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RANI CHANNAMMA UNIVERSITY, BELAGAVI

RANI CHANNAMMA UNIVERSITY, BELAGAVI

PROGRAM /COURSE STRUCTURE AND SYLLABUS
as per the Choice Based Credit System (CBCS) designed in accordance with
Learning Outcomes-Based Curriculum Framework (LOCF)
of National Education Policy (NEP) 2020
for

Bachelor of Science (Botany)

w.e.f.

Academic Year 2021-22 and onward

Head
Dept. of Botany
GSS College, Belagavi.

IQAC Co-ordinator
GSS College, Belagavi

PRINCIPAL
G.S.Sc. College, Belagavi

(Refer to literature on outcome based education (OBE) for details on Program Outcomes)

PO1: Skill development for the proper description using botanical terms, identification, naming and classification of life forms especially plants and microbes.

PO2: Acquisition of knowledge on structure, life cycle and life processes that exist among plant and microbial diversity through certain model organism studies.

PO3: Understanding of various interactions that exist among plants and microbes; to develop the curiosity on the dynamicity of nature.

PO4: Understanding of the major elements of variation that exist in the living world through comparative morphological and anatomical study.

PO5: Ability to explain the diversity and evolution based on the empirical evidences in morphology, anatomy, embryology, physiology, biochemistry, molecular biology and life history.

PO6: Skill development for the collection, preservation and recording of information after observation and analysis from simple illustration to molecular database development.

PO7: Making aware of the scientific and technological advancements- Information and Communication, Biotechnology and Molecular Biology for further learning and research in all branches of Botany.

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PO8: Internalization of the concept of conservation and evolution through the channel of spirit of inquiry.

PO 9: To enable the graduates to prepare for national as well as international level competitive examinations like UGC-CSIR, NET, KPSC etc.

PO10: To enable the students in practicing the best teaching pedagogy as a biology teacher including the latest digital methods.

PO 11: The graduates should be knowledgeable and competent enough to appropriately deliver on aspects of global importance like climate change, SDGs, green technologies etc at the right opportunity.

PO 12: The graduates should be able to demonstrate sufficient proficiency in the hands-on experiment of techniques in the area of specialization within biology during research and in the professional career.

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of National Education Policy (NEP) 2020
for

Bachelor of Science (Botany)

B.Sc III and IV sem

w.e.f.

Academic Year 2022-23 and onwards

Head
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B. Sc. Botany Course outcomes under NEP program

The framework of curriculum for the Bachelor's program in Botany aims to transform the course content and pedagogy to provide a multidisciplinary, student-centric, and outcome-based, holistic education to the next generation ofstudents.

Aside from structuring the curriculum to be more in-depth, focused, and comprehensive with significant skill-set for all exit levels; keeping in mind the job prospects; the emphasis has been to maintain academic coherence and continuum throughout the program of study and help build a strong footing in the subject, thereby ensuring a seamless transition into theircareers.

Special attention is given to eliminate redundancy, discourage rote learning, and espouse a problem-solving, critical thinking, and inquisitive mindset among learners.

The curriculum embraces the philosophy that science is best learned through experiential learning, not limited to the confines of a classroom but rather through hands-on training, projects, field studies, industrial visits, andinternships.

This updated syllabus, with modern technology, helps students stay informed on the leading-edge developments in plant sciences and promotes curiosity, innovation, and a passion for research, that will serve them well in their journey into scientific adventure and discovery beyondgraduation.

The goal is to equip students with holistic knowledge, competencies, professional skills, and a strong positive mindset that they can leverage while navigating the current stiff challenges of the job market.

Program Outcomes:

By the end of the program the students will be able to:

(Refer to literature on outcome based education (OBE) for details on Program Outcomes)

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PO6: Skill development for the collection, preservation and recording of information after observation and analysis- from simple illustration to molecular database development.

PO7: Making aware of the scientific and technological advancements- Information and Communication, Biotechnology and Molecular Biology for further learning and research in all branches of Botany..

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PO10: To enable the students for practicing the best teaching pedagogy as a biology teacher including the latest digital modules.

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Semester I

Year	1	Course Code: 21BSC1BOT1L	Credits	04
Sem.	1	Course Title: Microbial diversity and Technology	Hours	52

Course Pre-requisites, if any	NA	
Formative Assessment Marks: 40	Summative Assessment Marks: 60	Duration of ESA: 02 hrs.

Course Outcomes	1. Understand the fascinating diversity, evolution, and significance of microorganisms. 2. Comprehend the systematic position, structure, physiology and life cycles of microbes and their impact on humans and environment. 3. Gain laboratory skills such as microscopy, microbial cultures, staining, identification, preservation of microbes for their applications in research and industry.	
Unit No.	**Course Content**	**Hours**
Unit I	**Chapter No. 1:** Microbial diversity-Introduction to microbial diversity; Hierarchical organization and positions of microbes in the living world. Whittaker's five-kingdom system. Distribution of microbes in soil, air, food and water. Significance of microbial diversity in nature. **5 Hour** **Chapter No. 2** History and developments of microbiology-Microbiologists and their contributions (Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Dmitri Iwanowski, SergiusWinogradsky and M W Beijerinck and Paul Ehrlich).**3 Hours** **Chapter No. 3** Microscopy-Working principle and applications of light, dark field, phase contrast and electron microscopes (SEM and TEM). Microbiological stains (acidic, basic and special) and Principles of staining. Simple, Gram's and differential staining.**5 Hours**	13
Unit II	**Chapter No. 4.** Culture media for Microbes-Natural and synthetic media, Routine media -basal media, enriched media, selective media, indicator media, transport media, and storage media. **3 Hours** **Chapter No. 5.** Sterilization methods -Principle of disinfection, antiseptic, tyndallisation and Pasteurization, Sterilization-Sterilization by dry heat, moist heat, UV light, ionization radiation, filtration. Chemical methods of sterilization-phenolic compounds, anionic and cationic detergents. **5 Hours** **Chapter No. 6.** Microbial Growth-Microbial growth and measurement. Nutritional types of Microbes- autotrophs and heterotrophs, phototrophs and chemotrophs; lithotrophs and organotrophs. **5 Hours**	
Unit III	**Chapter No. 7** Microbial cultures and preservation-Microbial cultures. Pure culture and axenic cultures, subculturing. Preservation methods-overlaying cultures with mineral oils, lyophilisation. Microbial culture collections and	13

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OPEN-ELECTIVE SYLLABUS:

I	Course Code: 21BSC1BOT1		Credits	03
II	Course Title: PLANTS AND HUMANWELFARE		Hours	40
Course Pre-requisites, if any	NA			
Formative Assessment Marks: 40	Summative Assessment Marks: 60		Duration of ESA:.02 hrs.	

Course Outcomes	At the end of the course the student should be able to: 1. To make the students familiar with economic importance of diverse plants that offer resourcesto human life. 2. To make the students known about the plants used as-food, medicinal value and also plantsource of different economic value. 3. To generate interest amongst the students on plants importance in day today life, conservation,ecosystem and sustainability.

Unit No.	Course Content	Hours
Unit I	Origin of Cultivated Plants. Concept of Centres of Origin, their importance with reference to Vavilov's work. Examples of major plant introductions. Crop domestication and loss of genetic diversity (Only conventional plant breeding methods). Importance of plant bio- diversity and conservation. **Cereals**: Wheat and Rice (origin, evolution, morphology, post-harvest processing & uses).Green revolution. Brief account of millets and their nutritional importance.	10
Unit II	**Legumes:** General account (including chief pulses grown in Karnataka- red gram, green gram, chick pea, soybean). Importance to man and ecosystem. **Cash crops:** Morphology, new varieties and processing of sugarcane, products and by- products of sugarcane industry. Natural Rubber – cultivation, tapping and processing.	10
Unit III	**Spices:** Listing of important spices, their family and parts used, economic importance with special reference to Karnataka. Study of fennel, clove, black pepper and cardamom. **Fruits:** Mango, grapes and Citrus (Origin, morphology, cultivation ,processing and uses)	10
Unit IV	**Oils and fats:** General description, classification, extraction, their uses and health implications; groundnut, coconut, sunflower and mustered (Botanical name, family & uses). Non edible oil yielding trees and importance as biofuel. Neem oil and applications. **Beverages:** Tea, Coffee (morphology, processing&uses)	10

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Recommended Leaning Resources

Print Resources	**Text Books:** 1. Kochhar, S.L. (2012). Economic Botany in Tropics. MacMillan & Co. New Delhi. 2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. The Netherlands:Kluwer Academic Publishers. Netherland. 3. Chrispeels, M.J. and Sadava, D.E. (1994) Plants, Genes and Agriculture. Jones & Bartlett- Publishers. Lincoln, United Kingdom

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Semester: II

1	**Course Code: 21BSC2BOT2L**			
2	**Course Title: Diversity of non-flowering plants**		**Credit**	**04**
			Hours	**52**
Course Pre-requisites, if any		**NA**		
Formative Assessment Marks: 40		**Summative Assessment Marks: 60**	**Duration of ESA: 03 hrs.**	

Course Outcomes	After completing this course satisfactorily, a student will be able to: 1. Understand the diversity and affinities among Algae, Bryophytes, Pteridophytes and Gymnosperms. 2. Understand the morphology, anatomy, reproduction and life cycle across Algae, Bryophytes, Pteridophytes and Gymnosperms, and their ecological and evolutionary significance. 3. Obtain laboratory skills/explore non-flowering plants for their commercial applications.

Unit No.	**Course Content**	**Hours**
Unit I	**Chapter No. 1** Algae –Introduction and historical development in algology. General characteristics and classification of algae, Diversity- habitat, thallus organization, pigments, reserve food, flagella types, life-cycle and alternation of generation in Algae. Distribution of Algae. **5 Hours** **Chapter No. 2** Morphology and reproduction and life-cycles of Nostoc, *Oedogonium, Spirogyra, Ectocarpus and Batrachospermum*. Diatoms and their importance. Blue-green algae-A general account. Algal blooms and toxins. **5 Hours** **Chapter No. 3** Algal cultivation- Cultivation of microalgae-*Spirulina*; Algal cultivation methods in India. Algal products- Food and Nutraceuticals, Feed stocks, food colorants; fertilizers, aquaculture feed; therapeutics and cosmetics; medicines; dietary fibres from algae and uses. **3 Hours**	13
Unit II	**Chapter No. 4.** Bryophytes – General characteristics and classification of Bryophytes. Diversity-habitat, thallus structure, Gametophytes and sporophytes. **5 Hours** **Chapter No. 5** Distribution, morphology, anatomy, reproduction and life-cycles of *Riccia, Anthoceros*, and *Funaria*. Ecological and economic importance of Bryophytes: Fossil Bryophytes. **3 Hours** **Chapter No. 6. Pteridophytes-** General characteristics and classification; Structure of sporophytes and life-cycles. Distribution, morphology, anatomy, reproduction and life-cycles in Psilotum, *Selaginella, Equisetum, Pteris*. **5 Hours**	13
Unit III	**Chapter No. 7** A brief account of heterospory and seed habit. Stelar evolution in Pteridophytes. Affinities and evolutionary significance of Pteridophytes. Ecological and economic importance. **5 Hours** **Chapter No. 8. Gymnosperms-** General characteristics. Distribution and classification of Gymnosperms. Study of the habitat, distribution, habit, anatomy, reproduction and life-cycles in Cycas, Pinus and Gnetum. **5 Hours** **Chapter No. 9.** Affinities and evolutionary significance of Gymnosperms. Economic importance of Gymnosperms - food, timber, industrial uses and	13

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2.Genetics and Plant Breeding (Theory)

ProgramName	B.Sc.inBOTANY		
CourseTitle	Genetics and Plant Breeding(Theory)	Semester	V
CourseCode:	DSC – BOT-C11- T		
Contacthours	45 Hours	No.ofCredits	03
FormativeAssessmentMarks	40	DurationofSEA/Exam	2hours
		SummativeAssessmentMarks	60

CoursePre-requisite(s):

Course Outcomes(COs): After the successfulcompletionofthecourse,thestudentwillbeableto:.

CO1.Understandingthebasics of genetics and plant breeding

CO2.Abilitytoidentify,calculateanddescribecrossing over, allelic generations and frequencies of recombination.

CO3.Interprettheresults of mating and pollinations.

CO4.ClassifyPlantpollination methods

CO5.Recognitiono f modes of inheritance of traits/ phenotypes and Phenotype-genotype correlation.

Contents	45Hrs
Unit1:	**15hrs**
Mendelian genetics and its extension Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Probability and pedigree analysis; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Numericals; Polygenic inheritance. Extrachromosomal Inheritance Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial mutations in yeast.	
Unit2:	**15hrs**
Linkage, crossing over and chromosome mapping Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numerical based on genemapping; Sex Linkage.Variation in chromosome number and structure : Gene mutations Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method.Role of Transposons in mutation.DNA repair mechanisms. Fine structure of gene (Population and Evolutionary Genetics, Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection,mutation, genetic drift. Genetic variation and Speciation.	
Unit3:	**15hrs**
Plant Breeding: Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Importantachievements and undesirable consequences of plant breeding. Methods of crop improvement Introduction: Centers of origin and domestication of crop plants, plant genetic resources; Acclimatization; Selection methods: For self-pollination, cross pollination and vegetative Propagation inplants; Hybridization: For self, cross and vegetative propagation in plants – Procedure, advantages and limitations. Crop improvement and breeding: Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.	

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1. Plant Morphology and Taxonomy (Theory)

Program Name	B.Sc. in BOTANY		Semester	V
Course Title	Plant Morphology and Taxonomy(Theory)			
Course Code	DSC – BOT-C9 - T		No. of Credits	04
Contact hours	60 Hours		Duration of SEA/Exam	2 hours
Formative Assessment Marks		40	Summative Assessment Marks	60

Course Pre-requisite(s):

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO1. Understanding the main features in Angiosperm evolution

CO2. Ability to identify, classify and describe a plant in scientific terms, thereby, Identification of plants using dichotomous keys. Skill development in identification and classification of flowering plants.

CO3. Interpret the rules of ICN in botanical nomenclature.

CO4. Classify Plant Systematic and recognize the importance of herbarium and Virtual Herbarium, Evaluate the Important herbaria and botanical gardens.

CO5. Recognition of locally available angiosperm families and plants and economically important plants. Appreciation of human activities in conservation of useful plants from the past to the present.

Contents	60 Hrs
Unit 1:	15 hrs
Morphology of Root, Stem and Leaf. Their modifications for various functions. Inflorescence – types. Structure and variations of flower. Fruits-types. Floral diagram and floral formula. **Introduction to Taxonomy**:History, objectives, scope and relevance ofTaxonomy **Systems of classification**: Artificial, Natural and Phylogenetic; brief account of Linnaeus', Bentham& Hooker's, Engler and Prantl's system and APG IV System (2016).-Merits and demerits of classification. **Taxonomic literatures:** Floras, Monograph. Revisions,Journals. **Herbaria and Botanical gardens:**Important herbaria and botanical gardens of theworld and India. Technique of HerbariumPreparation and roles botanical gardens. **Virtual herbarium;** E-flora, Documentation.	
Unit 2:	15 hrs
Plant identification: Taxonomic dichotomous keys; intended (yolked) and bracketed keys. (brief account only). **Plant descriptions**. Common Terminologies used for description of vegetative and reproductive parts of the following families **Study of the diagnostic featuresof Angiospermfamilies(Any 15 from the listed):** Annonaceae,Brassicaceae, Malvaceae, Rutaceae Anacardiaceae, Fabaceae (with sub Families),Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Asteraceae, Apocynaceae, Solanaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae / Zingiberaceae, Liliaceae /Commelinaceae, Arecaceaeand Cyperaceae / Poaceae. **Plant TaxonomicEvidences:** from palynology embryology/ cytology, phytochemistry and molecular data. Field inventory.	
Unit 3:	15 hrs

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Department of Chemistry

Course outcomes (BSc I Semester)

INORGANIC CHEMISTRY

CO 1: Atomic structure and Periodic trends:

Review of Bohr's atomic model, calculation of radius and energy of nth orbital, extension of bohr's theory-Sommerfield model, deBroglie hypothesis, deBroglie equation,(Derivation), experimental verification-Davisson-Germer experiment,
Quantum numbers and their significance, electronic configuration of the elements up to atomic number 60, Aufbau principle, Hund's rule, (n+l) rule, Pauli's exclusion principle.

CO2: Chemical bonding

Ionic bonding: factors affecting the formation of ionic bonding, Lattice energy and its determination by Born-Haber cycle.
Covalent bond: Types, factors favouring covalent bond, properties of covalent compounds. Valence bond theory with respect to H2, F2, HCl molecules and its limitations.

CO3: Methods of analysis:

Errors in quantitative analysis, classification and minimization, accuracy, precision, standard deviation, t-test, significant figure and rules for computations.

CO4: Principles of volumetric analysis:

Concentration terms, normality, molarity, mole fraction, percentage, primary standard solution, titration-acid-base, precipitation, iodometric, redox and complexometric(with reference to EDTA) titrations, choice of indicators in the above titrations

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ORGANIC CHEMISTRY

CO1: Purification of organic compounds: Methods of purification of solids:

Crystallization,fractional crystallization and sublimation.

CO2: Methods of purification of liquids:

Distillation, fractional distillation, distillation under reduced pressure, steam distillation. Chromatography: General principles, types, brief outline of thin layer chromatography, paper chromatography and column chromatography, solvent extraction.

CO3: Criteria of purity: Melting point and boiling point.

CO4: Stereochemistry of organic molecules:

Cycloalkanes: Baeyer's strain theory, calculation of angle strain, Sachse Mohr theory of strainless rings. Chair and boat forms of cyclohexane. Axial and equatorial bonds. Conformational isomerism: Basic concept of conformational analysis with reference to ethane and butane.
Geometrical isomerism: definition, E and Z notation for 2-butene and butenedioic acid, rules for assigning notations.Determination of configuration of butenedioic acid by anhydride formation, dipole moment measurement, melting point and stability.
Optical isomerism: Chirality, van't Hoff-Lebel hypothesis, optical activity, D and Lconfigurations, R and S notations, sequence and priority rules, enantiomers, distereoisomers, epimers, anomers, racemic and meso (with suitable examples like lactic and tartaric acids.), racemisation, resolution of racemic mixture by chemical method, asymmetric synthesis, Walden inversion.

CO5: Spectroscopy:

Introduction to conventional methods of elucidation of structure of organic compounds (chemical degradation) and comparison with spectroscopic methods,electromagnetic spectrum.

CO6: UV spectroscopy:

Principle, types of transitions, chromophores, concept of auxochromes and their effect on λmax, bathochromic shift, hypsochromic shift, hypochromic and hyperchromic shift.
Woodward and Fieser rules and illustration of calculation of λmax taking myrcene and B-phelladrene as examples.

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PHYSICAL CHEMISTRY

CO1: Gaseous State:

Real gas isotherms, Andrew's experiment of CO2, PV-relationship. Critical phenomenon of gases. Critical constants(Pc, Vc, Tc) – Definition, of critical temperature, critical pressure & critical volume. Relationship between critical constants and Vanderwaals constants, experimental determination of critical constants, reduced equation of state and statement of law of corresponding states.

CO2: Liquification of gases(Linde's method only)

Maxwell's law of distribution of molecular velocities(No derivation), effect temperature on distribution of molecular velocities.

CO3: Solutions: Solution of gas in liquid

Henry's law and limitations: Completely miscible liquid pairs. azeotropes, theory of azeotropic mixtures, partially miscible liquid systems, critical solution temperature with respect to phenol water,triethyl amine-water and nicotine- water system.
Salt-hydrolysis : Types of salts, definition of degree of hydrolysis and hydrolysis constant derive the relation between Kh, Ka & Kw and expression for pH in case of hydrolysis of the Following - salts of weak base and strong acid, weak acid and strong base.Numerical problems.

CO4: Nernst distribution law: Statement and limitations,

Applications of Nernst distribution law in solvent extraction.

PRACTICAL COURSE OUTCOME

Preparation of standard solution and volumetric estimations

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PROGRAMME OUTCOME

PO1: Able to understand different theories of atomic models

PO2: Able to learn significance of quantum numbers

PO3: Have understood types of bonding present in different compounds

PO4: will learn how errors are involved in qualitative and quantitative analysis and how to minimise it.

PO5: How to compute the scientific data is understood.

PO6: Will understand concentration terms used to indicate strength of the solution.

PO7: Different types of titrations and principal behind it are understood.

PO8: will be introduced to different types of purification techniques followed in the Laboratories.

PO9: will be able to judge sample is pure or not.

PO10: Different types of confirmations and configurations will be introduced.

PO11: Will learn techniques to resolve and check optically active compounds.

PO12: Students are introduced to spectroscopic techniques and their applications and its advantage over classical approach is appreciated.

PO13: Able to understand how structure is correlated with the type of absorption shown.

PO14: Able to understand critical constants and their applications.

PO15: Able to understand how the liquefaction of gases is brought about.

PO16: Henry's law and its applications, how gasses dissolve in water is known.

PO17: Will be able to discriminate between different types of azeotropic mixtures.

PO18: Will understand types of salts and their hydrolysis.

PO19: Will understand application of Nernst law in solvent extraction.

PO20: Will be able to recognise the compound its characteristics by some preliminary tests.

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Department of Chemistry

Course outcomes (BSc II Semester)

INORGANIC CHEMISTRY

CO 1: Chemical bonding-II

Hybridization: Salient features of hybridization, geometry of molecules with respect to sp, sp^2, sp^3, dsp^3, sp^3d^2 hybridization.

CO 2: VSEPR theory- Postulates,

regular and irregular geometry (BF_3, CH_4, NH_3 and H_2O). Molecular orbital theory: LCAO concept, elementary account with respect to H_2, He_2, Li_2, B_2, N_2, O_2, O_2^+, O_2^- and O_2^{2-} molecules, calculation of bond order, stability, magnetic property etc.

Hydrogen bonding: Types, significance of hydrogen bonding, properties explained by hydrogen bonding like a)State of H_2O and H_2S b) Melting and Boiling point c) Ice has less density than water.

CO 3: Organic reagents in inorganic analysis

Sensitivity, selectivity and specificity, advantages of organic reagents over inorganic reagents - Dimethyl glyoxime, 8-hydroxyquinoline (oxine).

ORGANIC CHEMISTRY

CO 1: Alkenes, Dienes and Alkynes

Alkenes: Methods of preparation of alkenes by (i) dehydration of alcohols (ii) dehydro halogenation. Saytezaff's elimination (Formation of highly substituted alkenes, 2-butene), Hofmann orientation (Formation of least substituted alkenes, 1-pentene)

Chemical reactions of alkenes- Peroxide effect and its mechanism, hydroboration, oxidation, oxy-mercuration-reduction and mechanism, ozonolysis with respect to 2-butene and 2-methyl-2-butene, oxidation with $KMnO_4$.

Dienes: Classification and Nomenclature Preparation of 1,3 butadiene; 1,2 and 1,4 addition reactions (addition of halogens and halogen acids), Diel's-Alder reaction, polymerization of 1,3 butadiene.

Alkynes: Acidity of Alkynes, reactions of acetylene –metal ammonia reduction, oxidation and polymerization.

CO 2: Aromatic Hydrocarbons:

Resonance in benzene, Aromaticity–Huckel's $4n+2$ rule with respect to benzene, furan, pyridine and [10]–annulene. Mechanism of electrophilic aromatic substitution-halogenation, nitration, sulphonation and Friedel-Craft's reaction (evidences for two step mechanism and evidences for formation of electrophile).

Poly nuclear hydrocarbons: Classification, examples, constitution of naphthalene, Haworth synthesis, nitration and sulphonation of naphthalene.

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CO 3: Conversions

a) Alkanes to alkyhalides to alcohols and vice versa
b) Alkanes to alkyl cyanides to carboxylic acids
c) Benzene to p-nitrobenzoic acid
d) Benzene to m-bromoaniline
e) Naphthalene to 1,4-naphthaquinone
f) Naphthalene to anthranilic acid

PHYSICAL CHEMISTRY

CO 1: First law of thermodynamics

Statement, isothermal and adiabatic process, expression for work done in the reversible expansion of adiabatic expansion of an ideal gas (PV^{γ}=Constant) Joule- Thomson effect, Joule-Thomson experiment, derivation of Joule Thomson coefficient for an ideal gas and inversion temperature.

CO 2: Thermochemistry

Kirchoff's equation, bond energies and bond dissociation energies, calculation of bond energy and bond dissociation energies by taking simple molecules. Numerical problems.

CO 3: Liquid State: Physical Properties of Liquids

Surface Tension: Effect of temperature on surface tension. Determination of surface tension of liquid by drop numbers method, parachor and its application.

Viscosity: Effect of temperature on viscosity, determination of relative, absolute and intrinsic viscosity of liquids by ostwald's viscometer method.

Refractive index of liquid: Specific and molar refractions, determination of refractive index of liquid by Abbe's refractometer.

CO 4: Liquid Crystals

Types and applications.

CO 5: Colloids

Emulsions: Types of emulsions, Preparation and emulsifiers.

Gels: Classification, preparation and properties, general applications of colloids.

CO 6: Solids

Space lattice, unit cell, crystal systems, calculation of particles per unit cell, laws of crystallography, x-ray diffraction of crystals, derivation of Brag's equation, Miller indices, determination of structure of NaCl by rotating single crystal method.

PRACTICAL COURSE OUTCOME

Spotting of different types of Organic Compounds by Qualitative Analysis

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PROGRAMME OUTCOME

PO1: Able to understand different types of Hybridisation and geometry of compound.

PO2: Able to learn different theories in chemical bonding.

PO3: Have understood types of Hydrogen bonding present in molecules.

PO: 4: Able to understand advantages of organic reagents over inorganic reagents

PO 5: Understand methods of preparation of alkenes and Saytezaff's elimination

PO6: Able to understand different Chemical reactions of alkenes.

PO7: Able to Classify and understand nomenclature of alkenes

PO8: Able to identify Aromatic compound by Huckel's Rule.

PO9: Can able to understand mechanism of Electrophilic aromatic substitution.

PO10: Learnt about poly nuclear hydrocarbon.

PO11: Can able to learn conversions of different organic compounds.

PO12: will understand principal of thermodynamics in liquefaction of gases

PO13: How BE is useful in determination of enthalpy of reaction is understood

PO14: Important properties of liquid can be used for elucidation of structure of Compound is understood

PO15: Usefulness liquid crystals & its types is understood

PO16: Applications and preparations of Gels & Emulsions is understood

PO17: Laws of crystallography are useful in determination of structure is understood

PO18: By performing preliminary and some specific tests unknown organic Compounds can be identified

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B Sc III Semester Programme Outcome

PO 3. 1: Metallurgical process and reducing agents used in the extraction of metals.

