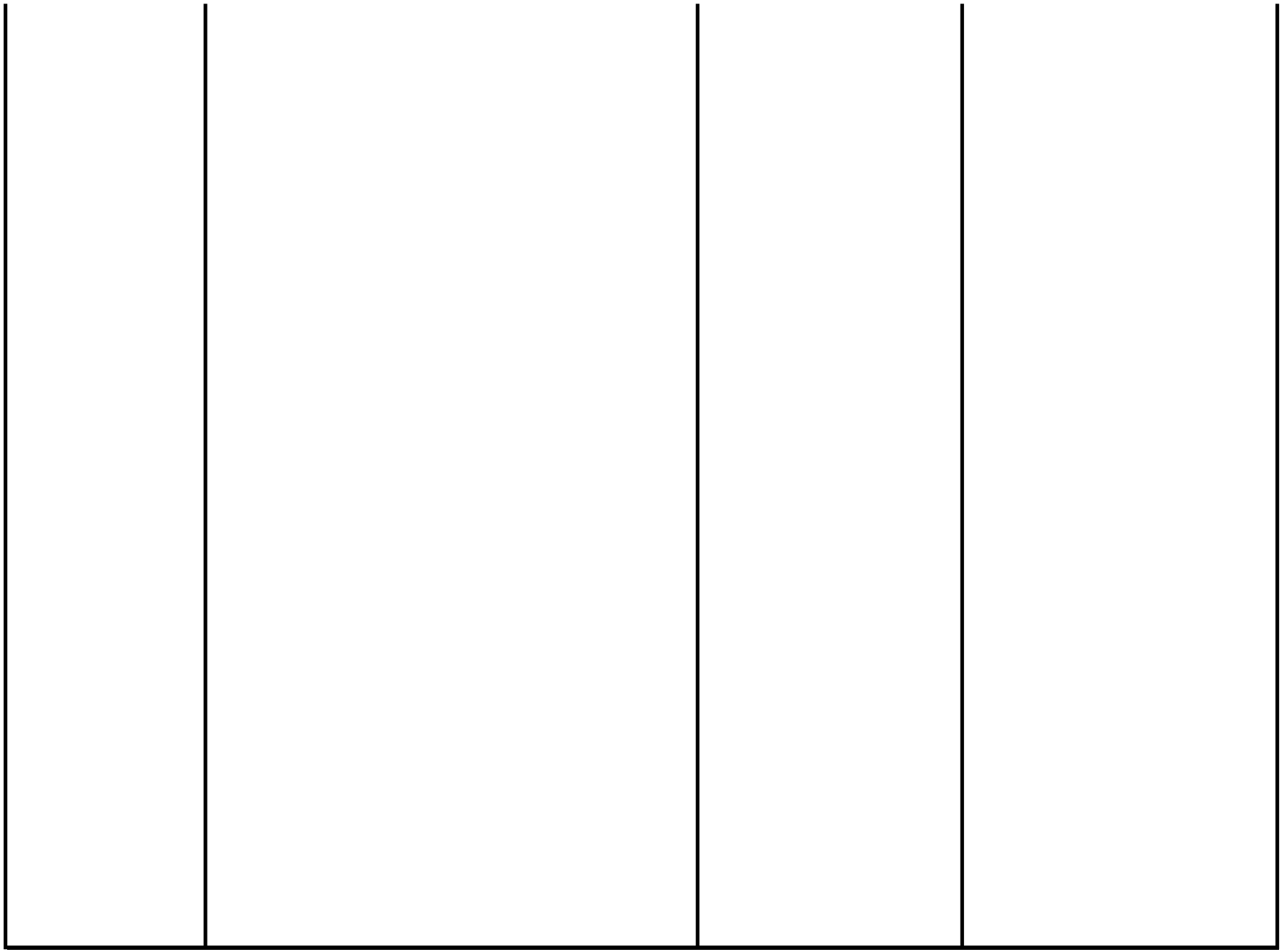
B.Voc Tourism and T	Develop knowledge, understanding and expertise in their chosen field of Tourism and Travel Management (through theory and practical components). Understand theoretical concepts and niche tourism concepts for sustainable growth of tourism activities. Critique tourism practices for their implications locally and globally. Apply relevant tourism technology and software for the creation and management of tourism experiences. Sensitize students to take up research-based activities and methods for interpretation of tourism data to understand travel trends, tourism promotion, destination management and city concepts Provide opportunities to excel in academics, research and industry along with entrepreneur ventures Demonstrate critical thinking and analytical skills through writing and verbal assessments. This shall enable the candidates for developing leadership and entrepreneurship qualities for job prospects	**RUVTTM501 to RUVTTM506 &** **RUVTTM601 to RUVTTM606** **Semester: V & VI** **3rd year:** **B. Voc. Degree** **Job Role: Consultant/ Free Lance/ Entrepreneur**	Introduction to Accounts Event Management Retail and Sales Management Research Based Project Advansed Fares International Tour Planning Introduction to Sociology Fundamentals of Public Relations

