

Ujjwal Bahu-Uddeshiya Sanstha, Nagpur

College code- 401

D.D. BHOJAR COLLEGE OF ARTS AND SCIENCE, MOUDA

Tah.: Mouda, Dist.: Nagpur, Pin - 441104

Affiliated to RTM Nagpur University, Nagpur, Approved by Government of Maharashtra

Email : dd.bhojar@rediffmail.com Website : ddbhojar.ac.in

Tel : 07115 - 281979 Mob. : 9158003321

Department of Science

Course outcomes-English

SEMESTER I – COMPULSORY ENGLISH

CO1. Students will be learn to use the four skills of language; Listening, Speaking Reading and Writing effectively.

CO2. Students will learn proper and correct usage of sentences of English. . They will learn more new words which will enrich their vocabulary.

CO3. They will be inspired to read books.

SEMESTER II – COMPULSORY ENGLISH

CO1. They will be able to make use of the English language in a professional way.

CO2. Learner will gain proficiency in language so as to enable them to face and use English easily in a global scenario.

CO3. The critical thinking ability of the students will be developed.

CO4. Good exposure to writing skills will enhance their creative ability



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Course Outcomes (COs)-Marathi

B.Sc. Course: SEM-I

- 1) Usefulness and importance of Marathi language.
- 2) The distinction between prose and verse literature
- 3) Introduction to select authors and poets
- 4) Formal letter writing, translation and summary writing

B.Sc. Course: SEM-II

- 1) Reflections of rural and urban life in Marathi
- 2) Introduction to Saint literature in Marathi
- 3) Introduction to scientific texts in Marathi
- 4) Introduction to the right to information regulations
- 5) Idioms, proverbs and phrases in Marathi language



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Course Outcomes(COs) of B. Sc. Chemistry

B. Sc. Semester-I

Paper-I (CH: 101) Inorganic Chemistry

CO-1: Details about quantum numbers Also factors affecting and trends in chemical properties like Ionization Potential, Electron affinity and Electronegativity.

CO-2: Learn Lattice energy and Born- Haber cycle and Formation of Hydrogen molecule with Potential energy diagram by of VBT.

CO-3: Should learn, s- block elements, Ionization potential, reducing properties. Application of s- block elements (Na, K and, Ca) in biosystem. And structures, bonding and applications of Xenon fluorides (XeF₂, XeF₄, XeF₆). Structure and bonding in XeOF₂ and XeOF₄.

CO-4: Students Practice of p-block elements Oxides: Structure of P₂O₃, P₂O₅ Oxyacids of Phosphorous: Structure of H₃PO₃ and H₃PO₄ And Simple tests for the detection of food adulteration in tea leaves and coffee, spices (turmeric and chili powder) and, milk.

Paper-II (CH: 102) Physical Chemistry

CO-1: To impart the students' concepts of thermodynamics and thermochemistry.

CO-2: To understand the basics of Gaseous state, ideal gas and real gas.

CO-3: To provide an insight into the liquid state and properties of liquid state.

CO-4: To get an overview about the adsorption and colloidal state



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B.Sc. Semester-II

Paper-I (CH: 201) Organic Chemistry

CO-1: Describe in details, Structure and Bonding: Hybridization in case of Methane, Ethane, Ethylene and Acetylene. And Reactive intermediates: Carbocations, carbanions, free radicals and carbenes (Definition, formation, geometry, stability).

CO-2: Should learn Stereochemistry of Organic Compounds: Elements of symmetry, Optical activity, D & L and R & S system of nomenclature. And Geometrical isomerism, maleic acid, fumaric acid, Conformational analysis of ethane and n-butane.

CO-3: Students learn, methods of formation (Ethane and Propane): Wurtz reaction, Kolbe's reaction and decarboxylation of carboxylic acid. Baeyer's strain theory and its limitations. formation (ethylene and propylene): Markownikoff's rule and Peroxide effect.

CO-4: Students prepare, Details of Classification of dienes. Methods of formation of 1,3-butadiene. And Methods of formation of acetylene from: Calcium carbide and dehydrohalogenation of dihalides, Chemical reaction: and MO picture, Huckel rule and aromaticity, Aromatic electrophilic substitution mechanism with energy profile diagram (e.g., nitration and sulphonation) And LPG, CNG, LNG, and Bio-Gas (definition, calorific value, composition, properties and uses). Octane number. Lubricants: Definition, classification

Paper-II (CH: 202) Physical Chemistry

CO-1: To learn the basics of second law of thermodynamics, Carnot cycle and partial molar properties.

CO-2: To learn and understand Phase equilibria and Solutions of Liquids in Liquids.

CO-3: To understand the concept of chemical kinetics and theories of reaction rate

CO-4: To get an overview about the nuclear chemistry, pollution and its control



B.Sc. Semester-III

Paper-I (CH: 301) Inorganic Chemistry

CO-1: Able to write structure and bonding of Inter-halogen and poly-halogen compound on the basis of VSEPR and MO theory.

CO-2: Able to write electronic configuration and periodic properties of Transition element.