PO 3.2: Types and properties of solvents, water as solvent.

PO 3.3: Different theories of acids and bases.

PO 3.4: Types of electronics effects and orientation of substituents

PO 3.5: Alcohols, preparation of alcohols and its reactions.

PO 3.6: Phenols, classification distinguishing properties of phenols and its reactions

PO 3.7: Synthesis and applications of organo-metallic compounds.

PO 3.8: Principal and application of infra-red spectroscopy.

PO 3.9: Raults law and colligative properties with respect to solution.

PO 3.10: Review of second law of thermodynamics.

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B Sc III Semester Course Outcome

CO 3.1: Students are able to tell about various metallurgical process and reducing agents used in the extraction of metals.

CO 3.2: Students have learnt about types of solvents and its properties, water as solvents.

CO 3.3: Students learnt about different theories of acids and bases

CO 3.4: Students are able to distinguish types of electronic effects and orientation of substituents

CO 3.5: Students can tell about alcohols , preparation of alcohols and its reaction

CO 3.6: Students have learnt about phenols, its classification, distinguishing properties of phenols and its reactions.

CO 3.7: Students have learnt about synthesis and applications of organo-metallic compounds.

CO 3.8 : Students have learnt about principle and applications of infrared spectroscopy.

CO 3.9 : Students are able to tell colligative properties and Rault's law with respect to solutions.

CO 3.10 : Students can tell about second law of thermodynamics, applicative study of second law of thermodynamics.

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B Sc IV Semester Programme Outcome

PO 4.1 : General properties of d and f block elements.

PO 4.2 : Trace elements in biological process, its structure and functions.

PO 4.3 : Types of air pollutants, sources and its consequences.

PO 4.4 : Types of water pollutants, sources and its consequences.

PO 4.5 : Structure and bonding of aldehydes and ketone, reactions involving C=O bond.

PO 4.6 : Introduction of carboxylic acids, comparative strength of different types of acids and its reactions.

PO 4.7 : Classification of aromatic amines, comparison of basic strength of different amines.

PO 4.8 : Preparation and chemical reactions of ether, brief introduction to crown ethers, synthesis of epoxides and its reactions.

PO 4.9 : Study of strong and weak electrolytes, application of conductance measurements.

Po 4.10 : Kinetics of chemical reactions.

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B Sc IV Semester course Outcome

CO 4.1 : Students learnt about general properties of f and d block elements and lanthanide contraction.

CO 4.2 : Students understood about trace elements in biological process, its structure and function.

CO 4.3 : Students learnt about types of air pollutants, sources and its consequences.

CO 4. 4 : Students can tell about water pollution and treatment methods of sewae and industrial effluents.

CO 4.5 : Students are able to tell about structure and bonding of aldehyde and ketones, mechanism of nucleophilic addition involving C=O bond.

CO 4.6 : Students learnt about carboxylic acids, nomenclature, comparative strength of different types of acids and its reactions.

CO 4.7 : Students learnt about classification of aromatic amines, comparison of basic strength of different amines.

CO 4.8 : Students are able to tell preparation and chemical reactions of ethers, brief introduction to crown ethers, synthesis of epoxide and its reactions, application of crown ether.

CO 4.9 : Students will be able to tell about strong and weak electrolytes, Debye- Huckel theory, applications of conductance measurements.

CO 4.10 : Students learnt about kinetics of chemical reactions, determination of order of reactions, theories of reaction rates.

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DEPARTMENT OF CHEMISTRY

Course outcomes

BSc VI Semester- Paper II

Inorganic Chemistry

UNIT-I

CO 1:Chromatography

- Principle and types were taught.
- Students understood the difference between stationary and mobile phases and physical factors of separation.
- Students learnt paper chromatography, calculation of Rf value, column chromatography and its applications.

CO 2:Flame photometry

- The students were taught the Principle and Limitations.
- Students were able to understand Instrumentation, Flame photometric determination of Na and K.

CO 3:Thermogravimetry

- Students were able to learn Principle and applications of thermogravimetric methods (TG and DTA).

CO 4:Electrogravimetry

- Students learnt Principle, Instrumentation, Electrogravimetric determination of Copper.

UNIT-II

CO 5:Soil Analysis

- Students have understood Macro nutrients, trace metals and organic matter in soil.
- Students were able to understand Determination of pH, Determination of nitrogen by alkaline permanganate method and phosphorus by Bray's and Olsen's method present in the soil.

UNIT-III

CO 6: Electronic spectra of transition metal complexes

- Students were able to study Russel-Sandar's coupling in defining ground states of spectrochemical series.
- Students were able to derive spectroscopic ground terms(d1 to d10 without J values.
- Students learnt types of electronic transitions(d-d transitions, charge transfer transitions-MLCT and LMCT), selection rule for d-d transitions.
- Students were able to draw Orgel- energy level diagram-d1 and d2 states and the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion.

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Organic Chemistry

UNIT-I

CO 7:Chemotherapy

- Students were taught Introduction, requirement of an ideal synthetic drug and classification.
- Students were able to write the mechanism for synthesis and also write the uses of the Antipyretics-antipyrine, paracetamol Anaesthetics-novacaine(local) and pentothal sodium(general)Antihistamines-chlorpheniramine maleate(CPM)Antimalarials-paludrine, chloroquineAntibiotics-chloromycetin, penicillin, tetracyclinPara pharmaceutical reagents-Benedict's reagent, sodium citrate, Barfoed reagent.

UNIT-II

CO 8:Soaps and Detergents

- Soaps –
- Students understood Introduction, manufacture by modern process, cleaning action of soap.
- Detergents –
- Students learnt anionic, cationic, nonionic, with suitable examples, distinction between soaps and detergents, emulsifiers, stabilisers and builders.

UNIT-III

CO 9:Reaction Mechanism

Students were able to write the following mechnaisms

a) Beckmann rearrangement
b) Favorskii rearrangement
c) Benzidine rearrangement
d) Benzillic acid rearrangement

UNIT-IV

CO 10:NMR Spectroscopy

- Students understood the Principle of Proton Magnetic Resonance(1H NMR) spectroscopy, nmr spectrum, chemical shift, nuclear shielding and deshielding.
- Students learnt spin-spin coupling(n+1) rule, intensity(height) of the signal, TMS as internal standard-advantages.
- Students were able to interpret PMR spectra of simple organic molecules such as ethyl bromide, n-propyl bromide, iso propyl bromide, ethanol, acetaldehyde and benzene.

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Physical Chemistry

UNIT-I

CO 11:Electromotive force

- Students understood the basic concepts of Reversible and irreversible cells.
- Students understood the meaning of EMF of a chemical cell and its measurement by potentiometer and working of standard cell (Weston standard cell).
- Students were able to learn Types of electrodes - Reference electrode, calomel electrod.
- Students were able to derive Nernst equation for emf of a cell and concentration cells– with and without transference.
- Students learnt liquid junction potential and its derivation, salt bridge.
- Students learnt Applications of emf measurements to the
  1) Determination of pH: Using hydrogen electrode, quinhydrone electrode and glass electrode.

2) Potentiometric titrations: Acid-base and redox titration.

UNIT-II

CO 12:Photochemistry

- Students studied Photochemical reactions and laws of photochemistry – Beer's law, Lambart's Law, Beer- Lambart's Law, Grothus-Draper Law and Einstein's Law of photochemical equivalence.
- Students were able to calculate quantum efficiency or yield.
- Students realized the reasons for high and low quantum efficiencies with examples.
- Students successfully learnt fluorescence, phosphorescence, photosensitization and chemiluminescence.

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DEPARTMENT OF GEOLOGY

Program Outcome:

1. **Discipline knowledge:** After the completion of the BSc Course (Degree), the students will be learning the basics and important aspects of all branches of Earth Sciences mentioned in the preamble; which will enable them to apply their acquired knowledge.
2. **Problem Solving:** After going through 6 or 8 semesters curricula the students will be able to understand and decipher majority of the geological processes and their effects.
3. **Ethics on Profession, Environment and Society:** As the subject Geology is related to Earth its resources and processes the students will be taught to acquire ethics to maintain the integrity while dealing with data collection, compilation, interpretation and finding solutions.
4. **Lifelong Learning and Entrepreneurship:** Geology is regarded as a technical subject one can start their own consultancy so, they will become an independent entrepreneur and hence learning will be lifelong.
5. **Motivation to take up Higher Studies:** Inspiration to continue towards advanced studies in Geology and Research.

Programme Outcomes of B.Sc. Geology On completion of the 03 years graduate of B.Sc. Geology programme in Geology students will be able to:

- Megascopically identify rocks, minerals and fossils in the field as well as laboratory.
- Read and interpret geological maps with particular reference to structure and lithology.
- Design and develop geological map, geological cross section and panel diagrams to understand subsurface geology.
- Interpret topographical maps.
- Identify landforms, soil types and their interrelationships.
- Carryout microscopic identification of rocks and minerals.
- Assist in site selections for civil engineering constructions.
- Plan and execute geological field work.
- Understand natural hazard and its impact on the society.
- Assess the environmental impacts in a geologic perspective.
- Develop geological knowledge so as to evolve sustainable living.

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Course Outcome:

I Semester:

At the end of the course the student should be able to:

1. Explain the origin and internal structure of the Earth.
2. Explain the conceptual and dynamic aspects of landform development.
3. Learn the relevance of applied aspects of Geomorphology in various fields.
4. Formulate conceptual and analytical descriptions of geodynamic processes such as volcanism, earthquake and formation of ocean.

Open Elective Course (OEC)

At the end of the course the student should be able to:

1. can understand the geology behind natural disasters.
2. will understand the origin and occurrence of geohazards and evaluate the prediction and mitigations.
3. can understand the causes, threats, impact, magnitude and intensity of the natural hazards
4. will be able to qualitatively estimate risk, and envisage risk-appropriate mitigation strategies. Credits:

II Semester:

At the end of the course the student should be able to:

1. To understand the states of matter, atomic arrangement in crystals, and classification of crystals based on crystal symmetry
2. To understand the characteristics of common rock-forming minerals
3. To acquire knowledge on different types of rocks, their distinction from each other and the rock cycle.
4. To understand the occurrence and distribution of rocks in India

Open Elective Course(OEC)

At the end of the course the student should be able to:

1. To understand mineralogy and genesis of gemstones.
2. To identify main physical and optical techniques used in the gems characterization.
3. This course is a good opportunity for most of science and social science students not only to know about the mineral resources of India starting the principles of rock formation including minerals genesis during the rock formation and after their formation. Students exit with a certificate course will have skills to work in quarrying, mining, rock polishing, cement, silica/glass, sand mining, brick, ceramic, pottery and refractory industries. They will be exposed to start their own entrepreneurship. Similarly, students exit with a diploma, to Honors degree will be benefited work/carryout research in the interdisciplinary science to get original ideas and look for new reserves

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III Semester:

At the end of the course the student should be able to:

1. Understand fossils, types, fossilization process and modes of preservation, economically important fossils, geotourism related fossils.
2. Understanding the origin and evolution of life on the earth. Learn rich mineral deposits like petroleum, coal, and other minerals associated with fossils.
3. Understanding the paleoclimate and Paleoenvironment

Open Elective Course(OEC)

After completing the course, the students will be able to understand -

1. Marine resources – Oceans and Seas. Mineral deposits in the deep sea like metals, petroleum, coal, phosphorites, metallic nodules. Marine life and their economic importance.
2. The importance of water resources both – surface and subsurface water, water harvesting, water conservation,
3. watershed planning and management and the role of remote sensing, water law and NGOs.

IV Semester:

At the end of the course the student should be able to:

1. Students will understand the natural structures and rock mechanics.
2. It helps to understand various primary and secondary structures occurring in rocks.
3. Students will know about the water cycle, ground water related issues, water conservation, estimation of ground water and also quality.
4. To understand the beauty and rarity of the geological features, landscapes,mountains, geysers, rock monuments, national parks, Fossils parks, etc.
5. To understand the preservation of the geological features and monuments. Propagating the importance of these geological features to the common man.

Open Elective Course (OEC)

At the end of the course the student should be able to:

1. The challenges and opportunities posed by the climate change, resource demands and conflicts, and natural disasters (due to man-made structures as well as natural climate change) point to the importance of studying transdisciplinary nature of the earth processes and their implications to our society.
2. This interdisciplinary nature of Earth Science draws a special attention from the students with other branches of science. From this interdisciplinary optional course on Earth and Social Science, students gain an understanding of natural processes and the impact the distribution and use of natural resources such as water, fossil fuels, and critical minerals for economic growth. It also facilitates the understanding natural hazards such as climate change, landslides, tsunami induced coastal erosions, thermal Disturbances in sea water & seafood, and earthquakes.

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V Semester

Paper I

At the end of the course students will be able to:

1. Define GIS Systems, Spatial data and Geoinformation, Maps, Databases, partial databases and spatial analysis, geographic phenomena.
2. Become aware of Reference surfaces for mapping, Coordinate Systems, Absolute, relative, network positioning.
3. Direct and indirect spatial data capture, accuracy and positioning, data checks and repairs, interpolating discrete and continuous data relate to classification of analytical GIS capabilities, Vector and Raster overlay operators.
4. Proximity and flow computations, interpolation, terrain modeling, GIS applications and advances, quantifying error propagation
5. Understand the GIS softwares
6. To understand Satellite Data Products and Maps types
7. To understand Geo-Processing Tools: Clip, Union, Dissolve, Merge, Intersect

Paper II

At the end of the course students will be able to:

1. To understand evolution of the early Earth from proto-planetary material and its differentiation to present day state.
2. To explain element fractionation and how this can be used to understand geochemical processes.
3. To demonstrate their ability to obtain, analyze and synthesize information relevantto Geochemistry.
4. To understand the chemistry of organic matter.
5. To understand plotting the geochemical data using suitable discriminant diagrams
6. To understand Models of P-T estimation using suitable mineral pairs.
7. To understand the estimate metal content in an ore.

VI Semester:

Paper I

At the end of the course students will be able to:

1. Explain mineral exploration
2. Explain importance of mineral resources
3. Describe geological concepts in mineral exploration
4. Explain geological mapping and sampling, Geochemical surveys. Subsurface exploration and drilling
5. Describe scope and necessity of Mineral Processing and Physical properties of Ores and their importance in Mineral Processing

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Paper II

Attend of the course students will be able to:

1. After completion of the course, the student will gain first-hand knowledge of geophysical principles and their significance.
2. The students will acquire skills to interpret SOI toposheets and use of GPS, to conduct electrical resistivity and other methods for exploration.

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DEPARTMENT OF ZOOLOGY
COURSE OUTCOME & PROGRAMME OUTCOME

B. Sc. 1st Semester (NEP) Zoology

COURSE OUTCOME (CO)

- To use simple and compound microscopes.
- To prepare stained slides to observe the cell organelles.
- To be familiar with the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form new organisms.
- The chromosomal aberrations by preparing karyotypes.
- How chromosomal aberrations are inherited in humans by pedigree analysis in families The antigen- antibody reaction.

B. Sc. 2nd Semester (NEP) Zoology

COURSE OUTCOME (CO)

- Understand: Basic structure of biomolecules through model making.
- Develop the skills to identify different types of blood cells.
- Enhance basic laboratory skill like keen observation, analysis and discussion. Learn the functional attributes of biomolecules in animal body.
- Know uniqueness of enzymes in animal body and their importance through enzyme kinetics.

B. Sc. 3rd Semester (NEP) Zoology

COURSE OUTCOME (COs):

- Describe the structure and function of biomolecules.
- Appreciate and illustrate the chemical composition of the genetic material and its replication.
- Describe theprocess of gene expression in prokaryotes and eukaryotes.
- Explain the concept of transposition, mutation and DNA repair mechanism.

B. Sc.4th Semester (NEP) Zoology

COURSE OUTCOME (COs):

- Acquaint knowledge on versatile tools and techniques employed in genetic engineering and recombinant DNA technology.
- An understanding on application of genetic engineering techniques in basic and applied experimental biology.
- To acquire a fundamental working knowledge of the basic principles of immunology.
- To understand how these principles, apply to the process of immune function.
- Use, and interpret results of, the principal methods of statistical inference and design;
- Helps to communicate the results of statistical analyses accurately and effectively; helps in usage of appropriate tool of statistical software.

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B. Sc.6th Semester (CBCS) Zoology P1

COURSE OUTCOME (COs):

- Gonadal hormones and mechanism of hormone action, steroids, glycoprotein hormones, and prostaglandins, hypothalamo – hypophyseal – gonadal axis, regulation of gonadotrophins, secretion in male and female; Reproductive System: Development and differentiation of gonads, genital ducts, external genitalia
- Outline and histological of male reproductive system in rat and human; Testis: Cellular functions, germ cell, system cell renewal;
- Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism;
- Epididymal function and sperm maturation; Accessory glands functions; Sperm transportation in male tract.
- Outline and histological of female reproductive system in rat and human; Ovary: folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles (rat and human) and their regulation, changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization; Hormonal control of implantation;
- Hormonal regulation of gestation, pregnancy diagnosis, foeto – maternal relationship; Mechanism of parturition and its hormonal regulation; Lactation and its regulation
- To understand about different Reproductive Technologies

B. Sc.6th Semester (CBCS) Zoology P2B

COURSE OUTCOME (Cos):

- To understand about Earthj as a living planet, Abiotic factors and Biotic factors.
- Biogeochemical cycles and and community ecology.
- To understand different habitats and ecosystems and ecological adaptations.
- Density, natality, mortality, age distribution, population growth, types and curves
- To study about the zoogeographical realms of the world.
- Understand Wildlife conservation methods, Status of Wildlife conservation in india, and Organisatoins related to Wlildlife conservation.

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English Department

Programme Outcome.

1. The Programme is expected to develop an understanding of the English Literature along with language skills.
2. They get acquainted with the different genres of poetry, prose, fiction and drama.
3. Identify literary techniques and creative uses of language in literary texts.
4. Identify genres, conventions, and period-specific discourses and their relevance to broader historical force.
5. Describe their own writing practices and how they have evolved.

Course Outcome

1. Acquired enhanced LSRW (Listening, Speaking, Reading, Writing) skills.
2. Equipped themselves with interpersonal communication skills.
3. Augmented presentation and analytical skills.
4. Ability to critically analyses, interpret and appreciate literary texts.
5. An awareness of social, cultural, religious and ethnic diversities.

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Marathi Department

Programme Outcome

- मराठी साहित्यातील लघुकथेचे स्वरूप समजून येतील.
- मराठी कादंबरीतून लेखकाचे जीवन व कार्य समजण्यास मदत होईल.
- मराठी कविता संग्रहातून कवितेचे स्वरूप व वाटचाल समजून येतील.
- मराठी साहित्यातील आधुनिक मराठी नाटकाची वैशिष्ट्ये समजतील.
- मराठीतील भाषिक कौशल्यांचा उपयोग व्यावहारिक व व्यावसायिक जीवनात होतो.उदा: सृजनात्मक लेखन, प्रसार-माध्यमांसाठी लेखन, रेडीओ जाॅकी, बातमी लेखन- वाचन इ.
- मराठीतील विविध वाङ्मय प्रकारांचे ज्ञान आत्मसात होते.

Course Outcome

- मराठी साहित्याचे मूलभूत ज्ञान आत्मसात होते.
- मराठी भाषेतील भाषिक कौशल्यांचा उपयोग विद्यार्थ्यांना होतो.
- संशोधन क्षेत्रात मराठी भाषेच्या ज्ञानाचा उपयोग होतो.
- अनुवादाची कला विकसित होते.
- मराठी भाषेतील ज्ञानाचा उपयोग सामाजिक उन्नतीसाठी होतो.
- मराठी भाषेच्या ज्ञानाने नैतिक मूल्यांचा विकास होतो.

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Kannada Department

Programme Outcome

- ವಿಜ್ಞಾನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಸಾಹಿತ್ಯದ ಕುರಿತು ಜ್ಞಾನವನ್ನು ನೀಡಲು ಅನುಕೂಲವಾಗಿದೆ.
- ನಿಮಿಷಾತ್ಮಕ ಚಿಂತನೆ ಕೌಶಲ್ಯಗಳನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಲು ಭಾಷೆ ಸಹಾಯಕಾರಿಯಾಗಿದೆ.
- ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳ ಭಾಷಾಜ್ಞಾನಕ್ಕೆ ಸಹಾಯಕಾರಿಯಾಗಿದೆ.
- ಸ್ವರಚಿತ ಕವನ ಹಾಗೂ ಲೇಖನಗಳನ್ನು ಪ್ರಸ್ತುತಪಡಿಸಲು ಕನ್ನಡ ಸಹಾಯಕಾರಿಯಾಗಿದೆ.
- ನೈತಿಕ ಮೌಲ್ಯಗಳನ್ನು ತಿಳಿಯಪಡಿಸಲು ಕನ್ನಡ ಭಾಷೆ ಉಪಯೋಗಕಾರಿಯಾಗಿದೆ.
- ಸೃಜನಶೀಲ ಸಾಹಿತ್ಯವನ್ನು ನಿರ್ಮಾಣ ಮಾಡುವ ಮತ್ತು ಅಭಿವ್ಯಕ್ತಿಗೊಳಿಸುವ ಭಾಷಾ ನಿಪುನತೆಯನ್ನು ಕಲಿಯಲಿಕ್ಕೆ ಸಹಾಯಕಾರಿಯಾಗಿದೆ.

Course Outcome

- ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಕನ್ನಡವನ್ನು ಕಡ್ಡಾಯಗೊಳಿಸಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷಾ ಅಧ್ಯಯನವು ಹೆಚ್ಚು ಅನುಕೂಲಕರವಾಗಿರುತ್ತದೆ.
- ಹಸಿ ಪದವಿಯಿಂದ ಉದ್ಯೋಗ ಹಾಗು ವ್ಯವಹಾರ ಕ್ಷೇತ್ರಗಳಲ್ಲಿ ದಕ್ಷತ ಹಾಗೂ ಸಾಮರ್ಥ್ಯವನ್ನು ಪ್ರಕಟಪಡಿಸುತ್ತವೆ.
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಮಾನವೀಯ ಮೌಲ್ಯಗಳಾದ ಸಾಮಾಜಿಕ ಸಾಂಸ್ಕೃತಿಕ ಮತ್ತು ನೈತಿಕ ಮೌಲ್ಯಗಳನ್ನು ತಿಳಿಯಪಡಿಸುತ್ತದೆ.
- ವಿಜ್ಞಾನ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಭಾಷಾ ಕೌಶಲ್ಯ ಬೆಳಿಸುತ್ತದೆ ಮತ್ತು ವ್ಯವಹಾರಿಕ ಕನ್ನಡ ಕುರಿತು ಜ್ಞಾನವನ್ನು ನೀಡುತ್ತದೆ.
- ಪದವಿ ಇಂದ ಭವಿಷ್ಯದಲ್ಲಿ ಸಂಶೋಧನಾ ಆಧಾರಿತ ಉದ್ಯೋಗ ಹಾಗೂ ಬೋಧನಾ ಆಧಾರಿತ ಉದ್ಯೋಗಗಳನ್ನು ಪಡೆದುಕೊಳ್ಳಬಹುದು.
- ಪದವಿಯಿಂದ ಹೊಸ ವಿಷಯಗಳ ವಿಶ್ಲೇಷಣೆ ಹಾಗೂ ಭಾಷಾ ಹಿಡಿತವನ್ನು ಪಡೆದುಕೊಳ್ಳಬಹುದು.

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Hindi Department

Programme Outcome

- भाषा के सैद्धांतिक भाषा के सैद्धांतिक रूप के साथ साथ व्यवहारिक रूप का वित्रण
- विद्यार्थियों को अपने विचारों को अभिव्यक्त करने की क्षमता
- प्रयोजन मुलक हिंदी पत्रकारिता, अनुवाद, रिपोर्ट लेखन कविता कहानी की प्रस्तुति का अनुभव
- उच्चतम स्तर पर हिन्दी भाषा की भूमिका और उसके परिणामों के लिए सजग
- रचनात्मकता में अभिव्यक्ति के लिए निर्माण
- भाषा के प्रति लगाव और संस्कृति का ज्ञान

Course Outcome

- उच्चारण और लिपि का सही ज्ञान
- मुलभूत कौशल श्रवण,लेखन और अभिव्यक्ति का विकास
- एक कुशल वक्ता का निर्माण
- विद्यार्थीयों में संवेदना का विकास
- राष्ट्रीय चेतना का विकास
- मानवीय मूल्यों के प्रति स्वस्थ नवीन विचारधारा विकसित करना
- अहिंदी भाषी प्रदेशों में हिंदी का विकास

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Sanskrit Department

Programme Outcome

[illegible]

1) [illegible]

2) [illegible]

3) [illegible]

4) [illegible]

<u>Course Outcome</u>

[illegible]

1) [illegible]

2) [illegible]

3) [illegible]

4) [illegible]

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Semester I

Bachelor of Science (Basic/Hons) Programme/ Bachelor of Home Science Programme/ Degree in Fashion and Apparel Design/ Interior Design and Decoration/ Bachelor of Science in Clinical Nutrition (Basic/Hons.) with Clinical Nutrition / Bachelor of Computer Applications (Basic/Hons.) with Computer Applications .
(Both Subjects with practical/One subject without practical and one subject with practical)

Year	2021	Course Code: BSCENGAECL2-1	Credits	3
Sem.	I	Course Title: Generic English – I	Hours	4

Course Pre-requisites, if any	NA
Formative Assessment Marks: 40	Summative Assessment Marks: 60

Course Outcomes

At the end of the course the student should be able to:
1. Acquire the LSRW (Listening, Speaking, Reading, and Writing) skills.
2. Learn to appreciate literary texts.
3. Obtain the knowledge of literary devices and genres.
4. Acquire the skills of creativity to express one's experiences.
5. Know how to use digital learning tools.
6. Be aware of their social responsibilities.
7. Develop critical thinking skills.
8. Develop gender sensitivity.
9. Increase reading speed, analytical skills and develop presentation skills.
10. Become employable with requisite professional skills, ethics and values.

