Outcomes

- **PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES AND COURSE OUTCOMES IN M.Sc. BIOTECHNOLOGY**
- **PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES AND COURSE OUTCOMES IN M.Sc. CHEMISTRY**
- **PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES AND COURSE OUTCOMES IN M.Sc. PHYSICS**
- **PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES AND COURSE OUTCOMES IN M.Sc. MATHEMATICS**
- **PROGRAM OUTCOMES FOR B.Sc.**
- **PROGRAM SPECIFIC OUTCOMES FOR B.Sc. IN EARTH SCIENCES**
- **COURSE OUTCOMES**
  - COMPULSORY ENGLISH
  - SUPPLEMENTARY ENGLISH
  - HINDI
  - MARATHI
  - COMPUTER SCIENCE
  - ELECTRONICS
  - MATHEMATICS
  - PHYSICS
  - CHEMISTRY
- **PROGRAM SPECIFIC OUTCOMES FOR B.Sc. IN LIFE SCIENCES**
- **COURSE OUTCOMES**
  - COMPULSORY ENGLISH
  - SUPPLEMENTARY ENGLISH
  - HINDI
  - MARATHI
  - BIOCHEMISTRY
  - BIOTECHNOLOGY
  - BOTANY
  - CHEMISTRY
  - ZOOLOGY

- **PROGRAM OUTCOMES IN B.C.A.**
- **PROGRAM SPECIFIC OUTCOMES IN B.C.A.**
- **COURSE OUTCOMES IN B.C.A.**
  - COMPULSORY ENGLISH
  - SUPPLEMENTARY ENGLISH
  - HINDI
  - MARATHI
  - GENERAL COURSE OUTCOMES
- **PROGRAM OUTCOMES IN B.C.C.A.**
- **PROGRAM SPECIFIC OUTCOMES IN B.C.C.A.**
- **COURSE OUTCOMES IN B.C.C.A.**
  - ENGLISH & BUSINESS COMMUNICATION
  - GENERAL COURSE OUTCOMES
- **PROGRAM OUTCOMES IN B.A.**
- **PROGRAM SPECIFIC OUTCOMES IN B.A.**
- **COURSE OUTCOMES**
  - COMMUNICATIVE ENGLISH
  - ENGLISH LITERATURE
  - COMPULSORY ENGLISH
  - SUPPLEMENTARY ENGLISH
  - COMPULSORY HINDI
  - HINDI LITERATURE
  - COMPULSORY MARATHI
  - MARATHI LITERATURE
  - ECONOMICS
  - HISTORY
  - POLITICAL SCIENCE
  - PHILOSOPHY
  - SOCIOLOGY

M. Sc. Biotechnology (CBCS)

(Semester pattern 2 years program)

Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Program Purpose

This semester pattern, choice-based credit program, aims to prepare the students to begin careers as Biotechnologists. They can enter into the fields related to Food, Pharmaceutical, Agricultural Industries and also into Teaching. Research prepares them to develop an aptitude, inclination, analytical and critical thinking. Presentations by students keep them abreast with the latest developments and requirements for research. This also improves their communication, reading and writing skills.

The Institution gives added inputs to the students for their overall personality and skill development. These include personality development, debates, model, poster and chart making, exhibitions, guest lectures, activities of various subject cells and associations, sports and cultural activities, etc. Students are also given exposure to use of ICT for their seminars and assignments.

Program Outcomes (PO)

Knowledge application

- To provide detailed understanding of Biological Sciences along with engineering technologies and to manipulate living organisms and biological systems to make products that advance healthcare, medicine, agriculture, food, pharmaceuticals and environmental control.
- To be capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that forms a part of the postgraduate program.
- To apply the core concepts of the subjects learnt to a chosen scientific discipline, identify, design, generate and interpret scientific data using quantitative, qualitative and analytical methodologies and techniques, keeping in mind the specific needs for public health, safety and environmental protection.

Creative and Critical Thinking

- To apply logical reasoning, to integrate their knowledge in a wider perspective, to evaluate evidence, arguments, claims and beliefs to identify and formulate arguments.

Effective Communication:

- To have the ability to express thoughts and ideas effectively through speaking and writing.

- To demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner in one or more Indian languages using appropriate media.

Leadership and Team Work

Effective Citizenship:

- To develop the ability to relate and to be aware of various social concerns leading to personal and national development.

Moral Maturity and Ethical Behavior:

- To develop the ability to accept moral and ethical values in conducting one's life. Use ethical practices in all scientific work. Increased cognitive ability, appreciating other's point of view, debate and promote interdependence to reach conclusions in a group of people.

Environment and Sustainability:

-To develop awareness regarding the current environmental problems and to make positive contribution towards sustainable development.

Self-directed and Life-long Learning:

- To develop the ability to acquire knowledge and skills that are necessary for participating in learning activities throughout life and adapting to changing trends and demands of work place.

Information / digital literacy:

- To create Placement Opportunities:
- To help the students to prepare for various competitive exams like GRE, GATE, MPSC, UPSC, NET / SET, M. Phil or Doctoral studies in the subject. Wider Placement opportunities / jobs in research / administration in various Research Institutes, Food, Pharmaceutical, Agricultural Industries and also teaching Profession.

Program Specific Outcomes (PSO)

Curricular Structure

A candidate, who is a B. Sc. in Life Sciences / Veterinary / Fishery Sciences / Pharmacy / Engineering Technology / Medicine (MBBS) / B.D.S. graduates / B.Sc. Agriculture, can opt for this program.

The course is divided into four semesters.

Teaching, Learning and Evaluation:

There are four Theory Papers including Internal Assessment, Seminar and Laboratory Courses. The syllabus is based on 16 hours of theory credits, 08 hours of practical credits and 01 credit for

delivering a seminar per semester. Candidates are required to pass separately in theory and practical examination. The internal assessment marks assigned to each theory paper are awarded on the basis of attendance / home assignment / class test / project assignment / seminar / any other innovative practice / activity.

Course Outcomes (CO)

Cell Biology and Enzymology:

- To gain in-depth knowledge about cell, structure and function of cell organelles, cell cycle and cell signalling, nomenclature and classification of enzymes, biological mechanisms of enzyme catalysis, kinetic studies, factors affecting rates of enzyme reactions, role of modulators, vitamins and coenzymes, allosteric, covalently modulated, immobilized enzymes and multienzyme complexes.
- To enable the students to explain the Michaelis-Menten model of enzyme kinetics, two substrate kinetics, effects of inhibitors, substrate concentration, temperature, pH, etc.
- To focus on isolation of organelles, study of marker enzymes, isolation, purification and immobilization of enzymes, data analysis and interpretation through laboratory experiments.

Molecular Biology:

- To get detailed knowledge of prokaryotic and eukaryotic molecular processes of DNA replication, transcription and translation. They will have in-depth knowledge about regulation of these molecular processes.
- To help students to analyze structural-functional relationships of genes and proteins in prokaryotes and eukaryotes.
- To understand the instruments, analytical techniques and application of biophysical methods used in the study of these molecular processes.

Bio molecules:

- To in-depth knowledge about major types of biological molecules like DNA, RNA, Proteins and their role in life related processes, denaturation and renaturation studies. Able to explain the impact of slight changes in the structure of macromolecules.
- To understand the structures and properties of the amino acids found in proteins. Able to describe the secondary, tertiary and quaternary structures of proteins, forces stabilizing their structures, models and methods of protein folding, role of chaperones and chaperonins.

- To have thorough understanding of carbohydrate and lipid chemistry. Understand energetic and structural roles of carbohydrates and lipids in living organisms.
- To strengthen the theoretical knowledge of the subject through laboratory experiments. Students are given hands-on training in quantitative and qualitative analysis of various biological molecules, interpretation of results and handling of sophisticated instruments.

Biophysical Techniques:

- To enable the student to get in-depth knowledge of principles, applications, instrumentation and techniques of spectroscopy, chromatography, electrophoresis, centrifugation and isotopic tracers.
- To understand the instruments, analytical techniques and application of biophysical methods used in the laboratory. Demonstrate practical skills required to deal with the detection, identification, separation, and estimation of various biomolecules.

Microbiology:

- To know the structure and biotechnological applications of eukaryae, viruses, bacteria, their growth, Energy and nutrient requirements, microbial control and drug resistance.
- To learn about microscopy and aseptic handling, isolation, pure culture preparation, staining procedures, external morphology, effect of antibiotics and UV radiations through Laboratory experiments are designed to strengthen practical skills in fundamental microbiological techniques.

Immunology:

- To understand immunity, antigen, antibody, immune system, their function and regulation, active and passive immunization, immunoglobulins and their gene libraries, clinical immunology, cancer immunotherapy; immunosuppressive therapy etc.
- To learn handing of equipment required for the study of various immunochemical techniques for laboratory experiments focused on the purification of immunoglobulins, antigen-antibody reactions and different diagnostic tests based on them.

Fundamentals of Genetic Engineering:

- To have detailed knowledge recombinant DNA techniques used in microbiological research, gene manipulation and gene transfer technologies, expression systems, methods of selection, use of various vectors and restriction enzymes in creating a recombinant DNA.
- To gain detailed knowledge about genomic and c-DNA library, methods of sequencing of genomes, phylogenetic relationships, PCR, etc.

- To help students get hands-on training in various tools, techniques and methods used to study rDNA technology.

Applied Molecular Biology:

- To have in-depth knowledge of recombination, genome mapping, epigenetics, cancer biology, angiogenesis, metastasis, stem cells, antisense, and ribozyme technology.
- To understand the various genetic and molecular changes to normal cells which convert proto-oncogenes into oncogenes.

Genetic Engineering & its Applications:

- To have detailed knowledge about transformation and transfection methods, somatic cell fusion, production of monoclonal bodies, gene therapy and expression of heterologous genes.
- To understand refolding and stabilization of recombinant proteins and industrial products of protein engineering.
- To understand various aspects of plant transformation technology, mechanism of inter-generic DNA transfer and preparation of gene construct for its expression in plants.
- To provide practical knowledge in the field of molecular genetics.
- To develop the ability to design and conduct genetic engineering experiments, as well as to analyze and interpret data.

Plant Biotechnology:

- To have theoretical and practical knowledge of Plant Tissue Culture Techniques.
- To understand tissue culture, culture media, callus and suspension cultures, single cell clones, organogenesis, embryogenesis, shoot tip culture, embryo culture and embryo rescue, hybrid plants, production of haploid plants, germplasm conservation, Herbicide resistance and insect resistance.
- To gain knowledge about applications of plant transformation for productivity and performance, plant metabolic engineering and industrial products and Green House Technology
- To perform laboratory experiments focused on preparation of tissue culture media, surface sterilization, effect of hormones on cell division, organ culture, callus culture, anther culture, protoplast isolation and culture, hardening and cytological examination of plant.

Specialization Course in Semester III and IV

A) Industrial Biotechnology: This course aims to provide fundamental insights to exploit enzymes and microbes for the manufacturing of products. Students will be able to understand the various aspects of bioprocess technology, principles underlying the design of a fermenter, fermentation process and downstream processing.

- To learn the technique involved in the production of biologically and industrially important compounds such as alcohol, antibiotics, preparation and formulation of biopesticides.
- To describe the equipment, materials and methods related to biotechnological processes, sterilization, microbial growth and cultivation. The student will be able mathematically compute, plan and analyze the bioprocesses. Performing laboratory experiments will make students more confident to use the knowledge of bioprocess engineering in industries.

B) Environmental Biotechnology: Students are sensitized to focus on environmental aspects of biotechnology for the benefit of the society. Understand types of pollutions, bioconversions, bioaccumulation, bioleaching, bio absorption, biodegradation, biotransformation, bioremediation processes, biofuels, biosensors and xenobiotics. They also understand advantages, disadvantages and applications of the above.

- To have knowledge about waste water and sludge treatment.
- To train the students in basic concepts of Environmental Biotechnology and its application in research.

Foundation Papers from other subjects like Chemistry, physics, computer science etc: Students can choose any one of these courses from various disciplines like Chemistry, Physics, and Computer Science etc. in lieu of Core Subject centric papers like Diagnostic Medical Biotechnology or Therapeutic Medical Biotechnology.

- To enable the students to have fundamental knowledge of other allied subjects which benefit them in interdisciplinary areas of research.

Diagnostic Medical Biotechnology (Core Subject Centric I): Students can choose this paper in lieu of the foundation course, to study advanced courses in Biotechnology. The student understands the application of advances in molecular and cell biology in medicine, nano-biotechnologies, molecular and clinical diagnostics, genomics, and proteomics. Understand the genomics technologies used in study of gene functions and their disorders and array-based techniques in diagnosis.

(Core Subject Centric II) Therapeutic Medical Biotechnology: Students can choose this paper in lieu of the foundation course, to study advanced courses in Biotechnology. The student understands the types of diseases that can be treated by gene therapy, somatic and germline gene therapy, problems associated with these therapies and drug designing. Understand the principles underlying the preclinical and clinical development of new therapeutic drugs and procedures.

Animal Biotechnology:

- To have theoretical and practical knowledge of Animal Tissue Culture Techniques.
- To understand the preparation and composition of tissue culture media, suspension and monolayer cultures, their initiation and maintenance.
- To have in-depth knowledge of various techniques of animal cell and tissue culture, culture media, growth factors, laboratory facilities and design, characteristics of cells in culture, primary culture, cell lines and their maintenance in the laboratory and concept of transgenic animals.

Biostatistics, Bioinformatics, Ethics & Patenting:

- To understand the concepts of probability, mean, median, mode, standard deviation, standard error, methods of sampling, sampling error, non-sampling errors, Chi-square test, cluster analysis, phylogenetics, presentation of statistical data and research designs.
- To make the student proficient in the use of computers and internet, public domain resources in biology, database management, analysis of genetic sequences, and identification of functional sequences, homology, BLAST, ENTREZ, and PuBMed.
- To understand the benefits of biotechnology, ELSI, release of genetically engineered organisms, human embryonic stem cell research.
- To gain basic knowledge about patenting and trademarks, intellectual property rights, plant-breeder rights, biosafety and quality control.
- To enable the students to explain the basic concepts of probability, mean, median and mode and their use in statistical analysis and retrieving biological data.

General outcomes of the Laboratory Courses:

- To be able to implement the theoretical concepts studied interpretation of experimental data, expertise in fundamental laboratory skills, laboratory safety protocols, classical laboratory techniques and modern instrumentation. Viva voce promotes analytical thinking and develops research aptitude.

Project in fourth semester:

- To be able to draw on classroom and laboratory knowledge to make an individual contribute to research.
- To be able to independently carry out a complete scientific work process, including the understanding of theoretical background, hypothesis generation, collection and analysis of data, interpretation and presentation of results.
- To enable students to publish research work after appropriate literature survey and analysis.
- To evaluate methods and results within the field of specialization, apply relevant theory, methods and analytic approaches within the specialized field of biotechnology, including statistical methods.
- To present the results of his/her work to an audience of examiners, peers and faculty at the college level, and be able to defend their research work.

Seminars in every semester:

- To help students to improve and refine their presentation and communication skills, public speaking, learn the importance of appropriate body language and presentation skills. They also learn literature survey and analysis.

M.Sc. Chemistry (CBCS)

(Semester pattern 2 years program)

Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Programme Outcomes

PO-1: To solve the multifaceted scientific problems and become knowledgeable experts at global level.

PO-2: To apply knowledge of Chemistry to actual use in industry.

PO-3: To conduct scientific experiments, techniques and interpret scientific data.

PO-4: To improve and implement new skills for future in teaching and research.

PO-5: To compete national and international level competitions.

PO-6: To apply appropriate knowledge to help society.

Programme Specific Outcomes

The objectives:

- To give students a comprehensive understanding of the principles of Chemistry.
- To gain the skill to design and carry out scientific experiments and interpret the data.
- To understand the interdisciplinary nature of Chemistry and to be aware of the emerging fields in Chemistry.
- To build a scientific temper and to learn the necessary skills to succeed in research or industrial field.
- To be able to define and resolve new problems in Chemistry and participate in the future development of Chemistry.

Course Outcomes

SEMESTER I

Theory:

Code: 1T1 Inorganic Chemistry

- To study the Stereochemistry and bonding in main group compound as well as to study the metal-ligand bonding.
- To study the metal – ligand equilibria in solution and mechanism of transition metal complexes.
- To have an idea about classification, nomenclature, structure, bonding and topology of boron

hydrides.

- To understand the basic concept, classification, structure and bonding of metal clusters.

Code: 1T2 Organic Chemistry

- To understand the basic concepts and mechanism in organic chemistry.
- To know stereochemistry and various possible conformations of organic compounds and how it affects the reaction outcome.
- To get an idea about the various kinetic and thermodynamic factors which control the organic reactions.
- To have an idea about various substitution reactions and their applications.

Code: 1T3 Physical Chemistry

- To know the basic concepts in classical thermodynamics and to learn the thermodynamic aspects of various processes and reactions.
- To study the basic concepts of Partial molar quantities and Phase rule,its derivation and applications.
- To study the chemistry of surfaces and different types of surface phenomena. To get an idea about the various techniques employed for the characterization of surfaces. To know the general properties of colloids and macromolecules.
- To learn the different theories of reaction rates and factors affecting reaction rates. To have an idea about the different types of catalysis and their mechanisms.

Code: 1T4 Analytical Chemistry

- To understand the basic concepts of analytical chemistry and Statistical analysis.
- To study the Separation techniques like chromatography, ion exchange and solvent extraction and their applications in industries.
- The students will get skill in the quantitative analysis by doing titrations in the different branches of volumetric analysis and will get training in the quantitative analysis of metal ions and anions using gravimetric method.
- To learn about electrochemical methods of analysis like conductometry and potentiometry and their applications.

Practical:

Code: 1P1 Inorganic Chemistry

- To impart the students a thorough knowledge of Systematic preparation of inorganic complexes and their characterization by Elemental analysis and physico-chemical methods Electronic and IR Spectra, magnetic susceptibility measurements, Thermal analysis and Molar conductance studies.
- To learn about quantitative analysis this includes separation and determination of two metal ions

from the alloys by using volumetric, gravimetric and spectrometric methods.

- To impart skill to students in the systematic qualitative analysis of mixtures containing two acid and two basic radicals with interfering radical by Semi micro method.

Code: 1P3 Physical Chemistry

- To develop skills in doing experiments in kinetics, thermodynamics, conductometry, potentiometry and phase rule. Enable the students to prepare data analysis using spreadsheet programme.

Code: 1S1 Seminar-I

- To help students with numerous benefits, including improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence.

SEMESTER II

Theory:

Code: 2T1 Inorganic Chemistry

- To understand the electronic spectra and magnetic properties of transition metal complexes and to know how magnetic moments can be employed for the interpretation of their structure.
- To get an overview about the reaction mechanism of transition metal complexes.
- To gain the knowledge about Structure and bonding of metal carbonyls as well as to study vibrational spectra of metal carbonyls for bonding and structure elucidation.
- To get an idea about Structure and bonding of metal nitrosyls. Enable students to elucidate the bonding and structure of metal nitrosyls by using vibrational spectra.

Code: 2T2 Organic Chemistry

- To understand the mechanistic and stereochemical aspects of addition reaction of carbon-carbon multiple bond and carbon-hetero atom multiple bonds involving electrophiles, nucleophiles and free radicals, regio and chemos electivity.
- To gain the knowledge about classification and generalmechanistic treatment of electrophilic, nucleophilic and free radical molecular rearrangement.
- To get insight into the chemistry of free radical reactions.
- To help students to get a basic understanding of green chemistry. This will give them an idea of Synthesis involving basic principles of green chemistry, prevention or minimization of hazardous products, choice of solvents, sonochemistry, microwave induced reactions, polymer supported reagents, reactions in aqueous medium, solvent free reactions, biocatalysts in organic synthesis.

Code: 2T3 Physical Chemistry

- To study the basic postulates of quantum mechanics. To enable the students to solve the simple

quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc.

- To understand the basic concepts of ideal and non-ideal systems in thermodynamics. To get idea about nonequilibrium thermodynamics.
- To get an overview about the solid state chemistry.
- To have a basic idea about nuclear Chemistry and its applications.

Code: 2T4 Analytical Chemistry

- To understand the criteria, techniques and hazards of sampling. To gain knowledge about safety aspects in handling hazardous chemicals.
- To understand the concepts of modern separation techniques.
- To get an idea about optical methods of analysis including spectrophotometry, colorimetry and flame photometry.
- To get an overview about the electrochemical methods of analysis which include Polarography and amphometric titrations.

Practical:

Code: 2P2 Organic Chemistry

- To learn the separation, purification and identification of an organic mixture by chemical/solvent separation methods.
- To enable the students to prepare organic compounds via single step and two step synthetic sequences.

Code: 2P4 Analytical Chemistry

- To develop basic skills in the techniques like calibrations of apparatus.
- To get skill in the quantitative analysis by doing titrations in the different branches of volumetric analysis.
- To get training in the quantitative analysis of metal ions and anions using gravimetric method.
- To develop basic skills in the separation techniques using chromatography, ion exchange.
- To get skill in handling instruments like, conductometer, potentiometer and colorimeter.

Code: 2S1 Seminar-II

- To provide various benefits like improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence to the students.

SEMESTER III

ORGANIC CHEMISTRY SPECIALIZATION:

Theory

Code: 3T1 Special I- Organic Chemistry

- To be familiarize with the important photochemical reactions in Organic Chemistry.
- To enable the students to understand the concepts of pecicyclic reactions.
- To study the reactions involving oxidation and reduction in organic chemistry.
- To get insight into the Chemistry of P, S, Si, and Boron compounds.

Code: 3T2 Special II-Organic Chemistry

- To get knowledge classification, nomenclature, occurrence, isolation, general methods of structure determination, stereochemistry and synthesis of terpenoids and porphyrins.
- To gain an idea about chemistry of alkaloids and prostaglandins.
- To study the fundamentals of steroids and plant pigments.
- To know the basic aspects of chemistry of natural products like carbohydrates, Amino acids, protein and peptides.

Practical

Code: 3P1 Organic Chemistry Special

- To get training in the quantitative analysis by estimation of some organic compounds.
- To enable the students to apply isolation techniques for organic compounds from natural source.
- To learn the separation, purification and identification of an organic mixture by chemical/solvent separation methods.

Theory

Code: 3T3 Medicinal Chemistry (Elective)

- To gain knowledge of the connection between the structural features of the drugs and their physico-chemical characteristics, mechanism of action and use.
- To gain knowledge about the therapeutic classes of drugs.