CO-3: Able to understand the types of error in chemical analysis and types of solvent.

CO-4: Able to understand the chemistry of inner transition element.

Paper-II (CH: 302) Organic Chemistry

CO-1: Students should be able to identify the formation and identify chemical reactions of activating, deactivating substituents, alkyl halides and polyhalogen compounds.

CO-2: Students should be able to classify and identify preparation methods, properties and analyse reaction mechanisms of alcohols and phenols

CO-3: Students should be able to evaluate and compare synthesis methods and reactions related to Aldehydes and Ketones.

CO-4: Students should be able to analyse structure and bonding, compare different methods of synthesis, identify reaction mechanisms of Carboxylic Acids and their derivatives.

B.Sc. Semester-IV

Paper-I (CH: 401) Inorganic Chemistry

CO-1: Able to understand coordination chemistry –types, classification, nomenclature Werner theory, coordination number, EAN rule chelating complex.

CO-2: Able to understand the isomerism in coordination compound having 4 and 6, and oxidation reduction in EMF Series.

CO-3: Able to understand the Colorimetry and Spectrophotometry Method and Separation Techniques.

CO-4: Able to understand the Inorganic Polymers, Silicones chemistry, Phosphonitrilic halide polymers

Paper-II (CH: 402) Physical Chemistry

CO-1: Students should be able to classify and explain different types of solids, crystals, crystal systems and should be able to characterize and interpret them.

CO-2: Students should be able to explain and evaluate different concepts and theories related to electrochemistry and its applications

CO-3: Students should be able to discuss concepts and applications of Rotational and Vibrational Spectroscopy and examine different spectra.

CO-4: Students should be able to interpret different principles and concepts of Quantum chemistry and discuss about dielectric and magnetic properties of molecules



B.Sc. Semester-V

Paper-I (CH: 501) Organic Chemistry

CO-01: Able to understand classification, nomenclature, synthesis, mechanism of nitrogen containing organic compound.

CO-02: Able to understand classification, nomenclature, synthesis, mechanism of Heterocyclic compound like furan, thiophene, pyrrole and pyridine, Indole, Quinoline and Isoquinoline.

CO-03: Able to perform Quantitative Analysis of carbon, hydrogen, nitrogen, sulphur and halogens and preparation and chemical properties of Organometallic compounds.

CO-04: Ability to understand Spectroscopy technique like UV and IR.

Paper-II (CH: 502) Physical Chemistry

CO-1: To acquaint knowledge on basics of Electrochemistry, Nernst equation, applications of EMF measurement in pH determination and potentiometric titration.

CO-2: Students to learn and understand about applications of Schrodinger equation in one and three dimensional box, concept and shapes of orbitals, radial distribution curves for different orbitals and molecular orbital theory

CO-3: To provide an insight into the photochemistry, laws of photochemistry, Quantum yield, Jablonskii diagram, Raman spectroscopy and rotational-vibrational spectra of diatomic molecules.

CO-4: To get an overview about the colligative properties, determination of molecular mass from relative lowering of vapour pressure and Macromolecules, determination of molecular mass of macromolecules using viscometry, osmometry and light scattering methods.

B.Sc. Semester-VI

Paper-I (CH: 601) Inorganic Chemistry

CO-1: Able to understand Concept related VSEPR theory Calculation of CFSE and Electronic spectra of Transition Metal Complexes.

CO-2: Able to understanding the Magnetic Properties of Transition Metal Complexes and Thermodynamic and Kinetic aspect of metal complexes.

CO-3: Able to learn Nomenclature, Classification Preparation of Organometallic compound and metal carbonyl compound.

CO-4: Able to understanding the Essential and Trace elements in biological processes, Hard and Soft Acids and Bases, HSAB Concept for acid base

Paper-II (CH: 602) Organic Chemistry

CO-1: To learn the basics of NMR spectroscopy, Infrared spectroscopy and to understand the interpretation of NMR spectra of organic molecules and Intensity and position of IR bands, applications of IR spectra.

CO-2: Students to learn and understand the synthesis, chemical properties of Malonic ester and acetocetic ester, classifications and reaction of glucose, mechanism of osazone formation, chain lengthening and chain shortening of aldoses.

CO-3: To understand the basics of amino acids, peptides, proteins, nucleic acids, fats, oils, soaps and detergents.

CO-4: To get an overview about the synthetic dyes, synthetic polymers and green chemistry



Course Outcomes (COs) of B. Sc. Botany

B.Sc. Semester-I

Paper – I: Viruses, Prokaryotes, Algae and Biofertilizers

CO1: identify various microbial life forms in depth with ultrastructure, reproduction and economic importance.

CO2: to gain knowledge about Cyanobacteria with ultrastructure and economic importance and Algae: Classification and economic importance.

CO3: to understand complete Life history of *Chara*, *Vaucheria*, *Ectopus* and *Batrachospermum*.