Unit No.	Course Content	Suggested Pedagogy	60 Hours
Unit I	1. Water the Elixir of life – C. V. Raman 2. Spoken English and Broken English - G. B. Shaw 3. Tiger in the Tunnel - Ruskin Bond	Lectures Tutorials Group Discussion	15 hrs
Unit II	1. Vachana 820 (Speaking of Shiva) by A. K. Ramanujan 2. To India My Native Land – Henry Derozio 3. The Road not Taken by Robert Frost	Lectures Tutorials Group Discussion	9 hrs
Unit III	Introducing One self, Introducing others, Requests, Offering help, Congratulating, Enquiries, Seeking permission Giving instructions to do a	Lectures Tutorials	16 hrs

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Semester II

Bachelor of Science (Basic/Hons) Programme/ Bachelor of Home Science Programme/ Degree in Fashion and Apparel Design/ Interior Design and Decoration/ Bachelor of Science in Clinical Nutrition (Basic/Hons.) with Clinical Nutrition / Bachelor of Computer Applications (Basic/Hons.) with Computer Applications .
(Both Subjects with practical/One subject without practical and one subject with practical)

Year	2021	Course Code: BSCENGAECL2-2	Credits	3
Sem.	II	Course Title: Generic English – II	Hours	4

Course Pre-requisites, if any	NA
Formative Assessment Marks: 40	Summative Assessment Marks: 60

Course Outcomes	At the end of the course the student should be able to: 1. Acquire the LSRW (Listening, Speaking, Reading, and Writing) skills. 2. Learn to appreciate literary texts. 3. Obtain the knowledge of literary devices and genres. 4. Acquire the skills of creativity to express one's experiences. 5. Know how to use digital learning tools. 6. Be aware of their social responsibilities. 7. Develop critical thinking skills. 8. Develop gender sensitivity. 9. Increase reading speed, analytical skills and develop presentation skills. 10. Become employable with requisite professional skills, ethics and values.

Unit No.	Course Content	Suggested Pedagogy	60 Hours
Unit I	1. Zero Budget Natural Farming by Shibu 2. Milka Singh: The Flying Sikh – Sonia Sanwalka 3. On Saying Please - A. G. Gardiner	Lectures Tutorials Group Discussion	15 hrs
Unit II	1. A Prayer for My Daughter – W. B. Yeats 2. Still I Rise - Maya Angelou 3. How did you Die? - Edmund Vance Cooke	Lectures Tutorials Group Discussion	9 hrs
Unit III	1. Reading passage to give a Title 2. Reading for Vocabulary building – synonyms, homonyms, homophones, suffixes, prefixes, collocations, often confused words.	Lectures Tutorials Group Discussion	16 hrs

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Digital Resources	http://owlt.col.org/module/unit/4-grammar-improving-composition-skills https://www.academia.edu/26724441/A_Concise_Grammar_for_English_Language_Teachers. https://www.efluniversity.ac.in/EnglishPro.php https://www.britishcouncil.in/

Question Paper Pattern

I	10 objective questions 5 from Unit I and 5 from Unit II	10x01=10
II	1 essay type question out of 2 from Unit I	01x10=10
III	01 essay type question out of 2 from Unit II	01x10=10
IV	02 questions out of 4 from Unit III	02x05=10
V	04 Language Activity out of 6 from Unit IV	04x05=20
Total		**60**

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(Basic/Hons.)

Semester – 3

Subject: Generic English-3
Ability Enhancement Compulsory Course (AECC)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	AECC	Theory	03	04	60 hrs	2hrs	40	60	100

Course Objectives

1. To enhance LSRW (Listening, Speaking, Reading, Writing) skills
2. To develop interpersonal communicative skills
3. To augment presentation skills
4. To critically analyse, interpret and appreciate literary texts
5. To sensitize about social, cultural, religious and ethnic diversities
6. To enable employability in emerging sectors such as - content writers, interpreters, translators, transcribers
7. To facilitate preparation for competitive examinations UPSC/KPSC/IBPS/SSC/RAILWAYS/TOEFL/IELTS and others.

Course Outcomes

At the end of the course the students will have :

1. Acquired enhanced LSRW (Listening, Speaking, Reading, Writing) skills
2. Equipped themselves with interpersonal communication skills
3. Augmented presentation and analytical skills
4. Ability to critically analyse, interpret and appreciate literary texts
5. An awareness of social, cultural, religious and ethnic diversities
6. Facilitated employability in emerging sectors such as - content writers, interpreters, translators, transcribers
7. Acquired language skills for competitive examinations - UPSC/KPSC/IBPS/SSC/RAILWAYS/TOEFL/IELTS and others.

Syllabus- AECC 3:	50/56hrs	Total marks: 60
Unit –1 RECEPTIVE SKILLS: READING SKILLS AND LISTENING SKILLS	23hrs	40 marks
	15 hours	30 marks

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Text: – *Fire and Rain* – Girish Karnad		
Unit – 2: Listening Skills- Persuasive Speeches (Audio version of the speeches to be emphasized)	**8hrs**	**10marks**
Listening to Famous Speeches 1 **"Crisis of Civilization"** speech by **Rabindranath Tagore** at Shanti Niketan in April 1941 was his last speech. Tagore had been unwell for some time, yet his words were very moving. https://www.youtube.com/watch?v=56dWrRCJwgE 2. Dr. B R Ambedkar's Constituent Assembly Speech on Dec 17,1946 https://www.youtube.com/wat ch?v=2VFm0Uo63rY 3.The speech by **Narayana Murthy** at Lal Bahadur Shastri Institute of Management Link: https://youtu.be/mMqJztCWbqA 4. Martin Luther King's 'I Have a Dream' Speech, 1963 https://www.youtube.com/watch?v=smEqnnklfYs 5.The speech by **Kiran Bedi,** India's first woman IPS officer on visionary leadership. https://youtu.be/IqYqMhVxTsY		
UNIT II	**23 hrs**	**20 marks**
Presentation Skills	**5hrs**	**5marks**
1. Organization of the Speech Use of Charts and diagrams Audio visual aids Body Language		
WRITING SKILLS	**18hrs**	**15 marks**
Introduction to Writing and Types of Writing	**6hrs**	**5marks**

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2.Types of Writing Descriptive Writing Reflective Writing Essay writing **3.Business Correspondence** Letter of Enquiry Letter of Complaint Job Application and Resume Writing **4.Commercial Writing** Advertisement Writing Product Manual Poster/Brochure Writing	**6hrs** **6hrs**	**5marks** **5marks**

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Semester – IV

Subject: Generic English
Ability Enhancement Compulsory Course (AECC)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	AECC	Theory	03	04	50/56hrs	2hrs	40	60	100

COURSE OBJECTIVES

15. To enhance the students' creative, interpretative and critical thinking
16. To equip the students to communicate confidently and effectively
17. To prepare for various interviews and professional contexts
18. To build persuasive and creative social media writing skills
19. To develop analytical and evaluative skills
20. To train students to identify and understand regional and global contexts and ethical frameworks in texts and narratives
21. To enable students for self-expression

COURSE OUTCOMES

By the end of the course the students will have:

15. Acquired creative, interpretative and critical thinking
16. Skills to communicate confidently and effectively
17. Obtained persuasive and creative social media writing skills
18. Developed analytical and evaluative skills
19. Learnt to identify and understand social contexts and ethical frameworks in the texts
20. Ability to articulate their views with clarity and confidence
21. Eligibility to take up jobs such as content writing, journalism and such other jobs with proficiency in English

Syllabus- AECC- 4	Total Hrs: 56	60 marks
Unit –I	23 hrs	40 marks
Text: *Carvalho*- K P Purnachandra Tejasvi	18hrs	30 marks
Unit – II: Listening, Decoding and Speaking Skills	5hrs	10hrs
Listening to Poems(any best rendering on you tube or any channel) 1. "Invictus"- William Ernest Henley	2hrs	

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2. "On Killing a Tree" – Gieve Patel		
TED Talks 1. A Well Educated Mind - Shashi Taroor https://youtu.be/kcW4ABcY3zI 2. India's Environmental Crisis, Unspoken and Unheard https://www.ted.com/talks/vimlendu_jha_india_s_environmental_crisis_unspoken_and_unheard?utm_source=whatsapp&utm_medium=social&utm_campaign=tedspread 3 Gender equality and empower all women – Shalini Rajanish https://www.ted.com/talks/dr_shalini_rajneesh_ias_gender_equality_and_empower_all_women_and_girls_un_sdg_goal_5?utm_source=whatsapp&utm_medium=social&utm_campaign=tedspread	**3hrs**	
UNIT-2 PRODUCTIVE SKILLS **SPEAKING SKILLS AND WRITING SKILLS**	**23hrs**	
1 Pecha kucha Presentation* Group Discussion Interview Skills (**PechaKucha* is a presentation format that requires a speaker to deliver twenty seconds of commentary per slide for twenty automatically advancing slides *PechaKucha*, which means "the sound of conversation" or "chit-chat" in Japanese, is a popular social event and a novel way for companies and educators to help employees and students sharpen public speaking skills and promote connectivity. The total presentation time for a *PechaKucha* presentation i six minutes and forty seconds.)	**4hrs**	**5marks**
WRITING SKILLS		
2.Technical Writing (any 4) Travel Writing Scientific Writing Précis Writing, Copy writing Article Writing	**8hrs**	**5marks**
3.Email Writing (any 3) **Casual and Professional** – Appreciation, Congratulations, Promotion Letter, Leave letter	**5hrs**	**5 marks**
4.Social Media Blog Writing, Podcast, Writing on face book, Twitter, Quora, Instagram	**6hrs**	**5 marks**

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Suggested Reading/ References

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28. Rogers, C., Farson, R. E. Active Listening. Gordon Training Inc., www.gordontraining.com/free-workplace-articles/active-listening/, Extract from 1957 article
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30. Yadugiri, M A. Making Sense of English - A Textbook of Sounds, Words and Grammar, Viva Books, 2020.
31. Yadugiri, M A. The Pronunciation of English - Principles and Practice. Viva Books, 2018.
32. Peck, John and Martin Coyle. Write It Right – Secrets of Effective Writing (Palgrave Study Skills), Palgrave Macmillan, 2005, 2012.
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34. Wood, Frederick. A Remedial English Grammar for Foreign Students. Macmillan Education, India, 1990.
35. Stanford Gene. Better Writing: From Paragraph to Essay. Harcourt College Pub, California, 1980.
36. Chaturvedi PD and Mukesh Chaturvedi. Business Communication, Concepts, Cases and Applications. Pearson, 2011.
37. Dev, Anjana Neira, Anuradha Marwah & Swati Pal. Creative writing - A Beginners Manual. Pearson.2008
38. Murphy, Raymond. Grammar in Use. CUP, 2019. 5 th Edition.
39. Seely, John. Oxford Guide to Effective Writing and Speaking OUP,1998.

ASSESSMENT

Mode of Evaluation and Distribution of Marks

- • The course shall carry a total of 100 marks.
- • There shall be semester-end written examination for all the courses conducted by the Examination Division of the University for 60 marks.
- • Each semester there shall be Internal Marks for 40.
- **A. FORMATIVE ASSESSMENT – 40 marks**
- **B. SUMMATIVE ASSESSMENT – 60 Marks**

TOTAL - 100 Marks

- **A. FORMATIVE ASSESSMENT – 40 marks**

Details of Formative assessment (IA) for AECC: 40% weight age for total marks

Type of Assessment	Weightage	Duration
Written test	10	1 hr
Seminar/Webinar	10	1 hr
Experiential Learning (Any two activities)	20	

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Creative Writing/Case study / Assignment / Field work / Interviews/ Project work/ Internship/Report on any Mega event		
Total	40	

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BCA PROGRAMME OUTCOME:

Upon graduation, students will be able to:

- Develop various real time applications using latest technologies and programming languages.
- Possess strong foundation for their higher studies.
- Blend analytical, logical and managerial skills with the technical aspects to resolve real world issues.
- Become employable in various IT companies and government jobs.
- The program prepares the young professional for a range of computer applications, computer organization, techniques of computer networking, software engineering, Web Designing and Advance JAVA.
- An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability in multidisciplinary teams with positive attitude.
- In order to enhance programming skills of the young IT professionals, the program has introduced the concept of project development during curriculum.

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PROGRAM OUTCOMES

By the end of the program the following outcomes will be achieved by the students:

1. **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity.
2. **Problem Solving:** Improved reasoning with strong mathematical ability to identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
3. **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems and acquiring a minimum knowledge on statistics and optimization problems. Establishing excellent skills in applying various design strategies for solving complex problems.
4. **Programming a Computer:** Exhibiting strong skills required to program a computer for various issues and problems of day to day applications with thorough knowledge on programming languages of various levels.
5. **Application Systems Knowledge:** Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.
6. **Modern Tool Usage:** Identify, select and use a modern scientific and IT tool or technique for modelling, prediction, data analysis and solving problems in the area of Computer Science and making them mobile based application software.
7. **Communication:** Must have a reasonably good communication knowledge both in oral and writing.
8. **Project Management:** Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.
9. **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer based solutions for problems.

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Semester – I (2022-23) NEP Course Outcomes

Subject Code	21BCA1C3LAC
Subject Name	Accountancy

At the end of the course the student should be able to:

- Study and understand Accounting, systems of Book, Branches of accounting advantage and limitations
- Know the concept of accounting, financial accounting process and Journalization
- Maintenance different account book and reconciliations
- Preparations of different bills, and trial balance

Subject Code	21BCA1C3LMF
Subject Name	Mathematical Foundation

At the end of the course the student should be able to:

- Study and solve problems related to connectives, predicates and quantifiers under different situations
- Develop basic knowledge of matrices and to solve equations using Cramer'srule
- Know the concept of Eigen values.
- To develop the knowledge about derivatives and know various applications of differentiation.
- Understand the basic concepts of Mathematical reasoning, set theory.

Subject Code	21BCA1C1L
Subject Name	Programming in C

At the end of the course the student should be able to:

- Read, understand and trace the execution of programs written in C language
- Apply programming control structures for a given problem to create C code
- Understand derived datatypes and develop C code using arrays/ strings
- Understand user defined functions and datatypes to develop C code

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Semester – I (2022-23) NEP Course Outcomes

Subject Code	21BCA1C21.
Subject Name	Fundamentals of Computers

At the end of the course the student should be able to:

- Create an awareness of computers its classification and anatomy
- Understand Number systems , Computer Languages and the steps for problem solving
- Understand the fundamentals of operating systems and basic commands
- Understand basic concepts of DBMS and Internet

Subject Code	21BCA1S1FD
Subject Name	Digital Fluency

After completing this course satisfactorily, a student will be able to:

- • To perform and get knowledge about applications, virtual learning and internet fundamentals.
- • Develop holistically by learning essential skills such as effective communication, problem-solving, design thinking, and teamwork.

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Semester – II (2022-23) Course Outcomes

Course Code	21BCA2C5L
Course Name	Object Oriented Programming with JAVA

At the end of the course, students will be able to:

- Understand the features of Java and the architecture of JVM
- Write, compile, and execute Java programs that may include basic data types and control constructs and how type casting is done.
- Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance
- The students will be able to demonstrate programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language.
- Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files

Course Code	21BCA2C4L
Course Name	Data Structures using C

At the end of the course the student should be able to:

- Understand the classification of data structures and dynamic memory allocation
- Use and implementation of pointers.
- Understand the difference between iteration and recursion and apply recursive definition for problem solving.
- Understand different techniques used for searching and sorting.
- Understand and evaluate the applications of stacks and queues.
- Understand and evaluate the applications of linked lists and tree.

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Semester – II (2022-23) Course Outcomes

Course Code	BSCENGAEC1.2-1
Course Name	Generic English - 1

At the end of the course the student should be able to

- Acquire the LSRW (Listening, Speaking, Reading, and Writing) skills.
- Learn to appreciate literary texts.
- Obtain the knowledge of literary devices and genres.
- Acquire the skills of creativity to express one's experiences.
- Know how to use digital learning tools.
- Be aware of their social responsibilities.
- Develop critical thinking skills.
- Develop gender sensitivity
- Increase reading speed, analytical skills and develop presentation skills.
- Become employable with requisite professional skills, ethics and values

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Semester – III (2022-23) NEP Course Outcomes

Course Code	21BCA3C7L
Course Name	Database Management System

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS
- Demonstrate Data model and Schemas in RDBMS
- Identify entities and relationships and draw ER diagram for a given real-world problem
- Convert an ER diagram to a database schema and deduce it to the desired normal form
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation
- Explain the transaction processing and concurrency control techniques

Course Code	21BCA3C9L
Course Name	Computer Communication and Networks

At the end of the course, students will be able to:

- Explain the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data
- Apply the basics of data communication and various types of computer networks in real world applications
- Compare the different layers of protocols.
- Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.

Course Code	21BCA3C8L
Course Name	C# and .Net Framework

At the end of the course the students will have

- Describe Object Oriented Programming concepts like Inheritance and Polymorphism in C# programming language.
- Interpret and Develop Interfaces for real-time applications.
- Build custom collections and generics in C#.

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Semester – III (2022-23) NEP Course Outcomes

Course Code	21BCA3L61N3
Course Name	Generic English-3

At the end of the course the students will have :

- To enhance LSRW (Listening, Speaking, Reading, Writing) skills
- To develop interpersonal communicative skills
- To augment presentation skills
- To critically analyse, interpret and appreciate literary texts
- To sensitize about social, cultural, religious and ethnic diversities
- To enable employability in emerging sectors such as – content writers, interpreters,
- translators, transcribers
- To facilitate preparation for competitive examinations UPSC / KPSC /IBPS /SSC / RAILWAYS/TOEFL/IELTS and others.

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Course Outcome Semester IV (2022-23)

Course Code	21BCA3C10L
Course Name	Python Programming

At the end of the course, students will be able to:

- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and creation of functions.
- Identify the methods to create and manipulate lists, tuples and dictionaries.
- Discover the commonly used operations involving file handling.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Develop the emerging applications of relevant fields using Python.

Course Code	21BCA3C11L
Course Name	Computer Multimedia & Animation

At the end of the course, students will be able to:

- Write a well-designed, interactive Web site with respect to current standards and practices.
- Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language.
- Determine the appropriate use of interactive versus standalone Web applications.
- Understand how to work with HTML5 SVG components to design UI.
- Apply and implement HTML5 canvas, colors,styles and transitions.

Course Code	21BCA4SE2OST
Course Name	Open Source Tools

At the end of the course, students will be able to :

- Recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves.
- Use appropriate open source tools based on the nature of the problem.
- Write code and compile different open-source software exceptions.

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Course Code	21BCA3C12L

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Course Outcome Semester IV (2022-23)

Course Name	Operating System

At the end of the course, students will be able to :

- Explain the fundamentals of the operating system.
- Comprehend multithreaded programming, process management, process
- Synchronization, memory management and storage management.
- Compare the performance of Scheduling Algorithms
- Identify the features of I/O and File handling methods

Course Code	21BCA4L8EN4
Course Name	Generic English

At the end of the course the students will be able to:

- Acquired creative, interpretative and critical thinking
- Skills to communicate confidently and effectively
- Obtained persuasive and creative social media writing skills
- Developed analytical and evaluative skills
- Learnt to identify and understand social contexts and ethical frameworks in the texts
- Ability to articulate their views with clarity and confidence
- Eligibility to take up jobs such as content writing, journalism and such other jobs with proficiency in English

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Semester – V (2022-23) CBCS Course Outcomes

Course Code	BCADSC 5.1
Course Name	Advanced Java

At the end of the course, students will be able to:

- Design Graphical user interface(GUI) using AWT and Swings
- Develop java programs using event handling.
- Develop programs using JDBC connectivity to access data from database and execute different queries to get required result
- Develop web based programs using Servlet and JSP
- Using Networking Concepts (client/server, socket) in the program

Course Code	BCADSC 5.3
Course Name	Network Security

At the end of the course the student should be able to:

- To understand different forms of cyber attacks.
- To understand basics of Cryptography and Network Security.
- Analyze the security issues in networks and computer systems to secure an IT infrastructure
- Understand IEE 802.11 wireless LAN security standards. To understand various protocols for network security to protect against the threats in the network.
- Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.
- To be able to secure a message over insecure channel by various means.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
- To understand various protocols for network security to protect against the threats in the networks
- Know different IT act, their aim and objectives.

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Semester – V (2022-23) CBCS Course Outcomes

Course Code	BCADSE 5.4
Course Name	Elective 1 a .Net Using C# -

After learning the course students will be able to –

- **Understand** code solutions and compile C# projects within the .NET framework.
- **Design** and **develop** professional console and window based .NET application
- **Demonstrate** knowledge of object-oriented concepts Design user experience and functional requirements C#.NET application.
- **Construct** classes, methods, and assessors, and instantiate objects.
- **Understand** and **implement** string manipulation, events and exception handling within .NET application environment.
- **Create** and **manipulate** GUI components in C#.
- **Design** and **Implement** Windows Applications using Windows Forms. Control Library. Advanced UI Programming & Data Binding concepts
- **Design** and **Implement** database connectivity using ADO.NET in window based application
- **Identify** and resolve problems (debug /trouble shoot) in C#.NET window based application
- **Identify** Industry defined problem and suggesting solution(s) using .NET application.

Subject Code	BCADSC 5.4
Subject Name	Elective 1 b. Android Programming

At the end of course students will be able to

- Installation and Configuration of application development tools, including:
  - Java Software Development Kit (JDK)
  - Android Software Development Kit (SDK)
  - Android Studio
  - Android Virtual Device Manager
  - Android Debug Bridge
  - Android Device Drivers
- Design and develop User Interfaces for the Android platform.
  - Android Applications, Activities and Widgets
  - Customizing Styles and Themes

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Semester – V (2022-23) CBCS Course Outcomes

- Displaying images
- Playing video and audio
- UI Fragments and the Fragment Manager
- Creating custom Surface Views and simple animation
- Responding to touch events
- Supporting different devices, localizations, orientations, API levels, and resolutions.
- XML resources
- Launching Activities and passing information between Activities

- Apply Java programming concepts to Android app development.
  - Extending classes
  - Overriding class methods
  - Adding new properties and methods to classes
  - Creating and implementing interfaces
  - Creating event listeners and responding to events
  - Using Android XML resources in Java code

Course Outcome	
Course Code	BCADSE 5.5
Course Name	Elective 2 a. PHP

At the end of the course, students will be able to:

- To implement PHP script using Decisions and Loops
- To develop PHP applications using Strings, Arrays and Functions.
- To design object-oriented programming (OOP) principles for PHP and use HTML form elements that work with any server-side language.
- To display and insert data using PHP and MySQL

Course Outcome	
Course Code	BCADSE 5.5
Course Name	Elective 2 b. Gaming and Animation

At the end of the course, students will be able to:

- To analyze and evaluate the game mechanics that make a successful level.
- To identify characteristics of successful user interfaces.
- To successfully execute the "Principles of Animation."

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Course Outcome Semester VI CBCS (2022-23)

Course Code	BCADSC 6.1
Course Name	Cyber Security

At the end of the course the student should be able to:

- Understand the cyber security threat landscape
- Develop a deeper understanding and familiarity with various types of cyber attacks, cybercrimes, vulnerabilities and remedies thereto
- Understand existing legal framework and laws on cyber security.
- Understand the importance of personal data its privacy and security
- Understand security aspects of social media platforms and ethical aspects associated with use of social media.

Course Code	BCADSC 6.2
Course Name	Artificial Intelligence

At the end of the course, students will be able to understand:

- The basic concepts and techniques of Artificial Intelligence (AI).
- Intelligent agents and reasoning.
- Heuristic search techniques and knowledge representation
- Reasoning with uncertain knowledge.
- Probabilistic reasoning in AI
- Natural language processing (NLP).

Course Code	BCADSE 6.4
Course Name	Cloud computing

At the end of the course, students will be able to understand:

- Recognize the benefits and features Cloud Computing Technology
- Use of Cloud Computing At Work
- Over viewing Cloud Computing
- Developing Applications and Migrating to the Cloud

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Course Outcome Semester VI CBCS (2022-23)

Course Code	BCADSE 6.5
Course Name	Big Data Analytics

At the end of the course, students will be able to:

- Understand Big Data and its analytics in the real world
- Understand Installation and Integration of "R" and "HADOOP" Technology
- Analyze the Big Data framework like "HADOOP" and "R" to efficiently store and process Big Data to generate analytics
- Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm
- Implement Big Data Activities using Hive
- Understanding Big Data Analysis with Machine Learning Concepts.
- Identify Big Data and its Business Implications.
- List the components of Hadoop and Hadoop Eco-System
- Access and Process Data on Distributed File System
- Manage Job Execution in Hadoop Environment
- Develop Big Data Solutions using Hadoop Eco System
- Apply Machine Learning Techniques using R.
- Understand Map Reduce Jobs
- Provide hands on HADOOP Eco System
- Apply analytics on Structured, Unstructured Data.
- Exposure to Data Analytics with R.

Course Code	BCADSC 6.3
Course Name	SOFTWARE TESTING

At the end of the course the student should be able to:

- To evaluate the work products such as requirements, design, user stories, code and to validate if the software is complete and works as per the expectation of the user and the stakeholders.
- To build confidence in the quality level of the software.
- This course is intended to help you learn how to test software.
- Understand and describe the basic concepts of functional (white box and black box) software testing.
- Identify a number of test styles and techniques and assess their usefulness in your context.
- Understand the basic application of techniques used to identify useful ideas for tests.
- Characterize a good bug report, peer-review the reports of your colleagues, and improve your own report writing.