Practical

Code: 3P3 Medicinal Chemistry Practical (Elective)

- To enable the students to gain knowledge of the importance of compounds which contain medicinal properties from drugs.
- To enable the students to understand the synthesis, purification and identification of drugs.

Code: 3T4 Spectroscopy– I(Core Subject Centric – I)

- To understand the idea of space groups and to learn the theory of molecular symmetry. To gain

skill to apply group theory.

- To know the basics principle of different techniques employed in molecular spectroscopy.
- To study the origin, instrumentation and important applications of Microwave, Mossbauer, Raman, IR and EPR techniques.
- To enable the students to elucidate the structure of compounds by analyzing the spectral data.

Code: 3S1 Seminar III

- To provide various benefits like improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence to the students.

SEMESTER IV

ORGANIC CHEMISTRY SPECIALIZATION

Code: 4T1 Special I- Organic Chemistry

- To know the basics of Carbanions inorganic Chemistry.
- To get insight into the Chemistry of organometallic reagents and transition metals in organic synthesis.
- To know the utility of protecting group strategy in organic synthesis.
- To know stereochemistry and various possible conformations of organic compounds and how it affects the reaction outcome.
- To get an idea about designing the synthesis based on retro synthetic analysis.

Code: 4T2 Special II-Organic Chemistry:

- To study the chemical and biological catalysis, remarkable properties of enzymes, mechanism of enzyme action and co-enzyme chemistry.
- To get insight into the chemistry of heterocycles.
- To impart the students thorough idea in the chemistry of nucleic acids, lipids and vitamins.
- To get an idea about dyes, pharmaceutical chemistry and polymer chemistry with their applications in daily as well as industrial applications.

Practical

Code: 4P1 Organic Chemistry Special Practical:

- To enable the students to understand quantitative analysis based on classical and instrumental technique of elements in organic compounds.
- To get knowledge of spectrophotometric/calorimetric and other instrumental methods of estimation organic compounds.
- To enable the students to prepare organic compounds via two step and three step synthetic sequences.

- To help students develop basic skills in structure elucidation of organic compounds on the basis of spectral data(UV, IR, 1H and 13CNMR and Mass)

Theory

Code: 4T3 Medicinal Chemistry (Elective)

- To study the drug rules and drug acts, overview of intellectual property right, Indian and international framework for patent protection.
- To get insight into the chemistry of antidiabetic agents, anti-viral agents, anti-malarial agents, local anti-infective drug, histamines, antihistamic agents, Antibiotics, anti-inflammatory drugs, and the lminitics and antiamoebic drugs.

Code: 4T4 Spectroscopy – II (Core Subject Centric –II):

- To get knowledge about basic principles and applications of UV-Visible and photoelectron spectroscopy.
- To study the basic principle and applications of nuclear magnetic spectroscopy.
- To enable the students to understand the problems based on structure determination of organic molecules by using NMR (1H and 13C nuclei) data, Structure elucidation using combined techniques including UV, IR, NMR and mass spectrometry (based on data and copies of the spectra).
- To get an idea about diffraction techniques likes X ray diffraction, electron diffraction and neutron diffraction.

Practical

Code: 4PROJ1 Project:

- To provide students with exposure to a variety of research projects and activities in order to enrich their academic experience.
- To provide opportunity for students to develop skills in presentation and discussion of research topics in a public forum.

Code: 4S1 Seminar IV

- To provide various benefits like improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence to the students.

M.Sc. Physics (CBCS)

(Semester pattern 2 years program)

Programme Outcomes, Programme Specific Outcomes and Course Outcomes

Program outcomes:

PO-1: To solve the multifaceted scientific problems and become knowledgeable experts at global level.

PO-2: To apply knowledge of physics to solve advanced scientific problems

PO-3: To conduct scientific experiment techniques and interpretation of the scientific data.

PO-4: To improve and implement new skills for future in teaching and research

PO-5: To compete national and international level competition.

PO-6: To apply appropriate knowledge to help society.

Program specific outcomes:

After completion of Post- graduation students will have

- Elementary and advanced knowledge of Mathematical Physics, Electronics, Electrodynamics, Statistical Physics,Classical physics, Quantum physics, Solid state physics, Material science and Nano material physics.
- Knowledge of designing and operate scientific experiments and interpret the experimental data.
- Basic knowledge of research and development.

Course Outcomes:

Semester I

Mathematical Physics-

This paper enables the students:

- To understand Fourier Series, Laplace transformation , Tensor
- To Differential equation, matrix, vectors and special functions like Hermite, etc.

Complex Analysis and Numerical Methods-

- To be able to understand Complex Numbers and Singularities

- To be able to understand Numerical method , Bisection method, false position method, iteration method, Newton-Raphson method etc
- To be able to understand Lagrange's interpolation and Runge Kutta methods for solving ordinary differential equations

Electronics-

- To be able to understand Electronics Semiconductor discrete devices, Opto-electronic devices
- To be able to understand Transistor as amplifier , gates ,Convertors and Communication Electronics

Electrodynamics I-

- To understand the basic laws of Electrostatics
- To get knowledge about Magnetostatics and time varying field

Semester II

Quantum Mechanics I

- To understand Schrodinger equation, quantum mechanical operators
- To be able to understand Hermitian operators, Dirac's bra-ket notations
- To be able to understand Solution of Schrodinger equation for simple problems, Angular momentum operator and spin angular momentum

Classical Mechanics-

- To be able to understand Basics of Elementary principles of mechanics of a particle
- To understand Hamiltonian formalism, Central force motion and Rigid body dynamics

Statistical Physics-

- To understand the fundamentals of classical statistical mechanics, Bose-Einstein statistics , Fermi dirac statistics, Maxwell Boltzmann statistics
- To be able to understand Phase transition , ordered disordered transition , Ising model etc

Electrodynamics II

- To get knowledge about Scalar and vector waves, Symmetries of Maxwell equations
- To be able to understand Motion of a charge in EM fields, Wave guides(TE,TM and TEM)

Semester III

Quantum Mechanics II

- To understand the basic concept of Time independent and time dependent perturbation theory, Zeeman effect, Stark effect, different and approximation methods to solve physics problem
- To understand quantum theory behind many particle system , scattering phenomena , Dirac theory

Solid state physics and spectroscopy

- To be able to understand crystal structure , their symmetry and defects in solid
- To be able to understand dielectric, piezoelectric , ferroelectric and pyroelectric properties of materials
- To be able to understand Atomic and Molecular spectra and their application

Material Science

- To develop understanding about equilibrium, Phase diagram of various reaction and its application , crystal growth kinetics
- To be able to understand basics about diffusion in solids and solid state ionics
- To get detailed knowledge of solid state device like Lithium ion battery , solar cell and fuel cell

Nano science and Nano technology

- To introduce nano science and different synthesis methods for nano materials
- To be able to understand characterization of nano materials
- To be able to understand Special nano material and their properties

Semester IV

Nuclear and particle Physics

- To be able to understand Basic nuclear properties; size, radii, shape, and charge distribution
- To be able to understand Elementary theories of alpha-, beta-, and gamma-, decay
- To be able to understand Interaction of charged particles and electromagnetic radiation with matter and detector
- To be able to understand Classification of elementary particles

Solid state physics

- To have an elementary idea about Band theory and magnetism
- To understand Lattice Dynamics, Free Electron Theory

- To gain knowledge about semiconductor and super conductors

Material Science

- To be acquainted with Mechanical response of Materials, Corrosion and degradation of materials, Spintronics and Photonics etc
- To be able to understand Concept of material synthesis and processing along with structural characterization and different characterization techniques

Experimental techniques in physics

- To be able to understand Radiation Sources, Detectors and Sensors, Structural Characterization and Thermal Analysis
- To be able to understand Morphological and Magnetic Characterization and Spectroscopic Analysis

M.Sc. Mathematics (CBCS)

(Semester pattern 2 years program)

Programme Outcomes,Programme Specific Outcomes and Course Outcomes

PROGRAM OUTCOMES (PO)

At the end of completion of the program curriculum students will able to:

PO1: To acquire the strong foundation of basic concepts, this will benefit them to become good academicians.

PO2: To apply the concept of mathematical tools to address real life problems.

PO3: To pursue research in reputed institutions and solve the existing mathematical problems using the knowledge of pure and applied mathematics.

PO4: To qualify various competitive exams like CSIR-UGC NET, SET, GATE, MPSC, UPSC, etc.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO 1: To imbibe problem-solving and computational skills

PSO 2: To understand the motivation behind the statements and proofs

PSO 3: To enhance self-learning and improve own performance.

PSO 4: To inculcate abstract mathematical thinking.

Course outcomes (CO)

1T1 Algebra

CO1: To assimilate the concept of automorphism, conjugacy, G-set, etc.

CO2: To analyse properties of solvable group, alternating group, etc.

CO3: To study Sylow's theorem and related concepts.

CO4: To understand maximal and prime ideals. Develop knowledge of R-homomorphism and quotient modules.

1T2 Real Analysis-I

CO1: To attain mastery in concept of uniform convergence, continuity, differentiation and integration.

CO2: To understand theorems on inverse function, implicit function, and Rank theorem.

CO3: To study Topological manifolds, Differentiable manifolds, Real Projective space, Grassman manifolds.

CO4: To study in detail about Lie groups.

1T3 Topology-I

CO1: To understand basics of cardinality and Topological Spaces.

CO2: To study open set, closed set, limit point, etc.

CO3: To assimilate the concept of Connected set, Compact and countably compact spaces.

CO4: To attain mastery in concept of T_0,T_1 and T_2-spaces.

1T4 Ordinary Differential Equations

CO1: To solve first order linear differential equations.

CO2: To understand second order equations with regular singular points and work out its applications.

CO3: To study existence and uniqueness of solutions of first order differential equations.

CO4: To analyse system of differential equations.

1T5 Integral Equations

CO1: To know the relation between differential and integral equations, and how to change from one to another.

CO2: To understand different kinds of kernels and use techniques for solving problems on each kind.

CO3: To explain types of Voltera equations and solve linear Volterra and singular integral equations using appropriate methods.

CO4: To use Hilbert transform a general and finite one for solving a wide range of differential and integral equations.

2T1 Algebra -II

CO1: To understand the unique factorization domains, principal Ideal domains and Euclidean domains.

CO2: To analyze properties of algebraically closed fields, splitting fields.

CO3: To compute Galois groups in simple cases and apply the group-theoretic information to comprehend results about fields.

CO4: To develop knowledge of Ruler and compass constructions.

2T2 Real Analysis -II

CO1: To gain knowledge of measurable sets and measurable functions.

CO2: To acquire mastery on Lebesgue Integral.

CO3: To study Convex functions, Lp-spaces.

CO4: To learn Baire category theorem and its application.

CO5: To understand Riesz-Fischer theorem and approximation in Lp-spaces.

2T3 Topology-II

CO1: To study continuous functions, product topology and metric topology.

CO2: To gain knowledge of connectedness, compactness.

CO3: To achieve the zenith in treating Countable Axioms, and Separable, Regular and Normal spaces.

CO4: To understand theorems like The Urysohn's Lemma, Urysohn's Metrization Theorem.

2T4 Differential Geometry

CO1: To study the theory of curves and surfaces in three space.

CO2: To analyse global properties of curves such as the four vertex theorem.

CO3: To understand the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem.

CO4: To understand two dimensional Riemannian manifolds.

CO5: To analyse problem of metrization and of continuation.

2T5 Classical Mechanics

CO1: To learn D-Alemberts principle and formulate Lagranges equation of motion.

CO2: To understand Legendre transformations and solve different problems.

CO3: To formulate Hamiltonian equation and understand its physical significance.

CO4: To gain knowledge of Canonical transformations and solve problems on it.

3T1 Complex Analysis

CO1: To explain the concepts of Analytic Functions, and Elementary Functions.

CO2: To understand Mobius Transformation and mappings of regions under some special transformations.

CO3: To construct the proofs of Cauchy Integral Formula, Liouvellis Theorem, and solve problems related to Taylor and Laurent series.

CO4: To identify different types of singularities, zeros of analytic function.

CO5: To study the maximum principle and Schwarz's lemma.

3T2 Functional Analysis

CO1: To understand Banach Spaces, The Hahn-Banach Theorem.

CO2: To study the open Mapping Theorem, Hilbert Spaces.

CO3: To analyse different operators and their properties

CO4: To understand Category theorem, uniform boundedness theorem, strong and weak convergence.

3T3 Mathematical Methods

CO1: To attain mastery in Fourier integral theorem and its application.

CO2: To attain mastery in application of Laplace and Fourier transform.

CO3: To study applications of finite Sturm-Liouville transforms.

CO4: To study application of finite Hankel transform, finite Legendre transform and finite Mellin transform.

3T4 Core Elective General Relativity

CO1: To describe Riemannian geometry in tensor formalism.

CO2: To define energy momentum tensor of various fluids and understand gravity due to curved space-time.

CO3: To obtain Einstein's field equations by different approach and Poisson's equations as an approximation to Einstein field equations.

CO4: To solve Einstein's field equations for static spherically symmetric Schwarzschild space-time and calculate the advances of perihelion, relativistic frequency shifts for sources moving in a gravitational field, as well as the bending of light passing through a spherical mass distribution.

3T4 Core Elective - Number Theory

CO1: To understand different functions namely the Mobius function u(n), Euler function φ(n), Liouville's function (n).

CO2: To master Dirichlet series and its analytic Properties.

CO3: To understand Chebyshev's functions Ψ(x) and v(x) and its applications.

CO4: To apply Chinese remainder theorem and polynomial congruence with prime power moduli.

3T5 Elective (For Students other than Mathematics)

Elementary Mathematics-I

CO1: To understand number systems, especially system of complex numbers.

CO2: To study applications of Matrices and determinants.

CO3: To understand the concepts of differentiation and integration and its applications.

3T5 - Operational Research-I

CO1: To understand basics and formulation of linear programming problems and revised simplex method (with and without artificial variables).

CO2: To apply simplex method to solve real life problems.

CO3: To study integer programming and its application.

CO4: To understand the concept of Bounded variable technique for L.P.P. and unconstrained optimization .

CO5: To study of Queuing Theory and Poisson queueing models- M/M/1, M/M/C for finite and infinite queue length.

4T1 - Dynamical Systems

CO1: To attain mastery in Dynamical systems, vector fields, its fundamental theorem, and Existence & uniqueness of a solution.

CO2: To study of Stability and Liapunov function of dynamical system.

CO3: To understand the Poincare Bendixson theorem and its applications.

CO4: To analyze Autonomous equations and differentiability of flows.

4T2 – Partial Differential Equations

CO1: To classify partial differential equations and transform into canonical form.

CO2: To solve linear partial differential equations of both first and second order.

CO3: To solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.

4T3 – Advance Numerical Methods

CO1: To obtain the solutions of Transcendental and polynomial Equations.

CO2: To find solutions of system of equations using direct methods and Iteration methods.

CO3: To attain mastery to solve problems using polynomial interpolation theory.

CO4: To acquire knowledge of Numerical methods to find solution of integral Equations.

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4T4 Core Elective-Cosmology

CO1: To study Einstein and de-Sitter static models and their comparison with actual universe.

CO2: To study Cosmology, master the concepts of Cosmological principle, Hubble law, Weyl's postulate, deceleration parameter, etc.

CO3: To understand the nature of Robertson-Walker metric in view of closed, open and flat models of the universe.

CO4: To acquire knowledge about steady state universe and its viability vis-a-vis actual universe.

4T4 Core elective Operator Theory

CO1: To understand use of complex analysis in spectral theory.

CO2: To study properties of Banach Algebras and Spectral properties of compact linear operators.

CO3: To analyse Operator equations involving compact linear operators.

CO4: To understand Projection operator and its properties.

CO5: To study spectral representation theorem

4T5 Elective

(For Students other than Mathematics)

Elementary Discrete Mathematics-II

CO1: To master the basic tools of Mathematical Logic.

CO2: To understand basic structure of discrete Mathematics through Lattice.

CO3: To study applications of Boolean algebra to Logic Circuits.

CO4: To acquire knowledge of preliminary concepts of Graph Theory.

4T5 - Operations Research–II

CO1: To identify and develop operations research model describing a real life problem.

CO2: To understand the mathematical tools that are needed to solve various optimization problems.

CO3: To solve various linear programming, transportation, assignment, queuing, inventory, and game problems related to real life.

BACHELOR OF SCIENCE SIX SEMESTER PROGRAM

- Affiliated to and as per syllabus of RTM Nagpur University.

Program purpose:

- Eligibility: Std XII (10+2 level) examination with basic science subjects.
- The student has to opt for three major subjects in Science, along with two additional subjects like Compulsory English language and one optional language- Supplementary English, Hindi or Marathi, at the Semester I and II level.
- The major subjects for the B.Sc. program are: Chemistry, Biochemistry, Botany, Zoology, Biotechnology, Mathematics, Physics, Electronics and Computer Science. The students opt either for the Earth Sciences group (Mathematics, Physics, Electronics, Computer Science, and Chemistry) or the Biology group (Chemistry, Biochemistry, Botany, Zoology, and Biotechnology).
- The institution provides added inputs to the students for their overall personality and skill development. These include programmes for personality development through the Training and Placement Cell UDAAN, debates, model, poster and chart making, exhibitions, guest lectures, activities conducted under various subject cells and associations, including sports and cultural activities etc.
- Students are also given exposure to the use of ICT through Power Point Presentation competitions and assignments.
- The program opens new vistas of opportunity in the service sectors like Public Service Commissions, Banking, PSUs, etc.

Program Outcomes (PO)

- To develop creative and critical thinking.
- To develop effective communication.
- To build strong leadership qualities and develop team spirit.
- To learn to become better and effective citizens of the country.
- To develop moral maturity and ethical behavior.
- To learn about the environment and sustainability process.
- To self-direct a life-long learning system.
- To learn knowledge application.

- To learn analytical, scientific reasoning and problem solving.
- To gain Information / Digital Literacy.

B.Sc.: Program Specific Outcomes (PSO)

(With Subject Combination from Earth Science subjects)

- To know the English language with its finer nuances with a view to understand the subject being studied, and to develop an ability to express the subject in oral and written form.
- To understand the evolution, development and dialects of the Hindi and Marathi Languages, with introduction to prose, poetry and other literature, with the use of the language in society, media and Government communications.
- To develop an ability to appreciate the ideas, values and morals put forward by the authors through a study of the languages.
- To understand the basic principles and theorems in the subjects learnt and their applicability.
- To develop the ability to use laboratory and other instruments and equipments related to their subject to measure, analyze and troubleshoot problems in the real world.
- To development skills to design and conduct experiments and small projects for day to-day applications.
- To build an orientation towards entrepreneurship and to undertake independent business ventures related to their field of study.
- To equip the students with hard and soft skills to work effectively as individuals and also as members of professional teams.
- To generate awareness of ethical concerns and environmental concerns.

COMPULSORY ENGLISH

Introduction

The era of globalisation has triggered a change in the hopes and aspirations of students and parents. The course aims to further strengthen and augment skills acquired at the school level. Proficiency in the use of English is the need of the hour. The contents of the course will help students in this direction. Due importance is given to sentence building, correct usage, comprehension and other aspects of language. The student can prudently use the skills gained to widen his/her horizon through further reading and practical application of those skills.

Course Outcomes (CO)

Semester I

* To expose students to new words, phrases and idioms with the aim to increase their competency in the use of the English language.
* To help comprehend a prose extract taking into account the nuances of style.
* To hone the skills of students to condense information with which they are flooded.
* To correct common grammatical errors which would enable students to speak and write better English.
* To focus attention on human rights violations across the globe.
* To make students aware of the various movements of British Poetry and its influence on Indian Poets.
* To inculcate the importance of perseverance and hard-work in the context of the thematic content.

Semester II

* To train students to write an effective C.V.
* To acquire a knowledge of phrasal verbs.
* To improve the ability to comprehend and explicate prose passages.
* To kindle the spirit of service. It is hoped that the biographical sketch of an icon like Florence Nightingale would serve as a catalyst to unleash sublime impulses.
* To perceive the difference in approach and style between Indian authors and their counterparts in other countries who write in a different milieu.
* To enable the student to accept divergent views and opinions for the health of the nation and the world at large.
* To enter into the spirit of poetry and respond aesthetically to the music of words and the rhythm of verse.

SUPPLEMENTARY ENGLISH

Introduction

The Supplementary English course is an advanced course in English language. It aims to make the student more comfortable in the language. The course attempts to improve the core skill of communication in students. The different authors and poets whet the appetite of students for further reading. They are also made aware of current issues - national and international - which impacts the world. This would endow students with a well rounded personality. The background and the several factors which resulted in the rise of "Standard English" as the lingua franca of the world are explained to the students.

Course Outcomes (CO)

Semester I

* The facilitator would expose students to a wide spectrum of authors and poets.
* To make students familiar with the challenges confronting the country through emphasis on the works of the Indian authors.
* To help students analyze the elements that goes into the making of a short story. This would give a fillip to their writing skills.
* To underscore the importance of idioms and phrases.
* To acquaint students with topical issues of importance through essays on environment and social issues.
* To endeavour to create an effective and literary prose style through practical exercises in reading and writing personal and reflective essays.
* To train students to write Emails.

Semester II

* To develop the skill of creative writing by giving students practical exercises in writing a story based on hints. This will give ample scope to their faculty of imagination.
* To help students write official letters and advertisements.
* To enable students to draft an effective report.
* To provide opportunities to speak on current issues.
* To bring to the fore issues concerning women.
* To increase familiarity with British and Indian authors.
* To make students aware of foreign words used in English.