CO4: to acquire Skill development practices in the field of Biofertilizers. Commercial production of *Rhizobium*, *PSB*, *Azotobacter* and *Azolla*

Paper – II: (Fungi, Plant Pathology, Lichens, Bryophyta and Mushroom Cultivation)

CO1: The General characteristics, Classification & economic importance of Fungi. Study in detail the life history of *Albugo*, *Mucor*, *Puccinia*, *Cercospora*

CO2: To explore host, pathogen, symptoms, Causes and Control of Leaf curl of Papaya, Citrus canker and Red rot of Sugarcane. To understand the types and reproduction in Lichens.

CO3: The General characteristics, Classification & economic importance of Bryophytes. Study in detail the life history of *Marchantia*, *Anthoceros*, *Funaria*

CO4: To acquire Skill development practices in the field of mushroom cultivation

SEMESTER-II

Paper-I: (Palaeobotany, Pteridophytes, Gymnosperms and Soil analysis)

CO1: Palaeobotany, types of fossils, and geological time scale

CO2: Pteridophytes, classification, life history, heterospory, seed habit, and steles.

CO3: General characteristics, classification, life cycle of gymnospermic forms.

CO4: Soil analysis: properties, types, and method of collection of soil samples

Paper – II: (Morphology of Angiosperms and Floriculture)

Course outcome: *After completion of this course students will gain knowledge of -*

CO1: Vegetative morphology of angiospermic plant parts.

CO2: Reproductive morphology, evolutionary significance, identification and description of floral characters of angiosperms.

CO3: To get an insight on taxonomic terminologies and description of carpel and types of fruit.

CO4: Skill development practices in floriculture related to cultivation, irrigation and harvesting.



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SEMESTER-III

Paper-I: (Angiosperm Systematics, Embryology and Indoor Gardening)

CO1: Origin of angiosperms, fossils angiosperms, plants diversity, description, identification, nomenclature and their classification including modern trends in the plant systematics.

CO2: Systems of classification and study of Angiosperm families

CO3: Embryology, pollination, and Fertilization in plants development.

CO4: Various analytical and technical skills related to Skill landscaping and Indoor gardening

Paper – II: (Angiosperm Anatomy and Horticulture)

CO1: Tissue, apical meristem of root and shoot: structure and functions.

CO2: Types of vascular bundles, normal primary structure of root, stem, and normal, anomalous secondary growth.

CO3: Periderm, growth rings, Sap-heartwood, leaf anatomy.

CO4: Skill development practices in horticulture: methods of propagation of horticultural crops and bonsai preparation

SEMESTER-IV

Paper-I: (Cell Biology, Plant Breeding, Evolution and Seed Technology)

CO1: Concept of Cell biology, cell organization, Structure and functions

CO2: Basic of Chromosome morphology, molecular organization and cell division:

CO3: Biostatistics, fundamental techniques in plant breeding and evolutionary significance .

CO4: Skill development practices in seed technology.

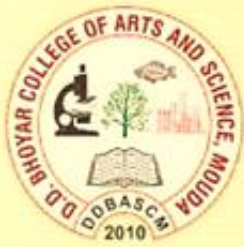
Paper – II: (Genetics, Molecular Biology and Plant Nursery)

CO1: Mendelism, interaction of genes, linkages and crossing over.

CO2: Mutation, chromosomal aberrations, DNA damage and repair.

CO3: Concept of gene, regulation, protein synthesis and genetic code.

CO4: Skill Development practices in plant nursery panning and management



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SEMESTER-V

Paper-I: (Plant Physiology, Mineral Nutrition and Hydroponics)

Course outcome: *Students will be able to improve the basic understanding on various physiological life processes in plants,*

CO1: To gain knowledge about the various uptakes and transport mechanisms in plants and are able to coordinate the various processes. They understand the role of Plant-Water relation, Transpiration, Mineral uptake.

CO2: Enrich themselves with the phenomenon mechanism of Photosynthesis and Respiration: and their role in plants.

CO3: Understand the process of N- Fixation, Plant Movements, Photoperiodism, Nitrogen Metabolism, and Plant Movements.

CO4: Skill Development practices like Mineral nutrition and Hydroponics

Paper – II: (Plant Ecology and Organic Farming)

Course outcome: *Students will remember and understand*

CO1: The basics and principles of ecology, biological diversity, conservation, sustainable development, population, community, climatic factors and edaphic factors.

CO2: The concept, types, development and functions of various ecosystems and their communication.

CO3: Fundamentals of plant succession and adaptations and biogeochemical cycles.

CO4: Skill development practices in organic farming.



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SEMESTER-VI

PAPER-I: (Biochemistry, Biotechnology and Herbal Technology)

Course outcome: *Students will be able to*

CO1: Basic concepts of Biochemistry, Lipids metabolism, of enzyme action and mechanism.

CO2: To acquire knowledge in Plant tissue culture, Methods of sterilization and Preparation of Culture Media, Protoplast culture and Applications of tissue culture.

CO3: Understand the fundamentals of Genetic engineering including Cloning vectors and Agro bacterium mediated gene transfer and its role in crop improvement.