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Course Outcome Semester VI CBCS (2022-23)

- To learn metrics for managing quality assurance and understand capabilities of test tools. Students understand and identify various software testing problems, and solve these problems by selecting software test models, criteria, strategies, and methods
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report. Students analyze and understand the use of software testing methods and modern software testing tools for their testing projects
- To understand software test automation problems and solutions. Students identify defects and manage those defects for improvement in quality for given Software

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POST GRADUATE DEPARTMENT OF BOTANY

MONTHLY TEACHING PLAN (20[illegible])

NAME OF THE STAFF: Dr. [illegible]

CLASS: IV SEMESTER

THEORY

SYLLABUS ALLOTED	PAPER	UNIT
	4.1 MYCOLOGY AND PLANT PATHOLOGY	UNIT I, II, III and IV
	TOPICS TO BE COVERED IN THE MONTH OF APRIL 2023	
	Introduction to [illegible]	
	Concept of disease, classification of diseases, genetic engineering and plant pathology	
	TOPICS TO BE COVERED IN THE MONTH OF MAY 2023	
	Parasitism and disease development	
	How pathogen affects the plant	
	Plant defence mechanism	
	General [illegible]	
	Environmental factors on infection	
	Disease epidemiology	
	Disease cycle, [illegible] and disease forecasting	
	Environmental factors which cause the plant diseases	
	Etiology of stress diseases	
	Plant disease management	
	Physical methods of plant disease control	
	Chemical methods of plant disease control	
	Plant diseases and [illegible] crop production	
	Effects of changes in agriculture methods	
	Diagnosis of plant disease	
	Stages in the development of disease	
	TOPICS TO BE COVERED IN THE MONTH OF JUNE 2023	
	Measurement of plant disease	
	Fungal genetics: *N. crassa* and *A. nidulans*	
	Fungal genetics: heterokaryosis, [illegible]	
	Fungal [illegible] and [illegible]	
	Introduction to fungi	
	Glossary of Mycological terms	
	Ultra structure of fungal hyphae	
	Fruiting body forms	
	Spore dispersal mechanism	
	Industrial applications of fungi and fungal genetics	
	Fungal spore dispersal and quantification	
	Disease cycle biology	
	Plant disease history	
	Host range	
	TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
	Nutritional deficiencies in plants	
	Conventional methods of disease control	
	Stages of disease: infection development and dispersal	

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P.G Department of Botany
Monthly Teaching Plan (2022-23)

Name of the staff: Santoshkumar [illegible]
Class – III semester

TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2022
THEORY 3.1: UNIT I: Bioenergetics – First and [illegible] energy change and equilibrium constant [illegible] between reduction potential and free energy change [illegible] study of [illegible] and other [illegible] **Practical** [illegible] time and enzyme concentration [illegible] 2. Effect of substrate concentration and pH [illegible] from plant tissue purification by column chromatography [illegible] activity in germinating seeds. 5. Determination of chlorophyll [illegible]
TOPIC TO BE COVERED IN THE MONTH OF SEPTEMBER 2022
THEORY 3.1 UNIT II: Oxidative [illegible] regulation. Electron transfer reaction in mitochondria [illegible] harvesting [illegible] Mechanism [illegible] pathways [illegible] conversion [illegible] C4 pathways and photorespiration. Biosynthesis of sucrose [illegible] **Practical** Crassulacean acid metabolism. 7. Estimation of proline from stressed plants. 9. Effect of light, K, Ca and some inhibitors and against stomatal opening
THEORY 3.1 UNIT III: Lipid metabolism [illegible] oxidation. Biosynthesis and catabolism of storage lipids [illegible] transport – organization of transport in plant [illegible] channels, P type and V type [illegible] membrane transport in guard cells
THEORY 3.1 UNIT IV: Nitrogen metabolism – uptake of nitrate and its reduction, catalytic and genetic regulation of nitrate reduction. Symbiotic nitrogen fixation, mechanism of action of nitrogenase. Plant growth regulators, mechanism [illegible] gibberellins, cytokinins, ethylene, abscisic acid

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Post Graduate Department of Biochemistry

CO's of MSc Biochemistry Course

- By completing their Post-Graduation Studies in Biochemistry, students are expected to have achieved the following knowledges, skills and capabilities.
- This course is a stage to develop active involvement in independent teaching and research through knowledge intensive, innovative thinking, creative problem solving and solution-oriented base.
- Students with intellectually motivating education to acquire systematic understanding of integrated specialties of biological and biochemistry aspects through biochemical reactions.
- The programme provides understanding the biochemical concepts in the field of health and disease, food and natural resources, biotechnology, microbiology, pharmaceuticals, fertilizers, bio-fertilizers environmental sustainability, etc.
- It gives knowledge required to design, execute, and analyse the results of biochemistry experimentation in microorganisms, animal and plant model systems by evaluating and drawing conclusions that are based on qualitative and quantitative data.
- It also brings a comprehensive, detailed understanding of the molecular basis of heredity and heritable traits in families and populations with insight into cellular and molecular mechanisms.
- It is expected that at the time of completion of the programme each student is confident and independent in their thought processes and can make an informed choice about their subsequent career.
- They are expected to be ethically sound and ready for the next phase of their development, skilled in the art of self-reading, oration and scientific writing.
- The program is projected to motivate students for higher education, especially research and provide trained manpower.
- Preparing students to qualify national / state level examinations such as (UGC-CSIR/ /ICAR), SET, GATE, GRE, other competitive, administration, research and teaching career at reputed national and international institutions upbringing the carrier of an individual.

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Post Graduate Department of Biochemistry

PO's of MSc Biochemistry Course

- Students will be offered advanced level theory and practical courses in subjects like General Biochemistry, Biomolecules, Analytical Biochemistry, Enzymes and their biochemical applications, Metabolism and Membrane Biochemistry, Microbiology, Cell signalling, Molecular Biology, Nitrogen metabolism, Recombinant DNA technology and Applications in Biotechnology, Molecular Genetics, Genetic Engineering. The importance is on training students for research.
- Students will be trained effectively in the various basic tools, techniques and instrumentation in specific research frontiers.
- The main objective of the programme is to empower students with clear understanding of the basic concepts of biochemistry and provide them knowledge of the recent advances in life sciences.
- The programme aims to train students to enable them to apply biochemical principles, theoretically and experimentally, to understand various complex life processes, while providing biochemical solutions to combat various human diseases.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2020-2021)

NAME OF THE STAFF: Prof. Mithun R

CLASS: M. Sc. III Semester

Syllabus Alloted	Paper	Unit
	3.3 - Medicinal Botany and Herbal Drug Technology	Unit IV – Herbal drug technology

TOPIC TO BE COVERED IN THE OCTOBER 2020
Herbal drug technology: Identification and authentication of phytoconstituents.
TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2020
Identification and Authentication of Phytoconstituents, Alkaloids, Coumarins, Lignans, Phenols, Terpenes, Sterols.
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2020
Method of isolation and estimation of the following drugs; Method of isolation and estimation of the following drugs: Forskolina from *Coleus forskooli*, L-Dopa from *Mucuna pruriens*, Allicin- *Allium sativa*, Piperine from *Piper nigram*.
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2021
Catechines from *Camellia sinensis* (green tea), Organization and institutes: National Medicinal Plant Board (NMPB), Foundation for Revitalization of Local Health Tradition (FRLHT), National Botanical Research Institute (NBRI).
TOPIC TO BE COVERED IN THE MONTH OF FEBRUARY 2021
Central Institute for Medicinal and Aromatic Plants (CIMAP), AYUSH.

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CLASS: M. Sc. I Semester

	Paper	Unit
Syllabus Allotted	1.1 – Microbial Diversity	UNIT III – Plant Virology.
	1.2 – Biodiversity and Conservation Biology	Unit I – Biodiversity; Unit IV – Biodiversity Management.
	1.4 – Evolutionary Biology and Plant Geography	UNIT IV – Plant distribution and Plant migration.

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2020
1.2 – Unit I – Biodiversity Definition, levels of diversity - genetic, species and ecosystem diversity. Endemism concept, types, endemism in Western Ghats.
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2020
1.1 – Unit III – Plant Virology Origin of viruses, Classification and nomenclature of Viruses with special stress on plant viruses, introduction to molecular virology, Virology on Internet - viral databases and their use for understanding viral phylogeny. 1.2 – Unit I – Biodiversity hotspots - general and with special reference to India, Mega-diversity regions. 1.2 – Unit IV – Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Afforestation.
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2021
1.1 – Unit III – Viral genomics and proteomics; Virus pandemics in recent years -SARS Family viruses, Covid-19 virus- origin, Causes and Response measures, Mechanism of replication of DNA and RNA viruses, Transmission of Viruses. 1.2 – Unit I – Importance of biodiversity, magnitude and distribution of Biodiversity. 1.2 – Unit IV – Green belt, Social forestry, Remote sensing technology.
TOPIC TO BE COVERED IN THE MONTH OF FEBRUARY 2021
1.1 – Unit III – modern techniques to study the viruses, 1.2 – Unit I – Biodiversity documentation assessment Inventory and monitoring, Biodiversity indices, Biodiversity database. 1.4 – Unit IV – Phytogeographical regions of India, Age and area hypothesis- Wills theory, Plant migration and barriers for plant migration.
TOPIC TO BE COVERED IN THE MONTH OF MARCH 2021
1.1 – Unit III – Morphology, chemical composition, ultrastructure. The virus cryptogram, Virus-Vector relationship, Control of Plant Viruses. Present knowledge of Viroid's and prions. 1.2 – Unit I – Biodiversity Management. 1.4 – Unit IV – Plant distribution and Plant migration- Floristic regions of the world, distribution of plants based on altitude and latitude and endemic distribution.

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CLASS: M. Sc. I Semester Practical

Syllabus Alloted	Paper
	Practical 1.5 Based on 1.1 and 1.2

PRACTICAL TO BE COVERED IN THE MONTH OF DECEMBER 2020
1.5 – Based on 1.2 1. Study of Endemic Plants. 2. Study of Medicinal Plants
PRACTICAL TO BE COVERED IN THE MONTH OF JANUARY 2021
1.5 – Based on 1.1 and 1.2 1. Rapid EIA (Environmental Impact Assessment). 2. Remote Sensing application and vegetation mapping. 3. Study of Economic Important Plants. 4. Vegetative organization in Fungi. 5. Asexual and Sexual Reproduction in Fungi.
PRACTICAL TO BE COVERED IN THE MONTH OF FEBRUARY 2021
1.5 – Based on 1.1 and 1.2 1. Different fruiting bodies in Fungi 2. Calculation of Frequency, Density and Abundance of species in population. 3. Calculation of Biodiversity Indices : Shannon and Simpsons indices.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2021-2022)

NAME OF THE STAFF: Prof. Mithun R

CLASS: M. Sc. III Semester

Syllabus Allotted	Paper	Unit
	3.3 - Medicinal Botany and Herbal Drug Technology	Unit IV – Herbal drug technology

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2021
Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses: Solanum trilobatum, Cardiospermum halicacabum, Vitex negundo, Adhatoda vasica, Azadirachta indica, Gloriosa superba, Eclipta alba, Aristolochia indica, Phyllanthus amarus, Boerhaavia diffusa, Curcuma longa, Ocimum sanctum
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2021
Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses: Centella asiatica, Aloe vera, Coleus forskohlii and Costus speciosus
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2022
Method of isolation and estimation of the following drugs: Forskolina from Coleus forskohlii, L-Dopa from Mucuna pruriens, Allicin Allium sativum, Piperine from Piper nigrum, Catechines from Camellia sinensis (Green Tea)

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CLASS: M. Sc. I Semester

	Paper	Unit
Syllabus Allotted	1.1 – Microbial Diversity	UNIT III – Plant Virology. Unit IV – Lichens.
	1.2 – Biodiversity and Conservation Biology	Unit I – Biodiversity;
	1.4 – Evolutionary Biology and Plant Geography	UNIT IV – Plant distribution and Plant migration.

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2021
1.2 – Unit I – Biodiversity: Definition, levels of diversity - genetic, species and ecosystem diversity, Endemism - concept, types, endemism in Western Ghats.
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2021
1.1 – Unit III – Plant Virology: Origin of viruses, Classification and nomenclature of Viruses with special stress on plant viruses, introduction to molecular virology, Virology on Internet - viral databases and their use for understanding viral phylogeny. 1.2 – Unit I – Biodiversity hotspots - general and with special reference to India, Mega-diversity regions. 1.2 – Unit IV – Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Afforestation.
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2022
1.1 – Unit III – Viral genomics and proteomics; Virus pandemics in recent years -SARS Family viruses, Covid-19 virus- origin, Causes and Response measures, Mechanism of replication of DNA and RNA viruses, Transmission of Viruses. 1.2 – Unit I – Importance of biodiversity, magnitude and distribution of Biodiversity. 1.2 – Unit IV – Green belt, social forestry, Remote sensing technology.
TOPIC TO BE COVERED IN THE MONTH OF FEBRUARY 2022
1.1 – Unit III – modern techniques to study the viruses, 1.2 – Unit I – Biodiversity documentation assessment Inventory and monitoring, Biodiversity indices, Biodiversity database. 1.4 – Unit IV – Phytogeographical regions of India, Age and area hypothesis- Wills theory, Plant migration and barriers for plant migration.
TOPIC TO BE COVERED IN THE MONTH OF MARCH 2022
1.1 – Unit III – Morphology, chemical composition, ultrastructure. The virus cryptogram, Virus-Vector relationship, Control of Plant Viruses. Present knowledge of Viroid's and prions. 1.2 – Unit I – Biodiversity Management. 1.4 – Unit IV – Plant distribution and Plant migration- Floristic regions of the world, distribution of plants based on altitude and latitude and endemic distribution.

CLASS: M. Sc. I Semester Practical

Syllabus Allotted	Paper
	Practical 1.5 Based on 1.1 and 1.2

PRACTICAL TO BE COVERED IN THE MONTH OF DECEMBER 2021
1.5 – Based on 1.2 1. Study of Endemic Plants. 2. Study of Medicinal Plants.
PRACTICAL TO BE COVERED IN THE MONTH OF JANUARY 2022
1.5 – Based on 1.1 and 1.2 1. Rapid EIA (Environmental Impact Assessment). 2. Remote Sensing application and vegetation mapping. 3. Study of Economic Important Plants. 4. Vegetative organization in Fungi. 5. Asexual and Sexual Reproduction in Fungi.
PRACTICAL TO BE COVERED IN THE MONTH OF FEBRUARY 2022
1.5 – Based on 1.1 and 1.2 1. Different fruiting bodies in Fungi 2. Calculation of Frequency, Density and Abundance of species in population. 3. Calculation of Biodiversity Indices: Shannon and Simpsons indices.

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CLASS: M. Sc. II Semester

	Paper	Unit
Syllabus Allotted	2.1 – Biochemistry and Biophysics	UNIT I – Physical & chemical properties of biomolecules
	2.2 – Developmental Biology of Plants	Unit I – Differentiation and cell polarity, SAM; Unit II – Development of Flower & RAM;
	2.3 – Genetics and Plant Breeding	UNIT III – Population Genetics

TOPIC TO BE COVERED IN THE MONTH OF APRIL - MAY 2022
2.2 – Unit I – Differentiation and cell polarity: Differentiation and cell polarity in acellular (*Dictyostelium*) unicellular (*Acetabularia*, *Fucus* egg, *Equisetum* spore) systems, 2.3 – UNIT III – Population Genetics Population and gene pools, Allele frequencies and genotype frequencies, Hardy-Weinberg's Law, Factors effecting allelic frequencies in population Mutation, Migration, Non-random mating, selection, genetic drift, genetic equilibrium
TOPIC TO BE COVERED IN THE MONTH OF JUNE 2022
Due to 1st Sem examinations classes were cancelled
TOPIC TO BE COVERED IN THE MONTH OF JULY 2022
2.1 – UNIT I – Physical & chemical properties of biomolecules: Physical and chemical properties of water, nucleotides, nucleic acids structure of nucleotides and poly nucleotides. Chemical and physical properties of nucleic acids. Conformation of nucleic acids (helix (A, B, Z), t-RNA, micro-RNA). Amino acids- peptide bonds, classification and characteristics of amino acids. 2.2 – Unit I – SAM: Shoot apical meristems (SAM)origin structure and function organogenesis formation of auxiliary buds. Cytohistological zonation and biochemical activity in the shoot apex and ultra-structure of meristems, SAM mutant, Phyllotaxis positioning, transition to reproductive phase, vernalization – changes in the biochemical activity. 2.3 – UNIT III – Linkage and crossing over, Cytological and molecular basis of crossing over, Recombination: -homologous and non-homologous, Linkage maps mapping by 2 point and 3-point test cross.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2022
2.1 – UNIT I – Proteins-primary structure, secondary structure-alphahelix and beta sheets, solubility of protein, protein sequencing methods, protein conformation-Fibrous and globular proteins, protein folding, Ramachandran Plot, Hydropathic index, solid phase synthesis of polypeptides, protein denaturation. 2.2 – Unit II – Development of Flower & RAM: Mechanism of leaf primordium initiation and stomata formation, Developmental pattern at the flowering apex, ABC model, specification floral organs, molecular aspects of MADS box genes during flower development. Cellular differences in between floral organs. senescence a general account, root hair Formation, structure and function of root apical meristem (RAM) quiescent centre, origin of lateral roots, genetics of root development.

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CLASS: M. Sc. II Semester Practical

Syllabus Allotted	Paper	
	2.5 Practical Based on 2.1	2.6 -Practical- IV Based on 2.2

PRACTICAL TO BE COVERED IN THE MONTH OF MAY 2022
2.5 Practical Based on 2.1 • Extraction of chloroplast pigments and demonstration of their absorption spectra. • Extraction of Chlorophyll pigment by paper chromatography • UV and Visible spectra of biomolecules. • Fractionation of proteins by gel filtration. 2.6 -Practical- IV Based on 2.2 • Microtome sectioning and histochemical stains • Invitro pollen germination to find out the percentage of viability and also the effect of volatile substances on germination and tube growth use different methods of culture (hanging, sitting suspension, surface).
PRACTICAL TO BE COVERED IN THE MONTH OF JULY 2022
2.6 -Practical- IV Based on 2.2 • Multiple staining for localizing pollen tubes in the pistil. • Study of different types of endosperms, isolation of different embryonic stages.
PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2022
2.5 Practical Based on 2.1 • Estimation of protein by Lowry's method. • Estimation of phospholipids.

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DEPARTMENT OF BOTANY

MONTHLY TEACHING PLANNING (2021-2022)

NAME OF THE STAFF: Prof. Mithun R

CLASS: M. Sc. IV Semester

Syllabus Alloted	Paper	Unit
	4.3 – Plant Biotechnology	Unit III – Biofuels and Introduction to Plant biotechnology

TOPIC TO BE COVERED IN THE APRIL 2021 - ONLINE
Unit III: Biofuels. Introduction.
TOPIC TO BE COVERED IN THE MONTH OF MAY 2021 - ONLINE
Unit III: Production of biogas, Structure of biogas plant, Biochemistry of methane production.
TOPIC TO BE COVERED IN THE MONTH OF JUNE 2021 - ONLINE
Unit III: Biogas research in India, Uses of biogas. Plant Biotechnology Introduction, Somatic hybrids and cybrids.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2021 - ONLINE
Unit III: Cytoplasmic gene transfer, gene transfer.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2021 - OFFLINE
Unit III: Gene transfer – Advantage and Limitations.

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CLASS: M. Sc. II Semester

Syllabus Allotted	Paper	Unit
	2.3 – Genetics and Plant Breeding	UNIT I – Transmission Genetics.
		UNIT II – Population Genetics.
		UNIT IV – Plant Breeding.

TOPIC TO BE COVERED IN THE APRIL 2021 - ONLINE
Unit I: Introduction to Genetics.
TOPIC TO BE COVERED IN THE MONTH OF MAY 2021 - ONLINE
Unit I: Transmission Genetics: An over view of Mendelian Genetics, extension of Mendelian's principles-Quantitative inheritance, multiple alleles, lethal allele. Extra nuclear inheritance: Inheritance of mitochondrial and chloroplast genes, male sterility in plant.
TOPIC TO BE COVERED IN THE MONTH OF JUNE 2021 - ONLINE
Unit I: Sex determination: Role of chromosomes and hormones in sex determination, molecular basis of sex determination and dosage compensation in man and Drosophila, Genetic disorders in man and their managements, Genetic testing and counselling, sex determination in plants.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2021 - ONLINE
Unit II: Population Genetics: Population and gene pools, Allele frequencies and genotype frequencies, Hardy-Weinberg's Law, Factors effecting allelic frequencies in population-Mutation, Migration, Non-random mating, selection, genetic drift, genetic equilibrium. Linkage and crossing over, Cytological and molecular basis of crossing over, Recombination: -homologous and non-homologous, Linkage maps mapping by 2 point and 3-point test cross.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2021 - OFFLINE
Unit IV: Plant Breeding: Mode of reproduction, methods of hybridization in self- and cross-pollinated plants, Plant Introduction, Domestication and acclimatization, patterns of evolution in crop plants. Heterosis-genetic basis of heterosis. Breeding plants for resistance to abiotic and biotic stresses. Marker Assisted Selection (MAS) in plant breeding.

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CLASS: M. Sc. IV Semester Practical

Syllabus Alloted	Paper
	Practical 4.5 Based on 4.1

PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2021 - OFFLINE
I. Pathology:- 1. Citrus Canker Disease. 2. Tobacco Mosaic Disease. 3. Bean Mosaic Disease. 4. Smut Disease of Wheat. 5. Smut Disease of Sorghum. 6. Downy Mildew Disease of Grapes. 7. Rust Disease of Coffee. 8. Tikka Disease of Groundnut. 9. Stem Rust Disease of Wheat. 10. Rust Disease of Sorghum. **II. Mycology:-** 1. Vegetative Organisation in Fungi. 2. Sexual Reproduction in Fungi. 3. Asexual Reproduction in Fungi. 4. Estimation of spore production of fungal pathogens of leaves using Haemocytometer method. 5. Rhziosphere, Rhzioplane, phylloplane studies of fungi.

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M.Sc I SEMESTER
Subject BOTANY

COURSE NUMBER: 1.1
COURSE NAME: MICROBIAL DIVERSITY.

CO:- Course Outcome

UNIT: 01

CO: 01 - Diversity in structure and organization of prokaryotic cyanobacteria, Bacteria, Chlamydiae, Actinomycetes, Archaebacteria, mycoplasmas and cyanobacteria.

CO: 02- Metabolic diversity in relation to phototrophic, chemoautotrophic, symbiotic, saprophytic and parasitic mode of life.

CO: 03- Diversity in relation to photosynthetic pigments and [illegible]

CO: 04- Diversity in carbon utilization by microorganisms, microbial diversity in degradation of natural substances such as cellulose, xylan, starch and other glucans, proteins, pectin, chitin, lignin, methane, aromatic hydrocarbons etc. and their ecological significance.

UNIT:02

CO: 01- Methods of studying microbial biodiversity, various culture methods bias in culturable bacteria.

CO:02-Isolation strategies recovering microbial biodiversity using environmental [illegible] and environmental genomics, screening environmental libraries preservation of microbial [illegible] polyphasic taxonomy of microorganisms.

UNIT:03

CO: 01- Toxin producing microorganisms and cyanobacterial blooms-their ecological significance.

CO: 02- Viruses, Viroids and Prions bacterial animal and plant viruses their diversity, structure and organization.

CO:03- Genetic diversity, vertical and horizontal gene transfer in microbial diversity, [illegible] and speciation.

UNIT:04

CO: 01- Structural diversity distribution and the ecological significance of lichens.

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CO: 02 - Fungal biodiversity- taxonomic diversity, general structural features of [illegible] classification

MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.1
COURSE NAME: MICROBIAL DIVERSITY.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand the different types and forms of bacteria

PSO: 02- Understand the different types in metabolism in microbes and their nutritional requirements

PSO: 03- Understand how microbes use photosynthetic pigments for energy conservation

PSO:04- Understand the carbon utilization and process of degradation of Carbohydrates in Microbes

PSO: 05- Understand different methods of microbe culture and culturing

PSO: 06- Understand the genomics and polyphasic taxonomy of microorganisms

PSO: 07- Understand cyanobacterial blooms and its toxins in detail

PSO: 08- Understand the viroid, prions, and details of fungus

PSO: 09- Understand the fungal taxonomy and lichens in detail

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MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.2
COURSE NAME: Biodiversity and Conservation Biology

CO: - Course Outcome

UNIT: 01

CO: 01- Biodiversity: Definition, levels of diversity - genetic, species and ecosystem diversity

CO:02 –Endemism concept, types, endemism in Western Ghats

CO: 03- Biodiversity hotspots - general and with special reference to India; Mega-diversity regions.

UNIT:02

CO: 01- Threats to biodiversity, IUCN threatened plant categories

CO: 02 - Methods of conservation: *In-situ* methods - National parks, Biosphere reserves, sacred grooves. *Ex-situ* methods: Botanical gardens, germplasm collection seed bank, pollen bank.

UNIT: 03

CO: 01 - Environmental movements: Global and regional.

CO: 02- Environmental Laws: Forest Conservation Act, Biodiversity bill (2002); Community Biodiversity Register (PBR); Convention on International Trade in Endangered Species (CITES), Ramsar Convention, Intellectual Property Rights (IPR).

UNIT: 04

CO: 01 - Biodiversity Management: Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Afforestation, Green belt, Social forestry, Agroforestry.

CO: 02- Remote sensing and biodiversity management.

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MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.2
COURSE NAME: Biodiversity and Conservation Biology

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01 Understand the different types of biodiversity and ecosystem

PSO: 02 – Understand the concept of biodiversity hotspot and mega diversity

PSO: 03- Understand the threatened categories of IUCN and different techniques of conservation

PSO: 04- Understand the Environmental Laws, concept of Ramsar site

PSO: 05- Understand the techniques for biodiversity management along with [illegible]

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MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.3
COURSE NAME: Systematic Botary of Angiosperms

CO: - Course Outcome

UNIT: 01

CO:01- Brief history and development of plant classification, sexual system of Linnaeus, Artificial system, Natural system and phylogenetic systems.

CO: 02- Detailed study of Bentham& Hooker's system, Outlines of Hutchinson, Cronquist and APG systems.

UNIT: 02

CO: 01- Botanical Nomenclature: Need for scientific names, history of botanical nomenclature

CO: 02 - Principles of ICBN, typification, rule of priority, ranks of taxa and nomenclature of taxa, effective and valid publication, citation, retention, choice and rejection of names and epithets.

CO: 03- Conservation of names, names of hybrids, names of cultivated plants.

UNIT: 03

CO: 01- Botanical Survey of India - organization and contributions of BSI

CO: 02- Herbarium methodology, significance of herbaria, floras

CO: 03- Taxonomic evidence: Chemotaxonomy, Cytotaxonomy, Embryology as taxonomic evidence. Brief account of numerical taxonomy.

UNIT: 04

CO: 01- Study of thesome families with economic important, systematics and phylogeny.

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MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.3
COURSE NAME: Systematic Botany of Angiosperms

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand the history of classification given by various scientist.

PSO: 02 - Understand the details of API system of classification.

PSO: 03- Understand the process of nomenclature, ranks, taxa, valid publication etc

PSO: 04 --Understand the work and Botanical survey of India (BSI)

PSO: 05- Understand the importance and methodology of Herbarium

PSO: 06- Understand the different techniques used in identification of plants

PSO: 07- Understand the classification, phylogeny and key characters of prescribed families

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MSc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.4
COURSE NAME: Evolutionary Biology and Plant Geography

CO: - Course Outcome

UNIT: 01

COP: 01- A biogenesis, Hypothesis of panspermia. Theory of Chemical of evolution,

COP: 02- Origin of life at molecular level process- structure of Coronary primitive earth, prebiotic synthesis, origin and evolution of RNA world, Ribonucleoprotein, adaptive radiation in progenote.