हिंदी

सामान्य उद्देश

हिंदी हमारे राष्ट्र की राष्ट्र भाषा है | हिंदी विदेशो में भी बहुत अधिक रुचि के साथ बोलने वाली भाषा है ये हमारे भारत देश में जन-जन में बोली जाने वाली आम भाषा है , जो उन्नतशील और प्रभावशाली है | हमारे भारत वर्ष में बोले जाने वाली एकमात्र भाषा है | सभी प्रांतो में अपने अपने लहजों में बोली जाती है | अलग- अलग प्रांतो से आए विद्यार्थियों को भाषा के प्रति प्रोत्साहित करना है

कोर्स आउटकम

1. भाषा को समझने, बोलने तथा लिखने को प्रोत्साहित करना |
2. नये- नये शब्दों से रू-ब-रू कराना |
3. हिंदी के प्रति रस निर्माण कराना |
4. सहज और सरल भाषा द्वारा भविष्य का निर्माण कराना |
5. भाषा ज्ञान का विकास कराना|
6. भाषा के द्वारा उन्हें नये-नये आयामो का बोध कराना |
7. भाषा के द्वारा संस्कार और संस्कृती का विकास करना |
8. हिंदी भाषा के द्वारा हमारे भारत देश कि विशेषता में एकता का बोध कराना |

इकाई 1: गद्द विभाग

1. साहित्य की विविध विधाओ से परिचय कराना |
2. मंथन साहित्य के द्वारा कहानियो के मध्यम से छात्रो को यथार्थ का बोध कराना |
3. कहानी से जो सीख मिलती है उसके प्रति विद्यार्थियों में जागरूकता निर्माण करना |

इकाई 2: पद्द विभाग

1. कविता के माध्यम से जीवन के हर पहेलुओं से रु-ब-रु कराना |
2. गागर में सागर भरने की कला से काव्य की सौन्दर्यता निखारना |
3. कविता के द्वारा कल्पना शक्ती को जागृत करना |

इकाई 3:व्यावहारिक हिंदी

1. व्यावहारिक हिंदी का जीवन में महत्वपूर्ण स्थान बताना |
2. पारिभाषिक शब्दावली के द्वारा कार्यालायो में प्रयोग होने वाले शब्दों का बोध कराना|
3. स्ववृत्त, साक्षात्कार के द्वारा अपनी भूमिका समाज के सामने प्रस्तुत करने के प्रति जागृत करना |
4. समाचार लेखन में रुचि निर्माण कराना |

इकाई 4: अन्य पाठ सामग्री

1. विलोम शब्दों का महत्व, अनेक शब्दों के लिये एक शब्द का उपयोग सिखाना |
2. शब्दों में शुद्धीकरण करना और जो शब्द सिर्फ सुनाई दिये जाते है उन शब्दों पर अपना मत कैसे प्रस्तुत करना आदि |

MARATHI

कोर्स आउटकम

सामान्य उद्देश

मराठी ही महाराष्ट्रवासी यांची भाषा आहे. मराठी ही पूरोगामी व प्रभावी आहे. तसेच ही महाराष्ट्राची बोली भाषा आहे. महाराष्ट्रातील प्रत्येक जिल्हयात ही वेगवेगळया पद्धतीने बोलली जाते. मराठी भाषा बोलण्या साठी महाराष्ट्रातल्या विद्याथ्र्यांना प्रोत्साहित केले पाहिजे।

1) भाषा समजण्यासाठी, बोलण्यासाठी, तसेच लिहण्यासाठी प्रोत्साहित करावयास हवे.

2) नवीन नवीन शब्दांची ओळख करून दयावयास हवी.

3) मराठी विषयी त्यांच्या मनात गोडी निर्माण करावयास हवी.

4) सहज आणी सोप्या भाषे द्वारे त्यांचे भविष्य उज्ज्वल करणे.

5) भाषा विषयक ज्ञानाचा विकास करणे.

प्रकरणः 1- गद्य विभाग

1) साहित्यातील विविध बाबीचा परिचय करून देणे.

3) गोष्टींच्या माध्यमातून विदयाथ्र्यानां वास्तवीकते बाबत ज्ञान देणे.

2) गोष्टीतील धडया नुसार विदयाथ्र्यांना जागरूक करणे.

प्रकरणः 2- पदय विभाग

1) कविते द्वारे विद्याथ्र्यांना जिवनातील क्षणाचा परीचय करून देणे.

2) कमित कमि शब्दांत कवितेचे सौदंर्य वाढवणे.

3) कविते द्वारा कल्पनाशक्ती दृढ करणे.

प्रकरणः 3 - निबंध

1) निबंध लिहण्याची कला, व निबंधा चे प्रकार याची माहिती करूण देणे.

निबंधा द्वारे समाज प्रकृति च्या संबधी माहिती देणे. मराठी म्हणीचा वापर कसा करावा याची माहिती देणे.

प्रकरणः 4- सारांश

1) सारांश लिहण्याची कला अवगत करणे.

2) कार्यालयातील पत्रा बाबत अवगत करणे

3) मराठी अनुवादा बाबत ध्यान वाढवीणे.

4) शुद्धलेखनाचे महत्व पटवून देणे.

COMPUTER SCIENCE

Course Outcomes (CO)

- To build the basic skill of programming through C.
- To develop their logic through this language.
- To make them learn and to do programming in C independently.
- To create a strong base for other advanced languages.
- To learn the fundamentals of Information Technology.
- To understand C++ using OOPs Concept
- To learn System Analysis and Design
- To learn Data Structure using C++
- To enable the students to understand the basics of computers including hardware, software and networking.
- To make the students realize the importance of data and teach them the way to protect the data.
- To teach them object-oriented concepts and bring them closer to the real world. Through C++ the students learn object-oriented programming.
- To introduce software project management and to describe its distinctive characteristics and to discuss project planning and the planning process and show how graphical schedule representations are used by project management and the risk management process.
- To make the students aware about the manner in which the data can be stored in the memory of the computer so that different operations like traversing, insertion, deletion, searching sorting, merging and copying can be performed on the stored data efficiently.
- To enable the student to get sufficient knowledge on utilizing efficiently the various system resources:
    - Java
    - Programming
    - Linux Operating System
    - Visual Basic Programming
    - Database
    - Management System
- To give the students an opportunity to work with a language that supports internet.
- To enable them to develop applications and applets.
- To help them to develop GUI, handle events, draw graphs etc.
- To use this language in the industry for different applications like Mobile applications,

Robotics etc.

- To provide a comprehensive introduction to Basic Linux Shell Programming Logic and educate the students to write simple and complex shell scripts.
- To introduce the concepts of visual programming.
- To introduce GUI programming using Microsoft foundation classes.
- To enable the students to develop programs and simple application using Visual Basic 6.0.
- To make them aware of different data models.
- To give them an idea of storing the data in a centralized database. They also learn its advantages over traditional file system. They also learn the role played by database administrator.
- To introduce how the high-level programming languages are handled by the system.

SQL AND PL/SQ:

- To practically learn to work in a relational database management system.
- To learn to create, manipulate and control the data kept inside the database tables.
- To learn the ways of normalizing tables.

ELECTRONICS

Course Outcomes (CO)

CO 1: Components and Network Theorems

- To identify passive and active electronic components its coding schemes and deployment as circuit elements.
- To make effective use of electronics instruments and systems for measurements and analyses
- To use application of network theorems for circuit analysis.
- To study semiconductor elements diodes and transistors circuits and their applications.

CO 2: Semiconductor Electronics:

-To understand constructional details, working and applications of FETs and Thyristors.

-To understand use of hybrid parameter models for circuit analysis.

-To understand the working and applications of power amplifiers.

CO 3: Analogue Electronics:

- To understand electronic systems with a continuously variable signal and the proportional relationship between input –output signals.
- To understand basic circuits using active components, construction and characteristics of components and circuits.
- To understand the design of amplifiers, oscillators and feedback circuits, understanding of working principles.
- To understand the basic design of differential amplifier, operational amplifier and its applications.

CO 4: Digital Electronics

- To understand basic digital signals and logic elements, their truth tables and applications.
- To understand Boolean algebra and its applications in design of digital circuits and the use of Karnaugh map for digital systems design.
- To understand the design of digital circuits and systems using digital integrated circuit.
- To understand the working and design aspects of memory modules.

CO 5: Microprocessors and microcontrollers:

- To understand basic architecture of 8-bit microprocessor 8085.
- To acquire programming skills in assembly language for 8085 microprocessors.

- To understand architecture of microcontroller its features and applicability
- To understand design of interface circuits using microcontrollers.

CO 6: Instrumentation:

- To understand the basic analogue and digital meters for its effective use in systems measurements.
- To understand the use of test elements such as power supplies, function generators, CRO, DFM
- To understand Transducer principles, construction, working and applications in instrumentation systems.
- To understand, design and development of conventional, PC based and Virtual instrumentation modules and systems.
- To understand use of software platform for study and analysis of electronic circuits and systems.

CO 7: Communication Electronics:

- To understand various aspects of communication process, its components and types of communication.
- To understand modulation and demodulation processes in communication systems.
- To understanding the analogue and digital communication systems and its processes.
- To understand of Optical communication system elements and principles.
- To have basic knowledge of mobile communication system.

CO 8: “C” Programming:

- To have the acquisition of basic programming skills in C language.
- To understand the application of C programming techniques to control electronic hardware systems and modules.

MATHEMATICS

Course Outcomes (CO)

- CO1: To understand the set of elementary concepts of Algebra, Calculus, Trigonometry, Vector Calculus, Difference Equations, Solid geometry, Differential equations and their applications are introduced. These ideas assist students in understanding and solving the problems in variety of ways.
- CO2: To understand convergence or divergence of the certain idea is an important tool in Mathematics. Students learn this through the study of sequences and series.
- CO3: To understand laplace and Fourier transforms are being used in Engineering
- To understand mathematics to solve various Ordinary and Partial Differential Equations. These features of Mathematical Modeling are rigorously worked out by students.
- CO4: To understand the critical thinking of students is developed through the study of Group Theory, Ring Theory, Abstract Algebra, and theory of Riemann- Stieltjes Integral, etc. The assimilation of proofs and counter examples give ample opportunities to students to enhance their logical reasoning ability.
- CO5: To understand the equilibrium of coplanar forces, Virtual work and equations of motion of bodies, etc. are introduced in study of Mechanics. This gives another dimension in learning, and solving the problems in Mechanics.
- CO6: To understand real and Complex analysis are important studies in Mathematics that help students grow in analyzing the related problems.
- CO7: To understand the theory of Relativity is of great significance in Mathematical physics today. The notions of Classical and Special Relativity are introduced to the students. This paves way in understanding the non-gravitational fields in the system.

PHYSICS

Course Outcomes (CO)

SEMESTER –I

Paper I

- To understand types of motion existing in nature
- To understand general properties of matter i.e. elasticity, surface tension and viscosity
- To understand application of laws of conservation of Physics: macroscopic world, rocket motion

Paper II

- To understand electrical laws of nature: coulombs law, Gauss law, electric field, electric potential.
- To understand dielectric nature of material: polarization phenomena mechanism, capacitor as application
- To understand Current: A.C., D.C. its laws and various D.C. circuits
- To understand fundamentals and analysis of A.C. circuits

SEMESTER –II

Paper I

- To understand concepts and different types of oscillations: free, damped and forced
- To understand the laws of ideal gases, kinetic theory of gases
- To understand the basic laws of thermodynamics
- To understand physical behavior of real gases and transport phenomena in gases

Paper -II

- To familiarize with the gravitation phenomena and various gravitation laws: Kepler's laws and Newton laws of gravitation.
- To introduce constituents of universe: galaxy, stars, solar system, composition of constituents of universe.
- To understand magnetic behavior of materials: para, ferro, dia, Different magnetic laws Biotsavart law, Amperes laws, Curie temp and Neel temp
- To understand superconducting behavior of materials, and its various effects.

SEMESTER –III

Paper I

- To understand concept of wave propagation. Classification of waves. Basic terminology of music science.
- To understand Transducers with reference to acoustics, microphone, loudspeakers, methods of recording and reproduction of sound and architectural acoustics of building.
- To understand Ultrasonics: theory, production properties and application.
- To understand Concepts of rectifier and power supply

Paper II

- To understand the basic concepts of interference (Newton's rings and Michelson's interferometer)
- To understand the basic theory of diffraction, its application
- To understand the basic concept of polarization, Nicol prism positive and negative crystals
- To understand the fundamentals of E.M. waves: theoretical derivation.

SEMESTER –IV

Paper I

- To Introduce crystal Physics.
- To understand theory and generation of X-rays, properties and usage of X Rays hard and soft X-rays
- To understand application of X-Ray in solid state Physics Braggs law and Bragg spectrometer.
- To understand Lasers: concept, construction and application of Laser different types of Laser.

Paper II

- To understand semiconductor devices: Diodes, BJT and their characteristics
- To understand construction and characteristics, working of JFET and MOSFET.
- To understand concept of molecular spectroscopy: vibrational, rotational and electronic spectra of molecules. And its application
- To understand Raman Effect: theory and its application.

SEMESTER –V

Paper I

- To understand Vector model of atoms,quantum no, Zeeman and stark effect
- To understand free electron theory of solid state and its application in electrical and thermal behavior.
- To understand origin of bands in solids and classification of materials based on band theory.
- To understand Classical statistical Physics (M.B. statistics and its applications)
- To understand Quantum statistical Physics (B.E and F.D and its application to free electron in metal and B.E condensation.

Paper II

- To understand need and developments of quantum mechanics, wave particle duality, De Broglie hypothesis, Heisenberg uncertainty principle
- To know the Schrodinger's Wave equation and basic concepts of quantum mechanics (wave function operators, Eigen values Eigen function particle in a box
- To know nano materials: general concepts of nano science, properties of nano materials
- To know methods of synthesis and characterization of nano materials and their application in various fields.

SEMESTER –VI

Paper-I

- To know Relativity: concepts and its consequences
- To know Detection and acceleration of nuclear radiation models of nucleus, nuclear reactor.
- To know Theory of nuclear radiation particles
- To know Bio-potentials of human body and basic principles of measuring signals of human body

Paper II

- To know Amplifier, OPAMP and oscillators
- To know Fibre optics: construction and working of optical fibers
- To know Communication: basic concepts of analogue communication (A.M., F.M. AND P.M.)
- To know Number system: different types and its interconversion, digital numbers and system, and their arithmetic. Various logic gates.

CHEMISTRY

Course Outcomes (CO)

Semester I

Paper-I:

- To understand the atomic structure based on quantum mechanics and explain periodic properties of the elements.
- To understand the structure and bonding in covalent molecules and ionic solids and predict the structure of molecules.
- To understand selected crystal structures, and perform calculations of the lattice energy of ionic compounds.
- To understand the properties of s block elements and hydrogen bonding in compounds.
- To understand the properties of noble gases and structure, bonding and applications of Xenon fluorides (XeF_2, XeF_4, XeF_6). Structure and bonding in $XeOF_2$ and $XeOF_4$.
- To understand the properties of p-block elements like Atomic and ionic radii, Ionization potential, electron affinity, electronegativity, redox properties and oxidation state.
- To understand about Hydrides: Comparative study with respect to structure of NH_3, PH_3, AsH_3 and SbH_3, Structure of P_2O_3,P_2O_5, Structure of H_3PO_3 and H_3PO_4, Preparation and structure of Caro's and Marshall's acids.
- To understand Structure and bonding of diborane, structure of borazine

Paper-II:

- To understand Thermodynamics: fundamental concepts
- To understand statements of first law of thermodynamics, definition of internal energy & enthalpy, Heat capacity, heat capacity at constant volume and at constant pressure & their relationship. Joule-Thomson experiment, Joule-Thomson coefficient & inversion temperature, calculations of w, q, ΔE & ΔH in isothermal & adiabatic expansion of ideal gases for reversible process.
- To understand Thermo chemistry: Standard states, Standard enthalpy of formation. Hess's law of constant heat of summation & its applications, Heat of reaction, relation between heat of reaction at constant volume and constant pressure, Average bond energy, bond dissociation energy and its calculations from thermo chemical data.

- To understand Gaseous State - Postulates of kinetic theory of gases, derivation of kinetic gas equation, deduction of various gas laws from kinetic gas, Effect of temperature on molecular velocities, Different types of molecular velocities (most probable, R.M.S. and average and expressions for them), their inter relationships, Definitions of collision diameter, collision number and Mean free path.
- To understand ideal gas and real gases-Difference between an ideal and real gases and deviations from ideal behavior.
- To understand the terms – Compressibility factors and Boyle temperature. Causes of deviation from ideal behaviors, Vander Vaal's equation of state, explanation of behavior of real gases by Van der Vaal's equation, Andrew's experiment on critical phenomenon of isotherms of CO_2.
- To understand Liquid State- Properties of liquid: Surface tension, Viscosity, Refractive index
- To understand Surface Chemistry and Catalysis

Semester I

Practical:

- To enable the students to understand the methods of chemical analysis such as detection of acidic and basic radicals.
- To enable the students to understand the various concepts in physical chemistry like heat of solution, heat of ionization of weak acid, viscosity, surface tension etc. by doing experiments pertaining to these concepts.

Semester II

Paper-I:

- To understand Structure and Bonding: Hybridization in alkanes, alkenes and alkynes,
- To understand General Mechanism of organic reactions
- To understand Stereochemistry of organic compounds: isomerism, Optical, geometrical and conformation isomerism
- To understand methods of preparation, structure, nomenclature and reactions of alkanes, alkenes, diens, alkynes and cylcoalkanes
- To understand Structure, molecular orbital structure of benzene and their substitution reactions with mechanisms.

Paper-II:

- To understand Thermodynamics- Second law of thermodynamics: Carnot's cycle and its efficiency, Carnot theorem, thermodynamic scale of temperature, concept of entropy, entropy change in reversible and irreversible processes, entropy change of the universe, entropy change for an ideal gas with change in P, V & T, entropy change during physical change, physical significance of entropy, entropy as criteria of spontaneity & equilibrium of a process. Free energy functions: Work function and Gibb's free energy (G), Variation of work function with T and V, variation of Gibb's free energy with T and P. A and Gas criteria for spontaneity and equilibrium of a process. Gibb's – Helmholtz equation & its applications.
- To understand Chemical equilibrium: Law of mass action, law of chemical equilibrium, relationship between Kp and kc. Van't-Hoffs reaction isotherm, relation between standard free energy change & equilibrium constant, effect of temperature on equilibrium constant (reaction isochor), integrated form of Van't Hoff equation.
- To understand Phase Equilibria- phase rule and its applications.
- To understand Liquid-Liquid mixtures.
- To understand nuclear chemistry.
- To understand molecular structure.
- To understand Chemical Kinetics.

Semester II

Practical:

- To predict the outcome and mechanism of some simple organic reactions, using a basic understanding of the relative reactivity of functional groups, melting point. To enable the students to understand the various concepts in physical chemistry like integral heat of solution, critical solution temperature, rate constant of hydrolysis etc. by doing experiments concerned.

Semester III

Paper I:

- To understand VSEPR theory and examples, Preparation, properties and structure of Interhalogen compounds and polyhalides
- To understand MO theory- Molecular Orbital diagrams of homonuclear diatomic molecules, MO of HF, CO and NO diatomic molecules.

- To understand Chemistry of elements of first, second and third transition series.
- To understand errors in Chemical Analysis: Accuracy and Precision, Absolute and Relative errors, Mean, Median, Average and Standard deviations, and significant figures.
- To understand Non-aqueous solvents: liquids NH_3 and SO_2
- To understand Chemistry of Lanthanides and actinides

Semester III

Paper II:

- To understand Orientation of electrophilic substitution on monosubstituted benzene with activating and deactivating groups
- To understand structure method of preparation physical and chemical properties of alkyl halides and polyhalogen compounds.
- To understand preparation, nomenclature physical and chemical properties of alcohols, dihydric alcohol, trihydric alcohol and phenols.
- To understand preparation, nomenclature physical and chemical properties of p
- To understand reparation, nomenclature physical and chemical properties of carboxylic acids and their derivatives such as acid chlorides, anhydrides, esters, amides.

Semester III

Practical:

- To enable students to understand methods of complete analysis of organic compounds with different functional groups.
- To enable the students to understand the methods of quantitative analysis by redox complexometric and acid-base titrations.

Semester IV

Paper I:

- To understand Coordination compounds -nomenclature, VBT and MOT of complexes.
- To understand Isomerism in coordination compounds: Structural isomerism and Stereoisomerism in coordination compounds.
- To understand Oxidation and reduction: Use of redox potential data: Analysis of Redox cycle, redox stability in water, Latimer diagram of Chlorine and Oxygen, Construction explanation of

Frost diagram, Frost diagram of Nitrogen and Oxygen, Pourbaix diagram of Iron.

- To understand Principles of photometery: Beer-Lamberts Law, derivation and deviation (Numerical), Types of colorimeter and spectrophotometer with simple schematic diagrams. Application of colorimeter and spectrophotometer in quantitative analysis with reference to estimation of Cu(II) as Cu- ammonia complex.
- To understand Separation Techniques: Chromatography, Ion- Exchange and Solvent Extraction.
- To understand Inorganic Polymers: Silicones, Silicon oils, Silicone Elastomers and Silicon Resins Phosphonitrilic halide polymers: Introduction, Preparation, properties and uses. Structure and bonding in $(NPCl_2)_3$ and $(NPCl_2)_4$

Paper II:

- To understand - Solid State- Laws of crystallography: Law of constancy of interfacial angles, Law of rationality of indices, Law of symmetry, elements of a crystal. Space lattice, Unit cell, Bravais lattices, crystal systems, identification of crystal planes, interplanar distance in cubic systems, X-ray diffraction by crystal, derivation of Braggs' equation, Determination of crystal structure of NaCl, KCI and CsCl, Laue's method and powder method.
- To understand Electrochemistry -Electrical transport: Conductance in metals (electronic) & in electrolyte solutions (ionic conductance), specific, equivalent and molar conductance, measurement of electrolytic conductance, variation of equivalent, specific & molar conductance with dilution, Kohlrausch's law, Arrhenius theory of electrolyte dissociation & its limitation, Ostwald's dilution law, validity and importance of Ostwald's dilution law. Debye-Huckel theory (elementary treatment).Relaxation effect, Electrophoretic effect, Onsagar equation.
- To understand Spectroscopy- Rotational and Vibrational Spectroscopy.
- To understand Quantum Chemistry

Semester IV

Practical:

- To enable the students to understand the methods of quantitative analysis by gravimetric analysis and qualitative by paper chromatography.
- To gain an understanding of instrumental methods of analysis by conductometry and potentiometry.

Semester V

Paper I

- To understand preparation, nomenclature, structure, physical and chemical properties of aliphatic and aromatic nitro and amino compounds.
- To understand aromaticity in heterocyclic compounds of five membered six membered and fused ring compounds containing nitrogen, sulphur and oxygen as heteroatom, preparation and reactions of pyridine indolequinoline and isoquionoline.
- To understand Quantitative analysis of carbon, hydrogen. Nitrogen,Sulphur and halogens in organic compounds and empirical and molecular formula.
- To understand organometallic compounds with magnesium, lithium and zinc their preparations and reactions.
- To understand Spectroscopic analysis -UV and IR.