Environmental Studies

Tourism Marketing

Entrepreneurship

Corporate analysis and Grooming



COURSE OUTCOMES

- The student shall clearly understand organizational role of Tour Management and MICE (Meeting, Incentives, Conference and Events) functionality.
- The candidate shall get an overview of Operations of basics of Computer Application for making effective presentations and Introducing key concepts of the tourism industry
- The student shall get an overview of the introduction of the agencies working for tourism activities
- The student shall be able to relate importance of ICT for understanding the change from traditional to technological aspect.
- She/he shall understand the basics of contemporary Indian society along with its contribution to tourism business in India
- The candidate shall be understanding endemic social – economic issues in contemporary India
- The candidate shall be able to study means of redressal and reform at national and global level
- The candidate shall be able to understand and lay emphasis on key concepts of communications to build up the confidence in oral and interpersonal communication
- The student shall be groomed for better writing skills by sensitizing the students to the dynamics of effective writing
- The module shall help to enhance the students' communication skills by giving adequate exposure in reading, writing, listening and speaking skills and related sub-skills.
- The module shall also help candidates aware of functional and operational use of language in tourism Industry
- The candidate shall be introduced to key concepts of the tourism in India(domestic and inbound tourism) - popular and upcoming

- The candidate shall be able to Introduce different States and Union territories in India and their impact and contribution to Indian Tourism Industry especially in relation to domestic and inbound tourism,
- The module shall emphasis and help understand the importance of different tourism circuits in India for inbound and domestic travel
- This unit is shall bring in the key aspects about coordinating with the travel agent to understand the tour and customer requirement, updating on the required information, reading itinerary, planning for the escorting and performing pre activities for the tour
- The basic concepts of Tour Escort, tour guide and Tour management shall be taught to the candidate for better understanding of the tourism product
- The module shall help candidate critically understand the responsibilities and role of a tour escort career scope in the industry
- The candidate shall clearly understand the scope and career options in the tourism industry along with it's upcoming digital career options
- The module shall help understand frontier formalities for outbound travellers
- The module shall also train candidate on documentation process and formalities required to travel outside one's own country - Outbound travel
- The candidate shall be able to understand the importance of Online Portals, it's working an and technological advancements in tourism
- The candidate shall gain knowledge about Tourism and Travel Management Industry, its rules, regulations and ethical practices.