COP: 03- Evolution of Eukaryotes – Endosymbiotic hypothesis, theories of evolution- Lamarckism Neolamarkism, Darwinism, Neo-Darwinism, Germplasm theory, Mutatiuon theory and Synthetic theory.

UNIT: 02

COP: 01- Madeline population, gene pool, gene frequency, genetic drift, founder effect, genetic polymorphism, Hardy Weinberg's Law, Genetics equilibrium and mechanism of speciation.

COP: 02- Patterns of evolution in plants- Evolution of vegetative, reproductive structure in Algae, Fungi, Bryophytes, Pteridophytes and spermatophytes (Evolution of sporophytes in Bryophytes).

COP: 03- Steelar evolution in Pteridophytes, Heterospory and seed habit. Fossil forms- *Lepidodendron, Lepidocarpon, Stigmaria*

UNIT: 03

COP: 01- Origin of islands and Continents- Pangea, Panthalasa, Laurasia, Gondwana land. Plant tectonics and Continental drifts.

COP: 02- Center of origin of cultivated plants. Vavilo centers and Zhukosky centers with plants in each region.

UNIT: 04

COP: 01- Floristic regions of the world. Phytogeographical regions of India.

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MSc I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.4
COURSE NAME: Evolutionary Biology and Plant Geography

CO: - Course Outcome

UNIT: 01

COP: 01- Abiogenesis, Hypothesis of panspermia. Theory of Chemical of evolution.

COP: 02- Origin of life at molecular level process- structure of cosmos primitive earth, prebiotic synthesis, origin and evolution of RNA world, photosynthesis, adaptation, progenote

COP: 03- Evolution of Eukaryotes – Endosymbiotic hypothesis, theories of evolution- Lamarckism Neolamarkism, Darwinism, Neo-Darwinism, Germplasm theory, Mutation theory and Synthetic theory.

UNIT: 02

COP: 01- Madeline population, gene pool, gene frequency, genetic drift, founder effect, genetic polymorphism, Hardy Weinberg's Law, Genetics equilibrium and mechanism of speciation.

COP: 02 Patterns of evolution in plants- Evolution of vegetative, reproductive structure in Algae, Fungi, Bryophytes, Pteridophytes and spermatophytes (Evolution of sporophyte in Bryophytes).

COP: 03- Steelar evolution in Pteridophytes, Heterospory and seed habit. Fossil forms- *Lepidodendron, Lepidocarpon, Stigmaria*

UNIT: 03

COP: 01- Origin of islands and Continents- Pangea, Panthalassa, Tatrsia, Gondwana land, Plant tectonics and Continental drifts.

COP: 02- Center of origin of cultivated plants, Vavilo centers and Zhukosky centers with plants in each region

UNIT: 04

COP: 01- Floristic regions of the world. Phytogeographical regions of India.

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COP: 02- Hansen's classifications, distribution of plants based on altitude and latitude, endism, tricontisin and endemic distribution

COP: 03 Age and area hypothesis- Wills theory. Plant migration and Barriers for plant migration

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M.Sc-I SEMESTER
Subject-BOTANY

COURSE NUMBER: 1.4
COURSE NAME: Evolutionary Biology and Plant Biogeography

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand how life originate on earth by learning different theories

PSO: 02- Understand the molecular theory of life, Darwin's theory

PSO: 03- Understand the evolution of reproductive systems in lower plant groups.

PSO: 04- Understand the Hardy Weinberg's equilibrium, founder effects.

PSO: 05- Understand the steelar evolution in pteridophytes

PSO: 06- Understand the formation of Continents and types of islands.

PSO: 07- Understand the origin of cultivated plants of the world

PSO: 08- Understand the plant migration, distribution, phytogeographical regions of India and world.

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MSc II SEMESTER
Subject BOTANY

COURSE NUMBER: 2.1
COURSE NAME: BIOCHEMISTRY AND BIOPHYSICS

CO:- Course Outcome

UNIT: 01

CO: 01 - Physical and chemical properties, structure of water, nucleic acids, nucleotides, and poly nucleotides.

CO: 02 - Amino acids: General Properties, peptide bonds, classification and characteristics of amino acids.

CO: 03 - Proteins: primary structure, solubility of protein, protein sequencing, protein conformation, protein folding alpha helix and beta sheets, Ramachandra Plot, Hydropathy index, solid phase synthesis of polypeptides and protein denaturation.

UNIT: 02

CO: 01 - Carbohydrates: A brief account of monosaccharides and disaccharides, structure of starch, cellulose, pectin and chitin.

CO: 02 – Lipids: classification, chemical and physical structure and properties of saturated and unsaturated fatty acids.

CO: 03 - Enzymes- nature and classification of enzymes, enzyme specificity, reaction rates and activation energy, enzyme kinetics. Michaelis-Menten equation, Line weavers Burk plot. Kinetics of bisubstrate reactions. Kinetic tests for determining inhibition mechanisms.

UNIT: 03.

CO: 01 - Atoms, bonds and molecules. Basic principles of diffusion, osmosis and viscosity and their application in biology.

CO: 02 - Electromagnetic radiation: Electromagnetic spectrum and light scattering absorption and emission of electromagnetic radiations by biomolecules.

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CO: 03 - Fluorescence and phosphorescence - theory of fluorescence, instrumentation, polarization and anisotropy of fluorescence. Fluorescence spectroscopy applied to proteins, nucleic acids and membranes.

UNIT:04-

CO: 04 - Nuclear Magnetic Resonance: The phenomenon of energy absorption and relaxation, chemical shifts.

Instrumental techniques - Proton NMR, C-13 NMR, P-31 NMR, two dimensional NMR-FINMR, solid state NMR, Magnetic resonance imaging. Applications of NMR in the study of proteins, Nucleic acids membranes and metabolites.

CO:02 - Mass spectrometry - basic theory and instrumentation, general modes of fragmentation, Gas chromatography and Mass Spectroscopy (GC-MS), FTIR spectroscopy and its applications in biology and medicine.

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MSc-II SEMESTER
Subject BOTANY

COURSE NUMBER: 2.1
COURSE NAME: BIOCHEMISTRY AND BIOPHYSICS

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01 - Understand the definition, Physical and Chemical properties structure of nucleic acid, nucleotide, polynucleotides and amino acid

PSO:02 -Understand the different structure and conformation of proteins

PSO:03 -Understand the definition, physical and chemical properties, structure and classification of carbohydrates, lipids and enzyme

PSO:04 - Understand the enzyme specificity, reaction rates and activation energy, Michaelis Menten Equation and Kinetic test for determining inhibition mechanisms

PSO:05 - Understand the Basic account, isotopes, bonds and molecules

PSO:06 – Understand the Basic principles and applications of Diffusion, Donnan membrane equilibrium

PSO:07- Understand the Basic principle, Theory, Instrumentation and Application of Electromagnetic radiation, Fluorescence, phosphorescence, NMR, Magnetic Resonance, Mass spectrometry, Gas Chromatography and Mass Spectroscopy (GC-MS), Types of LASERS

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MSc-II SEMESTER
Subject-BOTANY

COURSE NUMBER:2.2
COURSE NAME:Developmental Biology of Plants.

CO: Course Outcome

UNIT:01 -

CO.01 - Differentiation and cell polarity in acetabularia [illegible] unicellular [illegible] fucus egg, equisetum spores and multicellular root hair and [illegible] formation [illegible]

CO:02 - Shoot apical meristems (SAM) origin [illegible] organogenesis [illegible] of axillary buds. Cytohistological zonation and biochemical activity in the shoot apex and ultra structure of meristems, shoot apical meristem organization, SAM mutants, mechanism of leaf primordium initiation.

CO:03 -Phyllotaxy and Vernalization: Phyllotaxy [illegible] transition to reproductive [illegible] vernalization – changes in the biochemical activity.

UNIT:02 -

CO: 01- ABC model, specification floral organs, molecular aspects of MADS box [illegible] flower development. Cellular differences
in between floral organs.

CO: 02 - Senescence – a general account

CO: 03 - Root Apical Meristem (RAM) structure and function of RAM quiescent centre, origin of lateral roots, genetics of root
development.

UNIT:03

CO: 01- Androgenesis: Histochemical , ultra structural, genetical and functional aspects, concept and significance of male germ unit.

CO: 02 - Gynogenesis: Histochemical, ultra structural, genetical and functional aspects, concept and significance of female germ unit.

CO: 03 - Pollination and fertilization: structural and functional aspects of pollen, stigma and styles in the current aspects of fertilization.

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CO: 01 - Embryogenesis - Cellular and biochemical aspects of embryogenesis and formation of endosperm in relation to embryo development. Regulation of gene activity during early embryogenesis, embryo suspensor- composition and function.

CO: 02 - Seed development and germination. Physiology and biochemistry expression of genes during seed germination.
Seed dormancy and role of hormones, Photomorphogenesis, photoreceptors, structure and function.

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MSc II SEMESTER
Subject-BOTANY

COURSE NUMBER:2.2
COURSE NAME:Developmental Biology of Plants.

PROGRAMME SPECIFIC OUTCOME (PSO)
PSO: 01 – Understand the Differentiation and cell polarity in the Unicellular and multicellular systems.
PSO: 02 – Understand the origin, structure and function Cytohistological zonation and biochemical activity of SAM and RAM

PSO: 03 – Understand the concept of Phyllotaxy and Vernalization

PSO: 04 – Understand the concept in detail on development of gametophytes

PSO: 05 – Understand in detail the Androecieum, Gynoecieum, Male sterility, Pollination and fertilization, Embryogenesis, Photomorphogenesis, Seed development and germination

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MSc II SEMESTER
Subject-BOTANY

COURSE NUMBER:2.3
COURSE NAME:Genetics and Plant Breeding

CO:- Course Outcome

UNIT:01

CO: 01 - Transmission Genetics: An overview of Meisle'ian Genetics, extension of Mendelian's principles: Quantitative inheritance, multiple alleles, lethal allele

CO: 02 -Extra nuclear inheritance: Inheritance of mitochondrial and chloroplast genes, male sterility in plant.

CO: 03 - Sex determination: Role of chromosomes and hormones in sex determination, molecular basis of sex determination and dosage compensation in man and Drosophila

CO: 04 - Genetic disorders in man and their management, genetic testing and genetic counselling, sex determination in plants.

UNIT:02

CO:05 - Population Genetics: Population and gene pools, Hardy-Weinberg's Law, Factors effecting allelic frequencies in population- Mutation, Migration, Nonrandom mating, selection, genetic drift, genetic equilibrium

CO: 06 - Linkage and crossing over: Cytological and molecular basis of crossing over, recombination and gene mapping.

UNIT:03

CO: 07 - DNA as genetic material, Gene concept, Mechanism of DNA replication in prokaryotes and eukaryotes, Enzymes in DNA replication

CO: 08 - RNA: Types and role of RNA

CO: 09 - Genetic code-Contribution of Nirenberg and Khorana

CO: 10 - TransPSOable genetic elements: AC-DS elements in Maize, mechanism of transPSOitions, Human genome project.

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UNIT:04

CO: 11 - Plant Breeding: Mode of reproduction, methods of hybridization in self and cross pollinated plants, Plant Introduction, Domestication and acclimatization, pattern of evolution in crop plants.

CO: 12 - Heterosis-genetic basis of heterosis and Breeding plants for resistance to abiotic and biotic stresses.

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MSc-II SEMESTER
Subject-BOTANY

COURSE NUMBER: 2.3
COURSE NAME: Genetics and Plant Breeding

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand in detail the concept of Mendelian genetics including extra chromosomal inheritance

PSO: 02 – Understand in detail the concept of sex determination and genetic disorders

PSO: 03 - Understand the concept of population genetics, DNA as genetic material, Genetic code, Transposable genetic elements

PSO: 04 – Understand the concept of Plant Breeding and Heterosis

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MSc-II SEMESTER
Subject-BOTANY

COURSE NUMBER: 2.4
COURSE NAME: OEC – Personality Development

CO: Course Outcome

UNIT:01
CO: 01- Self Analysis: SWOT Analysis, Johari Window, Importance of Self Awareness, Self Esteem, Creativity

UNIT: 02
CO: 02 - Attitude: Factors Influencing Attitude, Challenges and Lessons from Attitude, Etiquettes.

UNIT: 03
CO: 03-Time Management: Value of Time, Priority Work, Time Wasters, Techniques of Time Mangement.

UNIT: 04
CO: 04 - Stress Management: Causes of Stress and its Impact, Techniques of Stress Management, Circle of Control, Stress Busters.

UNIT: 05
CO: 05 – Conflict Resolution and Decision Making: Importance and Necessity of Decision Making, Process and Practical Way of Decision Making, Problem Solving, Conflicts in Human Relations, Approach to Conflict Resolution.

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MSc-II SEMESTER
Subject BOTANY

COURSE NUMBER: 2.4
COURSE NAME: OEC – Personality Development

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01 – Understand in detail the concept of Self Analysis, self-esteem, self-confidence and creativity.

PSO: 02- Understand the concept of attitude, examples and characteristics.

PSO: 03- Understand the importance of time, time management, how to prioritize work.

PSO: 04- Understand how to control stress, what causes stress and about stress triggers.

PSO: 05- Understand the how to solve conflicts, importance of decision making and its importance.

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.1
COURSE NAME: –Plant Physiology

CO: Course Outcome

Unit: 01
CO: 01- Bioenergetics - First and second law of thermodynamics. Enthalpy, entropy, free energy change and equilibrium constant.

CO: 02 Reduction potential. Relation between reduction potential and free energy change. Hexose catabolism – Study of Glycolysis and citric acid cycle.

Unit: 02
CO: 01- Light absorption by chloroplast pigments. Light harvesting complexes. Macromolecular organization of chloroplast membranes.

CO: 02- Carbohydrate biosynthesis and inter conversions. Photosynthetic carbon reduction cycle and its regulation. C4 pathways and photorespiration.

CO: 03- Biosynthesis of sucrose, starch and cellulose.

Unit: 03
CO: 01- Lipid metabolism – fatty acid biosynthesis and oxidation.

CO: 02- Biosynthesis and catabolism of storage lipids. Biosynthesis and functions of membrane lipids.

CO: 03- Membrane transport – organization of transport at plasma membrane and Tonoplastpumps, carriers and ion channels.

CO: 04- P-type and V- type, ATPases, ABC transporters. Regulation of membrane transport in guard cells.

UNIT: 04

CO: 01- Nitrogen metabolism – uptake of nitrate and its reduction; catalytic and genetic regulation of nitrate reductase. Symbiotic nitrogen fixation, mechanism of action of nitrogenase.

CO: 02- Plant growth regulators, mechanism of action of auxins, gibberlins, cytokinins, ethylene, abscisic acid.

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.1
COURSE NAME: Plant Physiology

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01-Understand the basics of Thermodynamics

PSO: 02- Understand the steps in glycolysis and Kreb's cycle

PSO: 03- Understand the details of photosynthesis, Carbohydrate biosynthesis and their conversions

PSO: 04- Understand the details of Biosynthesis of amino acids, nucleic acid and cellulose

PSO: 05- Understand the details of Lipid metabolism

PSO: 06- Understand Membrane transport and Hormone mechanism

PSO: 07- Understand the details Plant growth regulators

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.2
COURSE NAME: –Cell and Molecular biology

CO: Course Outcome

Unit: 01

CO: 01- Microscopy: Concepts and applications of light, Phase contrast, Fluorescent and Electron microscopy. Autoradiography,Cell fractionation and Centrifugation techniques

CO: 02- Organization of chromatin, Organization of Chromatin

CO: 03- Central dogma of molecular biology, Fine structure of gene.

Unit: 02

CO: 01- Cell cycle- Regulation of CDK-cyclin activities, cellular check points

CO: 02- DNA damage and mechanism that prevent DNA Damage

CO: 03- Molecular basis of mutations and their role in evolution and cancer development

Unit: 03

CO: 01 - Transposable elements, transposable elements in man. Applications of transposons in research and health care system.

Unit: 04

CO: 01- Mechanism of transcription, Post transcriptional modifications

CO: 02- Mechanism of translation

CO: 03- Post translational modifications of proteins

CO: 04- Gene regulation in prokaryotes and eukaryotes

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.2
COURSE NAME: Cell and Molecular biology

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand the details of microscopy and different types of microscopes.

PSO: 02- Understand the concept of Chromatin structure and structural abnormalities in DNA.

PSO: 03- Understand the meaning and concept of Central dogma of molecular biology.

PSO: 04- Understand the different types of genes.

PSO: 05- Understand the importance and details of Mutations, mutagens.

PSO: 06 – Understand the cell cycle regulations and DNA damage and repair mechanisms.

PSO: 07- Understand the concept of Transposable elements, its importance in health care.

PSO: 08- Understand the process of Transcription and Translation in detail.

PSO: 09- Understand the modifications after translation in proteins.

PSO: 10- Understand the concept of LAC operon and Tryptophan operon.

PSO: 11- Understand the mechanism of Gene regulation in Eukaryotes.

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.3
COURSE NAME: -Medicinal plants and Herbal drug technology

CO: Course Outcome

Unit: 01
CO: 01- History, and importance of medicinal plants and a brief account of Ayurveda, Siddha and Unani

Unit: 02
CO: 01- Plant identification, authentication and herbarium of recognized herbaria

CO: 02- Ethnic communities of India. Ethnobotany and folk medicine. Applications of ethnobotany.

CO: 03- Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses

Unit: 03
CO: 01- Database of medicinal plants, Methods of preparation of herbal extracts and phytochemical analysis

CO: 02- Antibacterial and antifungal activity assay of herbal extracts. Medicinal plants and plant products used in the treatment of Jaundice, various problems of fertility, cancer and diabetes

CO: 03- Conservation of medicinal plants: In situ and Ex situ. IPR and Patenting threatened medicinal plants.

Unit: 04

CO: 01- Identification and authentication of phytoconstituents: Alkaloids, Coumarins, Lignans, phenols, terpenes, steroids

CO: 02- Method of isolation and estimation of the drugs in medicinal plants

CO: 03- Organization and institutes: national medicinal plant board (NMPB) foundation for revitalization of local health tradition (FLHT) national botanical research institute (NBRI) central institute for medicinal and aromatic plants (CIMAP) AYUSH

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MSc-III SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.3
COURSE NAME: Medicinal plants and Herbal drug technology.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand the history of medicinal plants and study the details of different types of medicinal systems practiced in India.

PSO: 02- Understand the method of identification of medicinal plants and Herbal drug methodology.

PSO: 03- Understand the classification, key characters, medicinal uses and method of propagation in some selected medicinal plants.

PSO: 04- Understand the concept of Ethnobotany and folk medicine and ethnic communities in India.

PSO: 05- Understand preparation of herbal extracts and phytochemical analysis. Anti Antibacterial and antifungal activity assay of herbal extracts.

PSO: 06- Understand Medicinal plants and plant products used in the treatment of various diseases.

PSO: 07- Understand Conservation of medicinal plants, IPR and concept of Patenting.

PSO: 08- Understand identification and authentication of phytoconstituents and Methods of isolation and estimation of the drugs.

PSO: 09- Understand different Organization and institutes in India with respect to identification, authentication of Medicinal plants.

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MSc-II SEMESTER
Subject-BOTANY

COURSE NUMBER: 3.4
COURSE NAME: -.OEC Enviroamental Chemistry

CO: Course Outcome

Unit-01
CO: 01- Earths evolution, details of Air pollution, prevention and causes, ozone depletion particulates in air.

CO: 02- Sources of SO and NO, methods of sensing, their impact of air pollution.

Unit: 02
CO: 01- Details of Hydrological cycle, chemistry of sea water, physico-chemical properties of water, norms of safe drinking water.

CO: 02- Treatment of water, various techniques and methods.

Unit: 03
CO: 01- Importance and estimation of DO, BOD, COD. Demineralization of water reverse osmosis.

CO: 02- Details of Radioactive waste management, its effects of ecosystem.

CO: 03- A detail account on the accident of Chernobyl, radioactive waste disposa

Unit: 04
CO: 01- Toxic chemicals in the environment, its effects on enzymes, effect of detergents on pollution.

CO: 02- Details of eutrophication, pollution caused by pesticides, heavy mental pollution, sewage and industrial effluent treatment.

CO: 03- Composition of soil, details of micro-macro nutrients of soil, sulphur cycle. Different types of soil polluting agents and preventation.

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MSc-III SEMESTER
Subject BOTANY

COURSE NUMBER: 3.4
COURSE NAME: OEC, Environmental Chemistry

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO: 01- Understand the details of air pollution, its causes, precipitation methods and hazards.

PSO: 02- Understand the details of hydrological cycle, sea water chemistry and physico-chemical parameters of water.

PSO: 03- Understand the importance of reverse osmosis and methods to treat water.

PSO: 04- Understand the importance of DO, BOD, COD.

PSO: 05- Understand the concept of Radioactive waste management, its effects on the environment.

PSO: 06-Understand in details of Chernobyl disaster as a case study in radioactive accidents.

PSO: 07- Understand Eutrophication, its causes and effects.

PSO: 08- Understand the effect of Detergents, pesticides on the environment, its causes and preventation.

PSO: 09- Understand Soil pollution, its causes, prevention.

PSO: 10- Understand the Micro-macro nutrients of soil and Nitrogen and sulphur cycles.

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MSc-IV SEMESTER
Subject-BOTANY

COURSE NUMBER. 4.1
COURSE NAME: MYCOLOGY AND PLANT PATHOLOGY

CO: Course out come

UNIT:01

CO: 01-Biologicalfeatures of fungi: Structure, mobility, life cycle pattern in fungi, vegetative structures and growth of fungal reproductive structures.

CO: 02-Growth forms: hyphal growth, mycelial habit and thallus, cultural, colony formation, fungal dimorphism, hyphal fusions, growth dynamics, non mycelial forms.

CO:03-Reproduction: Asexual and sexual, mating systems, physiological control of sexual reproduction, fruit body forms, morphogenesis and significance.

CO: 04- Dispersal mechanisms: Quantification of spores and their release.

UNIT:02

CO: 01-Nutrition: Carbon, Nitrogen, Mineral, Vitamin and growth regulators.

CO: 02-Metabolism and Biosynthesis: Carbohydrates (including chitin, non-carbohydrate (organic acids and lipids) and nitrogen (including lysine, amino acids, nucleic acids and proteins) secondary metabolites and their role.

CO: 03- Fungal genetics: Fungi as organism for genetic study, genetic markers, isolation and selection of mutants, tetrad analysis. Industrial application of fungal genetics and strain improvements. Somatic incompatibility – Systems in Ascomycetes and Basidiomycetes in culture and in nature, parasexuality.

UNIT:03

CO: 01-Introduction and history of plant pathology: Plant disease caused by fungi, bacteria, virus and nematodes, the concept of disease in plants, Classifications of plant diseases.

CO: 02-Plant diseases and world crop production: effects of changes in agricultural methods and in human society on the development and spread of plant diseases. Diagnosis of plant disease.

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CO: 03-Parasitism and disease development. Chemical responses to pathogen infection. Microbial toxins on plant diseases. Growth regulators in plant diseases

UNIT:04

CO: 01-Plant defence mechanisms: Structural metabolic preexisting biochemical mechanisms

CO: 02-Environmental effects on infections. Effect of temperature, soil pH, moisture, wind, light, Host – plant nutrition. Herbicides and pesticides

CO: 03-Plant disease epidemiology:. Measurement of plant disease, pattern. Comparison. Development. modelling computer simulation. forecasting of plant disease endemics

CO: 04-Management and control of plant diseases. Control methods that eradicate or prevent inoculums. Cultural methods and Biological methods

CO: 05-Environmental factors that cause plant disease. General Chrematistics. Diagnosis and control

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MSc-IV SEMESTER
Subject-BOTANY

COURSE NUMBER: 4.1
COURSE NAME: MYCOLOGY AND PLANT PATHOLOGY

PROGRAMME SPECIFIC OUT COME (PSO)

PSO: -01 Understand the vegetative and reproductive ultra-structures of Fungi.

PSO:02- Understand the concept of hyphal growth, spore's dispersal mechanisms in fungi.

PSO:03- Understand the types of reproduction in fungi and life cycle.

PSO:04- Understand the biosynthesis and metabolism of carbohydrates, lipids, amino acids in Fungi.

PSO:05- Understand the isolation and selection of Mutants, Tetrad analysis, Somatic incompatibility.

PSO:06- Understand the history, types and causal agents, role of environment in plant pathology.

PSO:07-Understand the disease triangle, diagnosis of plant diseases, effect of plant diseases on the World crop production.

PSO:08- Understand the mechanism of pathogen attack on Plants and Plants defence mechanism.

PSO:09- Understand the disease epidemiology, disease forecasting control measures to prevent the spread of the diseases.

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MSc-IV SEMESTER
Subject-BOTANY

COURSE NUMBER: 4.2
COURSE NAME: ECOLOGY AND ENVIRONMENTAL BIOLOGY

CO: Course out come

UNIT:0:

CO: 01-Ecosystem concept. Structure, types, components, functions and dynamics. Energy flow in the ecosystem, tropic levels food chains food web ecological pyramid.

C0: 02-Biogeochemical cycle: Hydrological cycle, gases nutrient cycle, and sedimentary nutrient cycle.

CO: 03-Major terrestrial ecosystem of the world Desserts, Grasslands, Savanna, Tundra and Forest Ecosystem.

UNIT:02

CO: 01-Characteristics of populations: Natality, mortality, life table, age structure, carrying capacity, concept of density dependent and density independent factors, population control.

CO: 02-Biotic community: Concept structure, dominance, fluctuation and succession, ecological niche- intraspecific and inter specific interactions allelopathy predation-prey relationship. System ecology and ecological models.

UNIT:03

CO: 01-Major aquatic ecosystems of the world. Fresh water ecosystem. Marine ecosystem.
CO: 02-Environmental pollution: Sources, major and impact of air, water and soil pollution radioactive pollution disPSOal and management oil pollution and management. Plant indicators in pollution.

CO: 03-Solid and liquid waste management: Tannery, Fertilizer, Pulp and Paper and Sugar industries.

C0: 04-Noise pollution: Assessment, control and management.

C0: 05- Global environment problem: Ozone depletion, global warming and climate change.

UNIT 04:

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CO:06-Definition and importance of Biodiversity:Biological hotspots, biodiversity [illegible] magnitude and distribution of biodiversity.