CO4: Skill Development practices in Herbal, Dye yielding and cosmetics technology.

Paper-II: (Phytogeography, Utilization of Plants, Techniques and Pharmacognosy)

Course outcome: *Student will understand the basics and fundamental of*

CO1: Phytogeography, Pollution, Natural resources and Conservation strategies.

CO2: Utilization of plants, branches and scope of ethnobotany.

CO3: Principle, types and application of Microscopy and various biophysical techniques

CO4: Skill development practices in Pharmacognosy



Course Outcomes (COs) of B. Sc. Zoology

B. Sc. Semester-I

Paper- I, Life and diversity of animal-Nonchordates(protozoa to Annelida)

CO1: Understand the classification and general characters of phylum protozoa and genus paramecium, plasmodium and parasitic protozoans of animals.

CO2: Describe classification and general characters of phylum Porifera and coelenterate along with respective examples Sycon and Obelia, coral reef formation.

CO3 :Describe classification and general characters of phylum Helminthes and their respective examples Ascaris, *Taenia solium* and parasitic adaptation in Helmenthes

CO4: Understand the classification and general characters of phylum Annelida and its example Leech, Trochophore larva and vermiculture

Paper-II Environmental Biology

CO1: Understand Atmosphere, Hydrosphere, Lithosphere, and Renewable and non-renewable energy sources.

CO2: Describe ecosystem, details of Pond Ecosystem, interspecific interaction and energy flow model.

CO3: Elaborate the concept of Biodiversity, reduction of Biodiversity, wildlife Conservation and hotspot of Biodiversity in India

CO4: Understand the Air pollution, Water pollution, Noise pollution, Bioaccumulation and biomagnification

B. Sc. Semester-II

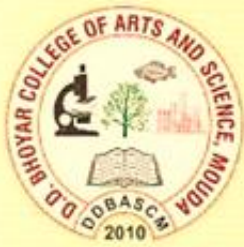
Paper-III Life and Diversity of Animals Nonchordate (Arthropoda to Hemichordata).

CO1: Understand the general character and classification of phylum Arthropoda its example Cockroach, Insects as vectors and study of crustacean larvae

CO2: Understand the general character and classification of phylum Mollusca, its example Pila, Pearl formation and molluscan larvae

CO3: Understand the general character and classification of phylum Echinodermata, its example Asterias and Echinodermata larvae

CO4: Understand the general character and classification of phylum Hemichordate, its example Balanoglossus and Affinities of Balanoglossus



Paper – IV: Cell Biology

CO1: Understand the ultrastructure of prokaryotic and eukaryotic cell, plasma membrane and its Fluid Mosaic Model, ultrastructure, types and functions of endoplasmic reticulum, and the ultrastructure and functions Golgi complex.

CO2: Explain the ultrastructure and function of mitochondria process of Glycolysis Krebs cycle and oxidative phosphorylation, Electron Transport Chain and terminal oxidation. Structure, polymorphism and functions of Lysosome

CO3: Understand the ultrastructure of nuclear membrane Structure and functions of nucleolus, Structure and function of Chromosome, Model of Nucleosome and Giant chromosomes

CO4: Explain the Structure, types, Lake's model and functions Ribosome, the Somatic cell division Mitosis and Meiosis, the ageing and cell death, cancer and its causative agents

B. Sc. Semester-III

Paper – V: Life and Diversity of Animals –Chordates(Protochordata to Amphibia)

CO1: Understand the general characters and classification of Protochordata, *Herdmania*, *Amphioxus*, Agnatha.

CO2: Describe the Salient features of Chondrichthyes and Osteichthyes and Origin of paired fins in fishes, Migration and Accessory respiratory organs in fishes, Amphibia and Parental care and Neoteny in Amphibia

CO3: Describe the Gametogenesis and type of eggs, the Fertilization of egg, the Post fertilization and development of fish, types of scales of fishes and development of placoid scales

CO4: Describe the Cleavage, blastulation and gastrulation of frog embryology, the Morphogenetic movements ingastrula of frog, the process of development of respiratory organs in frog, the process of development of Aortic arches of frog.

Paper – VI :Genetics

CO1: Describe the Mendelian Principles, the Interaction of genes epistasis, the Quantitative genetics, Extracellular genome

CO2: Explain cytoplasmic inheritance, linkage, crossing over, concepts of gene, genetic disorders in human beings

CO3: Explain Sex determination, the Chromosomal aberrations, gene mutation and disorder related to chromosomal number

CO4: Explain the lethal genes, Population genetics, Genetic counseling and applied genetics which include the DNA fingerprinting, amniocentesis, sperm banks, karyotyping



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B. Sc. Semester-IV

Paper - VII :Life and Diversity of Animals –Chordates(Reptilia, Aves and Mammals)

CO1: Describe the classification of reptilia, Poison apparatus of snake, biting mechanism, types of snake venom and its importance, Aves and Mammals

CO2: Describe modern theories of evolution, adaptations, introduction to genetic basis of evolution and races in man