Social digital platform etiquettes

- The candidate shall be able to practice Professional skills at work, like decision making, planning & organizing, customer centricity, problem solving, objection handling, analytical thinking, critical thinking
- Familiarize the students with the management concepts, functions and skills keeping in view their applicability in tourism.
- Ensure students gain basic knowledge of sound planning and decision-making

- The students shall understand basics of human resources development applicable to tourism industry
- The student shall be able to discuss and analyse the alignment of human resources strategy to the business strategies.
- The candidates shall understand the recruitment and selection methodologies and its strategies setting for effective interviews.
- The candidates shall be able to apply the effectiveness of job analysis techniques as well as discuss competencies building as a keystone of human resource functions.
- The candidates shall be able to analyse the wide range of cultural heritage attractions
- The students shall understand the role of UNESCO and ASI in preserving and promoting heritage and apply the same to destinations for effective promotion of their products
- The students shall understand contemporary approaches to heritage tourism development and heritage marketing
- The candidates shall be introduced to advanced concepts and trends for destination management in Tourism sector as a base for product development.
- The module shall help candidates understand the planning process of sites and regions along with Understanding the development at different levels and connecting it to current scenario in the industry.
- The objective of this course is to familiarize students with actual working and knowhow of travel agency, tour operators and airlines
- The candidates shall be able to focus on actual preparation of itineraries and essentials of itinerary costing which can be implemented in practical work place
- The module shall introduce concepts of tourism at international level for product development along with drawing comparative of different tourism products in the market.
- The module shall help understand continents and country profile of the popular and upcoming destinations

- The objective of this course is to familiarize students extensive study of different places of tourist interests in the world and different circuits
- Candidates shall be able to understand importance of profiling a destination on internet and profiling of international clientele
- The module shall help equip students with basic understanding of research methodology
- The paper shall provide an insight into the application of modern analytical tools and techniques for the purpose of tourism management decision making
- The module shall help acquaint students with current affairs and developing their general knowledge skills required for the industry and otherwise considering other sectors and political, cultural, social and scientific developments also directly or indirectly affect the tourism industry.
- The candidates shall be able to develop specific written, oral and body language abilities necessary to conduct effective communication in a professional environment with special focus on the tourism industry, learning its particular mode of conducting business communication.
- The objective of this course is to familiarize students with emerging role and importance of GDS in the industry
- The course also aims at practical hands on experience for operating and understanding GDS where students can efficiently use the same in their job roles
- The candidates shall learn hands on skills and understand the working of the industry and also understand application of the concepts taught during the earlier semesters
- The module shall help students provide guidance on validation issues and documentation regarding quality checks during the internship to ensure learning outcomes are met
- The candidates shall be able to understand working with colleagues of other departments is satisfactory to help candidates with team building and coordination.
- The students shall be able to understand corporate protocol and code and conduct of a work place along with confidentiality of information and data.
- Candidates shall be able to follow work compliance to standards and SOPs.
- The method of reporting any to the appropriate authority.

- The candidates shall be able to take responsibility for completing one's own work assignment and also take initiative to enhance/learn skills in one's area of work
- The candidate shall be able to analyse and suggest improvements (if any) in process based on experience with clear understanding of regulatory guidelines and requirements.
- Learn how to multi-task relevant activities.

- The learner's shall be able to understand business transactions and financial statements for demand, supply, profit and loss ratios and break-even point
- The learner's shall study the accounting, recording and classifying financial transactions to understand basic finances required in the industry
- Enable the learners for preparation of financial statements for entrepreneur skills and to understand financial repercussions on business
- Candidates shall be able to acquire an in-depth knowledge about the specialized field of "Event Management"
- The module shall also enable the candidate to become familiar with planning, organizing, and managing events, the industry's stakeholders, event infrastructure, marketing, human resources, contingency planning, legal issues, strategic management, and research, analysis and evaluation.
- The paper shall help acquaint students with fundamental theoretical concepts of Retailing and Sales.
- The paper shall help understand the candidate the concept of category management, retail store operations, performance metrics and designing marketing and promotional strategies
- The candidate shall be able to study the meaning and understand the concept of CRM and utilize various sources to gather data for a research paper and in turn understand how to develop outlines for research papers;

- The learner's shall be able to compile a final form of the research project and understand the feasibility of the topic and its relevance to the industry.
- Learners will get well acquainted with basic concepts of the airline industry and fares
- Learners will be familiarized with the concept routings, ticketing and other airline terminologies required while ticketing.