CO: 07- Biodiversity values and Conservation Timber, ornamental, medicinal values, in-situ and Ex-situ methods

CO: 08- Environmental management: natural resources, principles of conservation, concepts and strategies of sustainable development, environmental impact assessment, principles of remote sensing, application of RS and GIs in environmental management, environmental laws forest conservation act, Biological diversity Act.

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COURSE NUMBER 4.2

COURSE NAME ECOLOGY AND ENVIRONMENTAL STUDIES

PROGRAMME SPECIFIC OUT COME (PSO)

PSO 01- Understand the definition, energy flow and [illegible]

PSO 02- Understand the types of Ecosystems, and definition of population ecology

PSO 03 -Understand the details of biotic community and concept of Carrying capacity

PSO 04- Understand the types, causes and control of different types of pollution

PSO 05 Understand the management of solid and liquid waste in sugar, paper mill industries

PSO 06- Understand the concept of Biodiversity and its conservation

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MSc IV SEMESTER
Subject-BOTANY

COURSE NUMBER: 4.3
COURSE NAME: PLANT BIOTECHNOLOGY

CO: Course out come

UNIT:01

CO:01-Introduction and definition of old and new Biotechnology. An interdisciplinary ... Scoped and importance, commercial potential, biotechnology centres in India.

CO:02-Biofertilizers: Introduction, types, Blue green algae, Seaweeds, Azolla, ... arbuscularmycorrhizal fungi and Rhizobium.

UNIT:02

CO: 01- Industrial microbial products: Alcohol production (beer), Antibiotics production (penicillin), production of Vitamins (Vitamin B12), production of Single Cell Protein, algal protein: (Spirulina) Fungal protein: (Mushroom) and economic aspects.

CO: 02-Plant Tissue Culture: Introduction, Importance of plant tissue culture, basic requirements for tissue culture laboratory, composition of ... culture medium, ... plant tissues, Regeneration of plants, Root culture, meristem culture, Anther culture, Pollen culture. Role of tissue culture technology in crop improvements.

UNIT: 03

CO: -01 Production of biogas: Structure of biogas plant, the chemistry of methane ... Biogas research in India, Uses of biogas.

CO: 02-Plant Biotechnology: Introduction, Somatic hybrids and Cybrids, cytoplasmic gene transfer, gene transfer, Advantage and Limitations.

UNIT:04

CO: 03- Genetic Engineering of microorganisms: Vectors of gene cloning direct transformations, Microinjection, Nuclear transplantation, Isolation and cloning plasmid and Mitochondrial genes.

CO: 04- Transgenic plants: With nif genes. Improvement of seed proteins, production of disease free and disease resistant plan

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MSc-IV SEMESTER
Subject-BOTANY

COURSE NUMBER: 4.3
COURSE NAME: PLANT BIOTECHNOLOGY

PROGRAMME SPECIFIC OUT COME (PSO)

PSO: -01 Understand the difference between Old, new biotechnologies. And about Biofertilizers

PSO:02-Understand the production of Beer, Vitamins, Penicillin, Single cell protein and Mushroom cultivation.

PSO:03 -Understand the details of Plant tissue culture techniques

PSO:04 -Understand the details of Biogas production, biogas plant and its advantages

PSO:05- Understand the process and types of Gene transfer, Vectors used in Genetic engineering.

PSO: 06- Understand the isolation and cloning of plasmid, plants with rif genes and production of disease free and disease resistant plants

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S. K. E. SOCIETY'S

GOVINDRAM SEKSARIA SCIENCE COLLEGE, BELAGAUM

POST GRADUATE DEPARTMENT OF CHEMISTRY

Programme Outcome & Course Outcome

M.Sc. – I Semester

S. K. E. Society's

Govindram Seksaria Science College, Belagavi

P. G. Department Of Chemistry

CHT 2.1 : Inorganic Chemistry - II

Course Outcome (M.Sc. 2nd Semester)

CO 1: Symmetry and Group theory: It is expected to learn molecular symmetry, group theory and applications of group theory.

CO 2: Coordination chemistry – Reaction kinetics and mechanisms: student is expected to learn types of substitution reactions, mechanisms in square planar and octahedral complexes

CO 3: Solid state and structural chemistry: Students are expected to understand types of solid, crystallographic systems, defects in solids and alloy systems.

CO 4: Nuclear Chemistry: Expected to learn Radioactivity and its applications along with their disposal procedures.

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Govindram Seksaria Science College, Belagavi

P. G. Department Of Chemistry

CHIT 2.1 : Inorganic Chemistry - II

Programm Outcome (M.Sc. 2nd Semester)

PO 1: Able to explain molecular symmetry, group theory and applications of group theory.

PO 2: A typs of substitution reactions, mechanisms in square planar and octahedral complexes is understood.

PO 3: Students are able to explain types of solid, crystallographic systems, defects in solids and alloy systems.

PO 4: Radioactivity and its applications along with their disposal procedure are learnt.

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S. K. E. Society's

Govindram Seksaria Science College, Belagavi

P. G. Department Of Chemistry

CHOT 2.2 : Organic Chemistry - II

Course Outcome (M.Sc. 2nd Semester)

CO 1 Named reactions: It is expected to learn C-C, C-N, C-O, C-Cl bond formation reaction.

CO 2: Oxidation and Reduction reaction: Student is expected to learn oxidation and reduction reactions with various reagentss.

CO 3: Rearrangement reactions: Students are expected to understand rearrangement of electron deficient Carbon, Nitrogen, Oxygen and electron rich Carbon.

CO 4: Heterocyclic Compounds: Expected to review nomenclature and learn preparation and reactions of 3-membered, 4-membered, 6-membered, 7-membered and fused heterocyclic compounds.

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CHOT 2.2 : Organic Chemistry - II

Programme Outcome (M.Sc. 2nd Semester)

PO 1: Able to explain and apply C-C, C-N, C-O, C-Cl bond formation reactions.

PO 2 An Oxidation and reduction reaction with various reagents is understood.

PO 3 Students are able to explain rearrangement of electron deficient Carbon, Nitrogen, Oxygen and electron rich Carbon.

PO 4 Nomenclature, preparation and reactions of 3-membered, 4-membered, 6-membered, 7-membered and fused heterocyclic compounds are learnt.

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CHPT 2.3: Physical Chemistry - II

Course Outcome (M.Sc. 2nd Semester)

CO 1: **Quantum Chemistry - II**: It is expected to learn different theories and applications of quantum chemistry.

CO 2: **Thermodynamics -II:** It is expected to understand different laws of thermodynamics and various mathematical relationships.

CO 3: **Chemical Kinetics:** Students are expected to review theories involve in chemical reactions.

CO 4: Students are expected to learn kinetics of complex reactions, fast reactions and reaction in solution.

CO 5: **Photochemistry and Photodegradation:** Expected to review fundamentals, laws, photophysical process and photochemical processes involve in photochemistry.

CO 6 : It is expected to learn pemciple and various applications of photocatalyst in photodegradation.

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CHPT 2.3: Physical Chemistry - II

PROGRAMME Outcome (M.Sc. 2nd Semester)

PO 1: Students are able to explain different theories and applications of quantum chemistry.

PO 2: Students are able to apply different laws of thermodynamics and various mathematical relationships.

PO 3: Kinetics of complex reactions, fast reactions and reaction in solutions are understood.

PO 4: Students are able to review fundamentals, laws, photophysical process and photochemical processes involve in photochemistry.

PO 5: Principle and various applications of photocatalyst in photodegradation able to explained.

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CHGT 2.4: Spectroscopy - II

Course Outcome (M.Sc. 2nd Semester)

CO 1: **Nuclear Magnetic Resonance Spectroscopy**: It is expected to learn fundamentals and application of ^{1}H, ^{13}C NMR in organic compound elucidation.

CO 2: **Mass spectrometry:** It is expected to understand fundamentals, principle, instrumentation and various application of mass spectrometry.

CO 3: It is expected to learn combined problems on IR, UV-Visible, ^{1}H, ^{13}C NMR and mass spectrometry.

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CHGT 2.4: Spectroscopy - II

PROGRAMME Outcome (M.Sc. 2nd Semester)

PO 1: Students are able to review fundamentals and application of ^{1}H, ^{13}C NMR in organic compound structural elucidation.

PO 2 Students are able to explain fundamentals, principle, instrumentation and various application of mass spectrometry.

PO 3 Combined problems on IR, UV-Visible, ^{1}H, ^{13}C NMR and mass spectrometry are able to solve.

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CHEG - 2.5: Chemistry for Everyday Life

(OPEN ELECTIVE)

Course Outcome (M.Sc. I[st] Semester)

CO 1: **Pollution**: It is expected to review fundamentals of air pollution, water pollutants like detergents oils & fats

CO 2: **Industrial Chemistry:** It is expected to understand preparation, properties and uses of Fertilizer, Ceramics, cement, glass, paint and pigment

CO 3: **Bioorganic compounds:** It is expected to know fundamentals and functions of carbohydrate, vitamins, dairy products, beverages, flavors, food additives and drugs

CO 4: **Industrial organic chemistry:** Expected to review fundamental and characters of fuel cell, synthetic polymer, corrosion

CO 5: It is expected understand different dyes.

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CHEG - 2.5: Chemistry for Everyday Life

(OPEN ELECTIVE)

PROGRAMME Outcome (M.Sc. 1st Semester)

PO 1: Students are able to explain fundamentals of air pollution, water pollutants like detergents, oils & fats.

PO 2 Students are able to explain preparation, properties and uses of Fertilizer, Ceramics, cement, glass, paint and pigment..

PO 3 Students are able to review fundamentals and functions of carbohydrate, vitamins, dairy products, beverages, flavors, food additives and drugs.

PO 4 Students are able to explain fundamental and characters of fuel cell, synthetic polymer, corrosion.

PO 5: Students are able to explain properties of different dyes.

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POST GRADUATE DEPARTMENT OF CHEMISTRY

Programme Outcome & Course Outcome

M.Sc. – II Semester

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CHE 1.1 : Inorganic Chemistry - I

Course Outcome (M.Sc. 1st Semester)

CO 1 Ionic Bonding and Covalent bonding: It is expected to review different theories explaining the bond formation, its limitations and will be able to understand the properties

CO 2: Chemistry of non transition elements: student is expected to know nomenclature, classification and different method of synthesis

CO 3: Coordination chemistry and metal clusters: Students are expected to understand the fundamentals such as naming, isomerisation, metal – ligand equilibria and metal clusters

CO 4: Pi – acid metal complexes: Expected to learn properties, preparation and structural aspect of metal carbonyls, nitrosyl

CO 5 : Acid base chemistry - It is expected to review different theories.

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CHM 4.4 : Inorganic Chemistry - I

Programm Outcome (M.Sc. 1st Semester)

PO 1: Able to differentiate between different theories of ionic, covalent and metallic bonding.

PO 2: Preparation, reactions and structure of non transition element is understood.

PO 3: Students are able to understand naming, isomerisation of complexes and metal ligand equilibria.

PO 4: Preparation, reactions and structure of metal carbonyls and nitrosils is understood

PO 5: Different types of acid base concepts are learnt.

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CHOI 1.2 : Organic Chemistry - I

Course Outcome (M.Sc. Ist Semester)

CO 1: **Basic concept and reaction mechanism:** It is expected to review hybridization, electronic effect, intermediates and mechanisms.

CO 2: **Addition and elimination reaction:** student is expected to learn mechanism of addition and elimination reactions with different substrate.

CO 3: **Substitution reactions:** Students are expected to understand aromatic electrophilic, nucleophilic, aromatic-nucleophilic substitution reactions with mechanism.

CO 4: **Stereochemistry:** Expected to review stereo, geometrical, conformational analysis of organic molecules.

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CHOT 1.2 : Organic Chemistry - I

Programm Outcome (M.Sc. 1st Semester)

PO 1: Able to differentiate between hybridization, electronic effect, intermediates and mechanisms.

PO 2 mechanism of addition and elimination reactions with different substrate is understood

PO 3 Students are able to understand aromatic electrophilic, nucleophilic, aromatic-nucleophilic substitution reactions with mechanisms.

PO 4 Different types of stereochemistry concepts are learnt.

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CHPT 1.3: Physical Chemistry - I

Course Outcome (M.Sc. I[st] Semester)

CO 1: **Quantum Chemistry**: It is expected to learn different theories and applications of quantum chemistry.

CO 2: Thermodynamics -I: student is expected to review basics of thermodynamics and various mathematical relationships.

CO 3: Electrochemistry – I : Students are expected to understand theories of electrochemistry.

CO 4: Students are expected to learn fundamental of batteries.

CO 5: Polymer and Dendrimer chemistry: Expected to review terminology in polymer chemistry and Polymer processing techniques.

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CHPT 1.3 : Physical Chemistry - I

Programme Outcome (M.Sc. 1st Semester)

PO 1: Students are able to understand different theories and applications of quantum chemistry

PO 2: students are able to review basics of thermodynamics and various mathematical relationships

PO 3 Students are able to understand theories of electrochemistry and fundamental of batteries

PO 4: Students are able to review terminology in polymer chemistry and Polymer processing techniques

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CHST 1.4: Spectroscopy - I

Course Outcome (M.Sc. 1st Semester)

CO 1: Microwave spectroscopy: It is expected to learn fundamentals of microwave spectra

CO 2: Electronic spectroscopy: student is expected to understand principle and application of electronic spectroscopy

CO 3: Infrared spectroscopy: Students are expected to learn fundamentals and functional groups identifications using IR.

CO 4: Raman Spectroscopy: Expected to review theory of Raman spectroscopy

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CHST 1.4: Spectroscopy - I

PROGRAMME Outcome (M.Sc. 1st Semester)

PO 1: Students are able to review fundamentals of microwave spectra

PO 2 Students are able to explain principle and application of electronic spectroscopy.

PO 3 Students are able to apply Infrared spectroscopy in identification of functional groups

PO 4 Students are able to review theory of Raman spectroscopy

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CHES 1.5: Analytical Chemistry

Course Outcome (M.Sc. 1st Semester)

CO 1: Data analysis: It is expected to learn classification of analytical methods, sampling and their statistical analysis.

CO 2: Chromatography: student is expected to understand basics of chromatography, HPLC and GC.

CO 3: Solvent extraction and thermal methods of analysis: Students are expected to basics of solvent extraction and thermal characterization techniques like DTA, DSC and TGA

CO 4: Varied techniques in analytical chemistry: Expected to review cyclic voltammetry, coulometry, GC and HPLC

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CHES - 1.5: Analytical Chemistry

PROGRAMME Outcome (M.Sc. 1st Semester)

PO 1: Students are able to classify different analytical methods, sampling and their statistical analysis.

PO 2: Students are able to explain basics of chromatography, TLC and IEC.

PO 3: Students are able to review basics of solvent extraction and thermal characterization techniques like DTA, DSC and TGA.

PO 4: Students are able to explain cyclic voltametry, coulometry, GC and HPLC.

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POST GRADUATE DEPARTMENT OF CHEMISTRY

Programme Outcome & Course Outcome

M.Sc. – III Semester

South Konkan Education Society's
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PG Department of Chemistry
M.Sc. IIIrd Semester

CHORT-3.1 : ORGANIC CHEMISTRY-IIIA

PROGRAMME OUTCOME

UNIT-I **16 hours**

NATURE AND BONDING IN ORGANIC MOLECULE

PO 1: Delocalized chemical bonding, conjugation, cross conjugation, resonance, hyper-conjugation, bonding in fullerenes.

PO 2: Aromaticity in benzenoid and non-benzenoid compounds, alternant and non-alternant hydrocarbons, Huckel's rule, energy level of π-molecules orbitals.

PO 3: Annulenes, antiaromaticity, homo aromaticity.
Aromatic character and chemistry of cyclopentadienyl anion, tropylium cation, tropone and tropolone.

PO 4: Bonds weaker than covalent-addition compounds, crown ether complexes and cryptands, inclusion compounds, cyclodextrins, catenanes and rotaxanes

PO 5: Synthetic applications of enamines and imines anions in organic synthesis, phase transfer catalysis, crown ethers and graphene.

UNIT-II **16 hours**

PHOTOCHEMISTRY

PO 6: Interaction of radiation with matter, types of excitation, rate of excited molecules, quenching, quantum efficiency, quantum yield, transfer of excitation energy, actinometry.

PO 7: Singlet and triplet states, experimental methods in photochemistry of carbonyl compounds, and transition, Norrish type I and Norrish type II reactions.

PO 8: Paterno-Buchi reaction, photoreduction, photochemistry of enones, hydrogen abstraction rearrangement of unsaturated ketones and cyclohexadienones.

PO 9: Photochemistry of p-benzoquinones, photochemistry of aromatic compounds with reference to isomerization, addition and substitution, photochemical isomerization of cis and trans alkenes.

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PO 10: Photo-Fries rearrangement, Barton reaction, Hoffmann-Loeffler-Freytag reaction, photochemistry of vision

UNIT-III

PERICYCLIC REACTIONS 16 hours

PO 11: Pericyclic Reactions: Classification of pericyclic reactions, molecular orbital symmetry, frontier orbitals of ethylene, 1,3-butadiene, 1,3,5-hexatriene, allyl system

PO 12: Woodward-Hoffman correlation diagram method and Perturbation of molecular orbital (PMO) approach of pericyclic reaction under thermal and photochemical conditions, FMO and PMO approach to the following reactions

PO 13: Electrocyclic reactions- Con rotatory and dis rotatory ring closure 4n and 4n+2 and allylic systems, Woodward and Hoffmann selection rules for pericyclic reactions

PO 14: Cycloadditions reactions - Antrafacial and suprafacial additions, more emphasis on [2+2] and [4+2] Cycloadditions, Diels-Alder reaction, 1,3-dipolar cycloaddition reactions

PO 15: Sigma tropic rearrangements: Antra facial and supra facial shift involving carbon moieties, retention and inversion of configuration.

UNIT-IV

DYNAMIC STEREOCHEMISTRY 16 hours

PO 16: Prochirality: Homotopic, heterotopic, enantiotopic and diastereotopic ligands and faces, identification using addition, substitution and symmetry criteria

PO 17: Nomenclature of stereoheterotopic ligands and faces, symbols for stereoheterotopic ligands in molecules with one or more prochiral centres, chiral and prochiral centre

PO 18: Prochiral plane, symbols for enantiotopic and diastereotopic faces.

PO 19: Dynamic Stereochemistry: Stereoselectivity in organic synthesis: stereospecific and stereoselective reactions, principle of stereoselectivity-enantioselectivity and diastereoselectivity.

PO 20: Use of chiral reagents, Cram's and Prelog's rules, stereoselectivity in addition, elimination, substitution reactions, Ene, Claisen and Cope reaction.

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COURSE SPECIFIC OUTCOME

UNIT-I

CO 1: Able to understand Delocalized chemical bonding, conjugation and hyperconjugation.

CO 2: Able to learn aromaticity, antiaromaticity in organic molecules.

CO 3: Understood aromaticity of annulenes.

CO 4: Able to understand bonds weaker than covalent-addition compounds.

CO 5: Students acquire the knowledge of synthetic applications of enamines and imines anions in organic synthesis, phase transfer catalysis, crown ethers.

UNIT-II

CO 6: Learnt Interaction of radiation with matter, types of excitation

CO 7: Learnt Norrish type I and Norrish type II reactions and its applications

CO 8: Able to understand Paterno–Buchi reaction, photoreduction, photochemistry of enones

CO 9: Have understood photochemistry of p-benzoquinones, photochemistry of aromatic compounds

CO 10: Learnt about different types of photochemical reactions.

UNIT-III

CO 11: Able to interpret the molecular orbital symmetry, frontier orbitals of ethylene, 1,3-butadiene, 1,3,5-hexatriene, allyl systems.

CO 12: Have understood FMO and PMO approach. of pericyclic reaction under thermal and photochemical conditions.

CO 13 : Students acquire the knowledge of Electrocyclic reactions.

CO 14 : Learnt about Cycloadditions reaction like Diels-Alder reaction, 1,3-dipolar cycloaddition reactions.

CO 15: . On the completion of the course students will have the understanding of basics of Sigma tropic rearrangements reactions. Various theories/rules governing these reactions will help them to predict the products with stereochemistry involved in these reactions.

UNIT-IV

CO 16: Understood prochirality, ligands and faces

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CO 17: Students acquire the knowledge of nomenclature of stereoheterotopic ligands and faces. symbols for stereoheterotopic ligands in molecules with one or more prochiral centres, chiral and prochiral centre .

CO 18: Able to interpret: prochiral plane, symbols for enantiotopic and diastereotopic faces.

CO 19: Learnt about different types of stereospecific and stereoselective reactions, principle of stereoselectivity-enantioselectivity and diastereoselectivity.

CO 20: Have understood Cram's and Prelog's rules, Ene, Claisen and Cope reactions

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PG Department of Chemistry

M.Sc. III Semester

CHOT 3.2, ORGANIC CHEMISTRY

PROGRAMME OUTCOME

16 hours

UNIT-I

CARBOHYDRATES

PO1: Definition, classification, constitution of glucose and fructose(open chain and ring structure)

PO2: Inter conversion–aldose to ketose and ketose to aldose

PO3: chain lengthening and chain shortening of aldoses, epimerisation (conversion of glucose to mannose)

PO4: mechanism of mutarotation, conformations of monosaccharides, anomeric effect, Hudson's rules, epimerization.

PO5: Synthesis, industrial and biological importance of glycosides and amino sugars.

PO6: Disaccharides - Elucidation of structure of maltose and sucrose.

PO7: Polysaccharides- structural elucidation of starch, structure of celluiose, glycogen, importance of starch, cellulose and glycogen as energy and structural materials

PO8: structure and importance of chitin and insulin.

16 hours

UNIT-II

AMINO ACIDS, POLYPEPTIDES, PROTEINS AND NUCLEIC ACIDS

PO9: Amino acids: Introduction, classification, structure, methods of synthesis (Gabriel phthalimide, maionic ester, Strecker method) and physical properties.

PO10: Polypeptides: synthesis of polypeptides- Use of blocking agents, Bruce-Merrifield synthesis of polypeptides.

PO11: Proteins: structure of proteins, Primary secondary, tertiary and quaternary structure, end group analysis(Edman's and Sanger's methods), biological importance of proteins.

PO12: Nucleic acids: Introduction, classification, components of nucleic acids, structures and synthesis of nucleosides and nucleotides, Watson-Crick model of DNA, role of DNA and RNAs in protein synthesis, genetic code-salient features.

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UNIT-III

ANTHOCYANINS CAROTENOIDS AND PORPHYRINS

16 hours

PO13: Anthocyanins: Classification, method of isolation, basic structural features of anthocyanins

PO14: Structural elucidation of cyania chloride, pelargonin chloride, delphonin chloride.

PO15: Structural elucidation of quercetin and wedelactone (synthesis not included).

PO16: Carotenoids: Methods of isolation. Structural relationship of α-, β- and γ-carotenes. Structure elucidation and synthesis of β-carotene.

PO17: Porphyrins: Structure elucidation and synthesis of haemin, chlorophyll-a.

UNIT-IV

OILS, FATS AND LIPIDS

16 hours

PO18: Oils, fats and waxes: Definition, chemical composition,

PO19: Chemical properties-hydrogenation, hydrogenolysis, hydrolysis, drying oils, rancidity, analysis of oils.

PO20: fats-saponification value, iodine and acid value.

PO21: Soaps-Manufacture of soaps by hot process, cleansing action.

PO22: Synthetic detergents, comparison of soaps and detergents, types of detergents (cationic, anionic and nonionic).

PO23: Animal and plant waxes-composition, examples.

PO24: Lipids: Sphingolipids, phospholipids and glycolipids,

PO25: naturally occurring fatty acids and their triglycerides, essential fatty acids, unusual fatty acids,

PO26: methods of isolation: Gunstone's partition method,

PO26: reactions of fatty acids-Fischer and trans esterification,

PO27: oxidation and acyl group transfer reactions,

PO28: analytical values-cetane number, emulsions and biodiesel.

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COURSE SPECIFIC OUTCOME

UNIT-I

CO1: Students acquire knowledge on definition, classification, constitution carbohydrates (open chain and ring structure)

CO2: Inter conversion will be learnt by the student

CO3: Knowledge on step up and step down reaction of carbohydrates will be aquired by student

CO4: Students learn various mechanisms and rules applied to carbohydrates

CO5: Importance (synthesis and biological importance) of glycosides and amino sugars will be learnt by the students

CO6: Students acquire knowledge on Disaccharides

CO7: Students learn Polysaccharides with few examples and their importance

CO8: Structure and importance of chitin and insulin will be learnt by the student

UNIT-II

CO9: Students become competant on the concept of amino acids and various methods of synthesis.

CO10: Aquiring knowledge on polypeptides, synthesis and use of blocking agents.

CO11: Learning about proteins structure and importance of proteins, (Edman's and Sanger's methods)

CO12: Students gain an insight on Nucleic acids components of nucleic acids, structures and synthesis of nucleosides and nucleotides, Propsed model of DNA and its role in genetic code and protein synthesis.

UNIT-III

CO13: Acquiring insights on Anthocyanins and their features.

CO14: Students gain competance in Structural elucidation of few anthocyanins

CO15: Structural elucidation of few flavones will be learnt by the students.

CO16: Students gain knowledge on Carotenoids and their synthesis.

CO17: Students learn porphyrins and their synthesis.

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UNIT-IV

CO18: Students get intoduced to Oils, fats and waxes

CO19: Chemical properties of oils will be learnt by students

CO20: Students gain competance on variousvanalytical values of oils and fats.

CO21: Soaps and their characterization will be learnt by students.

CO22: Students will be able to learn Synthetic detergents.

CO23: Gaining an insight on waxes with examples.

CO24: Few examples and classification of lipids will be learnt by students.

CO25: Students will be able to understand about naturally occurring fatty acids a

CO26: Students gain competance upon methods of isolation of oils and fats

CO26: Students gain knowledge on reactions of fatty acids

CO27: Students gain knowledge on reactions of fatty acids- oxidation and acyl group transfer reactions,

CO28: Knowledge will be gained on analytical values by the students.

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CHORPr-3.6 : ORGANIC CHEMISTRY-IIIB

Total hours : 64

MULTISTEP ORGANIC PREPARATION

01. Preparation of 2-bromo-3-phenyl propionic acid from cinnamic acid.
02. Preparation of anthralinic acid from phthalimide.
03. Preparation of p-chlorotoluene from p-toluidine.
04. Preparation of benzophenoneoxime and its rearrangement to benzanilide.
05. Preparation of adipic acid from cyclohexanol.
06. Preparation of methyl red from anthralinic acid.
07. Preparation of benzopinacolone from benzophenone.
08. Preparation of 6,8-nitro-4-methyl-7-hydroxycoumarine from resorcinol.
09. Preparation of benzocaine from p-nitrotoluene.
10. Preparation of β-anilino-β-phenyl propiophenone from acetaphenone and benzaldehyde.