CO3: Describe comparative account of aortic arches and heart in Reptiles, Birds and Mammals, the structure of hen's egg, the Process of development of chick up to primitive streak stage, the development of extra embryonic membranes in chick and functions of membrane

CO4: Describe the blastocyst and implantation in Mammals, the types of placenta and functions of placenta, Sources and types Stem cells, the biological clock and rhythmic behavior in birds and mammals, the role of pheromones in reproductive behavior

Paper - VIII : Molecular Biology and Immunology

CO1: Describe the structure of DNA, forms of DNA, properties of DNA and explain the DNA as a genetic material, the structure of RNA, types of RNA and explain the RNA as a genetic material, the Prokaryotic and eukaryotic gene structure, the recombination in Bacteria

CO2: Describe DNA replication, Genetic code, protein synthesis and gene regulation model.

CO3: Express the concept of immunity, antigen, antibody and Antigen-antibody interaction.

CO4: Describe the Types of immune response, Complement system pathways, cytokines, Autoimmunity and immunodeficiencies.



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B. Sc. Semester-V

Paper - IX :General Mammalian Physiology

CO1: Describe the elementary idea of enzymes, the general properties of enzymes and classification of enzymes, the factors affecting enzyme activity

CO2 : Describe the Structure and functions of digestive glands, the gastrointestinal hormones, the digestion and absorption of proteins, carbohydrates and lipids. Explain the fat soluble and water-soluble vitamins their Sources, deficiency and disease

CO3: Explain the types, distribution and properties of Respiratory pigments, the Mechanism of Respiration with Transport of O₂ and CO₂, the Respiratory disorders and effects of smoking.

CO4 Describe the composition and functions of blood, the process of blood

Paper –X:Applied Zoology-I(Aquaculture and Economic Entomology)

CO1: Describe the selection and construction of site, Pre and post stocking management of nursery, rearing and stocking ponds, the breeding of fishes by bund and Chinese hatcheries. Induced breeding by hypophysation. Explain the brief study of freshwater aquaculture system, the fish products and by products and preservation of fish.

CO2: Understand the process of Prawn culture and Pearl culture. Explain the fabrication and setting up of aquarium and its maintenance, the process breeding of aquarium fishes, the Diseases in fish.

CO3: Describe the chemical and biological control of pest. Explain the life cycle, damage and control of crop pest- *Earias vitelli*, *Sitophilus oryzae*. the life cycle, damage and control of Animal pest- *Musca nebulosa*, *Stomoxys calcitrans*

.CO4: Understand the processes and concepts in sericulture, Apiculture, Lac culture.



B. Sc. Semester-VI

Paper -XI:General Mammalian Physiology – II

CO1:Describe the types of neurons and the electron microscopic structure of neuron, the process of conduction of nerve impulse, the ultrastructure of striated muscle and Properties of the muscles

CO2:Describe the structure of uriniferous tubule, the Mechanism of urine formation and counter – current mechanism, the normal and abnormal constituents of urine and Elementary idea of dialysis

CO3:Describe the structure and functions of Endocrine gland- pituitary, parathyroid, thyroid, adrenal, pineal glands

CO:4 Describe the Oestrous and menstrual cycle, the Male and female sex hormones, the causes of infertility in male and female and contraceptives

Paper - XII :Applied Zoology –II Biotechniques Microtechnique, Biotechnology, Bioinformatics and Biostatistics

CO1 :Describe the sterilization process, the separation technique of biomolecules, the process of electrophoresis - Agarose gel, SDS-PAGE electrophoresis, colorimeter and spectrophotometers

CO 2:Understand the Fixation, dehydration, clearing, embedding & section cutting, the difficulties encountered during section cutting, the double staining with Hematoxylin and Eosin, the histochemical staining techniques for carbohydrates (Periodic acid schiff), proteins (Mercury-bromophenol blue) and lipids(Sudan black-B)

CO3:Describe the recombinant DNA technology, Gene isolation method and the Shotgun cloning method, Isolation of gene, the basic concepts of cloning vectors and splicing, the application of biotechnology in insulin and vaccine production

CO4 : Describe the definition, Basic concepts of bioinformatics, and role of bioinformatics in life sciences, the introduction and types of databases. The nucleotide sequence databases, Elementary idea of protein data bases and the biostatistics



Course Outcomes (COs) of B. Sc. Physics

B. Sc. Semester-I

PAPER-I (101) Properties of Matter and Mechanics

CO1: To understand the elastic properties of matter and to recognise their applications in various problems.

CO2: Concept of viscosity in terms of fluid flow, Streamline and turbulent flow, equation of continuity of flow, Bernoulli's Theorem and its application.

CO3: Understand the concept of Surface tension by Jaeger's, Quincke's and Capillary rise methods.

CO4: Understand the concept of Mechanics

PAPER-II (102) Electrostatics, Time varying fields & Electric Currents

CO1: Understand the knowledge of electrostatics and laws governing the charge distribution

CO2: Understanding dielectric nature of material: polarization phenomena mechanism, capacitor as application

CO3: Study in depth the transient current response of CR, LC, LR and LCR circuits, which is essential in designing as well as understanding the working of electronic circuits.