- The students shall understanding and practical application of how to handle a GDS software (Sabre) which will enable them to work efficiently under corporates for Airline departments, GIT's, FIT's and understanding complex aviation concepts, working of aviation industry and basic terminologies used in the aviation industry for understanding of reservations, ticketing and refund roles.

- The learner's shall understand IATA regulations and terminologies in the aviation industry and work ethics and protocol.
- The candidates shall be able to lay emphasis on working on actuals of the circuit and develop it as a tourist destination projecting economic feasibility
- The students shall be able to prepare of reports, surveys using Google Docs, Google forms etc.

- The candidates shall be able to understand different tools and effective problem solving techniques and possible recommendations for research work carried.

- The learner's shall get an opportunity to participate in intra-college and intercollegiate research conventions.
- The department shall conduct of minor research activities using techniques have been learned in the past semesters for better understanding and implementation of the same

- To acquaint students with the Indian social system and the major challenges face by contemporary India and global challenges that affect travel trade.

- To help candidates understand basic understanding of Public Relation skills in relation to tourism industry
- To enable them to understand P.R. strategies and importance of communication in PR with respect to work environment and entrepreneur

- The learner's shall understand the natural environment and current environment challenges and case studies based on the same to correlate with the concepts of sustainable and responsible tourism trends
- The candidates shall be able to understand main benefits of business and marketing planning and importance of undertaking a detailed competitor analysis
- The candidates shall understand and conduct the communication strategies
- The learner's shall develop knowledge and appreciation of environmentally responsible travel and promote better understanding of resources, products, best management practices, and opportunities in the ecotourism sector.
- The module shall help candidates in understanding the changing dynamics of the travel business – considering data collection and profiling and build and maintain positive and effective relationships with colleagues and customers
- The candidates shall be able to work with functional, departmental boundaries to harness synergies and realize organizational vision along with working as a team with colleagues and share work as per their or own work load and skills along with emphasis on importance of time management and multi-tasking along with prioritization of work
- The candidates shall be able to understand stress management and ways to control the same at work place
- The aim of the topic is to give a basic understanding of the Value and Analyse firms under tourism sector
- The students shall understand the aspects of corporate industry and Customer Service and help them differentiate between the different organizational structures and business plans
- The learners shall engage in critical thinking by analysing situations and constructing and selecting viable solutions to solve problems along with emotional intelligence and its application at work place for efficiency and team management
- The learners shall understand Entrepreneurship and understanding documentation, logistics and environmental challenges and advantages while setting up SME's.

The candidates would be able to apply tools, mechanisms to cope up and stabilize entrepreneur set ups based on different case studies and hand holding

SUBJECT **PHARMA ANALYTICAL SCIENCES**	**PROGRAMME OUTCOMES**	**PAPER CODE**
	S. P. Mandali's Ramnarain Ruia Autonomous College has adopted the Outcome Based education model for its vocational programs to make its vocational graduates globally competent, ready with skill sets needed for the industry and capable of adapting to the changing needs of the job roles. The Bachelor in Vocation Programme will not only nurture good technical and analytical skills needed for the operation but will also encourage students to reflect on the broader purpose of their vocational education by developing and acquiring skills that go beyond the technical knowledge and prepare them as agents of social good in an unknown future.	**RUVPAS101 to RUVPAS107 and RUVPAS201 to RUVPAS207**
	PROGRAMME SPECIFIC OUTCOMES	**For Semester I and II**
	Description: A student completing Bachelor's Degree in B. Voc. program in the subject of Pharma Analytical Sciences will be able to:	
	Develop knowledge, understanding and expertise in their chosen field of Pharma Analytical sciences (through theory and practical components).	
	Develop an understanding of regulatory based pharmaceutical quality management processes and impact of analysis on health and environment	
	Understand theoretical concepts of various analytical instruments that are regularly used in most pharmaceutical laboratories as well as interpret and use data generated in instrumental analyses.	
	Understand cGLP, cGCP, cGMP, TQM, QMS and Laboratory safety management systems thoroughly used and practicing in the industry.	