Semester V

Paper II

- To understand Electrochemistry.
- To understand Galvanic cells, irreversible & reversible cells, emf of cell & its measurement, relation between electrical energy and chemical energy, calculation of thermodynamic quantities of a cell reaction (ΔG, ΔH & ΔS & equilibrium constant).
- To understand types of reversible electrodes: metal-metal ion electrode, gas electrode, metal insoluble salt-anion electrode, redox electrodes, amalgam electrode, Nernst equation, calculation of cell emf from single electrode potential, reference electrodes, standard electrode potential, concentration cells with & without transference, liquid-junction potential, salt bridge & its functions.
- To understand applications of emf measurements in: (i) pH- determination using hydrogen electrode, quinhydrone electrode & glass electrode (ii) Potentiometric titration(Acid –Base and Redox titrations).
- To understand Quantum Chemistry and Molecular Orbital Theory.
- To understand Photochemistry and Raman Spectroscopy.
- To understand Colligative properties and Macromolecules.

Semester V

Practical:

- To enable the students to understand the Quantitative analysis of glucose, amide and carboxylic group and saponification value of oil, Molecular mass by Rast method and Viscometric method.
- To learn the verification of Beer-Lambert law, Zero order reaction, Quantitative analysis using Abbes' refractometer.

Semester VI

Paper I

- To understand metal ligand bonding in Transition Metal Complexes: Crystal field theory: Splitting of d-orbital in octahedral, tetrahedral and square planar complexes. High spin and low spin complexes
- To understand electronic spectra of Transition Metal Complexes: Jahn-Teller Effect, selection Rules Hole Formalism Principle Electronic spectrum of $[Ti(H_2O)_6]^{3+}$ and $[Cu(H_2O)_6]^{2+}$ complex ions with respect to position of the band, intensity of the band, symmetry of the band and bandwidth.
- To understand magnetic properties of Octahedral and Tetrahedral complexes with respect to CFT.
- To understand Thermodynamic and Kinetic stability of metal complexes
- To understand Organometallic Chemistry: Nomenclature and Classification of Organometallic compounds, Structure of metal ethylenic complexes and Mechanism of homogeneous Hydrogenation using Wilkinson's Catalyst.
- To understand metal carbonyls: Definition, preparation, properties, Structure and bonding in mononuclear carbonyls.
- To understand Bioinorganic Chemistry: structure and biological role of Hemoglobin and Myoglobin, role of Ca, Na and K, Na-K pump and Ca pump
- To understand Hard and Soft Acids and Bases: Classification of Acids and Bases as Hard and Soft, Pearson's HSAB Concept and its applications. Symbiosis, Antagonism.

Semester VI

Paper II

- To understand NMR spectra of organic molecules,
- To understand Malonic ester and acetoacetic ester -preparation and reaction

- To understand Carbohydrate chemistry, structure and reactions of glucose
- To understand Structure of disaccharide and polysaccharide without involving structure determination.
- To understand structure and reactions of amino acids, proteins and nucleic acids. Fats oils and detergents
- To understand Synthetic dyes, drugs and polymers with suitable examples

Semester VI

Practical:

- To enable the students to understand separation and analysis of the two-component organic mixture using $NaHCO_3$ and NaOH.
- To know the preparation of complexes of copper, nickel and iron.

B.Sc.: Program Specific Outcomes (PSO)

(With Subject Combination from Life Science subjects)

Program Purpose

The institution offers a Bachelor of Science (B.Sc.) Program with any of two Life Science Subjects: Biochemistry, Biotechnology, Botany, and Zoology, with Chemistry. An undergraduate course in Life Science subjects gives detailed information about life, the environment, and interactions among life forms such as plants, animals, bacteria and viruses. It also delves deep into the structure and functioning of cells, the biochemical interactions taking place in them and the reasoning for them. The subjects have employment opportunities in the field of chemical industry, agriculture, forestry, biofertilizer and biopesticide industry, wildlife conservation and management, and gives opportunity for work and entrepreneurship in applied fields such as floriculture, horticulture, mushroom cultivation, apiculture, sericulture, fishery, prawn culture, pearl culture, lac culture, etc. It provides opportunity for higher learning, research and teaching in all the subjects studied.

Teaching Learning and evaluation Methods:

- Students are taught as per the prescribed syllabus which is well supplemented by practical work, where students acquire skill and confidence in handling laboratory glassware, chemicals and equipment. Teaching is in the form of conventional chalk and black board method, power point presentations, animations, demonstration of laboratory techniques, etc. Additional inputs are given to the students in the form of guest lectures and field visits. Students are encouraged to prepare and show power point presentations as their assignments. Students are evaluated internally on the basis of their performance in periodic tests, assignments, projects, attendance, etc., and through the regular University theory and Practical Examinations conducted by the University. Students also learn soft skills such as Leadership, Management, Public speaking, team work through various platforms and subject associations.
- Curricular Structure: The student is expected to appear for two theory papers and a Practical Examination in all science subjects, except Mathematics, in each of the six semesters. In addition, they appear for additional two language papers in the first two semesters.

Program specific outcomes:

PSO 1. To know the English language with its finer nuances with a view to understand the subject being studied, and to develop an ability to express the subject in oral and written form.

PSO 2. To understand the evolution, development and dialects of the Hindi and Marathi Languages, with introduction to prose, poetry and other literature, with the use of the language in society, media and Government communications.

PSO 3.To develop an ability to appreciate the ideas, values and morals put forward by the authors through a study of the languages.

PSO 4. To understand the nature and basic concepts of the life science with the study of various aspects of life and its processes.

PSO 5. To analyze the relationship among life forms with respect to various biochemical processes underlying living systems.

PSO 6. To identify the role played by various chemical substances and phenomena in living systems and in the environment by analysis of their chemical interactions.

PSO 7.To identify organisms on the basis of their characteristics and classify them. To perform procedures as per laboratory standards in the subject by use of different tools and techniques.

PSO 8. To understand the applications of the subject in the field.

PSO 9. To identify and analyze the role played by organisms in sustaining the environment.

PSO 10.To apply the basic knowledge of Science in general to Life Sciences to identify problem areas, and to find solutions for their remediation through analytical thinking.

COMPULSORY ENGLISH

Introduction

The era of globalisation has triggered a change in the hopes and aspirations of students and parents. The course aims to further strengthen and augment skills acquired at the school level. Proficiency in the use of English is the need of the hour. The contents of the course will help students in this direction. Due importance is given to sentence building, correct usage, comprehension and other aspects of language. The student can prudently use the skills gained to widen his/her horizon through further reading and practical application of those skills.

Course Outcomes (CO)

Semester I

* To expose students to new words, phrases and idioms with the aim to increase their competency in the use of the English language.
* To help comprehend a prose extract taking into account the nuances of style.
* To hone the skills of students to condense information with which they are flooded.
* To correct common grammatical errors which would enable students to speak and write better English.
* To focus attention on human rights violations across the globe.
* To make students aware of the various movements of British Poetry and its influence on Indian Poets.
* To inculcate the importance of perseverance and hard-work in the context of the thematic content.

Semester II

* To train students to write an effective C.V.
* To acquire a knowledge of phrasal verbs.
* To improve the ability to comprehend and explicate prose passages.
* To kindle the spirit of service. It is hoped that the biographical sketch of an icon like Florence Nightingale would serve as a catalyst to unleash sublime impulses.
* To perceive the difference in approach and style between Indian authors and their counterparts in other countries who write in a different milieu.
* To enable the student to accept divergent views and opinions for the health of the nation and the world at large.
* To enter into the spirit of poetry and respond aesthetically to the music of words and the rhythm of verse.

SUPPLEMENTARY ENGLISH

Introduction

The Supplementary English course is an advanced course in English language. It aims to make the student more comfortable in the language. The course attempts to improve the core skill of communication in students. The different authors and poets whet the appetite of students for further reading. They are also made aware of current issues - national and international - which impacts the world. This would endow students with a well-rounded personality. The background and the several factors which resulted in the rise of "Standard English" as the lingua franca of the world are explained to the students.

Course Outcomes (CO)

Semester I

* The facilitator would expose students to a wide spectrum of authors and poets.
* To make students familiar with the challenges confronting the country through emphasis on the works of the Indian authors.
* To help students analyze the elements that goes into the making of a short story. This would give a fillip to their writing skills.
* To underscore the importance of idioms and phrases.
* To acquaint students with topical issues of importance through essays on environment and social issues.
* To endeavour to create an effective and literary prose style through practical exercises in reading and writing personal and reflective essays.
* To train students to write Emails.

Semester II

* To develop the skill of creative writing by giving students practical exercises in writing a story based on hints. This will give ample scope to their faculty of imagination.
* To help students write official letters and advertisements.
* To enable students to draft an effective report.
* To provide opportunities to speak on current issues.
* To bring to the fore issues concerning women.
* To increase familiarity with British and Indian authors.
* To make students aware of foreign words used in English.

हिंदी

सामान्य उद्देश

हिंदी हमारे राष्ट्र की राष्ट्र भाषा है | हिंदी विदेशो में भी बहुत अधिक रुचि के साथ बोलने वाली भाषा है ये हमारे भारत देश में जन जन में बोली जाने वाली आम भाषा है-, जो उन्नतशील और प्रभावशाली है | हमारे भारत वर्ष में बोले जाने वाली एकमात्र भाषा है | सभी प्रांतो में अपने अपने लहजों में बोली जाती है | अलगअलग प्रांतो से आए - विद्यार्थियों को भाषा के प्रति प्रोत्साहित करना है

कोर्स आउटकम

1. भाषा को समझने, बोलने तथा लिखने को प्रोत्साहित करना |
2. नये रू कराना-ब-शब्दों से रू नये -|
3. हिंदी के प्रति रस निर्माण कराना |
4. सहज और सरल भाषा द्वारा भविष्य का निर्माण कराना |
5. भाषा ज्ञान का विकास कराना|
6. भाषा के द्वारा उन्हें नये नये आयामो का बोध कराना-|
7. भाषा के द्वारा संस्कार और संस्कृती का विकास करना |
8. हिंदी भाषा के द्वारा हमारे भारत देश कि विशेषता में एकता का बोध कराना |

इकाई 1: गद्द विभाग

1. साहित्य की विविध विधाओ से परिचय कराना |
2. मंथन साहित्य के द्वारा कहानियो के मध्यम से छात्रो को यथार्थ का बोध कराना |
3. कहानी से जो सीख मिलती है उसके प्रति विद्यार्थियों में जागरूकता निर्माण करना |

इकाई 2: पद्द विभाग

1. कविता के माध्यम से जीवन के हर पहेलुओं से रु रु कराना-ब-|
2. गागर में सागर भरने की कला से काव्य की सौन्दर्यता निखारना |
3. कविता के द्वारा कल्पना शक्ती को जागृत करना |

इकाई 3:व्यावहारिक हिंदी

1. व्यावहारिक हिंदी का जीवन में महत्वपूर्ण स्थान बताना |
2. पारिभाषिक शब्दावली के द्वारा कार्यालायो में प्रयोग होने वाले शब्दों का बोध कराना|
3. स्ववृत्त, साक्षात्कार के द्वारा अपनी भूमिका समाज के सामने प्रस्तुत करने के प्रति जागृत करना |
4. समाचार लेखन में रुचि निर्माण कराना |

इकाई 4: अन्य पाठ सामग्री

1. विलोम शब्दों का महत्व, अनेक शब्दों के लिये एक शब्द का उपयोग सिखाना |
2. शब्दों में शुद्धीकरण करना और जो शब्द सिर्फ सुनाई दिये जाते है उन शब्दों पर अपना मत कैसे प्रस्तुत करना आदि |

MARATHI

कोर्स आउटकम

सामान्य उद्देश

मराठी ही महाराष्ट्रवासी यांची भाषा आहे. मराठी ही पूरोगामी व प्रभावी आहे. तसेच ही महाराष्ट्राची बोली भाषा आहे. महाराष्ट्रातील प्रत्येक जिल्हयात ही वेगवेगळया पद्धतीने बोलली जाते. मराठी भाषा बोलण्या साठी महाराष्ट्रातल्या विद्याथ्र्यांना प्रोत्साहित केले पाहिजे।

1) भाषा समजण्यासाठी, बोलण्यासाठी, तसेच लिहण्यासाठी प्रोत्साहित करावयास हवे.

2) नवीन नवीन शब्दांची ओळख करून दयावयास हवी.

3) मराठी विषयी त्यांच्या मनात गोडी निर्माण करावयास हवी.

4) सहज आणी सोप्या भाषे द्वारे त्यांचे भविष्य उज्ज्वल करणे.

5) भाषा विषयक ज्ञानाचा विकास करणे.

प्रकरणः 1- गद्य विभाग

1) साहित्यातील विविध बाबीचा परिचय करून देणे.

3) गोष्टींच्या माध्यमातून विदयाथ्र्यानां वास्तवीकते बाबत ज्ञान देणे.

2) गोष्टीतील धडया नुसार विदयाथ्र्यांना जागरूक करणे.

प्रकरणः 2- पदय विभाग

1) कविते द्वारे विद्याथ्र्यांना जिवनातील क्षणाचा परीचय करून देणे.

2) कमित कमि शब्दांत कवितेचे सौदंर्य वाढवणे.

3) कविते द्वारा कल्पनाशक्ती दृढ करणे.

प्रकरणः 3 - निबंध

1) निबंध लिहण्याची कला, व निबंधा चे प्रकार याची माहिती करूण देणे.

निबंधा द्वारे समाज प्रकृति च्या संबधी माहिती देणे. मराठी म्हणीचा वापर कसा करावा याची माहिती देणे.

प्रकरणः 4- सारांश

1) सारांश लिहण्याची कला अवगत करणे.

2) कार्यालयातील पत्रा बाबत अवगत करणे

3) मराठी अनुवादा बाबत ध्यान वाढवीणे.

4) शुद्धलेखनाचे महत्व पटवून देणे.

BIOCHEMISTRY

The subject broadly aims to deal with

Biomolecules and Human Physiology

Microbiology

Virology & Immunology

Course Outcomes (CO)

- To gain an insight into various physiological activities in human beings and the coordination between different systems of human body. Through understanding of Carbohydrate Chemistry, Digestion, Excretion, Hematology, Muscle Physiology and Biochemistry, Reproduction, Endocrinology, NeuroBiology, Lipids, Membranes and transport mechanisms. Understand energetic and structural roles of carbohydrates and Lipids in living organisms. Understand the structure and functions of membrane proteins.
- To strengthen the theoretical knowledge of the subject through laboratory experiments. The students will be conversant with blood components and their examination, staining, digestive enzymes, quantitative clinical Biochemistry techniques and qualitative analysis of various physiologically important molecules.
- To understand basic study of Micro-organisms (Bacteria and Viruses) and Immunology. The student gains basic knowledge of History, classification, laboratory techniques, structure and methods of studying growth, nutritional requirements, and control of microorganisms.
- To understand study of Immunology makes the students understand the basic defense mechanisms and human immune responses towards microorganisms. The student gains basic knowledge about Immunity, Antigen, Antibody, Cells of immune system and their function and regulation. The students would understand basic concepts in the working of human immunological system, at the molecular level.
- To strengthen the theoretical knowledge of the subject through laboratory experiments.
- To teach the students Microscopy and aseptic handling, isolation, pure culture preparation, staining characteristics, external morphology of microbes. Understanding the effect of antibiotics and UV radiations, Handing of equipment required and study of various immunochemical techniques.
- To have an in-depth knowledge about the four major types of biological molecules like DNA, RNA, Proteins and their role in life related processes. Able to explain the impact of slight changes the structure of Macromolecules.
- To understand structures and properties of the amino acids found in proteins. Able to describe

the primary, secondary, tertiary and quaternary structures of proteins including explanation of the forces involved in forming and maintaining such structures.

- To give the students hands-on training about estimations of these molecules by various methods, interpretation of results and handling of sophisticated instruments.

Biophysical & Biochemical techniques / Bioinstrumentation

- To enable the student to get sufficient knowledge in principles and applications various instruments and techniques of Biological Importance. The students study spectroscopy, chromatographic and electrophoresis techniques, centrifugation methods, Isotopic tracer techniques.
- To understand the instruments, analytical techniques and application of Biophysical methods used in the laboratory. Demonstrate practical skills required to deal with the detection, identification, separation, and estimation of various biomolecules.
- To understand biological mechanisms of enzyme catalysis. In-depth knowledge of History, chemical nature, isolation, purification, structure, active site, regulatory mechanisms, kinetic studies, factors affecting rates of enzyme reactions, role of modulators, vitamins and coenzymes, etc.
- To explain the structural mechanisms of important biological processes and how they take place and are regulated.
- To explain the Michaelis-Menten model of enzyme kinetics, including the effects of inhibitors, substrate concentration, temperature, pH.
- To explain allosteric, covalently modulated, immobilized enzymes and multienzyme complexes.
- Laboratory experiments focus on isolation and study of their activities, data analysis and interpretation. The student will be able to perform immobilization of enzymes.

Metabolism:

- To understand the importance of thermodynamic principles governing Metabolism.

Molecular Biology & Basic DNA technology:

- To understand Concepts of high energy bonds and their role in Metabolism, techniques involved in metabolic studies, Substrate level and oxidative phosphorylation. Students will explain / describe the catabolic and anabolic pathways of Carbohydrates, Lipids, Proteins and Nucleic acids along with their regulation. Understanding the importance of reactive oxygen species and their role in aging. By the end of this course, student will have detailed knowledge

of molecular processes of DNA Replication, Transcription, Translation in prokaryotes and Regulation of these processes. Explain the Recombinant DNA Techniques used in microbiological research, gene manipulation and gene transfer technologies, expression systems, methods of selection, use of plasmids and restriction enzymes in creating recombinant DNA.

- To analyze structural-functional relationships of genes and proteins in prokaryotes and factors responsible for ageing and cancer. Understand the instruments, analytical techniques and application of Biophysical methods used to study molecular processes.

General outcomes of the Laboratory Courses:

- To be able to implement the theoretical concepts studied, interpretation of experimental data, expertise in fundamental laboratory skills, laboratory safety protocols, classical laboratory techniques and modern instrumentation.
- To promote analytical thinking and develop research aptitude through Viva voce.

BIOTECHNOLOGY

Microbiology &Virology

Course Outcomes (CO)

- This course presents a basic study of Micro-organisms (Bacteria and Viruses). The student gains basic knowledge of history, classification, laboratory techniques, structure and methods of studying growth, nutritional requirements and control of microorganisms.
- Laboratory experiments are designed to strengthen theoretical knowledge of the subject. The students learn microscopy, aseptic handling, isolation, pure culture preparation, staining characteristics and external morphology of microbes. Understanding the effect of antibiotics and UV radiations. Macromolecules By the end of this course, student will have in depth knowledge about the major types of biological molecules i.e., DNA, RNA, Proteins and their role in life related processes. Able to explain the impact of slight changes the structure of macromolecules.
- To enable the students to understand the structures and properties of the amino acids found in proteins.
- To be able to describe the primary, secondary, tertiary and quaternary structures of proteins including explanation of the forces involved in forming and maintaining such structures.
- To understand Chemistry of Carbohydrate and Lipids and their energetic and structural roles.
- To strengthen theoretical knowledge of the subject laboratory experiments. The students become acquainted with quantitative and qualitative analysis of various biological molecules. Students are given hands-on training about estimation of these molecules by various methods, interpretation of results and handling of sophisticated instruments.

Cell Biology:

- To gain knowledge about structure and function of the cell and its organelles. Cell division, cell cycle, structure of muscle and nerve cell, synaptic transmission and neuromuscular junctions.

Enzymology:

- To understand the biological mechanisms of enzyme catalysis. In-depth knowledge of history, chemical nature, isolation, purification, structure, active site, regulatory mechanisms, kinetic studies, factors affecting rates of enzyme reactions, role of modulators, vitamins and coenzymes, etc.
- To understand the mechanism by which biochemical reactions take place and are regulated.

To understand enzyme kinetics with respect to Michaelis-Menten equation, effects of inhibitors, substrate concentration, temperature and pH. Students will have knowledge of allosteric, covalently modulated, immobilized enzymes and multienzyme complexes.

- Laboratory experiments focus on isolation and study of enzyme activity, data analysis and interpretation. The student will be able immobilize enzymes and test their activity. Metabolism Understanding the importance of thermodynamic principles governing metabolism, concepts of high energy bonds and their role in metabolism, techniques involved in metabolic studies, substrate-level and oxidative phosphorylation.
- To explain the catabolic and anabolic pathways of Carbohydrates, Lipids, Proteins and Nucleic acids along with their regulation. Understand the importance of reactive oxygen species and their role in aging.

Biophysical:

- Techniques / Bioinstrumentation
- To enable the student to get sufficient knowledge in principles and applications of various instruments and techniques of Biological Importance. The students study spectroscopy, chromatographic and electrophoresis techniques, centrifugation methods, Isotopic tracer techniques.
- To understand the instruments, analytical techniques and application of Biophysical methods used in the laboratory. Demonstrate practical skills required to deal with the detection, identification, separation, and estimation of various biomolecules.

Immunology:

The study of Immunology makes the students understand the basic defense mechanisms and human immune responses towards pathogens. The student gains basic knowledge about Immunity, Antigen, Antibody, Cells of immune system and their function and regulation. The students will understand basic concepts in the working of human immune system at a molecular level. Students gain theoretical and practical knowledge of different diagnostic tests based on antigen-antibody reactions like RID.

- To understand basic concepts of Biostatistics: Mean, Median, Mode, Standard Deviation and Standard Error and practice problems associated with these concepts.
- To understand Molecular Biology & Basic DNA technology Environmental, Industrial and Food Biotechnology and Plant and Animal Biotechnology
- To have detailed knowledge of molecular processes of DNA Replication, Transcription,

Genetic Code, Translation in Prokaryotes and Regulation of these processes. Explain the Recombinant DNA Techniques, gene manipulation, gene transfer, expression systems, and methods of selection, use of plasmids / other vectors and restriction enzymes in creating recombinant DNA.