Course specific outcome

Students acquire all essential practical skills and learn techniques through Multistep preparations, estimations, extractions, separations, isolations, distillations, chemical and spectral characterization which provides deeper understanding of subject and confidence for implementation of newer ideas helping them to pursue higher education and R&D activities.

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PG Department of Chemistry

M.Sc. III Semester

CHOT 3.3, ORGANIC CHEMISTRY

PROGRAMME OUTCOME

UNIT–I **16 hours**

ELECTRON SPIN RESONANCE SPECTROSCOPY

PO1: Basic principle interaction between spin and magnetic field.

PO2: origin of spectral line-intensity, width and position of spectral lines, relaxation process, multiplicity in ESR,

PO3: hyperfine splitting, g-value and factor affecting.

PO4: Rules for interaction of spectra, zero field splitting and Krammer's degeneracy,

PO5: John-Teller distortion, isotropic and anisotropic coupling constants, nuclear quadrupole coupling interaction, spin hamiltonian,

PO6: ESR spectra of radical containing a single set of equivalent protons-methyl, p-benzoquinone, cyclopentadienyl, benzene.

PO7: ESR spectra of transition metal complexes, applications.

UNIT–II **16 hours**

NUCLEAR QUADRUPOLE RESONANCE and MOSSBAUER SPECTROSCOPY

PO8: Nuclear quadrupole resonance spectroscopy: Consequence of nuclear spin larger than ½, prolate and oblate nucleus.

PO9: Nuclear quadrapolar charge distribution-theory and instrumentation, relationship between electric field gradients and molecular structure.

PO10: applications and interpretation of eQq data, effect of crystal lattice on the magnitude of eQq, structural information from NQR spect a.

PO11: Mossbauer spectroscopy: Theory and principles.

PO12: Experimental methods, isomer shift, quadrapole interactions,

PO13: Electron density, magnetic interactions;

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PO14: Time and temperature dependent effect,

PO15: Application-Iodine trihalides, Prussian blue, trisiron dodecacarbonyl, tin halides, hexacyano ferrate and nitroprussides.

UNIT–III

16 hours

FLAME EMISSION and CHIROPTICAL SPECTROSCOPY

PO16: Flame emission spectroscopy: Introduction, types of spectra.

PO17:types of emission spectra, principle, instrumentation, delivery of sample.

PO18: Flames, excitation profiles in flames, chemical reactions in flames.

PO19: Types of fuels and oxidants, flame temperatures.

PO20: Total consumption and premix burners, factors influence intensity of emitted radiation.

PO21: interferences in flame emission spectra, applications both qualitative and quantitative.

PO22: Chiroptical spectroscopy: Introduction, Polarized light.

PO23: Types of polarized light, optical activity, Specific rotation.

PO24: instrumentation of Polarimeter, optical rotary dispersion (ORD) and Circular Dichroism, difference between CD and ORD.

PO25: applications of CD and ORD, cotton effect, plane curves,

PO26: anomalous curves, octant and haloketone rules.

PO27: applications in the determination of conformation of cyclic and steroidal ketones.

PO28: application of optical rotation method in the determination of rate constants acid catalyzed muta-rotation of glucose and inversion of cane sugar.

UNIT–IV

16 hours

MOLECULAR LUMINESCENCE and PHOTOELECTRON SPECTROSCOPY

PO29: Molecular luminescence spectroscopy: Theoretical basis for the fluorescence and phosphorescence. Singlet and triplet excited states.

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PO30: Variables affecting luminescence-quantum efficiency, transition types, structure and structural rigidity, temperature and solvent effects, effect of pH, dissolved oxygen and concentration effect.

PO31: Excitation and emission spectra us emission spectra. Fluorescence instrumentation-fluorophores and spectro fluorometers.

PO32: Sensitivity and selectivity. Modification necessary to measure phosphorescence. General scope of applications of luminescence.

PO33: Photoelectron spectroscopy: Introduction, principles, chemical shifts photoelectron spectra of simple molecules

PO34: X-ray photoelectron and Auger electron spectroscopy, applications.

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COURSE SPECIFIC OUTCOME

UNIT-I

CO1: Students get introduced to electron spin resonance spectroscopy.

CO2: Interpretation of the width and position of spectral lines and multiplicity.

CO3: Students gain an insight on splitting and g factor.

CO4: Knowledge of rules of spectra will be learnt by students.

CO5: Gaining an insights on few effects in ESR spectroscopy by students

CO6: Learning about the interpretation of the spectra of radicals with few examples

CO7: Students will be competent with the application of ESR spectra of transition metal complexes

UNIT-II

CO8: Getting introduced to Nuclear quadrupole resonance spectroscopy for prolate and oblate nucleus.

CO9: Students gain insight on theory and instrumentation of NQR.

CO10: Students will gain fundamental knowledge about applications of NQR.

CO11: Students will gain fundamental knowledge about Mossbauer spectroscopy: Theory and principles.

UNIT-III

CO16: Exposure to fundamental concepts of Flame emission spectroscopy.

CO17: Gaining knowledge about principle and instrumentation.

CO18: Students understand about Flames and their various reactions.

CO19: Acquiring knowledge about types of fuels and oxidants, flame temperatures.

CO20: Students learn about factors influence intensity of emitted radiation.

CO21: Knowledge gained about interferences and applications

CO22: Introducing to Chiroptical spectroscopy

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CO23: Types of polarized light, optical activity, Specific rotation will be learnt by the students

CO24: Gaining an insight about instrumentation of Polarimeter (ORD) and Circular Dichroism.

CO25: Students shall study applications of CD and ORD and effects.

CO26: Students shall learn anomalous curves, octant and haloketone rules.

CO27: Acquiring knowledge on applications in the determination of conformation of cyclic and steroidal ketones.

CO28: gaining an insight on application of ORD by applying to a specific example.

UNIT-IV

CO29: Introduction to Molecular luminescence spectroscopy

CO30: Knowledge will be imparted on Variables affecting luminescence.

CO31: Student shall compare spectra and understand and interpret the spectra and learn about instrumentation.

CO32: Sensitivity and selectivity of phosphorescence and fluoroscence and general applications will be focused upon.

CO33: Introduction to Photoelectron spectroscopy and dealing with simple molecule spetra.

GO34: Students will gain competance with principles of X-ray photoelectron and Auger electron spectroscopy, and their applications applications.

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M.Sc. IV Semester

CHOT-4.1 ORGANIC CHEMISTRY

PROGRAMME OUTCOME

UNIT-I **16 hours**

MEDICINAL CHEMISTRY

PO 1: Introduction, definition of drug, requirements of drugs, chemotherapy, pharmacokinetics, pharmacodynamics, metabolites and anti metabolites.

PO 2: Prodrug and soft drugs, agonists and anti-agonists, concept of drug receptor, elementary treatment of drug receptor interactions

PO 3: Theories of drug activity-occupancy theory, rate theory, induced fit theory, classification of drugs

PO 4: Sulphonamides: Introduction, classification, synthesis and SAR studies of sulphathiazole, sulphanilamide, sulphadiazine. **Antimalarials:** Introduction, classification, synthesis and drug action-Chloraquin and Pamaquin.

PO 5: Analgesics: Introduction, classification, synthesis and drug action-Paracetamol, Aspirin, Salol, Cinophen, Phenyl butazone, Antipyrine. **Anti-inflammatory:** Introduction, classification, synthesis and drug action-Indomethacin and ibuprofen.

UNIT–II **16 hours**

CHEMISTRY OF DYES

PO 6: Definition, requirements, theory of colour and constitution-chromophore-auxochrome theory, modern theory, classification of dyes-based on methods of dyeing, structure.

PO 7: Azo dyes: classification, synthesis and applications of acid azo dyes-methyl orange, basic azo dyes-Bismarck brown, direct azo dyes-Congo Red.

PO 8: Triphenylmethane dyes: synthesis and applications of malachite green, phenolphthalein, crystal violet. Cyanine dyes: synthesis and applications of quinoline blue, sensitol red.

PO 9: Fluorescent brightening agents, photographic sensitizers(cyanines), color photography(additive and subtractive process), chemistry of colour developers, instant colour processes.

UNIT–III **16 hours**

GREEN CHEMISTRY

PO 10: Concept of green chemistry, need for green chemistry, goals, limitations. Principles – Introduction, twelve principles.

PO 11: Synthetic methods-Concept of atom economy, concept of selectivity, use of auxillary substances, designing of synthetic methodologies, designing of products.

PO 12: Use of green solvents, catalytic reagents, analytical methodologies, energy requirements and mode of supply of energy to reactions- use of microwaves, use of sonification with examples.

PO 13: Designing of green synthesis-Choice of starting materials, reagents, catalysts-biocatalysts, polymer supported catalysts, choice of solvents.

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COURSE SPECIFIC OUTCOME

UNIT-I

CO 1: Able to understand definition of drug, requirements of drugs, chemotherapy, pharmacokinetics, pharmacodynamics, metabolites and anti metabolites.

CO 2: Able to learn prodrug and soft drugs, agonists and anti-agonists, concept of drug receptor

CO 3: Able to understand theories of drug activity.

CO 4: Able to understand Introduction, classification, synthesis of sulphonamide and antimalarial drugs.

CO 5 Able to understand Introduction, classification, synthesis and mode of action of analgesics and anti-inflammatory drugs.

UNIT-II

CO 6: Students acquire the knowledge of bazics and theories of dyes.

CO 7: Learnt about Azo dyes: classification, synthesis and its applications.

CO 8: Able to understand Triphenylmethane dyes classification synthesis and applications.

CO 9: Students acquire the knowledge of applications of dyes in Fluorescent brightening agents, photographic sensitizers(cyanines), color photography(additive and subtractive process), chemistry of colour developers, instant colour processes.

UNIT-III

CO 10: Learnt about , principles and concepts of green chemistry.

CO 11: Students acquire the knowledge of atom economy, concept of selectivity, use of auxillary substances, designing of synthetic methodologies, designing of products.

CO 12: Students will now understand use of green solvents, catalytic reagents, analytical methodologies, use of microwaves, use of sonification.

CO 13 : Students will now be able to apply the principles of green chemistry to synthesise organic compounds by green methods.

CO 14 : Learnt about Green synthesis of adipic acid, catechol, paracetamol, acetaldehyde.

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CHOT-4.2 ORGANIC CHEMISTRY

PROGRAMME OUTCOME

16 hours

UNIT-I

ALKALOIDS

PO 1: Definition, nomenclature and physiological action, occurrence, isolation.

PO 2: general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants.

PO 3: structure, stereochemistry, structural elucidation and synthesis of the following: ephedrine, (+)-conine, nicotine, atropine, quinine, structure and uses of reserpine and morphine.

16 hours

UNIT-II

TERPENOIDS

PO 4: Classification, nomenclature, occurrence, isolation, general methods of structure determination isoprene rule, structure .

PO 5:, structural elucidation and synthesis of the following representative molecules: citral, geraniol, α-terpeneol, menthol, zingiberene.

PO 6: structure and uses of farnesol, phytol, abietic acid.

16 hours

UNIT–III

STEROIDS AND PROSTAGLANDINS

PO 7: Steroids: Introduction, classification and nomenclature, Diels hydrocarbon- its importance and synthesis, stereochemistry of cholesterol.

PO 8: Structural elucidation of cholesterol-Blanc's rule, location of double bond, hydroxy group, angular methyl groups and side chain in cholesterol, total synthesis.

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COURSE SPECIFIC OUTCOME

UNIT-I

CO 1. Students understand nomenclature and physiological action, occurrence and isolation of alkaloids

CO 2: Able to learn general methods of structure elucidation, degradation and classification of alkaloids.

CO 3: Able to understand general methods of structure elucidation and synthesis of alkaloids and their uses.

UNIT-II

CO 4: Students understand nomenclature, occurrence and isolation of terpenoids.

CO 5 Able to understand general methods of structure elucidation and synthesis of terpenoids.

CO 6: Students acquire the knowledge of some terpenoids and their uses.

UNIT-III

CO 7: Students acquire the knowledge of nomenclature ,physiological action, occurrence and stereochemistry of cholesterol.

CO 8: Able to understand general methods of structure elucidation and synthesis of cholesterol.

CO 9: Students acquire the knowledge of Introduction, classification and biological importance, structural elucidation of PGE1 and synthesis of PGE1

UNIT-IV

CO 10: Learnt about Introduction, classification, penicillins, chloramphenicol, streptomycin, chloromycitin and tetracyclins–structure and their importance

CO 11: Students acquire the knowledge of synthesis of cephalosporin-C, structural elucidation of Penicillin-G.

CO 12: students will now understand Definition, Classification and biological importance and synthesis of vitamins.

CO 13: Students acquire the knowledge of Definition, Classification and biological importance and synthesis of hormones.

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PO15: α,β-unsaturated carbonyl compounds, control in carbonyl condensations.

PO16:1,5-difunctionalised compounds, Michael addition and Robinson annulations.

PO17: Retrosynthesis: Retrosynthesis of benzocaine, 4-methoxy acetophenone.

PO18: Retrosynthesis: Retrosynthesis of saccharin, bisavalone, cubane,

PO19: Retrosynthesis: Retrosynthesis of estrone, cantharidin and lycorane.

16 hours

UNIT–III

PHASE TRANSFER CATALYSTS, CROWN ETHERS AND PROTECTING GROUPS

PO20: Phase transfer catalysis: Introduction, definition, mechanism of phase transfer catalysis.

PO21:Types of phase transfer catalysts and reactions and their advantages.

PO22:PTC in application in substitution, elimination

PO23:PTC in addition and alkylation reactions.

PO24:Crown ethers: Introduction, nomenclature, features

PO25:Nature of donor site, general synthesis of crown ethers.

PO26:Protecting Groups: Illustration of protection and deprotection in organic synthesis.

PO27:Protection of hydroxyl, carboxyl groups

PO28:Protection of carbonyl, thiol and amino groups.

PO29: Functional Group Interconversions(FGI).

16 hours

UNIT –IV

REAGENTS IN ORGANIC SYNTHESIS

Use of the following reagents in organic synthesis and functional group transformation:

PO30: 01. Gilmann reagent 02. Lithium diisopropyl amide (LDA)

PO31:03. Dicyclohexyl carbodimide (DCC) 04. 1,3-Dithiane (reactivity umpolung)

PO32:05. Trimethylsilyl iodide 06. Tri-n-butyl tin hydride (TNBH)

PO33:07. DDQ 08. Woodward-Prevost hydroxylation

PO34:09. Osmium tetroxide 10. Peterson synthesis

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CO14: Two Group C-C Disconnections: Diels-Alder reaction, 1,3-difunctionalised compounds will be learnt by students.

CO15: Students shall get an insight about α,β-unsaturated carbonyl compounds, control in carbonyl condensations.

CO16: 1,5-difunctionalised compounds, Michael addition and Robinson annulations will be focused upon by the students.

PO17: Application of Retrosynthesis: Retrosynthesis of benzocaine, 4-methoxy acetophenone will be studied by students.

CO18: Application of Retrosynthesis: Retrosynthesis of saccharin, bisavalone, cubane will be studied by students.

CO19: Application of Retrosynthesis: Retrosynthesis of estrone, cantharidin and lycorane will be studied by students.

UNIT–III

CO20: Students get introduced to Phase transfer catalysis:

CO21: Learning about Types of phase transfer catalysts and reactions and their advantages by the students.

CO22: Gaining knowledge about PTC in application in substitution, elimination

CO23: Students shall get to study about PTC in addition and alkylation reactions.

CO24: Students get introduced to Crown ethers:

CO25: Nature of donor site, general synthesis of crown etherswill be learnt by students.

CO26: Students shall gain competence in Protecting Groups: Illustration of protection and deprotection in organic synthesis.

CO27: Learning about Protection of hydroxyl, carboxyl groups by students.

CO28: Acquiring the knowledge about Protection of carbonyl, thiol and amino groups by students.

CO29: Gaining an insight about Functional Group Interconversions(FGI) by the students

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PG DEPARTMENT OF MICROBIOLOGY

PROGRAMME OUTCOME

- To introduce concepts about microbial classification, diversity, morphology, physiology and nutrition, culture methods, optimization of growth and microbial interactions with plants, animals and humans.
- To give a primary exposure on the history and development, basics of Microbiology, classification, diversity, and their ecological aspects.
- To study the diversity of fungi, algae andprotozoa, provide hands-on training for identification of these microorganisms.
- To expose students to the various instrumentation techniques and methodologies necessary for research in Microbiology.
- To provide a basic knowledge on various statistical tools required for biology.
- To provide knowledge about fundamentals of microbial genetics, gene expression, genetic mapping, the link between phenotype, genotype and the use of microbes in genetic research.
- To provide knowledge about the basic units of life, including their types, structures, modes of action, and importance.
- To study the various physiological processes in microorganisms.
- To provide a comprehensive understandingon the beneficial and harmful effects of microorganisms in food, risks connected withconsuming food contaminated with microorganisms, as well as their preventative methods.
- To provide knowledge on various bioinformatictools used for analysis of biological macromolecules.
- This course focuses on the relationship between microbes and human health. Students will study important diseases emphasizing on etiology, pathogenesis, diagnosis, treatment, and prevention.
- To expose foundational and up-to-date understanding of immunology and immunological techniques.
- To provide a complete overview of the role of microbes in agriculture, plant-microbe interactions, plant diseases caused by pathogenic microorganisms, and also the potential of microbes as biofertilizers and biopesticides for ecofriendly crop improvement.
- This curriculum focuses on methodologies for strain improvement of industrially important microorganisms, bioreactor design, techniques involved in upstream and downstream fermentation process.
- To create knowledge and awareness on the types of commercial products obtained from potential microbes. Also on conventional and modern production strategies.
- To provide hands-on training in different fundamental microbiological techniques.
- To provide practical information on estimation of biological macromolecule, enzymatic activity, detection of food-borne diseases.
- To provide hands-on training on medicaland immunological techniques.
- Comprehensive understanding of different types of recombinant techn[illegible]

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bioinformatic tools.

- To provide hands-on training on role of microbes for crop improvement, and production of different industrial products from microorganisms.

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M.Sc I Semester Zoology

Course Outcomes (CO's)

Course Name: ZCT 1.1 "Animal Systematics and Evolution"

CO1: Concept and future of Biosystematics and concept of Species

CO2: Purpose and methods of collecting, identifying and preserving species

CO3: Components and procedure of classification, methods of construction of Phylogenetic tree and Phylogenetic analysis

CO4: Taxonomic keys, International rules of Nomenclature, Bioinformatics

CO5: Theories of Evolution, Experimental evidences of Natural selection and concept of Inclusive Fitness

CO6: Neo Darwinism, Genetic Drift and Non Darwinism

Programme outcomes:

PO1: Understanding of concept of Biosystematics and Species

PO2 Knowledge of Collection, Preservation, and Identification of various organisms

PO3 Analysis of phylogenetic relationships between different taxas

PO4 Understanding of Classical and Modern theories of evolution and its impact on the process of speciation.

Course Name: ZCT 1.2 "Biology of Non-Chordates"

CO1: Evolution of Bilateria, Coelom and Metamerism, Phylogeny and Systematic position of minor phyla.

CO2: Various modes of Locomotion and Nutrition in Invertebrates

CO3: Respiratory organs and Respiratory pigments in Invertebrates, Patterns of circulation

CO4: Excretory organs, Morphology and mechanism of Excretion

CO5: Primitive and advanced Nervous systems in various phyla and their sensel organs

CO6: Various modes of Reproduction and their significance, Larval forms and their significance.

Programme outcomes:

PO1: A complete idea of the evolution of invertebrates right from the embryonic stage

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PO2: A thorough understanding of the various mechanisms involved in their various physiological processes.

PO3: A thorough knowledge of various structures in non-chordates and their functions.

Course Name: ZCT 1.3 "Biology of Chordates"

CO1: Origin, General characters and Classification of Protochordates and Chordates, Phylogenetic relationships between Protochordates and Chordates.

CO2: Development and derivatives of Integument in Pisces and Tetrapods, Evolution of Urinogenital system and Comparative account of Kidney.

CO3: Development of Nervous system and Comparative account of Brain, Brief account of Sense organs.

CO4: Structure, mechanism, origin and evolution of Respiratory and Circulatory system, Study of Locomotion with respect to Axial and Appendicular skeleton.

CO5: Types of Vertebrae and Types of Vertebrate Musculature.

CO6: Origin, evolution and adaptations in Chordates.

Programme outcomes:

PO1: Understanding of origin, evolution and inter-relationships of chordates

PO2: Knowledge of development and evolution of various anatomical and physiological systems of chordates.

PO3: Understanding of evolution by studying comparative account of various organ systems.

PO4: Thorough understanding of adaptive characters of organisms with respect to their environment.

PO5: Detailed understanding of various anatomical and morphological features of the vertebrate body.

Course Name: ZCT 1.4 "Environmental Biology"

CO1: History, importance and basic concepts of Environmental biology and Ecology.

CO2: Types, characteristics and factors regulating Growth of Population.

CO3: Concept and Classification of Natural resources, Account on renewable and non-renewable resources.

CO4: Concept of Biodiversity, Threats to Biodiversity its management and conservation.

CO5: Composition and structure of Atmosphere, Environmental pollution, Climatic change and strategies to deal with it.

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CO6: Types of Environmental health hazards, Toxicity measurements, Environmental legislation and protection.

Programme outcomes

PO1: Understanding of Structure and composition of Environment and Ecosystem.

PO2: Analysis of Climate change and Threats to Biodiversity.

PO3: Various means and methods to counter climate change and depleting biodiversity.

PO4: Knowledge of management and conservation of various natural resources.

PO5: Impact of various harmful toxic substances in the environment and ways to measure them.

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M.Sc II Semester Zoology

Course Outcomes (CO's)

Course Name: ZCT 2.1 "Molecular Genetics"

CO1: Mendelian and Post mendelian Genetics, Non-Mendelian Inheritance, Structure and Function of DNA.

CO2: modes and mechanisms of genetic recombination in bacteria, life cycle of bacteriophage, plasmid and episomes.

CO3: Various models of Prokaryotic and Eukaryotic Gene regulation, Dosage compensation, Genome imprinting.

CO4: Types of Chromosomal, Gene, Structural, Gain of Function mutations and their causes.

CO5: Genetic diseases and Chromosomal abnormalities.

CO6: Salient features of yeast, Drosophila and human genomes, Evolutionary genomics, Proteomics.

Programme Outcomes

PO1: Understanding of both Mendelian and Post mendelian Genetics.

PO2: Understanding of Inheritance and Genetic Recombination in various organisms.

PO3: Knowledge of causes of mutations and Chromosomal aberrations.

PO4: Analysis of complete Genomics and Proteomics of selected organisms.

Course Name: ZCT 2.2 "Molecular Cell Biology"

CO1: Introduction to Modern cell biology, Cell morphology, Central dogma of molecular biology and Synthetic biology.

CO2: Detailed study of Plasma membrane, its structure, composition and functions.

CO3: Detailed study of Molecular organization of cell organelles and their function and Cytoskeleton.

CO4: Structure and classification of Aminoacids, bond formation and folding of polypeptide chain, Structure and classification of Carbohydrates and lipids.

CO5: Ultra structure of Nucleus, nucleolus and chromosomes, Role of Histones in packaging DNA.

CO6: Molecular events during Cell cycle, Apoptosis, Cancer biology and Immunology.

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Programme Outcomes

PO1: Through understanding of the structure of cell and its organelles.

PO2: Knowledge of role of various cell organelles and biomolecules in different biological processes.

PO3: Understanding of the ultrastructure of Nucleus, Chromosome and role of histones in packaging DNA.

PO4: Understanding the role of Biomolecules in regulating cell cycle and apoptosis.

PO5: Knowledge of Cancer biology and Immunology

Course Name: ZCT 2.3 "Animal Physiology"

CO1: History, central themes and sub disciplines of animal physiology and Physiological aspects of respiration and blood circulation

CO2: Mechanism of Osmoregulation across various classes of vertebrates.

CO3: Effects of extreme high and low temperature on organisms and its regulation.

CO4: Feeding methods and mechanism of digestion and enzyme catalysis and types of enzymes.

CO5: Types and ultra structure of muscles and mechanism of muscle contraction and disorders related to muscles.

CO6: Structural organization and function of Nervous system, Synaptic transmission and neurotransmitters.

Programme Outcomes

PO1: Knowledge of various structural adaptations developed by animals to cope up with their environment.

PO2: Thorough knowledge of various physiological processes involved in maintaining homeostasis in animals.

PO3: Analysis of how various proteins and neurotransmitters cause contraction of muscles and transmission on nerve impulse.

PO4: Understanding the role of various atmospheric and environmental components in physiological processes.

PO5: Analysis of physics involved behind maintaining smooth functioning of the body.

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M.Sc III Semester Zoology

Course Outcomes (CO's)

Course name- ZCT 3.1 "Developmental biology"

CO1: Basic concepts of developmental biology history, its issues and modern approaches. Knowledge of pattern and axis formation in Drosophila, amphibians and mammals.

CO2: Concept learning of morphogenesis and neurogenesis in model organisms.

CO3: Detailed study of limb development in model organisms. Study of metamorphosis and role of thyroid hormone and regeneration, molecular mechanism of ecdysone.

CO4: Study of heterotypy, heterochrony, heterometry, heterotypy and genetic pathways of development.

Programme outcomes:

PO1: Thorough knowledge of development of organisms from zygote to adult stage.

PO2: Knowledge of limb, axis and organ development and formation in selected model organisms.

PO3: Analyze how genes and cells are regulated and coordinated to bring overall morphogenesis and neurogenesis.

PO4: To understand how hormones regulate metamorphosis and genes regulate regeneration.

Course name: ZCT 3.2 "Parasitology"

CO1: Historical account on discovery of parasites, type, classification, bioecology of parasites and Host parasite interaction.

CO2: Etiology, life cycle, host, transmission, pathology, distribution, symptomatology, diagnosis, treatment and prevention of common parasites and disease caused by them.

CO3: Immune response and defense mechanism of host, biochemical and morphological adaptations of parasites and parasites of veterinary importance.

CO4: Vectors and modes of transmission of diseases, life cycle and disease transmission by ectoparasites.