Make aware, handle and troubleshoot the sophisticated instruments/equipments used for the analysis and Introduce advanced techniques and ideas required in developing area of pharmaceutical analysis.
Carry out experiments in the area of pharmaceutical analysis Qualitative and Quantitative methodologies (organic, in-organic analysis, estimation, separation and chromatographic techniques, derivation process, and potentiometric analysis etc.)
Enhance student’s ability to develop statistical models and methods for interpretation of data.

RUVPAS301 to RUVPAS307 & RUVPAS401 to RUVPAS407
For Semester III and IV

RUVPAS501 to RUVPAS504 & RUVPAS601 to RUVPAS604
For Semester V and VI

PAPER TITLE

Job Role: Lab. Technician/Assistant (LFS/Q0509 of LSSSDC)

Job Role: Validation Supervisor (LFS/Q0305 of LSSSDC)

Job Role: Quality Control Chemist (LFS/Q1301 of LSSSDC)

Course outcomes

Clear understanding of organizational role of Lab. Technician / Assistant.
Operations of basic laboratory instruments and measuring devices.
Clear understanding of Safety and Health guidelines
Gain knowledge about Life Science and Pharmaceutical Industry, its rules, regulations and ethical practices.
Carry out preparation of solution and regent, and check the working environment for experimentation.
Introduction to Audits and Audit related preparations.
Introduction to Skills of Team Work and leadership.

Skills of office communication (writing leave applications/ memo/ Log-book entries/ drafting of e-mails.
Gain complete knowledge of company's standard operating procedure and guidelines and follow them while carrying out proper reporting and documentation for various types of documentation and recording of data/problem/incidents in secure manner.
Assist in recording observation and then calculating results before developing conclusions, and keep accurate and detailed logs of all of their work to ensure adherence to protocol and procedures.
Read the all manuals, health and safety instructions and pictograms.
Read and understand manuals, sops, health and safety instructions, memos, reports, job cards etc.
Reading and understanding various images, graphs, diagrams etc.
Understand the various coding systems as per company norms.
Apply Basic Computer Skills (Ms Office, Internet) at Work.
Opening an e-mail account.
Social digital platform etiquettes.
Introduction to LIMS and 21 CFR Part 11compliance.
Learn and practice Reading/ writing/ Generic Skills like Record detail of work done using written/typed report or computer based record/e- mails.
Practice Professional skills at work, like decision making, planning & organizing, customer centricity, problem solving, objection handling, analytical thinking, critical thinking
Know about and follow the Escalation matrix for reporting identified issues, hazards and breakage
Report typical instrument faults and related causes, including recognition of signs and symptoms of faulty lab instruments and apparatus /early warning signs of potential problems.
Understand and evaluate Risk and impact of not following defined procedures/work instructions and follow the instructions and SOPs
Maintain cleanliness in the work area by doing Pre housekeeping activities, operations & post housing activities
Skills for Planning Laboratory work
Documentation practices and GLP
Clear understanding of regulatory guidelines and requirements
Operate, maintain, and install laboratory instruments as well as monitor experiments as they are performed within labs and Help in set up of the experiment