- To analyze structural-functional relationships of genes and proteins in prokaryotes and factors responsible for ageing and cancer. Understand the instruments, analytical techniques and application of biophysical methods used to study molecular processes.
- To learn about water and waste water treatment processes, concept of biodegradation, biodeterioration and biotransformation, xenobiotics, bioaccumulation and biomagnification.
- To understand the basic principles of Industrial Biotechnology like commercial products obtained from microorganisms, GMOs and various types of fermenters. Gain knowledge about various processes in food biotechnology like types of cheeses and their production, microorganisms as food (mushroom and spirulina) and assessment of microbiological quality of various foods.
- To be aware of importance of quality control, quality assurance in food and pharmaceutical industry.
- To have theoretical and practical knowledge of Animal and Plant Tissue Culture Techniques.
- To understand the preparation and composition of tissue culture media, callus and suspension cultures, their initiation and maintenance, Ti &Ri plasmids, transgenic plants and their applications.
- To have in-depth knowledge of various techniques of animal cell and tissue culture, culture media, growth factors, laboratory facilities and design, characteristics of cells in culture, primary culture, cell lines and their maintenance in the laboratory, Awareness of the use of recombinant DNA products in medicine, recombinant vaccines and concept of transgenic animals.

General outcomes of the Laboratory Courses:

- To enable students, at the end of laboratory courses, to implement the theoretical concepts studied, interpretation of experimental data, expertise in fundamental
- To develop laboratory skills, laboratory safety protocols, classical laboratory techniques and modern instrumentation.
- To promote analytical thinking and develop research aptitude through Viva voce.

BOTANY

Course Outcomes (CO)

Semester I

Paper I-Viruses, Prokaryotes and Algae

- To enable students to explain general characteristics of Viruses, Ultra structure of TMV, Structure and Multiplication of T4 – Bacteriophage.
- To be acquainted with economic importance of viruses.
- To gain knowledge about Mycoplasma.
- To learn the differences in Archaebacteria and Eubacteria.
- To be equipped with knowledge on cell structure and Reproduction and economic importance of Bacteria in and Cyanobacteria.
- To be able to differentiate algal species from other organisms.
- To gain knowledge about habitat of algae and various forms of algae.
- To learn about economic importance of algae

Paper II - Fungi, Lichen, Plant Pathology and Bryophyta

- To describe general characteristics, classification and economic importance of Fungi.
- To explain the life history of Albugo, Mucor, Puccinia, Cercospora.
- To elucidate types of Lichens and their Reproduction and Economic importance
- To be able to identify diseased plants
- To be aware of symptoms of plant diseases and their control measures
- To gain knowledge regarding various forms of Bryophytes
- To learn the importance of bryophytes in ecology as well as their applications for human use.

Practical:

- To be able to prepare temporary mount of algae and its microscopic observation.
- To be able to demonstrate Gram staining of bacteria
- To prepare temporary mount of bryophytes by taking hand sections and examine internal structure microscopically.
- To prepare temporary mount by taking hand section through affected portion of diseased plant

Semester – II

Paper – I (Pteridophyta & Gymnosperms)

- To elucidate classification, alternation of generation and economic importance of Pteridophytes and general characters of Psilopsida, Lycopsida, Sphenopsida and Pteropsida,
- To elucidate classification, general characters, economic importance, and alternation of generation of Gymnosperms.
- To elucidate life cycle of Pteridophtes (Rhynia, Selaginella,Equisetum)and Gymnosperms (Cycas and Pinus)
- To elucidate details of fossil Cycadeoidea
- To explain concept of Apogamy, Apospory, Stelar system in pteridophytes, heterospory and seed habit.

Paper – II - Palaeobotany& Morphology of Angiosperms

- To elucidate geological time scale, process of fossilization and types of fossils.
- To describe glossopteris, a fossil gymnosperm.
- To describe types of root, stem, leaf.
- To describe types of inflorescence.
- To explain details of flower and fruit.

Practical:

- Students will be able to study internal structure by taking hand section and making temporary Mountof Selaginella and Equisetum, Cycas and Pinus
- Students will be able to describe morphological characters of leaf
- Students will be able to describe various parts of flower

Semester III

Paper I - Angiosperm Taxonomy

- To gain knowledge about Benettitalean theory Origin of Angiosperms and Phylogeny of Angiosperm and Fossil Angiosperm Sahanianthus
- To learn about Floras, Herbarium, keys and Principles of Botanical Nomenclature
- To explain Bentham and Hooker's &Engler and Prantl's System of classification.
- To gain insight into various aspects that can be used to classify the plants.

- To be aware about characteristics and economic importance of Malvaceae, Brassicaceae, Fabaceae,Asteraceae, Asclepiadaceae, Euphorbiaceae and Poaceae

Semester III

Paper II - Cell Biology, Plant Breeding and Genetics

- To be able to explain structure of plant cell wall, plasma membrane, Endoplasmic reticulum, Golgi complex Vacuoles, Ribosomes (70S and 80S), Mitochondria, Chloroplasts and Nucleus
- To be able to explain morphology of chromosome, karyotype, Nucleosome model of chromosome organization and sex Chromosomes in Melandrium
- To be able to elucidate stages of Cell division i.e Mitosis and Meiosis in plants and importance of cell division.
- To be able to gain knowledge about basic terms and methods used in descriptive statistics
- To be able to explain measures of Central tendency and measures of variability in descriptive statistics.
- To be able to learn about use of descriptive statistics in student's test
- To be equipped with knowledge regarding various plant breeding methods that can be employed for production of new plant varieties.

Practical:

- To enable students to do plant description and to draw diagrams required for plant identification
- To enable students to solve problems based on descriptive statistics and student's test
- To enable students to prepare slides for examination of various stages of cell division.

Semester – IV

Paper – I - Anatomy & Embryology of Angiosperms

- To be able to explain basic body plan &modular type of growth in plants
- To be able to gain knowledge about meristems and permanent tissue, apical meristem, cambium, periderm, growth ring, sap wood, heart wood and senescence and abscission of leaves and types of vascular bundles
- To be able to learn about anatomy of dicot and monocot root, stem and leaf.
- To be aware about types, adaptation, and significance of pollination

- To be able to explain structure of anther and development of male gametophyte,
- To be able to explain structure and types of ovules, development of female gametophyte, Fertilization and formation of endosperms and structure of embryo.

Semester- IV

Paper-II - Genetics & Molecular Biology

- To be able to explain concepts of Mendelism and non-mendelian interaction of genes
- To be able to equip with knowledge of linkage and crossing over and their significance
- To be aware about polyploidy and aneuploidy
- To be equipped with knowledge pertaining to structural changes in chromosome:
- To be able to elucidate Watson and Crick model of DNA Structure and semi conservative method of DNA replication in eukaryotes
- To be aware about Benzor's concept of gene
- To be able to explain details of mutations and its application in crop improvement
- To have knowledge on DNA damage and repair
- To know about satellite and repetitive DNA
- To explain Genetic code, t-RNA (Clover leaf model) and are aware about transcription and translation in prokaryotes
- To be able to explain Lac operon model for regulation of gene expression in prokaryotes

Practical:

- To do anatomical study by preparing temporary mount of the root, stem and leaf by taking hand sections
- To calculate percent germination in the given pollen grains
- To prove Mendel's Laws of Inheritance through colored beads
- To solve problems based on gene interaction

Semester V

Paper I- Biochemistry and Plant Physiology-I

- To be able to learn about various biomolecules and their structural and functional role in plants.
- To be able to explain various plant water relations and their significance

- To be able to explain process of upward movement of water through xylem and mechanism of transpiration and phloem transport.
- To be aware about role and deficiency symptoms of macro- and micro nutrients, passive and active modes of Solute transport
- To be able to elucidate types and processes of respiration and photosynthesis
- To be able to explain Glyoxylate cycle of lipid metabolism.
- To be aware about mechanism of biological nitrogen fixation

Paper II - Plant Ecology-I

- To gain knowledge regarding Ecology, its branches and significance
- To learn about Gaseous composition of Atmosphere, effect of Light & Temperature on vegetation.
- To learn about soil formation,its profile and physical and chemical properties
- To learn about interactions between living organisms
- To be able to elucidate Nitrogen and phosphorous cycles
- To be able to explain ecosystem, food chain, food web, ecological pyramids.
- To be able to understand difference between qualitative and quantitative study of plant and plant forms at community level and distribution of plants.
- To be equipped with knowledge of Phytogeography, especially pertaining to India

Practical:

- To enable students to demonstrate presence of particular biomolecule in given sample.
- To enable students todemonstrate process pertaining to Plant Physiology and Plant Biochemistry
- To enable students to demonstrate practical field work techniques (Density, Abundance, Frequency and Homogeneity)

Semester – VI

Paper – I - Plant Physiology-II & Biotechnology

- To be aware about concept of growth in plants, phytochromes and their role
- To be able to explain circadian rhythms and biological clock, tropic and nastic movements in Plants
- To gain knowledge about plant growth regulators
- To be able to can explain concept of photoperiodism and vernalization, senescence and abscission

- To be able to elucidate causes and role of seed dormancy and methods to break it
- To be aware of hypersensitive response and Systemic acquired resistance in plant defense mechanism and role of terpenes and phenolic compounds
- To be equipped with knowledge and basic procedures involved in Plant tissue culture,
- To be also equipped with basic knowledge of Genetic engineering and Agarobacterium tumefaciens mediated gene transfer in plants
- To be aware of advantages and disadvantages of transgenic plants

Semester – VI

Paper – II - Plant Ecology, Techniques & Utilization of Plants

- To gain knowledge about plant succession and its causes.
- To be able to explain morphological, anatomical & physiological adaptations in plants
- To be aware about environmental management, environmental pollution & its control
- To gain acquaintance with renewable and non-renewable natural resources
- To learn the principle and application of microscopy, centrifugation, electrophoresis, spectroscopy, chromatography
- To be equipped with knowledge about morphology, utilization and chemical constituents of Wheat, Groundnut, Cotton, Clove, Coffee, Neem and Rubber.
- To be aware about ethnobotany.

Practical:

- Students are able
- To determine seed viability.
- To study the ecological adaptations of plants by morphological and anatomical observations.
- To perform practical pertaining to basic physiochemical properties of water.
- To study the dust holding capacity of leaves and determine the percent leaf-area injury of different leaf samples.
- To enable students to be equipped with skill to demonstrate separation of biomolecules.

CHEMISTRY

Course Outcomes (CO)

Semester I

Paper-I:

- To understand the atomic structure based on quantum mechanics and explain periodic properties of the elements.
- To understand the structure and bonding in covalent molecules and ionic solids and predict the structure of molecules.
- To understand selected crystal structures, and perform calculations of the lattice energy of ionic compounds.
- To understand the properties of s block elements and hydrogen bonding in compounds.
- To understand the properties of noble gases and structure, bonding and applications of Xenon fluorides (XeF_2, XeF_4, XeF_6). Structure and bonding in $XeOF_2$ and $XeOF_4$.
- To understand the properties of p-block elements like Atomic and ionic radii, Ionization potential, electron affinity, electronegativity, redox properties and oxidation state.
- To understand about Hydrides: Comparative study with respect to structure of NH_3, PH_3, AsH_3 and SbH_3, Structure of P_2O_3,P_2O_5, Structure of H_3PO_3 and H_3PO_4, Preparation and structure of Caro's and Marshall's acids.
- To understand Structure and bonding of diborane, structure of borazine

Paper-II:

- To understand Thermodynamics: fundamental concepts
- To understand statements of first law of thermodynamics, definition of internal energy & enthalpy, Heat capacity, heat capacity at constant volume and at constant pressure & their relationship. Joule-Thomson experiment, Joule-Thomson coefficient & inversion temperature, calculations of w, q, ΔE & ΔH in isothermal & adiabatic expansion of ideal gases for reversible process.
- To understand Thermo chemistry: Standard states, Standard enthalpy of formation. Hess's law of constant heat of summation & its applications, Heat of reaction, relation between heat of reaction at constant volume and constant pressure, Average bond energy, bond dissociation energy and its calculations from thermo chemical data.
- To understand Gaseous State - Postulates of kinetic theory of gases, derivation of kinetic gas equation, deduction of various gas laws from kinetic gas, Effect of temperature on molecular

velocities, Different types of molecular velocities (most probable, R.M.S. and average and expressions for them), their inter relationships, Definitions of collision diameter, collision number and Mean free path.

- To understand ideal gas and real gases-Difference between an ideal and real gases and deviations from ideal behavior.
- To understand the terms – Compressibility factors and Boyle temperature. Causes of deviation from ideal behaviors, Vander Vaal's equation of state, explanation of behavior of real gases by Van der Vaal's equation, Andrew's experiment on critical phenomenon of isotherms of CO_2.
- To understand Liquid State- Properties of liquid: Surface tension, Viscosity, Refractive index
- To understand Surface Chemistry and Catalysis

Practical:

- To enable the students to understand the methods of chemical analysis such as detection of acidic and basic radicals.
- To enable the students to understand the various concepts in physical chemistry like heat of solution, heat of ionization of weak acid, viscosity, surface tension etc. by doing experiments pertaining to these concepts.

Semester II

Paper-I:

- To understand Structure and Bonding: Hybridization in alkanes, alkenes and alkynes,
- To understand General Mechanism of organic reactions
- To understand Stereochemistry of organic compounds: isomerism, Optical, geometrical and conformation isomerism
- To understand methods of preparation, structure, nomenclature and reactions of alkanes, alkenes, diens, alkynes and cylcoalkanes
- To understand Structure, molecular orbital structure of benzene and their substitution reactions with mechanisms.

Paper-II:

- To understand Thermodynamics- Second law of thermodynamics: Carnot's cycle and its efficiency, Carnot theorem, thermodynamic scale of temperature, concept of entropy, entropy change in reversible and irreversible processes, entropy change of the universe, entropy change for an ideal gas with change in P, V & T, entropy change during physical change,

physical significance of entropy, entropy as criteria of spontaneity & equilibrium of a process. Free energy functions: Work function and Gibb's free energy (G), Variation of work function with T and V, variation of Gibb's free energy with T and P. A and Gas criteria for spontaneity and equilibrium of a process. Gibb's – Helmholtz equation & its applications.

- To understand Chemical equilibrium: Law of mass action, law of chemical equilibrium, relationship between Kp and kc. Van't-Hoffs reaction isotherm, relation between standard free energy change & equilibrium constant, effect of temperature on equilibrium constant (reaction isochor), integrated form of Van't Hoff equation.
- To understand Phase Equilibria- phase rule and its applications.
- To understand Liquid-Liquid mixtures.
- To understand nuclear chemistry.
- To understand molecular structure.
- To understand Chemical Kinetics.

Practical:

- To predict the outcome and mechanism of some simple organic reactions, using a basic understanding of the relative reactivity of functional groups, melting point. To enable the students to understand the various concepts in physical chemistry like integral heat of solution, critical solution temperature, rate constant of hydrolysis etc. by doing experiments concerned.

Semester III

Paper I:

- To understand VSEPR theory and examples, Preparation, properties and structure of Interhalogen compounds and polyhalides
- To understand MO theory- Molecular Orbital diagrams of homonuclear diatomic molecules, MO of HF, CO and NO diatomic molecules.
- To understand Chemistry of elements of first, second and third transition series.
- To understand errors in Chemical Analysis: Accuracy and Precision, Absolute and Relative errors, Mean, Median, Average and Standard deviations, and significant figures.
- To understand Non-aqueous solvents: liquids NH_3 and SO_2
- To understand Chemistry of Lanthanides and actinides

Paper II:

- To understand Orientation of electrophilic substitution on mono substituted benzene with

activating and deactivating groups

- To understand structure method of preparation physical and chemical properties of alkyl halides and polyhalogen compounds.
- To understand preparation, nomenclature physical and chemical properties of alcohols, dihydric alcohol, trihydric alcohol and phenols.
- To understand preparation, nomenclature physical and chemical properties of p
- To understand reparation, nomenclature physical and chemical properties of carboxylic acids and their derivatives such as acid chlorides, anhydrides, esters, amides.

Practical:

- To enable students to understand methods of complete analysis of organic compounds with different functional groups.
- To enable the students to understand the methods of quantitative analysis by redox complexometric and acid-base titrations.

Semester IV

Paper I:

- To understand Coordination compounds -nomenclature, VBT and MOT of complexes.
- To understand Isomerism in coordination compounds: Structural isomerism and Stereoisomerism in coordination compounds.
- To understand Oxidation and reduction: Use of redox potential data: Analysis of Redox cycle, redox stability in water, Latimer diagram of Chlorine and Oxygen, Construction explanation of Frost diagram, Frost diagram of Nitrogen and Oxygen, Pourbaix diagram of Iron.
- To understand Principles of photometery: Beer-Lamberts Law, derivation and deviation (Numerical), Types of colorimeter and spectrophotometer with simple schematic diagrams. Application of colorimeter and spectrophotometer in quantitative analysis with reference to estimation of Cu (II) as Cu- ammonia complex.
- To understand Separation Techniques: Chromatography, Ion- Exchange and Solvent Extraction.
- To understand Inorganic Polymers: Silicones, Silicon oils, Silicone Elastomers and Silicon Resins Phosphonitrilic halide polymers: Introduction, Preparation, properties and uses. Structure and bonding in $(NPCl_2)_3$ and $(NPCl_2)_4$

Paper II:

- To understand - Solid State- Laws of crystallography: Law of constancy of interfacial angles, Law of rationality of indices, Law of symmetry, elements of a crystal.Space lattice, Unit cell, Bravais lattices, crystal systems, identification of crystal planes, interplanar distance in cubic systems, X-ray diffraction by crystal, derivation of Braggs' equation, Determination of crystal structure of NaCl, KCI and CsCl, Laue's method and powder method.
- To understand Electrochemistry -Electrical transport: Conductance in metals (electronic) & in electrolyte solutions (ionic conductance), specific, equivalent and molar conductance, measurement of electrolytic conductance, variation of equivalent, specific & molar conductance with dilution, Kohlrausch's law, Arrhenius theory of electrolyte dissociation & its limitation, Ostwald's dilution law, validity and importance of Ostwald's dilution law. Debye-Huckel theory (elementary treatment).Relaxation effect, Electrophoretic effect, Onsagar equation.
- To understand Spectroscopy- Rotational and Vibrational Spectroscopy.
- To understand Quantum Chemistry

Practical:

- To enable the students to understand the methods of quantitative analysis by gravimetric analysis and qualitative by paper chromatography.
- To gain an understanding of instrumental methods of analysis by conductometry and potentiometry.

Semester V

Paper I

- To understand preparation, nomenclature, structure, physical and chemical properties of aliphatic and aromatic nitro and amino compounds.
- To understand aromaticity in heterocyclic compounds of five membered six membered and fused ring compounds containing nitrogen, sulphur and oxygen as heteroatom, preparation and reactions of pyridine indolequinoline and isoquionoline.
- To understand Quantitative analysis of carbon, hydrogen. Nitrogen, Sulphur and halogens in organic compounds and empirical and molecular formula.
- To understand organometallic compounds with magnesium, lithium and zinc their preparations and reactions.
- To understand Spectroscopic analysis -UV and IR.

Paper II

- To understand Electrochemistry.
- To understand Galvanic cells, irreversible & reversible cells, emf of cell & its measurement, relation between electrical energy and chemical energy, calculation of thermodynamic quantities of a cell reaction (ΔG, ΔH & ΔS & equilibrium constant).
- To understand types of reversible electrodes: metal-metal ion electrode, gas electrode, metal insoluble salt-anion electrode, redox electrodes, amalgam electrode, Nernst equation, calculation of cell emf from single electrode potential, reference electrodes, standard electrode potential, concentration cells with & without transference, liquid-junction potential, salt bridge & its functions.
- To understand applications of emf measurements in: (i) pH- determination using hydrogen electrode, quinhydrone electrode & glass electrode (ii) Potentiometric titration(Acid –Base and Redox titrations).
- To understand Quantum Chemistry and Molecular Orbital Theory.
- To understand Photochemistry and Raman Spectroscopy.
- To understand Colligative properties and Macromolecules.

Practical:

- To enable the students to understand the Quantitative analysis of glucose, amide and carboxylic group and saponification value of oil, Molecular mass by Rast method and Viscometric method.
- To learn the verification of Beer-Lambert law, Zero order reaction, Quantitative analysis using Abbes' refractometer.

Semester VI

Paper I

- To understand metal ligand bonding in Transition Metal Complexes: Crystal field theory: Splitting of d-orbital in octahedral, tetrahedral and square planar complexes. High spin and low spin complexes
- To understand electronic spectra of Transition Metal Complexes: Jahn-Teller Effect, selection Rules Hole Formalism Principle Electronic spectrum of $[Ti(H_2O)_6]^{3+}$ and $[Cu(H_2O)_6]^{2+}$ complex ions with respect to position of the band, intensity of the band, symmetry of the band and bandwidth.

- To understand magnetic properties of Octahedral and Tetrahedral complexes with respect to CFT.
- To understand Thermodynamic and Kinetic stability of metal complexes
- To understand Organometallic Chemistry: Nomenclature and Classification of Organometallic compounds, Structure of metal ethylenic complexes and Mechanism of homogeneous Hydrogenation using Wilkinson's Catalyst.
- To understand metal carbonyls: Definition, preparation, properties, Structure and bonding in mononuclear carbonyls.
- To understand Bioinorganic Chemistry: structure and biological role of Hemoglobin and Myoglobin, role of Ca, Na and K, Na-K pump and Ca pump
- To understand Hard and Soft Acids and Bases: Classification of Acids and Bases as Hard and Soft, Pearson's HSAB Concept and its applications. Symbiosis, Antagonism.

Paper II

- To understand NMR spectra of organic molecules,
- To understand Malonic ester and acetoacetic ester -preparation and reaction
- To understand Carbohydrate chemistry, structure and reactions of glucose
- To understand Structure of disaccharide and polysaccharide without involving structure determination.
- To understand structure and reactions of amino acids, proteins and nucleic acids. Fats oils and detergents
- To understand Synthetic dyes, drugs and polymers with suitable examples

Practical:

- To enable the students to understand separation and analysis of the two-component organic mixture using $NaHCO_3$ and NaOH.

To know the preparation of complexes of copper, nickel and iron.

ZOOLOGY

Zoology as a subject at the Program level includes a variety of topics, both of generalized and specialized nature, such as Taxonomy of Invertebrates and Chordates, Environmental Biology, Biodiversity, Cell Biology and genetics, Embryology, Physiology, Applied Zoology including Recombinant DNA technology, Animal Tissue Techniques, Biostatistics and Bioinformatics.