CO4: Fundamentals and analysis of A.C. circuits

B. Sc. Semester-II

PAPER-I (201) Oscillations, Kinetic theory of gases and Thermodynamics

CO1: Concepts and different types of oscillations: free damped and forced

CO2: Understanding the laws of ideal gases, kinetic theory of gases

CO3: Understanding the basic laws of thermodynamics

CO4: Understanding various thermodynamic process, function and applications of Maxwell general relationship.

PAPER-II (202) Gravitation, Astrophysics, Magnetism and Magneto statics

CO1: Apply Kepler's law to describe the motion of planets and satellite in circular orbit, through the study of law of Gravitation

CO2: Introduction of constituents of universe: galaxy, stars, solar system and composition of constituents of universe

CO3: To gain knowledge of superconductivity, its underlying principles and its applications

CO4: To understand the different magnetic laws Biot-Savart law, Amperes laws, Gauss law of magnetization & its application



B. Sc. Semester-III

PAPER-I (301) Sound waves, Applied acoustic, Ultrasonic and Power supply

CO1: To get the concept of wave propagation, knowledge of sound waves, classification of waves and applications.

CO2: Understand the specific principles relevant to the acoustics of spaces.

CO3: Understand the different methods for generation of the ultrasonic waves, theory and application.

CO4: To understand how a semiconductor diode with different filters rectifies an input ac signal. Concepts of rectifier and power supply

PAPER-II (302) Physical optics and Electromagnetic waves

CO1: Basic concepts of interference through Newton's rings, Michelson's interferometer and Fabry-Parrot Interferometer

CO2: Basic theory of Fresnel's and Fraunhofer diffraction and its application

CO3: Basic concept of polarization, Nicol prism positive and negative crystals

CO4: Understand the physical significance of Maxwell equations and EM wave equations and its Application

B. Sc. Semester-IV

PAPER-I (401) Solid state physics, X-ray and Laser

CO1: Understand the basic concepts of crystal structures using different examples (NaCl, diamond, CsCl, ZnS etc.)

CO2: Theory, generation, properties and application of X-rays.

CO3: Understand the X-ray diffraction: Laue's theory, Bragg's law and Bragg spectrometer.

CO4: Understand the concept, construction and application of Laser with its different types

PAPER II (402) Solid state electronics, and Molecular physics

CO1: Understand the basic concepts of crystal structures using different examples (NaCl, diamond, CsCl, ZnS etc.)

CO2: Theory, generation, properties and application of X-rays.

CO3: Understand the X-ray diffraction: Laue's theory, Bragg's law and Bragg spectrometer.

CO4: Understand the concept, construction and application of Laser with its different types



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B. Sc. Semester-V

PAPER-I (501) Atomic physics, free electron theory and Statistical physics

CO1: Understand the various atom model (Bohr's model, Sommerfield, Vector model), quantum no, various types of couplings, Zeeman and Stark effect.

CO2: Understand the concept of Free electron theory, Band theory of solid and classification of materials based on band theory

CO3: Understand in depth about statistical distribution

CO4: Realise the basic Ideas about Maxwell-Boltzmann, Bose-Einstein and Fermi Dirac Statistics and their applications

PAPER-II (502) Quantum mechanics, Nanomaterials and Nanotechnology

CO1: Understand the developments of quantum mechanics through Compton effect, wave particle duality, De Broglie hypothesis, Heisenberg uncertainty principle, Thought experiment

CO2: To understand Schrodinger's Wave equation and basic concepts of quantum mechanics (wave function operators, Eigen values and Eigen function)

CO3: Nano materials : general concepts of nanoscience, size dependent properties of nano materials

CO4: Different methods of synthesis and characterization techniques (SEM, TEM, BET) of nano materials and their application in various fields



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. Sc. Semester-VI

PAPER-I (601) Relativity, Nuclear physics and Bio Physics

CO1: To understand the concept of theory of Relativity and its consequences

CO2: To give an extended knowledge about nuclear reactions such as nuclear fission and fusion

CO3: Understand the Liquid drop model and shell model of nucleus

CO4: To understand the concept of alpha decay, β -decay, γ -decay and its consequences. Acquire the basic knowledge of the Bio physics, Bio potential and Bioinstrumentation

PAPER-II (602) Electronics, Fiber optics, Communication and Digital electronics

CO1: Understand the concept of Amplifiers, Op-AMP and oscillators with its application.

CO2: Understand the basic concept and applications part of optical fibre into communications systems

CO3: Communication: basic concepts of analogue communication (A.M., F.M. AND P.M.)

CO4: Understand the binary arithmetic, logics and Boolean functions



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Course Outcomes (COs) of B. Sc. Computer Science

B.Sc. Semester I

Paper-I :- Programming in C

CO1: Understand programming structures like Sequence, Selection, Iteration and Modular.

CO2: Understand development tools such as algorithm, flowchart and pseudo code for any Problem to solve them programmatically.