Help the lab/QC Chemists/ Research Associates in performing the experiments and analysis
Ensure appropriate measures are taken in Handling of chemicals, their proper labeling and stocking.
Follow the correct methods for carrying out corrective action for each problem
Display commitment to handle and use the chemical properly from initial receipt to ultimate disposal
Ensure all chemical containers are dated
Ensure incompatible chemicals are kept away from each other
Help the Lab/QC Chemists/Research associates in performing the experiments and analysis & Carry out inspection and maintenance of equipment and materials
Work compliance to standards and SOPs
Learn the Basic Concepts of Safety including Hazards, Accidents, Safety Signs and Signals and Henriech's Pyramid and follow and practice same at shop floor.
Clear understanding of organizational role of Validation Supervisor.
Ensure and assist in the implementation of the overall validation program for systems, facilities, equipment, manufacturing processes and cleaning activities.
Skills for planning and executing validation work.
Documentation practices, GMP and GLP
Audits and Audit related preparations.
Skills of office communication.
Provide guidance on validation issues and documentation regarding quality checks.
Communicate validation issues and requirements to plant personnel on a frequent basis.
Report any identified breaches in health, safety, and security policies and procedures to the designated person.
Write and update the inspection procedures, protocols and checklists.
Ensures support in preparation of validation protocols, inspection maps and timely review and approval of validation protocols/summary reports, master plans and SOPs.
Record and communicate details of work done to appropriate people using written/typed report or computer based record/electronic mail.
Maintain proper and concise records as per the given format.
Installations, up-gradation, downloading, un-installations of basic computer applications/software.
Record and communicate details of work done to appropriate people using written/typed report or computer based record/electronic mail write detailed reports for investigation.
Identify defective equipment/apparatus, materials and processes and corrective steps to be taken.
Ensure that disposal of waste and leftover tested material is carried on safely as per the SOP.

Ensure the disposal of all materials used in the experiment safely as per health and safety management system of the company.
Take corrective action in response to typical faults and inconsistencies
Troubleshoot/ investigate validation related deviations
Ensure that all safety measures are in place.
Take up the results of the findings with the appropriate authority.
Use logic and reasoning to identify the strengths and weaknesses of each of the members in the team.
Understanding of validation requirements of Manufacturing, Operations.
Quality Operation, calibration, validation and troubleshooting of various laboratory instruments.
Setup appropriate equipment or apparatus for testing.
Use logic and reasoning to identify the strengths and weaknesses of each of the members in the team.
Combine pieces of information to form general rules or conclusions.
The inspection or test points (control points) in the process and the related procedures and recording requirements.
Common causes of variation and corrective action required.
How to carry out statistical analysis of test data.
How to obtain and interpret records, charts, specifications, equipment, manuals, history/ logs, technical support reports and other documents.
Use the right mathematical methods or formulas to solve a problem.
Apply general rules to specific problems to produce answers that make sense.
Planning and executing validations.
Calibrate the testing equipment periodically as per the SOP.
Ensure support in preparation of validation protocols, inspection maps and timely review and approval of validation protocols/summary reports, master plans and SOPs.
Provide support to supervisor for carrying out investigations related to complaints, batch failures, OOS/ OOT, incidents etc.
work as a team with colleagues and share work as per their or own work load and skills.
Interview team members and colleagues to collect data to be recorded in log books and batch documents.
Support/assign personnel/team members to support internal and external audit activities as per instructions of superiors/supervisor.
Working with colleagues of other departments.
Communicate and discuss work flow related difficulties in order to find solutions with mutual agreement.
Provide documented shift handovers to the next person in the shift.
Implementation of different quality management systems (ISO and OHSAS).
Communicate confidential and sensitive information discretely to authorized person as per the SOP.
Maintain confidentiality of information and data.