Course Outcomes (CO)

CO1: **Semester I & II Paper I**: **Life and diversity of Animals (Invertebrates)**

- To understand the concepts of taxonomy of animals, to relate taxonomy with evolution of animals.
- To describe the general characteristics and classification of the invertebrate phyla Protozoa, Porifera, Coelenterata, Platyhelminthes. Aschelminthes, Annelida, Arthropoda, Mollusca and Echinodermata.
- To describe the characteristics, structure and life cycle of one animal as a representative type study from each phylum.
- To identify parasites with their adaptations, pathogens with diseases, symptoms, treatment and prophylaxis, important animals with their economic importance, from among the invertebrates so studied.
- To identify various animals and classify them as laboratory work.
- To understand organ systems through understanding techniques of dissection.
- To prepare permanent stained micro preparations as part of laboratory work.

CO2: **Semester I - Paper II**

Environment

- To understand the environment through study of various zones of atmosphere, lithosphere and hydrosphere, and identify the place of animals in various food chains and ecological pyramids.
- To understand the causes, effects and control measures of different types of pollution.
- To understand and analyze specific problems related to the environment, and to come up with solutions to the problems through creative thinking.
- To analyse the different parameters of water quality- pH, Dissolved Oxygen,
- Dissolved carbon dioxide and total hardness as laboratory work.
- To identify producers and consumers of the ecosystem in a food chain, by observation as

laboratory work.

Biodiversity

- To understand the concept of biodiversity, and relate the same to plant-animal interactions.
- To understand the reasons for reduction and the present methods being used for conservation of biodiversity.
- To understand the locations and biodiversity of various National parks and Wildlife Sanctuaries in India.
- To understand and analyze specific problems related to the conservation of biodiversity, and to come up with innovative solutions to the problems through creative thinking.

CO3: **Semester II- Paper II (Cell Biology)**

- To understand the cell as the unit of life. To study various cell organelles and their role in the functioning of the cell. To study the various biochemical processes adopted by cells in maintenance of life.
- To understand the process and types of cell division.
- To relate cell biology to immunology and the biology of cancer.
- To study cell division under microscope and observe and identify various stages of division.

CO4: **Semester III & IV- Paper I - Life and diversity of Animals: Chordates**

- To understand the taxonomy of various chordates, with characteristics, classification and type study of the different Classes- Protochordata, Urochordata, Cephalochordata, Cyclostomata, Pisces, Amphibia, reptilian, Aves and Mammalia.
- To understand the structure and gradual development of different organ systems such as heart, aortic arches, urinogenital system over the different classes and relate the same to evolution.
- To understand in detail the development of Fishes, Amphibia, Aves and Mammalia through developmental biology.
- To identify, classify and be able to comment upon various animals, tissues and bones as part of laboratory work.

CO5: **Semester III & IV PaperII –**

Developmental Biology

- To study the processes involved, and the actual development of Protochordates, Cyclostomes, Fishes, amphibians, Reptiles and Mammals.
- To identify and comment on the developmental stages of Protochordates, Cyclostomes, Fishes, amphibians, Reptiles and Mammals, based on observation, as laboratory work.
- To identify stages of embryo development as laboratory work.

Genetics

- To understand the basic concept of genes.
- To study Mendelian genetics with respect to inheritance of characters and relate the same to eugenics.
- To relate genetics with abnormalities occurring in the physical and sexual make upof individuals, their causes and pathways of inheritance.
- To understand population genetics, inbreeding and cross breeding.
- To study the structure and processes of
- DNA replication.
- To understand the meaning of the genetic code and its role in protein synthesis.
- To study and understand the process of protein synthesis.
- To study the difference between structure and function of prokaryote and eukaryote genes.
- To study Operon systems of prokaryotes.
- To experimentally verify laws of inheritance as laboratory work.
- To identify genetic defects as laboratory work.

Immunology and Molecular Biology

- To study cells, tissues, processes and responses involved in the immune system.
- To study various diseases associated with immune system.
- To study the structure and working of various equipment used in immunology, as laboratory work.
- To identify and comment on parts of the immune system, as laboratory work.
- To be able to perform determination of blood groups on the basis of immunological reactions, as laboratory work.

CO6: **Semester V and VI Paper I Mammalian Physiology**

- To understand mammalian histology and physiology with respect to digestive, respiratory, excretory, reproductive, muscle and nervous systems.

- To relate Physiology with the endocrine system and its control over the other systems.
- To acquire the skills of identifying presence of proteins, lipids and carbohydrates from given samples in the laboratory by performing various tests.
- To microscopically study histology of various mammalian organs in the laboratory.
- To acquire the skills of enumerating the different types of blood corpuscles

CO7: **Semester V and VI Paper II: Applied Zoology**

Aquaculture

- To understand requirements and process of fish farming.
- To study different types of polyculture systems and composite fish culture systems.
- To understand the process of induced breeding of freshwater fish.
- To understand breeding and maintenance of aquarium fishes.
- To understand the requirements of the prawn fishery and to be able to differentiate it from those of fresh water fishery.
- To visit fish farm as part of practical work.
- To identify different edible and economically important fishes as laboratory work.
- To identify different types of fish scales by microscopy.
- To understand the digestive and reproductive systems of fish by studying dissection techniques.
- To calculate the Gonosomatic Index of fish.
- To gain insights into fishery as a possibility of entrepreneurship.

Microtechnique

- To gain in-depth knowledge of the theory and process of tissue processing, microtomy, histological and histochemical staining.
- To collect, preserve and process tissue for study in the laboratory through processes of fixation, dehydration, block making, section cutting and staining.
- To acquire the skill of operating the microtome.
- To acquire the skill of preparation of permanent slides using double staining technique.

Economic Entomology

- To understand economic entomology, with classification and characters of the insects involved.
- To study processes of bee-keeping, sericulture and lac culture as possible sources of income.
- To identify and characterise various animals of economic importance in the laboratory

Biotechnology

- To understand basic concepts in recombinant DNA technology, Gene isolation method by Shotgun cloning, use of DNA manipulation enzymes: Nucleases, ligases, polymerases for isolation of genes
- To study basic concepts of cloning vectors and splicing : Insertion of DNA and ligation using blunt ends, cohesive ends, Cloning vectors
- To understand the applications of biotechnology: Insulin and vaccine production

Bioinformatics and Biostatistics

- To understand basic concepts in bioinformatics, importance and role of bioinformatics in life sciences
- To study bioinformatics databases. Nucleotide sequence databases and protein databases
- To understand the concepts and apply biostatistics in tabulation and presentation of data, calculating sampling errors, mean, mode, median, probability, standard error and standard deviation.
- To be able to perform biostatistical analysis on the basis of given data as laboratory work.
- To carry out literature survey using the internet, with special reference to protein databases.

BACHELOR OF COMPUTER APPLICATIONS (B.C.A)

SIX SEMESTER PROGRAM

Program Outcomes

- To identify, design, and analyze complex computer systems and implement and interpret the results from those systems.
- To analyze the local and global impact of computing on individuals, organizations, and society.
- To make the students employment ready with the knowledge and skills imparted to them.
- To inculcate in the students the soft skills essential for jobs as well as to communicate effectively.
- To imbibe in them the moral values leading to their becoming good persons and good citizens.

Program Specific Outcomes

- To know the English language with its finer nuances with a view to understand the subject being studied, and to develop an ability to express the subject in oral and written form.
- To understand the evolution, development and dialects of the Hindi and Marathi Languages, with introduction to prose, poetry and other literature, with the use of the language in society, media and Government communications.
- To develop an ability to appreciate the ideas, values and morals put forward by the authors through a study of the languages.
- To provide an opportunity to work in an IT or computing environment and to enhance their career prospects by gaining additional knowledge and skills in selected areas of IT.
- To appreciate and integrate new software and hardware technologies and to extend their knowledge in specific areas of interest in academia and the industry.
- To be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

COMPULSORY ENGLISH

Introduction

The era of globalisation has triggered a change in the hopes and aspirations of students and parents. The course aims to further strengthen and augment skills acquired at the school level. Proficiency in the use of English is the need of the hour. The contents of the course will help students in this direction. Due importance is given to sentence building, correct usage, comprehension and other aspects of language. The student can prudently use the skills gained to widen his/her horizon through further reading and practical application of those skills.

Course Outcomes (CO)

Semester I

* To expose students to new words, phrases and idioms with the aim to increase their competency in the use of the English language.
* To help comprehend a prose extract taking into account the nuances of style.
* To hone the skills of students to condense information with which they are flooded.
* To correct common grammatical errors which would enable students to speak and write better English.
* To focus attention on human rights violations across the globe.
* To make students aware of the various movements of British Poetry and its influence on Indian Poets.
* To inculcate the importance of perseverance and hard-work in the context of the thematic content.

Semester II

* To train students to write an effective C.V.
* To acquire a knowledge of phrasal verbs.
* To improve the ability to comprehend and explicate prose passages.
* To kindle the spirit of service. It is hoped that the biographical sketch of an icon like Florence Nightingale would serve as a catalyst to unleash sublime impulses.
* To perceive the difference in approach and style between Indian authors and their counterparts in other countries who write in a different milieu.
* To enable the student to accept divergent views and opinions for the health of the nation and the world at large.
* To enter into the spirit of poetry and respond aesthetically to the music of words and the rhythm of verse.

SUPPLEMENTARY ENGLISH

Introduction

The Supplementary English course is an advanced course in English language. It aims to make the student more comfortable in the language. The course attempts to improve the core skill of communication in students. The different authors and poets whet the appetite of students for further reading. They are also made aware of current issues - national and international - which impacts the world. This would endow students with a well rounded personality. The background and the several factors which resulted in the rise of "Standard English" as the lingua franca of the world are explained to the students.

Course Outcomes (CO)

Semester I

* The facilitator would expose students to a wide spectrum of authors and poets.
* To make students familiar with the challenges confronting the country through emphasis on the works of the Indian authors.
* To help students analyze the elements that goes into the making of a short story. This would give a fillip to their writing skills.
* To underscore the importance of idioms and phrases.
* To acquaint students with topical issues of importance through essays on environment and social issues.
* To endeavour to create an effective and literary prose style through practical exercises in reading and writing personal and reflective essays.
* To train students to write Emails.

Semester II

* To develop the skill of creative writing by giving students practical exercises in writing a story based on hints. This will give ample scope to their faculty of imagination.
* To help students write official letters and advertisements.
* To enable students to draft an effective report.
* To provide opportunities to speak on current issues.
* To bring to the fore issues concerning women.
* To increase familiarity with British and Indian authors.
* To make students aware of foreign words used in English.

हिंदी

सामान्य उद्देश

हिंदी हमारे राष्ट्र की राष्ट्र भाषा है | हिंदी विदेशो में भी बहुत अधिक रुचि के साथ बोलने वाली भाषा है ये हमारे भारत देश में जन-जन में बोली जाने वाली आम भाषा है , जो उन्नतशील और प्रभावशाली है | हमारे भारत वर्ष में बोले जाने वाली एकमात्र भाषा है | सभी प्रांतो में अपने अपने लहजों में बोली जाती है | अलग- अलग प्रांतो से आए विद्यार्थियों को भाषा के प्रति प्रोत्साहित करना है

कोर्स आउटकम

1. भाषा को समझने, बोलने तथा लिखने को प्रोत्साहित करना |
2. नये- नये शब्दों से रू-ब-रू कराना |
3. हिंदी के प्रति रस निर्माण कराना |
4. सहज और सरल भाषा द्वारा भविष्य का निर्माण कराना |
5. भाषा ज्ञान का विकास कराना|
6. भाषा के द्वारा उन्हें नये-नये आयामो का बोध कराना |
7. भाषा के द्वारा संस्कार और संस्कृती का विकास करना |
8. हिंदी भाषा के द्वारा हमारे भारत देश कि विशेषता में एकता का बोध कराना |

इकाई 1: गद्द विभाग

1. साहित्य की विविध विधाओ से परिचय कराना |
2. मंथन साहित्य के द्वारा कहानियो के मध्यम से छात्रो को यथार्थ का बोध कराना |
3. कहानी से जो सीख मिलती है उसके प्रति विद्यार्थियों में जागरूकता निर्माण करना |

इकाई 2: पद्द विभाग

1. कविता के माध्यम से जीवन के हर पहेलुओं से रु-ब-रु कराना |
2. गागर में सागर भरने की कला से काव्य की सौन्दर्यता निखारना |
3. कविता के द्वारा कल्पना शक्ती को जागृत करना |

इकाई 3:व्यावहारिक हिंदी

1. व्यावहारिक हिंदी का जीवन में महत्वपूर्ण स्थान बताना |
2. पारिभाषिक शब्दावली के द्वारा कार्यालायो में प्रयोग होने वाले शब्दों का बोध कराना|
3. स्ववृत्त, साक्षात्कार के द्वारा अपनी भूमिका समाज के सामने प्रस्तुत करने के प्रति जागृत करना |
4. समाचार लेखन में रुचि निर्माण कराना |

इकाई 4: अन्य पाठ सामग्री

1. विलोम शब्दों का महत्व, अनेक शब्दों के लिये एक शब्द का उपयोग सिखाना |
2. शब्दों में शुद्धीकरण करना और जो शब्द सिर्फ सुनाई दिये जाते है उन शब्दों पर अपना मत कैसे प्रस्तुत करना आदि |

MARATHI

कोर्स आउटकम

सामान्य उद्देश

मराठी ही महाराष्ट्रवासी यांची भाषा आहे. मराठी ही पूरोगामी व प्रभावी आहे. तसेच ही महाराष्ट्राची बोली भाषा आहे. महाराष्ट्रातील प्रत्येक जिल्हयात ही वेगवेगळया पद्धतीने बोलली जाते. मराठी भाषा बोलण्या साठी महाराष्ट्रातल्या विद्याथ्र्यांना प्रोत्साहित केले पाहिजे।

1) भाषा समजण्यासाठी, बोलण्यासाठी, तसेच लिहण्यासाठी प्रोत्साहित करावयास हवे.

2) नवीन नवीन शब्दांची ओळख करून दयावयास हवी.

3) मराठी विषयी त्यांच्या मनात गोडी निर्माण करावयास हवी.

4) सहज आणी सोप्या भाषे द्वारे त्यांचे भविष्य उज्ज्वल करणे.

5) भाषा विषयक ज्ञानाचा विकास करणे.

प्रकरणः 1- गद्य विभाग

1) साहित्यातील विविध बाबीचा परिचय करून देणे.

3) गोष्टींच्या माध्यमातून विदयाथ्र्यानां वास्तवीकते बाबत ज्ञान देणे.

2) गोष्टीतील धडया नुसार विदयाथ्र्यांना जागरूक करणे.

प्रकरणः 2- पदय विभाग

1) कविते द्वारे विद्याथ्र्यांना जिवनातील क्षणाचा परीचय करून देणे.

2) कमित कमि शब्दांत कवितेचे सौदंर्य वाढवणे.

3) कविते द्वारा कल्पनाशक्ती दृढ करणे.

प्रकरणः 3 - निबंध

1) निबंध लिहण्याची कला, व निबंधा चे प्रकार याची माहिती करूण देणे.

निबंधा द्वारे समाज प्रकृति च्या संबधी माहिती देणे. मराठी म्हणीचा वापर कसा करावा याची माहिती देणे.

प्रकरणः 4- सारांश

1) सारांश लिहण्याची कला अवगत करणे.

2) कार्यालयातील पत्रा बाबत अवगत करणे

3) मराठी अनुवादा बाबत ध्यान वाढवीणे.

4) शुद्धलेखनाचे महत्व पटवून देणे.

General Course Outcomes

- To be able to appreciate the role of operating system as System software.
- To be able to compare the various algorithms and comment about the performance.

Operating System (BCA I SEM I):

- Algorithms used for management of memory, CPU scheduling, File handling and I/O operations.
- To apply various concepts related with Deadlock to solve problems related with Resources allocation, after checking system in Safe state or not.
- To appreciate the role of process synchronization.

Software Engineering –I (BCA II SEM IV, BCA III SEM I)

Web Technology I (BCA II SEM III) & Web Technology II (BCA II SEM IV)

- To be able to effectively use the UNIX/Linux system to accomplish typical personal,office, technical, and software development tasks.
- To have strong foundation in science, mathematics, and engineering, and can apply this fundamental knowledge to software engineering tasks.
- To be able to effectively apply software engineering practice over the entire system lifecycle. This includes requirements engineering, analysis,prototyping, design, implementation, testing, maintenance activities and management of risks involved in software and embedded systems.
- To be able to know classical and evolving software engineering methods, can select and tailor appropriate methods for projects, and can apply them as both team members and managers to achieve project goals.
- To be able to apply a structured approach to identifying needs, interests, and functionality of a website.
- To be able to design dynamic websites that meet specified needs and interests.
- To be able to write well-structured, easily maintained, standards compliant, accessible HTML code.
- To be able to write well-structured, easily maintained, standards compliant CSS code to present HTML pages in different ways.
- To be able to use JavaScript to add dynamic content to pages.
- To be able to select appropriate HTML and CSS code from public repositories of open-source and free scripts that enhances the experience of site visitors.

- To be able to modify existing HTML and CSS code to extend and alter its functionality, and to correct errors and cases of poor practice.
- To be able to write code that works in all major browsers (including IE, Mozilla-based browsers such as Firefox, Opera, Safari and Chrome).
- To be able to effectively debug code, making use of good practice and debugging tools.
- To be able to develop dynamic web site using java script, vb script and jsp in WT-II
- To be able to write server side java application called server let to catch form data sent from client, process it and store it on database
- To be able to write a serve side java application called jsp to catch data sent from client.
    - Software Testing (BCA III SEM II)
    - Theory of Computation (BCA II SEM IV)
    - Operation Research (BCA II SEM III, IV)
    - Office Automation(BCA 1, SEM I)
    - System Analysis and Design(BCA I, SEM II)
    - Discrete mathematics (BCA I SEM I,II)
    - JavaProgramming(BCA-III SEM VI)
    - Data Structureusing C++
    - Reviews.
- To understand the need for life-long learning and can readily adapt to new software engineering environments.
- To investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
- To implement various test processes for quality improvement
- To design test planning.
- To manage the test process
- To be able to apply the software testing techniques in commercial environment
- To be able to use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques
- To provide a basic knowledge of various mathematical models required in compiler construction(lexical analysis, syntax analysis, parsing etc)
- To enable the students to handle different categories of problems like Transportation Problem, Assignment Problem, Inventory Control, Queueing Model etc
- To develop familiarity with Microsoft word, excel, PowerPoint.

- To use MS-office programs to create personal, academic and business documents
- To study components of computer and windows operation system
- To introduce software project management and to describe its distinctive characteristics and to discuss project planning and the planning process and show how graphical schedule representations are used by project management and the risk management
- To introduce most of the basic logic used in advanced courses in computer sciencelike Graph, Tree etc.
- To give knowledge of prerequisites to basic mathematical logic.
- To give the students an opportunity to work with a language which supports internet.
- To enable them to develop applications and applets.
- To help them to develop GUI, handle events, draw graphs etc.
- To understand the importance of this language and its use in the industry for the different applications like Mobile applications, Robotics etc
- To make the students aware about the manner in which the data can be stored in the memory of the computer so that different operations like traversing, insertion, deletion, searching sorting, merging copying can be performed on the stored data efficiently.
    - Visual Basic Programming
    - Database Management System
    - Compiler Construction Statistical
    - Methods (BCA-I SEM-I)
    - VB.Net (BCA-III SEM-V)
    - DE-I & II(BCA-II SEMIII,IV)
    - C Programming(BCA-I, Sem-I)
    - C++ using OOPs Concept (BCA-I SEM-II)
    - Computer Graphics –I,II(BCA-III SEM V,VI)
- To introduce the concepts of visual programming.
- To introduce GUI programming using Microsoft foundation classes. To enable the students to develop programs and simple application using Visual Basic 6.0. Makes them aware of different data models.
- To give them an idea of storing the data in a centralized database.
- To learn its advantages over traditional file system.
- To the role played by database administrator.
- To introduce how the high level programming languages are handled by the system.

- Statistics are the numerical quantities calculated from sample observation; a single quantity that has been calculated.
- Statistics assists in sound and effective planning in any field.
- To understand NET Framework and describe some of the major enhancements to the new version of Visual Basic.
- To describe the basic structure of a Visual Basic.NET project and use main features of the integrated development environment (IDE)
- To create applications using Microsoft Windows® Forms.
- To create applications that use ADO. NET.
- To work with XML Documents.
- To use Crystal Reports.
- To understand the fundamental concepts and techniques used in digital electronics.
- To understand the number systems and its application in digital design.
- To understand and design various combinational and sequential circuits.
- To understand the internal structure or process of computer system (hardware)
- To build the basic skills of programming through C.
- To develop their logic through this language.
- To learn to do programming in C independently.
- To create a strong base for other advanced languages.
- To make the students realize the importance of data and teacher them a way to protect the data.
- To teach them object-oriented concepts and bring them closer to the real world. Through C++ the students learn object-oriented programming.
- To help to understand how the graphics system works.
- To teach how images are constructed in computer hardware display devices

Computer Fundamentals (BCA I SEM I)

Students who successfully complete the course learn:-

- To gather data and analyze and specify the requirements of a system.
- To design system components and environments.
- To build general and detailed models that assist programmers in implementing a system.
- To design a database for storing data and a user interface for data input and output, as well as learn to protect the system and its data.
- To get an in-depth understanding of how computers are essential components in business, education and society.

- To introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.
- To identify the components of a personal computer system as well as Internetworking components.
- To demonstrate mouse and keyboard functions as well as some networking tools.
- To demonstrate window and menu commands and how they are used.
- To demonstrate how to organize files and documents on a USB/hard drive.
- To apply technical knowledge and perform specific technical skills, including:
    - Describe the usage of computers and why computers are essential components in business and society.
    - Utilize the Internet Web resources and evaluate on-line e-business system.
    - Solve common business problems using appropriate Information Technology applications and systems.
    - Identify categories of programs, system software and applications. Organize and work with files and folders.
- To describe various types of networks network standards and communication software.
- Data Communication & Networking (BCA III SEM V/ SEM VI)
- E-commerce (BCA I SEM II)
- ASP.NET (BCA-III SEM VI)
- To study and develop PHP
- To get a good head-start in their career.

By the end of this course, students should be able to:

- To understand the fundamental concepts of data communications and networking
- To identify different components and their respective roles in a computer communication system.
- To apply the knowledge, concepts and terms related to data communication and networking.
- To solve problems in networking by referring to problems solving steps through relevant information by choosing suitable techniques.
- To acquaint themselves with networking software simulation tools, configuring of networking devices and understand their functionality.