CO3: Understand basic concepts of programming in C such as character set, Operators, Functions etc.

CO4: Understand arrays, strings, functions, structures, unions and pointers.

CO5: Understand the file handling, sequential access and random access programmatically.

Paper-II :- Fundamentals of Information Technology

CO1: Understand the meaning and basic components of a Digital computer system

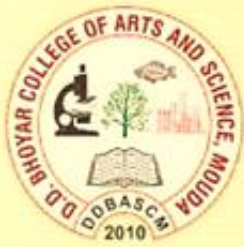
CO2: Understand the role of CPU, BUS, Number System, and Language Evaluation

CO3: Understand the concept of Compilers, Interpreters and Assembler

CO4: Understand the concepts and need of primary and secondary memory, different storage devices

CO5: Explain input devices and output devices.

CO6: Explain Network concepts, LAN, WAN Man, Network protocols etc



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B.Sc. Semester II

Paper-I :- Object Oriented Programming using 'CPP

CO1: Understand key structured programming, constructs declaration sequence, selection, repetition evaluating expression.

CO2: Understand C++ functions and the concepts related to good modular designs.

CO3: Understand pointers and reference parameters; understand the creation of class and objects.

CO4: Handle files programmatically creating dynamic objects.

CO5: Understand inheritance virtual functions, need and pure virtual functions.

CO6: Understand mechanism of inline function, constructors, destructors, operator overloading and exception handling

Paper-II :- System Analysis and Design

CO1: Carry Feasibility Study of system, Gather data to analyze and specify requirements of a system

CO2: Design system components and environment

CO3: Develop data flow diagram and decision tables to design system

CO4: Understand the concept of Implementation, Testing and Conversion of system

CO5: Work as an effective team member on assigned projects.

CO6: Understand the concept of Software Reliability and Quality Management

B.Sc. Semester III

Paper-I :- Data Structures

CO1: Determine appropriate data structure as applied to specified problem definition.

CO2: Understand the concept of Linked List, Double linked List and their representation

CO3: Explain the different mechanism involved in memory Mgt.

CO4: Understand the concept of avoidance, detection and prevention of Deadlock.

CO5: Explain Trees in Memory, Definition and Representation of Graphs in Memory

Paper-II :- Operating Systems

CO1: Understand the basic of Structure of Operating System, Characteristics of Modern OS

CO2: Understand the anatomy of Process Management, CPU Scheduling Algorithm

CO3: Understand the concept of deterministic Modelling, Dead Lock Prevention, Dead Lock Detection, Recovery from Deadlock

CO4: Explain paging, segmentation, Segmentation with paging. Protection

CO5: Understand file management, Buffering



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B.Sc. Semester IV

Paper-I :- Java Programming

- CO1:** Understand model of Java Programming language such as Operators, tokens etc.
- CO2:** Creating a class & subclass, Understand Data members, Invoke a method, passing arguments to a method, calling method.
- CO3:** Explain Method overloading, Constructor overloading. Java class library
- CO4:** Understand Decision making & loops, Creating an array, String array,
- CO5:** Explain the concept of Inheritance and Interfaces
- CO6:** Evaluate user requirement for software functioning.
- CO7:** Solve given problems using Java programming.
- CO8:** Create GUI applications

Paper-II :- Linux Operating System

- CO1:** Understand the basic set of commands and utilities in Linux, concept of shell
- CO2:** Understand the anatomy of Linux operating system, editor and procedure of printing files
- CO3:** Sharing Files with other Users
- CO4:** Perform backup and to create compress file and decompress them.
- CO5:** Perform operation on process.
- CO6:** Understand KDE and GNOME desktop environment



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B.Sc. Semester V

Paper-I :- Visual Basic Programming

CO1: Write, compile and execute applications using various controls like text box, command button.

CO2: Write programs using Arrays and functions

CO3: Write, compile and execute applications using database connectivity like ADODC.

CO4: Create database using MS-Access and visual Data managers

CO5: Write, compile and execute Menu driven application.

CO6: Explain Data Environment and Data Reports

Paper-II :- Data Base Management System

CO1: Understand basic concepts of DBMS, its objective

CO2: Role of Database Administrator, Database Users, different Data models and network models

CO3: Understand concept of ER model.

CO4: Explain Relational Model, Structure and Extended Relational model

CO5: Understand Functional Dependency and Perform normalization of database



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B.Sc. Semester VI

Paper-I :- Compiler Construction

- CO1:** Understand Compilers and translators and their need.
- CO2:** Explain Intermediate code Generation.
- CO3:** 3 Define programming languages, ,High Level programming languages
- CO4:** Understand the lexical and syntactic structure of a language, the role of the lexical analyser
- CO5:** Understand Parsers, Shift-reduce parsing and DAG representation of basic blocks