Commercial awareness of pharmaceutical products and overall healthcare sector.
Clear understanding of Safety and Health guidelines
Fire safety and evacuation procedures.
Work compliance to standards and SOPs.
The method of reporting any anomalies (materials/processes out of specification) to the appropriate authority.
Take responsibility for completing one's own work assignment.
Ensure and assist in the implementation of the overall validation. program for systems, facilities, equipment, manufacturing processes and cleaning activities.
Release or hold the production for further inspection as per findings.
Monitor and adjust the processes to achieve required quality outcomes and support teams during tech transfers.
Troubleshoot/investigate validation related deviations.
Review and approve facility equipment and software changes.
Take up the results of the findings with the appropriate authority.
Take initiative to enhance/learn skills in one's area of work.
Basics of tactical decision making on safety, process, scheduling and personnel-related issues.
Suggest improvements (if any) in process based on experience.
Clear understanding of regulatory guidelines and requirements.
Identification of defect/problem and troubleshooting.
Procedures for reporting any unresolved issues and hazards.
Pharmaceutical GMPs and regulatory requirements (both national and international.
Learn how to multi-task relevant activities.
Quality Control Chemist prepares and tests samples from all phases of the manufacturing process to ensure that the product quality meets the standards, prepares documents that report test results and is responsible for preserving workplace safety while handling hazardous materials.
Gain knowledge about Life Sciences Industry, Legal and Regulatory framework and Pharmacopeia to enable him/herself for establishing the Industry Standards in his/her performance.
The individual should have basic lab-work skills and thorough understanding of chemical testing material, equipment and processes.
To study the Quality policy of the company.
Preparation of reports/ articles/ validation logs/ memos/ monographs/ calibration reports/ training logs etc.
Presentation of data by Audio-visual aids, MS-power point presentation, posters, banners etc.
Ensure documents pertaining to day-to-day analysis are efficiently completed and handed over to immediate supervisor
Check equipment log books

Reviewing legal and regulatory frameworks relevant to the production work and implications of failing to comply with those specifications.
Reviewing quality Control methods approved by the company.
Format of presenting the information captured during quality checks
Preparation of reports, surveys using Google Docs, Google forms etc.
Advance computing, data analysis and interpretation of results by using softwares.
Archival of electronic data, taking backup of various e-records.
Coordinate effectively with personnel in other disciplines to integrate findings and recommendations
Identify causes for out-of-spec products and then recommend changes to improve the product's quality
Analyse root cause of deviations and take corrective actions
Participate in laboratory investigations when required
Regular documentation of all the activities
Inspection & calibration of equipment
Troubleshoot malfunctioning of instruments when needed
Operate and maintain all analytical equipments.
Seek clarification on problems from others
Use effective problem solving techniques
Assess the problem (of juniors and subordinates)
Participations in intra-college and intercollegiate research conventions.
Conduction of minor research activities using techniques have been learned in the past semesters.
Conduct physical inspection in the department
Assist in preparation of specifications, general test procedures, and standard test procedures
Review categorization of samples like control sample, stability sample etc.
Prepare and standardize volumetric solutions within the expiry date in order to ensure storage of various samples as per the prescribed conditions
Conduct physical inspection in the department
Assist in preparation of specifications, general test procedures, and standard test procedures
Review categorization of samples like control sample, stability sample etc.
Prepare and standardize volumetric solutions within the expiry date in order to ensure storage of various samples as per the prescribed conditions
Pass on relevant information to others.
Ensure good housekeeping of the laboratory.

Approve batches and incoming raw materials by performing routine analysis of different samples to classify their physical and chemical identity.
Build and maintain positive and effective relationships with colleagues and customers
Work with functional, departmental boundaries to harness synergies and realize organizational vision.
Identify and recommend opportunities for improving health, safety, and security to the designated person
Coordinate with colleagues within and outside the department
Work as a team with colleagues and share work as per their or own work load and skills
Work and support colleagues of other departments
Communicate and discuss work flow related difficulties in order to find solutions with mutual agreement
Explain what information means and how it can be used to team members
Document all the control steps undertaken or recommended to be followed as per the standards (GLP).
Plan the work in a proper manner so that extensive load should not be there.
Planning of work assigned on a daily basis and provides estimates of time required for each piece of work.
Provide opinions on work in a detailed and constructive way
Apply balanced judgments to different approaches
Analyze & understand the depth of issue and handle with a proactive approach.

Provide opportunities to excel in academics, research and industry.