- To know the strategies for securing network applications.
- To appreciate usefulness and importance of computer communication in today life and society.
- To demonstrate an understanding of the foundation and importance of E-commerce.
- To analyze the impact of E-Commerce on business models and Strategy.
- To describe internet trading relationships including Business-to Consumer, Business-to-Business, Intra-organizational.
- To present concepts and skills for the strategic use of e-commerce: XML in data-modeling techniques and managing metadata services and ASP.NET to understand and develop dynamic web applications.
- To use Microsoft ADO.NET to access data in wed applications.

BACHELOR OF COMMERCE IN COMPUTER APPLICATIONS (B.C.C.A.) SIX SEMESTER PROGRAM

Program Outcomes

- To identify, design, and analyze complex computer systems and implement and interpret the results from those systems.
- To analyze the local and global impact of computing on individuals, organizations, and society.

Program Specific Outcomes

- To know the English language with its finer nuances with a view to understand the subject being studied, and to develop an ability to express the subject in oral and written form.
- To understand the evolution, development and dialects of the Hindi and Marathi Languages, with introduction to prose, poetry and other literature, with the use of the language in society, media and Government communications.
- To develop an ability to appreciate the ideas, values and morals put forward by the authors through a study of the languages.
- To provide to work in an IT or computing environment with the opportunity to enhance their career prospects by gaining additional knowledge and skills in selected areas of IT.
- To appreciate and integrate new software and hardware technologies and extend their knowledge in specific areas of interest in academia and the industry.
- To be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

English & Business Communication

Sem I & Sem II

Course Outcomes (CO)

- To develop the student's ability to communicate effectively in English, both orally and in writing business related topics.
- To be able to write standard business related letters and application for employment as well as Job Offer Letters.
- To learn Basic English Grammar and various ways to enrich vocabulary.
- To learn the Essentials of English Communication and its various types.
- To learn different barriers of effective communication and how to overcome them.
- Students submit a creative writing assignment on human values/ world peace/ environmental issues inspired by or related to the lessons prescribed in the syllabus and give a Power Point Presentation/ Oral Presentation in order to develop their presentation skills.

General Course Outcomes

C Programming (BCCA-I, Sem-I)

Fundaments of Computer (BCCA-I, Sem-I)

- To understand the functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain.
- To have the ability to work with textual information, characters and strings. Ability to work with arrays of complex objects.
- To understand the concept of object thinking within the framework of functional model.
- To understand the concept of functional hierarchical code organization.
- To understand the defensive programming concept.
- To develop the ability to handle possible errors during program execution.
- To enable the students to understand the basics of computers including hardware, software and networking.
- To identify and analyze computer hardware, software, networking components.
- To install, configure, and remove software and hardware.
- To use system development, word-processing, spreadsheet and presentation software to solve basic information systems problem.
- To retrieve information and create reports from relational databases. English & Business

    - Communication (BCCA-I, Sem-I)
    - English & Business Communication (BCCA-I, Sem II)
    - C++(BCCA-I, Sem II)
    - Principal of Business Management(BCCA-I, Sem II)
    - E-Commerce and Web Designing (BCCA-I, Sem II)
    - Business Economics(BCCA-I, Sem III)
- To develop the knowledge of accounting.
- To develop the student's ability to communicate effectively in English both orally and writing, on Business related topics.
- To learn to write standard business-related letters and application for employment as well as Job Offer Letters.
- To learn the Basic English grammar and English vocabulary. Students also learn the essentials of English communication and barriers to effective communication (and how to overcome them.)
- To develop the student's ability to communicate effectively in English both orally and writing, on business related topics.
- To learn to write standard business-related letters and application for employment as well as Job Offer Letters.
- To learn the Basic English grammar and English vocabulary. Students also learn the essentials of English communication and barriers to effective communication (and how to overcome them.)
- To be able to understand the difference between object-oriented programming and procedural oriented language and data types in C++.
- To be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
- To able to simulate the problem in the subjects like Operating system, Computer networks and real-world problems.
- To discuss and communicate the management evolution and how it will affect the future manager
- To identify and evaluate social responsibility.
- To practice the process of management
- To learn the concepts and skills for the strategic use of e commerce from three perspectives: business to consumers, business to business and intra organizational.

- To be able to apply a structured approach to identifying needs, interests, and functionality of a website.
- To be able to design dynamic websites that meet specified needs and interests.
- To be able to write well-structured, easily maintained, standards compliant, accessible HTML code.
- To be able to write well-structured, easily maintained, standards compliant CSS code to present HTML pages in different ways.
- To able to write code that works in all major browsers (including IE, Mozilla-based browsers such as Firefox, Opera, Safari and Chrome).
- To able to effectively debug code, making use of good practice. Develop the ability to explain economic terms, concepts and theory and demonstrate the ability to employ the economic way of thinking
- To be able to recognize the role of ethical values in economic decision.
    - Visual Basic Programming (BCCA-II, Sem III)
    - Database Management System(BCCA-II, Sem III)
    - Mathematics (BCCA-II, Sem IV)
    - Business Law(BCCA-II, Sem IV)
    - Core Java
    - Business Law(BCCA-II, Sem IV)
    - PHP & MYSQL Business Law(BCCA-II, Sem IV)
    - System Analysis and Design
    - Business Law(BCCA-II, Sem V)
    - Computerized Accounting (Tally)
    - Business Law(BCCA-III, Sem V)
- To introduce the concepts of visual programming.
- To introduce GUI programming using Microsoft foundation classes. To enable the students to develop programs and simple application usingVisual Basic 6.0.
- To be able to learn the fundamental knowledge of Database management system and various types of Data models.
- To be able to learn the practical implementation of Relational database management system (using Oracle software)
- To be able to learn the normalization of database tables.
- To be able to learn the role of a database administrator

- To be able to understand basics theory and concept of probability theory.
- To be able to understand basic statistical concept data collection and presentation.
- To be able to analyze and correlation
- To be forecasting nonlinear one factor regression
- To understand the business law to individuals and businesses and role of law in an economic political.
- To be able to understand the students to the legal and ethical framework of business
- To work professionally and make desktop application and web applications with java development kit.
- To understand the importance of classes and objects along with the constructors, arrays and vectors.
- To understand the importance of multithreading and different exception handling mechanism.
- To enable to understand java swings for designing GUI applications based on architecture.
- To enable students to write PHP code to produce outcome and solve problems.
- To be able to understand Basic Debugging develop the ability to understand PHP error messages and used them to debug.
- To be able to export and import a database and tables with PHP my admin. Writing and executing SQL statements with PHP.
- To introduce software project management and to describe its distinctive characteristics and to discuss project planning and the planning process and show how graphical schedule representations are used by project management and the risk management process.
- To be able to be able to demonstrate basic knowledge of computers and computerized accounting software.
- To be able to demonstrate ability to write a business memo using correct formatting,grammar and spellings.
- To be able to demonstrate an understanding of accounting reports and records.

(BCCA-III, Sem V)

The course covers management accounting fundamentals and introduces arange

of management accounting tools.

  - VB.Net (BCCA-III, Sem V)
  - Company Law and Secretarial Practice (BCCA-III, Sem VI)
  - Python (BCCA-III, Sem VI)

- To understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic.
- To describe the basic structure of a Visual Basic.NET project and use main features of the integrated development environment (IDE)
- To create applications using Microsoft Windows® Forms.
- To create applications that use ADO. NET.
- To work with XML Documents.
- To use Crystal Reports
- To provide the knowledge of company law.
- To understand the role of secretory in company.
- To understand the companies Act 2013 and also the history of companies' law.
- To understand structure of python.
- To understand the concepts of file input output.
- To understand visualization libraries.

BACHELOR OF ARTS (B.A.) SIX SEMESTER PROGRAM

Program Outcomes (PO)

After pursuing an undergraduate course in Arts, the students are expected:

- PO1. To acquire basic and fundamental knowledge in the field of language, humanities, social sciences that will make them sensitive and responsible citizens of the country.
- PO2. To develop critical temper and to think and act wisely dealing with various issues prevailing in the human society with responsibility and courage.
- PO3. To develop creative ability.
- PO4. To develop problem-solving ability.
- PO5. To update knowledge of students.
- PO6. To equip students to appear for All India Competitive Examinations.
- PO7. To develop within them and spread among others those human values that will result in giving social service and develop good citizenship qualities.
- PO8. To kindle in the students a life-long interest in humanities and arts.

Program Specific Outcomes (PSO)

- The program admits students who have passed the +2-level examination. The subjects offered by the institution are English, Supplementary English, English Literature, Hindi, Hindi Literature, Marathi, Marathi Literature, Philosophy, History, Economics, Political Science and Sociology. A student generally opts, as per rules of the affiliating Rashtrasant Tukadoji Maharaj Nagpur University, any five of the available subjects, although she/ he may opt for another subject not offered by the institution.
- Program Specific Outcomes of B.A. are:
  - PSO1. To develop Learning, Reading, Speaking and Writing competencies.
  - PSO2. To develop the ability to interpret and analyze available texts, to have an understanding of the literary, socio economic and political progress of the world over centuries, and the principles on which human kind has developed to its modern form.
  - PSO3. To develop an ability to apply principles and theories to the present

scenario, with an ability to correlate and communicate the same.

- PSO4. Assimilate soft skills for professional and business communication through proper use of language.
- PSO5. To develop an ability to form and express one's own ideas through knowledge of the different Arts subjects studied.
- PSO6. To interact with society and understand various issues affecting society.
- PSO7. To understand and recognize responsibility towards nation and society.

B.A. COMMUNICATIVE ENGLISH

Course Outcomes

General:

Communicative English is a vocational subject. It aims at enhancing the communication skills and proficiency of the students. The Communicative English courses aims at training the under-graduate students in various modes of communication in English like written communication, verbal and non-verbal Communication and thus develop communication skills and self-confidence through practical application of the gained knowledge.

SEM I: Aims and Objectives

Unit I and II - Elements of Phonetics

- To enable students to acquire a basic knowledge of phonetics required for effective communication.
- To identify speech sounds of English language.
- To identify various organs and systems involved in the production of speech sounds.

Unit III and IV – Grammar and its usages

- To enable students to practice modern usage of English as it is spoken and written today with speech practice, reading passages and comprehension.

Sem II: Aims and Objectives

Unit I and II – Elements of Phonetics

- To enable students to acquire a basic knowledge of sound system in English language.
- To enable students to acquire a basic knowledge of spoken aspect of English language required for effective communication.

Unit III and IV – Grammar and its usages

- To enable students to practice modern usage of English as it is spoken and written today with speech practice, reading passages and comprehension.

Sem III: Aims and Objectives

Unit I- Reading Skills

- To apply and strengthen the phonetic and grammar skills learned in B A I and II Semester

- To develop reading strategies, skimming a passage and enhance speed of reading.

Unit II - Business Communication

- To develop business communication skills, effective communication in business organizations

Unit III – Written Communication Skills

- To make the students aware of different writing skills that is used for communication.
- To make them familiar with the writings of Notice, Agenda, Minutes and Note making.

Unit IV – Vocabulary Development

- To develop effective vocabulary by understanding the usages of synonyms and antonyms
- To make the students familiar with some foreign words to strengthen their vocabulary.
- To make the students understand with the importance of idiom and phrases in making language effective.

Sem IV: Aims and Objectives

Unit I: Reading Skills

- To develop the reading skills of the students which would be helpful for the examination like IELTS, TOEFL, etc,
- To make the students identify the different types of passages and to solve them.

Unit II: Business Communication

- To make the students familiar with e-mail writing and its importance
- To enhance their comprehension regarding non-verbal communication.

Unit III: Written Communication

- To familiarize the students with summarizing, Report writing, Fax messages and letter writing.

Unit IV: Vocabulary Development

- To make the students understand with synonyms, antonyms, one word for many and homophones
- To develop communication skills and self-confidence through practical application of the above skills.

Sem V: Aims and Objectives

Unit I: Oral Communication: Theoretical Background and Oral Skills

- To develop communication skills; Oral Skills required in meetings, conferences and seminars.
- To consolidate the skills and sub-skills acquired in B A Part I and II

Unit II: Oral and related skills

- To develop the listening skills of the students
- To develop the presentation skills to boost up their self-confidence.

Unit III: Written Communication

- To familiarize the students with importance of punctuation marks and capitals.
- To make them aware with some forms of business correspondence.

Unit IV: Introduction to Mass Media and Entrepreneurship

- To introduce the students to Mass Media.
- To make them familiar with interviewing, compering, announcing, commentary, voice training and speech training.
- To introduce the students to entrepreneurship
- To make the students understand with definition and core elements of Entrepreneurship, its need and value.

Sem VI: Aims and Objectives

Unit I: Oral Communication: Theoretical Background and Oral Skills

- To make the students familiar with audio-visual aids, communication through PPT and Voice mail.

Unit II: Oral and related Skills

- To make the students understand with the importance of Group discussions, Interviews, Public Speaking and oral presentation.

Unit III: Written Communication

- To familiarize the students with memorandum writing, abbreviations and numerals

Unit IV: Introduction to Mass Media and Entrepreneurship

- To make the students familiar with the working of the News Paper
- Suppliers of News, the reporters, News-Editors, Sub-Editors, etc.
- To make the students understand with the creativity and innovation of the Entrepreneurship.

B.A. ENGLISH LITERATURE

Course Outcomes

General Aim:

Improve their ability of reading literature in English with good understanding and reflect over the text and con-text from different perspectives. The reading of literature provides an opportunity for the language to be internalized whereby grammar rules, phrases and vocabulary already learnt can be reinforced and at the same time learn new words and phrases which are in the text. One of the aims of literature is that it acts as a stimulus that ignites interest and motivates the student by involving them on a personal, emotional level. Literature also fosters good moral attitude and moulds the students to become better citizens of the country.

Sem I and II - Aims and Objectives

Unit I: Poetic Quest: This unit deals with the poems of British poets.

- To develop a liking for poetry, reading and writing.
- To enable students to enjoy recitation with proper rhythm, modulation and rhyme.
- To enable students to appreciate the beauty, style and format of poetry.
- To develop aesthetic sense of the students.

Unit II: Background: To the study of English Literature

- To understand the underlying principles of English Literature.
- To familiarize the students with different poetic types
- To make the students understand with different stanza forms.

Unit III: Practical Criticism

- To familiarize the students with the use of practical criticism.
- To make the students understand with different Metrics.
- To make the students understand with different types of rhyme.

Unit IV: Literary Terms

- To familiarize the students with the different literary terms.

Sem III and IV - Aims and Objectives

Unit I: Essays and Short Stories

- To develop the language ability of the students. To understand the passage and grasp the meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To enrich their active and passive vocabulary. To express the ideas of the passage orally and in writing.
- To enjoy reading and writing. To prepare the students for world citizenship.
- To make students curious about the subject of the essay.
- To understand the style of essay-writing.
- To arrange ideas in an organized manner.
- To make the students understand a few facts through the story. To make them identify the moral or life lesson.
- To make them understand how to mould one's character. To enable the student to identify the style of story writing.

Unit II: Novel

- To make the students understand with the type of the novel.
- To make them understand the plot of the novel.
- To introduce different characters of the novel.

Unit III: Background

- To understand the meaning and significance of Essays.
- To familiarize the students with the meaning of novel and how novel went through changes in different era.
- To make them understand the meaning and relevance of short story.

Unit IV: Literary Terms

- To familiarize the students with different literary terms, their meanings and usages.

Sem V and VI: Aims and Objectives

Unit I and II (Play):

- To make the students recognize Drama as an art form which requires a seriousness of approach.
- To introduce Shakespearean plays like Tragedy, Comedy, and Tragi-comedy etc.
- To enable the students to use Drama to explore issues with a practical social or moral dimension.
- To enable them to invent and develop convincing roles in given situations.
- To enables students to develop an ability to analyze and assess social, moral, ethical, and aesthetic values.
- To help the students to process, understand, express and communicate present and past experiences and to consider possible outcomes and future actions.
- To assists students in appreciating their own cultural heritage and in developing an understanding of cultural change and diversity.

Unit III: Background

- To familiarize the students with different dramatic types.
- To make the student understand different dramatic devices.
- To make the student understand the dramatic art.

Unit IV: Literary Terms

- To make the students aware of different literary terms used in drama.

B.A. COMPULSORY ENGLISH

Course Outcomes

General Aim: The overall aims of the course are:

- To enable the learner to communicate effectively and appropriately in real life situation.
- To use English effectively for study purpose across the curriculum.
- To develop interest in and appreciation of Literature.
- To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing.
- To revise and reinforce structure already learnt.

Sem I and II: Aims and Objectives

Unit I: Prose

- To develop the language ability of the students.
- To enable the students to understand the passage and grasp its meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To enable the students to understand the passage by silent reading.
- To enrich their active and passive vocabulary.
- To prepare the students for world citizenship.

Unit II: Poetry

- To understand and derive pleasure from the given poem
- To appreciate the beauty of language and the thought in the poem
- To kindle the students' imagination and develop aesthetic sense.

Unit III: Short Stories

- To make the students to learn a few facts through the story.
- To aware the students with the morals.
- To make the students understand the style of short story writing.

Unit IV: Grammar and Vocabulary

- To enable learners to achieve linguistic competencies.

- To be able the use grammar as a tool or resource in the comprehension and creation of oral and written discourse efficiently, effectively and appropriately.
- To enable the students to understand many aspects of language use such as social function.
- To enable them understand how language is used in context and encourage them to use it in appropriate contexts as well.

Unit V: Conversational Skills (Step Up I)

To strengthen the conversational skills of the students by providing them some activities.

- Making Introduction
- Greeting People
- Talking about family
- Describing people, places, animals
- Expressing feelings
- Inviting, Suggesting, Accepting, Refusing

Sem III and IV: Aims and Objectives

Unit I: Prose

- To develop the language ability of the students.
- To enable the students to understand the passage and grasp its meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To enable the students to understand the passage by silent reading.
- To enrich their active and passive vocabulary.
- To prepare the students for world citizenship.

Unit II: Poetry

- To understand and derive pleasure from the given poem
- To appreciate the beauty of language and the thought in the poem
- To kindle the students' imagination and develop aesthetic sense.

Unit III: Short Stories and One Act play

- To make the students to learn a few facts through the story.
- To aware the students with the morals.

- To make the students understand the style of short story writing.
- To familiarize the students with drama as cultural production and with the one-act play as a specific form of that production.
- To provide students with a solid foundation in a particular form of literary expression and to develop their ability to express their understanding in written and verbal form.
- To make them familiarize with the theoretical foundations of the genre.
- To make them relate to the genre to non-dramatic forms of cultural expression such as poetry and literature.

Unit IV: Grammar and Vocabulary

- To enable learners to achieve linguistic competence.
- To be able the use grammar as a tool or resource in the comprehension and creation of oral and written discourse efficiently, effectively and appropriately.
- To enable the students to understand many aspects of language use such as social function.
- To enable them understand how language is used in context and encourage them to use it in appropriate contexts as well.
- To make the students familiar with the rules and importance of punctuation in language.
- To make them aware of the rules of Narration and its application in the enrichment of language.

Unit V: Conversational Skills (Step Up II)

To strengthen the conversational skills of students by giving them some activities:

- Note Taking-Exercises for Summarizing
- Writing Tasks
- Listening to the audio CD, Spoken English Foundation Course Vol. I and II
- Listening to the story and summarizing
- Meeting people, exchanging greetings and Taking leave
- Giving personal information
- Inviting People, Accepting and Refusing an invitation

Sem V and VI: Aims and Objectives

Unit I: Prose

- To develop the language ability of the students.
- To enable the students to understand the passage and grasp its meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To enable the students to understand the passage by silent reading.
- To enrich their active and passive vocabulary.
- To prepare the students for world citizenship.

Unit II: Poetry

- To understand and derive pleasure from the given poem
- To appreciate the beauty of language and the thought in the poem
- To kindle the students' imagination and develop aesthetic sense.

Unit III: Short Stories and One Act Play

- To make the students learn a few facts through the story.
- To make the students understand the morals mentioned in the short stories and plays..
- To make the students understand the style of short story writing.
- To familiarize the students with drama as cultural production and with the one-act play as a specific form of that production.
- To provide students with a solid foundation in a particular form of literary expression and to develop their ability to express their understanding in written and verbal form.
- To familiarize them with the theoretical foundations of the genre.
- To make them relate the genre to non-dramatic forms of cultural expression such as poetry and literature.

Unit IV: Applied Skills

- To enable the students how to write professional report.
- To make them understand the common techniques used for writing reports.
- To enable the students to read and understand the professional papers and journals.

- To make the students understand the common techniques used for writing advertisements.
- To enable the students to write an advertisement.
- To enable the students to know the technique of writing an essay and to enable them to write essays on different topics.

Unit V: Conversational Skills (Step Up III)

- To provide the students a situation at the Railway Counter to enhance their conversational skills.
- To give them a situation of complaining about a stale food product or an eatable
- To give them the situation of complaining about a hyped bill.
- Going to the Sarpanch and enquiring about widening of roads, approaching the MLA with a request
- To make the students familiarize with translation of sentences.

B.A. SUPPLEMENTARY ENGLISH

Course Outcomes

General Aim: The overall aims of the course are:

- To use English effectively for study purpose across the curriculum;
- To develop interest in and appreciation of Literature;
- To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing.
- To revise and reinforce structure already learnt.

Sem I and II: Aims and Objectives

Unit I: The Many World of Literature-(Prose)

- To develop the language ability of the students.
- To enable the students to understand the passage and grasp its meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To enable the students to understand the passage by silent reading.
- To enrich their active and passive vocabulary.
- To prepare the students for world citizenship.

Wings of Poesy (Poem)

- To understand and derive pleasure from the given poem.
- To appreciate the beauty of language and the thought in the poem.
- To kindle the students' imagination and develop aesthetic sense.

Unit II: Applied Language Skills

- To make the students aware of the technique of writing applications for job.
- To make the students familiarize with the leave application.
- To make the students understand the sentence formation and its correct order.
- To provide the students some exercise of sentence re-ordering.

Sem III and IV: Aims and Objectives

Unit I: Reflections on Vital Issues (Prose)

- To introduce the students to prose lessons.
- To make the students aware of the current situation of the society.
- To make the students understand the process of globalization.

- To make the student understand with the pros and cons of globalization.
- To strengthen the vocabulary of the students.
- To develop their reading and listening skills.

Modern Short Stories: A Reader

- To make the students to learn a few facts through the story.
- To teach them certain morals.
- To make the students understand the style of short story writing.

Unit II: Applied Language Skills

- To make the students understand the format of e-mail writing and make them practice it.
- To make the students understand the method of précis writing.