Paper-II :- SQL and PL/SQ

- CO1:** Understand CODD'S Rules, Oracle Database Objects, data types, operators
- CO2:** Create tables, derive table from existing table, altering, dropping of Tables.
- CO3:** Check Integrity Constraints and Adding and Dropping Constraints
- CO4:** Understand types of Views, Create Views, Drop Views, Insert, Update and Delete
5Data using Views,.
- CO5:** 5Understand basic concepts of PL/SQL Programming
- CO6:** Create cursors, triggers and Exception Handling



Course Outcomes (COs) of B. Sc. MATHEMATICS

S. N.	Sem	Name of Paper	Code	CO's
1	I	Elementary Mathematics	M1CO1	Learn about Complex Numbers & the elementary functions.
			M1CO2	Acquire knowledge of Matrices
			M1CO3	Make known about theory of Equations
			M1CO4	Understand the concept of Elementary Number Theory:
2	I	Differential and Integral Calculus	M2CO1	Apply the knowledge of Leibnitz's theorem, Maclaurin's and Taylor's theorems & Indeterminate forms to solve the examples
			M2CO2	Acquire knowledge of Limit and continuity of functions of two variables, Partial derivatives, composite functions, Asymptotes & Envelopes
			M2CO3	Define & understand Jacobians and its properties, Taylor's series of two variables, Maxima and Minima of function of two variables, Lagrange's method of multiplier
			M2CO4	Find the Reduction formulae & evaluate Integration of algebraic rational functions, trigonometric functions, irrational functions
3	II	Geometry, Differential & Difference Equations	M3CO1	Understand the concept of sphere, cone & cylinder
			M3CO2	Learn about Orthogonal trajectories, Exact equations, linear and Bernoulli's equations & reduction of order
			M3CO3	Understand the concept of Second order linear differential equations
			M3CO4	Understand the concept & Apply the knowledge of Difference Equations
4	II	Vector Analysis	M4CO1	Learn about Vector calculus & Differential Geometry
			M4CO2	Acquire the knowledge of Double integration, Triple integration, Gamma function & Beta function
			M4CO3	Evaluate Ordinary integral of vectors, line integral, Surface integral, Volume integral
			M4CO4	Acquire the knowledge of Green's Theorems in the plane and its application, Gauss divergence Theorem, Stokes' Theorem
5	III	Partial Differential Equations & Calculus of Variations	M5CO1	Understand the concept of simultaneous differential equation in of first order and first degree in three variables, Pfaffian differential equation and its solution, able to solve first order Partial Differential Equation
			M5CO2	Study about the linear differential equation and integral surface, capable to solve Partial Differential Equation of first order by Charpit's method and Jacobi's method
			M5CO3	Find the solution of PDE of second order using various methods
			M5CO4	Understand the concept of Functional and their classes, apply Euler's differential equation to extremum of a functional
6	III		M6CO1	Introduce about the group theory and some of their examples with counting principal
			M6CO2	Understand about Normal, Quotient, Permutation group and Homomorphism of group
			M6CO3	Introduce the ring theory and their types with examples



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			M6CO4	Acquire the knowledge of field of quotients of an integral domain, Euclidean and Polynomial rings
7	IV	Real Analysis	M7CO1	Introduction about the set and their types with some basic theorems, concept of Neighborhood with limit of set
			M7CO2	Define various types of sequences & find its limit, able to test convergence of sequence
			M7CO3	Get knowledge of various types of series & their various test, able to check convergence of series
			M7CO4	Acquire the knowledge of Riemann integral, Criteria and Properties, understand the mean value theorem
8	IV	Mathematical Methods	M8CO1	Apply the knowledge of power series and find the solution of first and second order LDE, also find the ordinary, singular and regular singular point
			M8CO2	Learn about the Legendre's and Bessel's functions
			M8CO3	Understand the concept of Laplace transform & its inverse, apply the knowledge of Laplace transform to solve the differential equations
			M8CO4	Learn the concept of Fourier series on different Interval
9	V	Complex Analysis	M9CO1	Define the concept of functions of complex variable, C-R equations, find the analytic functions by using different methods
			M9CO2	Get knowledge of conformal and bilinear transformation with examples
			M9CO3	Acquire knowledge of complex integration with some important theorems
			M9CO4	Learn the convergence of a series of complex terms, residue, evaluation of improper integral
10	V	Metric Space, Boolean Algebra & Graph theory (optional)	M10CO1	Discuss the countable & uncountable sets and metric space
			M10CO2	Understand the concept of Completeness, Compactness, Connectedness
			M10CO3	Learn about Lattices and Boolean algebra
			M10CO4	Introduce about the graph theory
11		Mechanics	M11CO1	Learn about the Coplanar forces, equilibrium of three forces and centre of gravity
			M11CO2	Learn the concept of work and energy, virtual work, flexible string and common catenary
			M11CO3	Discuss motion in plane, Newton's laws of motion and understand the projectile
			M11CO4	Learn the concept of Lagrange's dynamics and constraints, also gain knowledge of differential equation of an orbit and Virial theorem
12	VI	Linear Algebra	M12CO1	Introduction about Vector spaces and to get knowledge of basis and dimension
			M12CO2	Understand the concept of Linear Transformation, Rank and