Sem V: Aims and Objectives

Unit I: David Copperfield (Novel) and Easy English

- To make the students understand the different themes and plot of the novel.
- To familiarize them with different characters of the novel.
- To make the students familiar with the different prose lessons.

Unit II: Applied Writing Skills

- To familiarize the students with the meaning and format of letter writing.
- To make the students write letter of congratulation and condolence.

Sem VI: Aims and Objectives

Unit I: Easy English and Michael (Play)

- To make the students understand the different prose lessons.
- To develop the language ability of the students.
- To enable the students to understand the passage and grasp its meaning.
- To read with correct pronunciation, stress, intonation, pause and articulation of voice.
- To develop the active vocabulary of the students.

Unit II: Applied Skills

Comprehension

- To develop the reading skills of the students.
- To develop their grasping power through the provided comprehension.

बी.ए. अनिवार्य हिन्दी

कोर्स आउटकम

सामान्य उद्देश्य

हिन्दी हमारे राष्ट्र की राष्ट्रभाषा है। जन-जन में बोली जाने वाली आम भाषा है, जो उन्नतशील और प्रभावशाली है और संपूर्ण भारत वर्ष में बोली जाने वाली एकमात्र भाषा है। सभी प्रांतों में अपने - अपने लहजों में बोली जाती है। अलग-अलग प्रांतों से आये विद्यार्थियों को भाषा के प्रति प्रोत्साहित करना है।

1. भाषा को समझने, बोलने तथा लिखने को प्रोत्साहित करना।

2. नये-नये शब्दों से रू-ब-रू कराना।

3. हिन्दी के प्रति रस निर्माण कराना।

4. सहज और सरल भाषा द्वारा भविष्य का निर्माण कराना।

5. भाषा ज्ञान का विकास कराना।ः

बी.ए. सेमेस्टर 1 , 2

इकाई 1 : गद्य विभाग

साहित्य की विविध विधाओं से परिचय कराना।

कहानी के माध्यम से छात्रों को यथार्थ का ज्ञान कराना।

कहानी के सीख द्वारा छात्रों को जागरूक कराना।

इकाई 2 : पद्य विभाग

कविता के द्वारा जीवन के क्षणों से रू-ब-रू कराना।

भाषा के कम शब्दों में कविता के सौंदर्य को निखारना।

कविता के द्वारा कल्पनाशक्ति को जागृत करना।

इकाई 3 : अन्य पाठ्य सामग्री

पारिभाषिक शब्दावली के द्वारा कार्यालयों में प्रयोग होने वाले शब्दों का ज्ञान कराना।

पत्र लेखन द्वारा पत्रों के विविध प्रकार से परिचित कराना।

कल्पना विस्तार , मुहावरें एवं लोकोत्तियों में अंतर स्पष्ट कराना।

हिन्दी के रचनाकारों से परिचित कराना।

बी.ए. सेमेस्टर 3 , 4

इकाई 1 : गद्य विभाग

सामाजिक कहानियों द्वारा समाज के प्रति जिम्मेदारी बताना।

कहानी के माध्यम से वर्तमान स्थिति से अवगत कराना।

इकाई 2 : पद्य विभाग

कविता को पढ़ने का तरीका, उसका लय तथा तुकबंदी करना ।

कविता के भाव को पहचानना। रसास्वादन करवाना।

इकाई 3 : अन्य पाठ्य सामग्री

फीचर लेखन के अंतर्गत अर्थ, स्वरूप, तत्व व विशेषताओं को परिचित कराना।

प्रूफ शोधन द्वारा प्रूफ शोधक के गुण , विशेषताओं तथा अर्थ व स्वरूप, को परिचित कराना।

विज्ञापन के अर्थ,परिभाषा,प्रयोजन,लक्ष्य भाषा आदि से परिचित कराना।

हिन्दी में संक्षिप्तीकरण के स्वरूप,विशेषताओं आदि से परिचित कराना।

लेखकों का सामान्य परिचय करवाना।

बी.ए. सेमेस्टर 5

इकाई 1: गद्य विभाग

निबंध लिखने की कला , निबंध के प्रकार आदि से अवगत कराना।

निबंध द्वारा समाज, प्रकृति के बारे में जानकारी देना।

इकाई 2 : गद्य विभाग

एकांकी द्वारा इतिहास के पन्नों को पात्रो ंद्वारा समझाना।

कहानी द्वारा अंधविश्वास तथा समाज में हो रही कुरितियों से अवगत कराना।

इकाई 3: द्रुतवाचन

विभिन्न रचनाकारों, आलोचकों से परिचित कराना।

बी.ए. सेमेस्टर 6

इकाई 1,2: उपन्यास 'सूरज का सातवाँ घोड़ा'

'धर्मवीर भारती' द्वारा रचित उपन्यास 'सूरज का सातवाँ घोडा' यह लघु उपन्यास है। जिससे विद्यार्थियों को उपन्यास पढ़ने को प्रेरित करना है।

उपन्यास द्वारा सामाजिक , धार्मिक व कुरितियों से होने वाले प्रभाव को समझाना।

इकाई 3: अनुवाद ,कंप्यूटर

अनुवाद के अर्थ,परिभाषा एव ंप्रकार, अनुवाद का महत्व व अनुवादक की योग्यताएंॅ की जानकारी देना।

कंप्यूटर का परिचय ,प्रमुख अवयव,उपयोगिता

. इंटरनेट का सामान्य परिचय एव ंउपयोगिता की जानकारी ।

इकाई 4: द्रुतवाचन

आधुनिक गद्यकारों एवं कवियों के जीवन का परिचय कराना।

बी.ए. हिन्दी साहित्य

कोर्स आउटकम

सामान्य उद्देश्य

हिन्दी साहित्य को अपनी योग्यतानुसार पढ़ने , लिखने को बढ़ावा देना। रस, छंद, अलंकार , काव्यशास्त्र, आदि से अवगत करवाना। नये-नये शब्दों से रू-ब-रू करवाना। क्योंकि हिन्दी के साथ हिन्दी साहित्य का इतिहास भी जानना जरूरी है। भारत वर्ष में ही नहीं विदेशों में भी हिन्दी भाषा का प्रभाव है। जिससे विद्यार्थियों में भाषा के प्रति रूचि निर्माणकरना।

काव्य प्रतियोगिता द्वारा विद्यार्थियों को अलग-अलग कवियों की कविता तथा स्वरचित कविता के लिए प्रोत्साहित करना।

भाषा सुधारने हेतु कविता की ओर रूझान करना।

सरल शब्दों में तुकबंदी करना।

भाषाशैली का विकास करना।

बी.ए. सेमेस्टर . 1

- हिन्दी साहित्य की विविध विधाओं से परिचित करवाना।
- सामाजिक कहानियाँ ,निबंध व सिनेमा विधा की जानकारी देना।
- हिन्दी साहित्य के इतिहास के तहत आदिकाल का परिचय करवाना।
- हिन्दी साहित्य के प्रमुख साहित्यकारों से परिचय करवाना।

बी.ए. सेमेस्टर 2

- 'मोहन राकेश ' के नाटक 'आधे -अधूरे ' द्वारा विद्यार्थियों को सामाजिकता का बोध करवाना।
- मध्यमवर्गीय परिवार की आर्थिक स्थिति की समस्या से अवगत करवाना।
- अपने आपको सर्वगुण संपन्न समझना ठीक नहीं है क्योंकि कोई भी मनुष्य सर्वगुण संपन्न नहीं होता ,इसकी जानकारी
- देना।
- हिन्दी साहित्य की विधाओं के अंतर्गत
- महाकाव्य ,खंडकाव्य ,उपन्यास, कहानी ,नाटक ,एकांकी ,संस्मरण ,साक्षात्कार व आत्मकथा से परिचय करवाना।
- हिन्दी साहित्य के प्रतिनिधि साहित्यकारों से परिचय ।

बी.ए. सेमेस्टर 3

- भक्तिकालीन कवियों के दोहों और पदों से अवगत करवाना।
- 'भक्तिकालीन प्रतिनिधि कवियों का संक्षिप्त परिचय जानना।

बी.ए. सेमेस्टर 4

- वृंदावनलाल वर्मा ' रचित ऐतिहासिक उपन्यास 'मृगनयनी' में स्त्रियों को स्वावलंबी व दृढनिश्चयी बताया है जो कीआज भी प्रासंगिक है।
- विद्याथियों को इस उपन्यास के माध्यम से मनोरंजन , साहस-पराक्रम और परिस्थितियों का निडरता से सामना करने की सीख मिलती है।
- रस तथा अलंकार के अंतर्गत अर्थ,परिभाषा,प्रकार व अवयव से परिचित करवाना।

- शब्द शक्ति, काव्य गुण तथा काव्य दोष का ज्ञानप्राप्त करवाना।
- हिन्दी साहित्य के इतिहास के अंतर्गत भक्तिकाल तथा रीतिकाल का इतिहास जानना।

बी.ए. सेमेस्टर 5

- छायावादी कवियों जयशंकरप्रसाद के 'कामायनी' महाकाव्य के 'इडासर्ग' से परिचित करवेना तथा सूर्यकांत त्रिपाठी 'निराला' जी की कविताओं को ेआत्मसात करवाना।
- आधुनिककाल के अंतर्गत भारतेंदु युग, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद, नईकविता, साठोत्तरी कविता से अवगत करवाना।
- हिन्दी साहित्य के प्रतिनिधि कवियों की कविताओं को आत्मसात करवाना।

बी.ए. सेमेस्टर 6

- विभिन्न निबंधकारों के निबंध की शैलियों से परिचित करवाना।
- आधुनिक काल में हिन्दी की साहित्यिक विधाओं का क्रमिक विकास के अंतर्गत उपन्यास, कहानी, निबंध, नाटक, एकांकी, आलोचना की जानकारी देना।
- गद्य के प्रतिनिधि कहानीकारों से परिचय करवाना।

बी.ए. अनिवार्य मराठी

कोर्स आउटकमः

सत्र 1 व 2

- गद्यातील साहित्याशी परिचय करणे व लेखकांनी मांडलेले विचार अंतर्गत करून त्यावर मंथन करणे.
- पद्यातील काव्याचा रसग्रहण करणे व कविने केलेल्या रचनेचे प्रकार आत्मसात करणे
- व्यवहारिक मराठीबाबतची तत्वे, स्वरूप व भूमिका समजून घेणे, पत्रलेखन व सारांश लेखनाची कला आत्मसात करणे.

सत्र 3 व 4

- आचार्य अत्रे, राष्ट्रसंत तुकडोजी महाराज, पु. भा. भावे व दुर्गा भागवत इत्यादि लेखकांचे विचार समजून घेणे व पुनरावलोकन करणे.
- कवि संत नामदेव, सुरेश भट, यंशवंत, अनिल इत्यादि कविंची कविताशैली व त्यातील फरक बारकाईने समजून घेणे.
- इतिवृत्त लेखन वृत्तलेखन, भांषांतर व मुलाखात लेखनाच्या अभ्यास व सराव करणे.

सत्र 5 व 6

- मारूती चित्तमपल्ली, विनोबा भावे, इरावती कर्वे, गंगाधर गाडगीळ, नरेंद्र दाभोळकर यंासारख्या लेखकांचे समाजाबाबत मांडलेले विचार समजून घेणे व त्याचा सार आत्मसात करणे.
- नामवंत कविंचे रचनात्मक लेखन, त्यांची शैली, कवितेची गहनता व त्यातून व्यक्त केलेली भावना समजून घेणे.
- संपादन प्रक्रिया, कार्यालयीन लेखन व्यवहार ग्रंथ परीक्षण व त्याचे स्वरूप व प्रकार, तसेच ईंटरनेट, मेल इत्यादि करिता मराठीचा वापर आत्मसात करणे.

बी.ए. मराठी साहित्य

कोर्स आउटकम

सत्र व 1 व 2

- कादंबरी लेखन प्रकाराचे स्वरूप, घटक, प्रकार व वाटचाल तसेच कादंबरी वाङ्मयाचे वेगळेपण "तहान" या लेखक सदानंद देशमुख यांच्या कादंबरीवरून अभ्यासणे.
- कादंबरीचे कथानक, आशय, विषय, व्यक्तिरेखा, प्रसंग, संघर्ष, संवाद, भाषाशैली व निवेदन पध्दतीने अवलोकन करणे
- लेखिका प्रा. श्रीमती अनिता आढाव यांच्या कथेचे व कवि भीमराव दत्ता कांबळे, यांच्या कवितचे संकल्पना, स्वरूप व रचना आत्मसात करणे.
- लेखक वसंत कानेटकर यांच्या "अश्रुंची झाली फुले" या नाटकाचे घटक, प्रकार, वाटचाल, स्वरूप व वैशिष्टये, तसेच त्यातील कथानक, आशय, व्यक्तिरेखा प्रसंग, संघर्ष, संवाद भाषाशैली व निवेदन पध्दतीचा अभ्यास करणे.
- प्रा. डा॔. वसंत शेंडगे यांचे "एक चिंतन " तसेच उषा उत्तम काळे लिखित "चरित्र, आत्मचरित्र, आत्मकथन" यांचे स्वरूप व संकल्पना समजून घेणे.

सत्र 3 व 4

- संत कवींची आध्यात्मिक लोकशाही, त्यांच्या वाङ्मयाचा इतिहास, भाषाशैली, त्याच्या प्रेरणा व त्या काळाच्या समाज परिस्थितीचे ज्ञान प्राप्त करणे.
- संत तुकाराम यांचे चरित्र, त्याच्या अभंगामधील भक्तीयोग, काव्यशैली, व्यवहारिकता तसेच त्यातून मिळणारे समाज प्रबोधन आत्मसात करणे.
- काव्यलक्षण व काव्यप्रयोजन या विषयांवर काव्यशास्त्र परिचय करून घेणे.
- काव्य संकल्पना, व्याख्या, प्रकार, स्वरूप वैशिष्टये त्यातील विविध घटक, व मराठी काव्याच्या संग्रहाबद्दल अध्ययन करणे.
- कवि कुसुमाग्रज यांची कावय विषयक जाण, कवितेतील प्रतिमा, प्रतिक, भाषासौंदर्य समजून त्या आधारे कविंच्या सामाजिक, राष्ट्रभक्तीपर व प्रेमकवितांचे रसग्रहण करणे.
- काव्यशास्त्राचे काव्यकारण, शब्दशक्ती व अर्थविचार समजून घेणे.

सत्र 5 व 6

- प्राचीन गद्यसाहित्याचा "लीळाचरित्र" या गद्यावरून अभ्यास, त्याचप्रमाणे दलित साहित्याचा अर्थ त्यातील वेदनेचे आदिरूप, दलिताच्या विद्रोहाचे आदिरूप व दलित साहित्याचे स्वरूप हे "वेदना आणि विद्रोह" या गद्यरचनेच्या आधारावर समजून घेणे.
- भाषेचे स्वरूप व उपयोग, तसेच स्वनविज्ञान यांचे "भाषाविज्ञान परिचय" या पुस्तकावरून अध्ययन करणे.
- "गरूडझेप" ग्रंथाचे अध्ययन व प्राचीन मराठी वाङ्मयाचा इतिहास या ग्रंथातील ज्ञानदेवे रचिला पाया, संतमेळयाची अभंगवाणी, शाहिरी काव्य व बखर गद्य पध्दतींचा अभ्यास करणे.
- भाषाविज्ञान, परिचय या पुस्तकातील "रूपिम आणि पदविचार" तसेच "प्रमाण भाषा आणि बोली" या प्रकरणांचा अभ्यास करणे.

B.A. ECONOMICS

Course Outcomes

Micro Economics

Sem I

- To get an overall knowledge about the scope of the subject and tools of economic analysis.
- To gain knowledge about consumer demand in the economy and factors affecting demand and supply of commodities in the market.
- To study about the decision making of consumer under various choices through utility analysis and indifference curve analysis.
- To study about the concepts of consumer surplus.
- To study about the meaning of production and laws related to returns to production.

Sem II

-To understand the production techniques and calculation of cost and revenue in enterprises.

-To understand the different market structure in the economy and compare it with the real market sectors in the economy.

-To understand the determination of prices of different factors of production such as land, labour and capital.

-To learn the basic statistics those are necessary for calculations in average.

Macro Economics

Sem III

- To learn about macro-economic aspects of an economy
- To understand the Gross National Output (GDP) of an economy and it's measurement.
- To learn about the concept of money and the functions performed by it in an economy.
- To learn about the monetary and fiscal policy in a country are framed and their role in stabilization of the economy.

- To study about the consumption, investment and expenditure functional relationship and their measurement.

Sem IV

- To learn about the history and functions of commercial banks and how the credit is created in the country.
- To understand about the functioning of Reserve Bank of India as well as how the monetary policy is framed in the country.
- To gather knowledge about the modern banking system as well as money market and capital market instruments in India.
- To introduce a new subject of health economics and understand the health problems in India.
- To study about the concept of dispersion in social science data analysis with practical questions.
- To study Indian Economy

Sem V

- To evaluate the characteristics of Indian economy as well as different types of economies.
- To study about the trend of national income in India.
- To study about the features of Maharashtra Economy.
- To gather knowledge about the problems related to agriculture and agricultural labour in India.
- To understand the role of industry in Indian economy and importance of cottage and small industries.
- To study the different concepts of employment and poverty in India.

Sem VI

- To familiarize the terms and measurement of economic development.
- To understand the concepts of inclusive growth, sustainable development and human development index and its measurement.
- To understand the importance and objectives of planning in India.
- To know about the taxation issues and role of finance commission.
- To understand the role of foreign trade in Indian economy.

B.A. HISTORY

The main focus in the history course in UG level of the RTM Nagpur University, to which the College is affiliated to, is to study the stages and growth of civilization in India right from Indus Valley period to contemporary India. It contains political, social, cultural, religious and economic development of India. It also focuses on the landmark events of world history with special reference to Europe and Asia. The main aims of history teaching are:

- To understanding the process of change and development over the centuries through which the civilization has passed through to reach the present stage of development.
- To promote an understanding of current national and international occurrences.

Course Outcomes (CO)

- The university offer undergraduate general course of History. Students who pass B.A. with history as an optional subject might come up with the following knowledge and skill.

  - To be able to learn a basic narrative of historical events in a specific time frame of any part of the world.
  - To be able to understand and evaluate different historical ideas, various arguments and points of view.
  - To be able to present clear and compelling argument based on critical analysis of diverse historical sources.
  - To be able to understand the use of the past for present purposes.
  - To be able to the value of diversity, develop a secular outlook towards society and believe in the equality of man irrespective of caste, creed, religion and color, and learn religious toleration.

B.A. PHILOSOPHY

Course Outcomes (CO)

Students will be able to:

- To understand and discuss major philosophical problems in the Indian and Western Traditions.
- To express complex thoughts logically and coherently.
- To apply their philosophical learning to important public issues and articulate their thoughts well in such debates.
- To be able to develop their own philosophical areas of interest and investigate them from various perspectives.
- To be able to learn and articulate fundamental metaphysical questions about what exists; epistemological inquiries such as what we can know; and ethical aspects such as how we should live our lives, etc.
- To be able to describe the ways in which the formal techniques of logic are important to philosophical research.
- To be able to acquire reading skills necessary to understand and critically engage with historical and contemporary philosophical texts.
- To be aware of the existence of multiple philosophical traditions, particularly our own Indian tradition, and will be able to reflect on the similarities and differences of such traditions.

B.A. POLITICAL SCIENCE

Course Outcomes (CO)

B.A. Program in S.F.S College has multiple optional subjects and Political Science is one of them. The semester pattern for B. A. program is now divided into six semesters from the year 2016. Syllabus has been designed for all six semesters by the RTM Nagpur University. The course consists of six semesters:

I- Political Theory

II- Political Thinkers (Western Thinkers)

III-Indian Government and Politics

IV-State Politics

V- Comparative Government and Politics

VI-Foreign Policy

The Course Outcomes are as follows:

- To be able to develop interest in the subject Political Science as it has included THINKERS and FOREIGN POLICY in B. A. Program. The Seriousness of study is seen among students as this syllabus is going to help them in preparation for Civil Service Examination. Most of the students have decided to take political science as an optional subject in their examination.
- Previous syllabus did help students to compete Civil Service, Bank, Railway examinations. Some of the students have joined Railway, Banks and other Private Companies.
- Students are taken to Maharashtra Assembly Bhawan to witness the functioning of Indian Parliamentary system. Students are also sent to World Parliament, Students' Parliament held in Pune. The Ministry of Parliamentary Affairs conducted Inter-college Mock Parliament in the RTM Nagpur University. Students have been benefited out these programs and have developed interest in the subject.
- This new syllabus has developed writing-skill and students do consult number of books. Competitive spirit has been developed among students
- To develop competitive spirit among students.
- To develop an interest in the subject and learn about thinkers and Foreign Policy etc.
- To develop a reading-culture among students.
- To develop focus amongst students who can opt for Class I services like IAS, IPS, etc.

B.A. SOCIOLOGY

Program Outcomes (PO)

- To make the students understand the nature of sociology and its nexus with other disciplines.
- To make the students understand the recent concept surfacing in the studies of sociologist and social scientists.
- To equip young minds to understand the sociological perspective so as to enhance sociological understanding of the problem in hand.
- To understand social stratification and social structure, changing nature of social institutions related social dynamics and social problems of Indian society.
- To build the knowledge base and apply it to the different facets of society.
- To examine different sociological concepts and social institutions like gender, religion, caste, class, education and family.
- To make use of sociological concepts in understanding social problems and role of human being in society.
- To sustain the interest of the students in term of making them capable of fitting into the job market.
- To develop a multi-disciplinary interest and a broad perspective among the students.

Course Outcomes (CO)

- To understand the importance of Sociology and its relation with other social sciences.
- To understand the recent concept surfacing in the studies of sociologist and social scientist.
- To understand the sociological perspective so as to enhance sociological understanding of the problem in hand.
- To understand the social stratification, social structure, changing nature of social institutions, related social dynamics and social problems of Indian society.
- To understand the various sociological thoughts of founding fathers of Sociology and its relevance to the current scenario.
- To understand the meaning, needs and importance of social control.
- To understand effect and importance of various sources of social change.

- To understand the various component of Indian society.
- To understand the various important element and functions of social structure.
- To understand the role of religion, family and education in the society.
- To understand the pattern of social deviance in different societies and measures to control them.
- To understand various concepts such as Law, Society, Community, Association, Institution, Organization and other basic concepts of Sociology.