CO5: Basic traditional and modern methods for controlling parasites and study of parasite resistance.

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Programme outcomes:

PO1: Understand the history, discovery and types of parasites.

PO2: Understand - mode of life, mode of invasion, interaction with the host and damaged caused to the host.

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PSO3: Understand host immune system and the responses displayed by the immune cells on encounter of parasites

PSO4: Understand how various strategies are adopted by the various ectoparasites, endoparasites in order to survive in the body of host

PSO5: Analyse and adopt various methodologies to control the invasion of parasites

Course name: ZOOL 3.3 "Animal Biotechnology"

CO1: Historical account and basics of animal cell culture including establishing primary cell culture, cloning and immortalization of cells

CO2: Different cell isolation techniques, characterization of cells using different biotechnological techniques and embryo culture

CO3: Embryo transfer in livestock (SUPER) animal cloning, cloning for wildlife conservation

CO4: Legal, ethical and socio economic outcomes of transgenic animals and their application in biotechnology

Programme outcome

PSO1: Understanding of protocols of cell culture cloning, methods, primary cell culture

PSO2: Knowledge for production of better livestocks

PSO3: Knowledge of various biochemical and molecular lab techniques of animal biotechnology

PSO4: Understanding of transfection methodologies and overall awareness of animal biotechnology

PSO5: Knowledge of biotechnological application in industries pharma and in medicine

Course name: DEC 3.7 "Fundamentals of animal sciences"

CO1: Introduction to animal taxonomy, classification and nomenclature

CO2: Basics of animal cell and organelles

CO3: Detailed study of animal physiology such as nutrition, respiration, excretion, nervous system and reproduction

CO4: Fundamentals of animal genetics, evolution and continuity of life and fundamentals of ecology and environmental pollution

CO5: Detailed study of economic zoology such as apiculture, sericulture, dairy and poultry.

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Programme outcomes:

PO1: Brief idea and knowledge of overall concepts of zoological sciences.

PO2: Understanding of classification system in zoology.

PO3: Knowledge of cell and its organelles and their function.

PO4: Knowledge of economic zoology gives an idea to provide a alternative source of income.

PO5: Brief overview of evolutionary, genetic and ecological studies.

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M.Sc IV Semester Zoology

Course Outcomes (CO's)

Course name: ZCT 4.1 "General and comparative endocrinology"

CO1: Overview of vertebrate endocrine system, types of secretion and classification of hormones.

CO2: Anatomical study of various endocrine glands and role of thyroid gland in amphibian metamorphosis

CO3: Synthesis and action of various hormones produced by various endocrine glands, role of hormones in homeostasis of calcium and glucose, in metabolism, behavior and milk ejection reflex.

CO4: Receptor mediated hormonal action and positive and negative feedback loops of hormones.

CO5: Detailed study of various growth factors.

CO6: Organization, function and hormonal responses with respect to immune system.

Programme outcome:

PO1: Understand the endocrine system and hormones secreted by them.

PO2: Understanding how hormones control homeostasis, metabolism and behavior in vertebrates

PO3: Understanding the feedback loops of hormones and role of growth factors.

PO4: Understanding the interaction of hormones with the immune system.

Course name - ZCT 4.2 "Biology of Reproduction"

CO1: Study of sex determination and study of gonads, hermaphroditism.

CO2: Detailed study of anatomical, histological, physiological and functional aspects of male reproductive system.

CO3: Detailed study of anatomical, histological, physiological and functional aspects of female reproductive system.

CO4: Study of female reproductive processes and their control, histophysiology and endocrine functions of placenta and mammary glands.

CO5: Overview of fertility control in male and female including temporary and permanent methods and Assisted Reproductive Technology (ART).

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Programme outcome:

PO1: Understanding of Histo-architecture and Physiology of Male and Female reproductive system

PO2: Understanding the governance of Hormones in Puberty, Pregnancy, Parturition and Lactation

PO3: Knowledge of Contraception and Assisted reproductive techniques.

PO4: Understanding of role of genetics and endocrine glands in sexual dimorphism.

Course name – ZCT 4.3 "Applied Zoology"

CO1: Detailed study of vermiculture, life cycle of Earthworm and applications of vermiculture.

CO2: Detailed study of lifecycle of honeybees and silkworms, their rearing practices and economic importance.

CO3: Overview of lifecycle and damages caused by agricultural pests and their control measures.

CO4: Study of various dairy breeds, their breeding practices and economic importance of dairy farming.

CO5: Overview of culturing freshwater, brackish and marine fish (indigenous and exotic) and fishery products.

CO6: Overview of indigenous and exotic poultry breeds and techniques of poultry farming, poultry diseases and economic importance.

Programme outcome:

PO1: Knowledge of life cycle of economically important Zoological organisms.

PO2: Application of knowledge of the pests in order to manage and control pests in agriculture.

PO3: Knowledge of culturing economically important organisms to generate revenue.

PO4: Knowledge of various byproducts produced by Vermiculture, Apiculture, Sericulture, Dairy, Fisheries, Poultry.

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Monthly teaching

Month-wise Syllabus Distribution for 2022-23

Name of Faculty: Dr. P. A. Deshpande

M. Sc. III Sem

December 2022 - January 2023

Paper 3.1: Developmental Biology

1. Morphogenesis: Gastrulation, selective affinities of cells.

Paper 3.3: Animal Biotechnology

1. Historical account of cell culture.
2. Advantages and limitations of cell culture.
3. Methods and protocols for cell culture.

Paper 3.6: Fundamentals of Animal Sciences (OEC)

1. Brief description and economic importance of apiculture.
2. Brief description and economic importance of sericulture.

M. Sc. I Sem

Paper 1.1: Biology of chordates

1. Origin of chordates.

Paper 1.2: Biology of Non-chordates

1. Asexual, sexual and parthenogenetic mode of reproduction and their significance in invertebrates.

Paper 1.3: Animal Systematics and Evolution

1. Collection: Purpose, value, scope of collections, content of collections.
2. Preservation of collections.

Paper 1.4: Environmental Biology

1. Concept and classification of natural resources.

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Name of Faculty: Dr. P. A. Deshpande

M. Sc. III Sem

February 2023

Paper 3.1: Developmental Biology

1. Notch-signalling, skin/ nerve regulatory switch in flies.

Paper 3.3: Animal Biotechnology

1. Nomenclature of cell-lines, Propagation of cell-lines.
2. Cloning methods.

Paper 3.6: Fundamentals of Animal Sciences (OEC)

1. Brief description and economic importance of animal husbandry.
2. Brief description and economic importance of fisheries.

M. Sc. I Sem

Paper 1.1: Biology of chordates

1. Origin, evolution and adaptive radiation in fishes.

Paper 1.2: Biology of Non-chordates

1. Larval forms and their significance (Porifera, Coelenterata, Platyhelminthes, Annelida).

Paper 1.3: Animal Systematics and Evolution

1. Preservation of collections.
2. Post-collection processes.

Paper 1.4: Environmental Biology

1. Non-renewable resources: Land and soil.

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Name of Faculty: Dr. P. A. Deshpande

M. Sc. III Sem

March 2023

Paper 3.1: Developmental Biology

1. Axonal path finding.
2. Mesoderm, Vertebrate heart development.

Paper 3.6: Fundamentals of Animal Sciences (OEC)

1. Brief description and economic importance of poultry.
2. Brief description and economic importance of vermiculture.

M. Sc. I Sem

Paper 1.1: Biology of chordates

1. Origin, evolution and adaptive radiation in amphibians.
2. Origin, evolution and adaptive radiation in reptiles.

Paper 1.2: Biology of Non-chordates

1. Larval forms and their significance (Arthropoda, Mollusca, Echinodermata).

Paper 1.3: Animal Systematics and Evolution

1. Preparation and packaging of specimen for posting.
2. Curating of collections.

Paper 1.4: Environmental Biology

1. Renewable resources: Water, Forest.

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Name of Faculty: Dr. P. A. Deshpande

M. Sc. I Sem

April 2023

Paper 1.1: Biology of chordates

1. Origin, evolution and adaptive radiation in aves.
2. Origin, evolution and adaptive radiation in mammals.

Paper 1.2: Biology of Non-chordates

1. Invertebrate larvae and their evolutionary significance.

Paper 1.3: Animal Systematics and Evolution

1. Identification of collected specimens.

Paper 1.4: Environmental Biology

1. Renewable resources: Wildlife, agriculture, livestock.
2. Renewable and non-renewable energy resources.

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2.6.1

DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2022-2023)

NAME OF THE STAFF: Mr. R. S. SAWANT

CLASS -B.Sc. 1st SEMESTER-DSC

TOPIC TO BE COVERED IN THE MONTH OF SEPTEMBER 2022	HOURS
Chapter No. 3 Microscopy-Working principle and applications of light, dark field, phase contrast and electron microscopes (SEM and TEM). Microbiological stains (acidic, basic and special) and Principles of staining. Simple, Gram's and differential staining.	3 hours
TOPIC TO BE COVERED IN THE MONTH OF OCTOBER 2022	
TEM Microbiological stains (acidic, basic and special) and Principles of staining. Simple, Gram's and differential staining. **Chapter No. 2** History and developments of microbiology-	2 hours
TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2022	
ChapterNo.2 Microbiologists and their contributions (Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Dmitri Iwanowski, Sergius Winogradsky and M W Beijerinck and Paul Ehrlich)	4 hours
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2022	
Chapter No. 1: Microbial diversity-Introduction to microbial diversity; Hierarchical organization and positions of microbes in the living world. Whittaker's five-kingdom system. Distribution of microbes in soil, air, food and water. Significance of microbial diversity in nature.	5 hours

CLASS -B.Sc. 1st SEMESTER-OEC

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2022	HOUR
Origin of Cultivated Plants. Concept of Centres of Origin, their importance with reference to Vavilov's work. Examples of major plant introductions.	5 hours
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2022	
Crop domestication and loss of genetic diversity (Only conventional plant breeding methods). Importance of plant bio- diversity and conservation. **Cereals**: Wheat and Rice (origin, evolution, morphology, post-harvest processing & uses). Green revolution. Brief account of millets and their nutritional importance.	5 hours

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CLASS B.Sc. 3RD SEMESTER- DSC

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2022	HOURS	No of Hrs
Unit III: Morphogenesis and Differentiation Differentiation and cell polarity in acellular (Dictyostelium),	2 hours	
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2022		
Unicellular (Acetabularia) and multicellular system (root hair and stomata formation Shoot Apical meristem (SAM): Origin, structure and function,: Differentiation of root, stem, leaf Transition from vegetative apex into reproductive apex	6 hours	04 Feb
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2023		
Developmental patterns at flowering apex: ABC model specification of floral organs. Modification of gene action by growth hormones and cellular differences between floral organs. Senescence – a general account	6 hours	04.

CLASS B.Sc. 3RD SEMESTER- OEC

TOPIC TO BE COVERED IN THE MONTH OF NOVEMBER 2021	HOURS	
Principles of gardening,	2 hours	04
TOPIC TO BE COVERED IN THE MONTH OF DECEMBER 2021		
garden components, adornments, lawn making, methods of designing rockery, water garden, etc. Special types of gardens, their walk-paths, bridges, constructed features. Green house,	6 hours	
TOPIC TO BE COVERED IN THE MONTH OF JANUARY 2023		
Special types of gardens, trees, their design, values in land scaping, propagation, planting shrubs and herbaceous perennials. Importance, design values, propagation, planting, climbers and creepers, palms, ferns, grasses and cacti succulents.	6 hours	4

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester I

Month: October 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
R. T. Katamble	ATOMIC STRUCTURE 'Review of Rutherford Bohrs model 'Bohrs Model of an atom ·Derivation of radius and Energy of an elatron of an H-atom	04
Smt. V. p. pitre	Gaseous state - * Introduction - * Real and Ideal gas. * Andrew's Isotherm * Critical constants	04
Smt. C. V. Balikai & R. Chitni		04
Smt. C. V. Balikai		04

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester I

Month: November 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
R. T. Katamble	Atomic structure contd · Hydrogen spectra · de-Broglie hypothesis and equation · Heisenberg uncertainty principle · quantum numbers · Atomic orbitals	04
Smt. V. p. pitre	* Derivation of critical constants. * Equation of reduced state. * Problems on Pr, Vr, Tr & Pc, Vc, Tc. * Distribution of molecular velocity	04.
Smt. C. V. Balikai		
Smt. C. V. Balikai	Bonding in organic molecules – Types of bonding – Hybridization	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester I

Month: December 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
R. T. Katamble	Atomic Structure contd Electronic configuration - Rules. . E.C of elements from z=1 to 54. Periodicity in properties. - introduction	04
Smt. V. p. pitre	* Nernst distribution law * Introduction * solubility. * K_D.	04.
Smt. C. V. Balikai		
Smt. C. V. Balikai	Bonding in organic molecules - Types of Hybridization - Effect of hybridization on Bond properties. - Aromaticity	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester I

Month: Jan 2024

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
R. T. Katamble	Periodicity in properties · Sheilding effect. · Effective atomic number and its calculation · Energy exchange. · Electronegativity scales	04
Smt. V. P. pitre	* Association of the solute * Dissociation of the solute * Parke's process.	04
Smt. C. V. Balikai		
Smt. C. V. Balikai	Bonding in organic molecules — Types of reaction — Arrow used in reaction. — Electrophile / nucleophiles and free radicals.	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester III

Month: Nov ----------2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Prof. A. K. Samant	- Elimination reactions. - E1, E2, E1cB reactions. - Hoffmann elimination - Addition of halogens. - Ozonolysis	
Prof. A. K. Samant	- Diels-Alder reactions. - Allylic and benzylic bromination. - mech. of n propene, 1 butene.	
Dr. S. G. Adoor	Thermodynamics – Introduction, Basics, Thermodynamic process, Heat and work. First law, Work done, Joule-Thomson effect, problems.	
Smt. C. V. Balikai	* Quantitative analysis- Instrumental methods - Electromagnetic Spectrum - Beers law, Beer-lamberts law - Derivation	04

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MONTHLY TEACHING PLAN

Semester III

Month: Dec ----------2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Prof. A. K. Samant	• Nucleophilic substitution reactions • S_N1, S_N2 reactions, energy profile diagram • Mech. of Halogenation, nitration, sulphonation.	
Prof. A. K. Samant	• Mech. of Friedel-Craft alkylation and acylation. • Activating and deactivating groups. • S_NAr reaction & Benzyne mech.	
Dr. S. G. Adoor	Thermodynamics – Second law ⇒ Entropy, statements of second law, Entropy change for reversible and irreversible processes, Gibbs energy and Helmholtz energy	
Smt. C. V. Balikai	Quantitative Analysis. – Limitation, construction of caliberation Graph. – internal standard addition. –	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester III

Month: Jan 2024

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Prof. A. K. Samant	• Structure of ionic solids • Radius ratio rules • Calculation of limiting radius ratio values with coordination 3, 4, 6.	
Prof. A. K. Samant	• Ionic compounds of AB type AX: ZnS, NaCl, CsCl. • AX_2 CaF_2. • Limitations of radius ratio concept	
Dr. S. G. Adoor	Adsorption → Freundlich adsorption isotherm. Langmuir adsorption isotherm BET equation	
Smt. C. V. Balikai	Analytical Chemistry – Spectrophotometer – Single beam double beam – Evaluation procedure.	

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MONTHLY TEACHING PLAN

Semester III

Month: Feb 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Prof. A. K. Samant	• Kapustinskii equation. • Solvation energy and solubility of ionic solids. • Covalent bonding - Lewis theory. octet rule.	
Prof. A. K. Samant	• Sidgwick-Powell Theory. • VSEPR theory. • Effect of lone pairs, electronegativity, • VSEPR examples BF_3, BF_4^-, NH_3, NH_4^+ CF_4, SF_6 Limitations.	
Dr. S. G. Adoor	Catalysis → types of catalysis Michaelis-Menten eqn Heterogeneous catalysis- Unimolecular and bimolecular surface reactions	
Smt. C. V. Balikai	- Analytical Chemistry - Nephelometry and Turbidometry - Application - Determination of SO_4^{2-} and PO_4^{3-}	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester V I

Month: November. 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. S. M. Deshpande	Polymers - Introduction to Polymers. monomers & copolymers General Preparation of Polymers, properties.	
Prof. A. K. Samant	Introduction to transition & inner transition elements.	
Smt. P. P. Pitre	Spectroscopy - * Rotational spectra. * Types of molecules * Moment of inertia equation.	04.
Smt. C. V. Balikai	Alkaloids - Definition, classification - Properties.	

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MONTHLY TEACHING PLAN

Month: December 2023

Semester V-I

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. S. M. Deshpande	Polymers: Plasticizers, Stabilizers, Polymer Synthesis, Initiator, Manufacture of Polymers - Polyethylene, Polystyrene, Polyvinylchloride, Fluoro Polymers.	04
Prof. A. K. Samant	• Introduction to topic • E.C. of d-block elements • General properties • Variable oxidation state. • Colour of d-block elements.	
Smt. P. P. Pitre	* Energy level diagram. * Calculation of energy * Selection rule. * Problems on $I = \mu r^2$	04.
Smt. C. V. Balikai	Alkaloids - Extraction & isolation - Hoffmans degradation - Nicotine. - Conine	04

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester V-I

Month: January 2024

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. S. M. Deshpande	Polyamides, Polyurethanes, Silicon Polymers. Polycarbonates, Conducting Polymers, Polyaniline, Polypyrrole, Poly-thiophene. Nanomaterials – Preparation, ; Bionorganic materials,	
Prof. A. K. Samant	• f-block elements. • E.C. of f-block elements • Colour, Magnetic properties • Lanthanide contraction. • Ion-exchange method.	
Smt. P. P. Pitre	Vibrational spectra: * Introduction * Simple harmonic oscillator * Energy level diagram * Selection rule, Problems.	04
Smt. C. V. Balikai	Heterocyclic Compound - Introduction, classification - pyridine, pyrrole & furan.	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Month: February 2024

Semester V I

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. S. M. Deshpande	Inorganic polymers, types, silicones, Phosphazenes- structure, applications.	
Prof. A. K. Samant	• Nomenclature of coordination compds. • Valence bond theory and examples • Isomerism in coordination chemistry	04
Smt. P. P. Patre	Electronic spectra. * Valence bond theory * Molecular orbital theory * Franck condon principle * Types of transitions.	05
Smt. C. V. Balikai	- Green Chemistry - Introduction - principles of Green Chemistry.	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester V-II

Month: NOV ----------2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. R. T. Katamble	Industrially Important compounds-I CEMENT · Introduction- Portland cement · Raw materials & components of cement · Manufacturing of cement- Rotary kiln method · Setting of cement	04
Prof. S. G. Adoor	Electromotive force - Galvanic cells - Daniel Cell Measurement of EMF, standard cell, Types of electrodes, Reference electrode, Nernst equation	
Prof. S. G. Adoor		

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MONTHLY TEACHING PLAN

Semester V-II

Month: Dec 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Prof. R. T. Katamble	Industrially important compounds - I ABRASIVES Defination - Mohs scale of Hardness Types of abrasives, properties & uses . Preparation of carborundum, WC & Alundum	04
Prof. S. G. Adoor	Determination of pH using hydro different electrodes Problems. Concentration cells with and without transference. Salt bridge, Liquid junction potential Potentiometric titrations	
Prof. S. G. Adoor		

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MONTHLY TEACHING PLAN

Semester V-II Month: Jan 2024

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Mr. R. T. Katamble	Industrially important compds - I Glass: Raw materials · Types of glass · Manufacture of glass · Properties & uses of glass	04
Prof. S. G. Adoor	Battery Technology - Introduction, working Lead storage battery, Nicd battery. In-MnO_2 and Li-MnO_2 batteries.	
Prof. S. G. Adoor		
Dr S.M.Gurupadi	UV-visible Spectroscopy - Types of electronic transitions, Chromophore auxochrome, - Woodward-Fischer rule for calc. of λ_{max}, Applications of UV-VIS-Spectroscopy.	

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DEPARTMENT OF CHEMISTRY

MONTHLY TEACHING PLAN

Semester V-II

Month: Feb 2023

Name of the staff	Synopsis of portion to be taught in the chapter during the month	No of Hrs
Dr. R. T. Katamble	Industrially important compds - II . Fuel: characteristics of fuels & Calorific value · Advantages of gaseous fuels . Manufacture of water gas · Alloys	06
Prof. S. G. Adoor	Fuel Cells - Introduction, H_2-O_2 Fuel Cell Mass Spectroscopy - Theory and instrumentation, McLafferty rearrangement	
Prof. S. G. Adoor		
??		

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DEPARTMENT: GEOLOGY

TEACHING PLAN **Month : May-June 2023**

Sl. No.	Name of the staff	Name of Topic	Semester	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
1	Mr. Suraj Subhash Mesne	Basics of Crystallography, Mineralogy and Petrology	2	Crystal morphology and internal structures. Crystal parameters and indices. Crystal symmetry and classification of crystals into six systems and 32-point groups	6	
		Gems and Ornamental Stones (OEC)		Introduction to Gemology, classification of gemstones, detailed study of different physical characters and Optical properties of minerals with special reference of to gem minerals. Physico-optical effects in gem stones. Colour and cause of color in gems		
		Structural Geology and Hydrogeology	4	Introduction and basic concepts. Scope of hydrogeology and its societal relevance Hydrologic cycle. Precipitation, evapo transpiration, run-off, infiltration and subsurface movement of water	6	
		Paper I: Hydrogeology & Geochemistry Paper 2: Environmental Geology and Engineering Geology	6	Introduction. Concept of Geochemistry, Structure and atomic properties of elements Role of Engineering Geologist in planning, design and construction of major manmade structures Engineering properties of rocks: crushing strength, porosity, density, abrasive resistance	14	
		Basics of Crystallography, Mineralogy and Petrology	2	Rock associations in time and space. Physical aspects of magma generation in crust and mantle. Physical properties of magmas; igneous cumulates, liquid immiscibility, pneumatolitic action, magmatic assimilation and mixing of magmas	10	

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Geology Department
G. S. S. College, Belgaum

Head of the Department

IQAC Co-ordinator
GSS College, Belagavi

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DEPARTMENT: GEOLOGY

TEACHING PLAN **Month : May-June 2023**

Sl. No.	Name of the staff	Name of Topic	Semester	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
2	Mr. Yogesh Maruti Kutre	Structural Geology and Hydrogeology	4	Introduction to structural geology,structural forms of rocks, concept of brittle and ductile deformation,Forces Compression, tension, tortion and shear	12	
		Paper 2: Environmental Geology and Engineering Geology	6	Definition of ecology and environmental geology, man and environment, scope and importance. Role of Geology in environmental studies. The physical environment - Atmosphere, hydrosphere, lithosphere and biosphere. Anthropogenic environment	10	
		Mining Geology (SEC)		Introduction- Role of geology in mining industry. Definition of mining terms- shaft, hanging wall, adit, roof, drive, cross cut, tunnel, raise, winze, stopes- types		
3	Miss. Tejasvi Pawashe	Basics of Crystallography, Mineralogy and Petrology	2	Elements of crystal chemistry and aspects of crystal structures. Minerals: definition and classification	4	
		Industrial Minerals (OEC)		Introduction to minerals and rocks Introduction to rock forming and economically important minerals. Principles of rock cycle, origin and classification of economically important mineral deposits.		
		Structural Geology and Hydrogeology	4	Ground water chemistry: Physical and chemical properties of water and water quality, Introduction to methods of interpreting groundwater quality data using standard graphical plots	4	

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DEPARTMENT: GEOLOGY

TEACHING PLAN

Month : May-June 2023

Sl. No.	Name of the staff	Name of Topic	Semester	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
		Paper I: Hydrogeology & Geochemistry	6	Hydrological Cycle- Evaporation, transpiration, evapotranspiration, precipitation, sublimation, infiltration, runoff, groundwater flow. Water Resources: Surface water and its types. Groundwater and its sources, and sustainable water management Hydrological properties of water bearing materials: Specific yield, specific retention, porosity, permeability, types of openings in rocks.	12	

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DEPARTMENT: GEOLOGY

TEACHING PLAN

Month : July 2023

Sl. No.	Name of the staff	Name of Topic	Semester	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
1	Mr. Suraj Subhash Mesne	Basics of Crystallography, Mineralogy and Petrology	2	Stereographic projections of symmetry elements and forms.	4	
		Gems and Ornamental Stones (OEC)		Cutting and polishing of gemstones. A detailed study of important precious and semi-precious gem minerals- their characters and occurrences- world occurrences in general and Indian occurrences in particular. Precious Varieties.1. Diamond, 2. Ruby, 3. Sapphire, 4. Topaz, 5. Emerald ii) Semi-Precious varieties: Garnets, Quartz, Lapislazuli, Turquoise and Organic gems.		
		Structural Geology and Hydrogeology	4	Rock properties affecting groundwater, Vertical distribution of subsurface types of aquifer, aquifer parameters, anisotropy and heterogeneity of aquifers. Ground water flow Darcy's law and its validity intrinsic permeability and hydraulic conductivity. Groundwater flow rates and flow direction, Laminar and turbulent ground water flow. Well hydraulics and Ground water exploration,	6	
		Paper I: Hydrogeology & Geochemistry Paper 2: Environmental Geology and Engineering Geology	6	The Periodic Table. Goldschmidt's classification of the elements and distribution in the Earth – Lithophile, Siderophile, Chalcophile & Atmophile.	8	

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2	Mr. Yogesh Maruti Kutre	Basics of Crystallography, Mineralogy and Petrology	2	Textures of igneous rocks Classification of igneous rocks. Igneous rock association, Origin, classification and occurrence of sedimentary rocks. Siliciclastic Sedimentary Rocks. Sedimentary textures,	12	
		Structural Geology and Hydrogeology	4	rimary structural forms–Sedimentary and Igneous Rocks. Lineation, Foliation and Unconformity. Description and origin of foliations. axial plane cleavage and its tectonic significance. Description and origin of lineation and relationship with the major structures. Unconformity types – para, dis, non, angular and regional unconformities Secondary structural forms:A. Cohesive Dislocations –Distortion, bending and Folds Folds. Definitions - parts of folds, axis, axial planes, limb, plunge. Crest and troughs. Mechanics of folding. Buckling, Bending, Flexural slip and flow folding. Types of folds – symmetrical and asymmetrical – anticline, syncline, anticlinorium, synclinorium, overturned fold, recumbent fold. isoclinal, chevron, fan folds, monocline and drag folds. Denudational structures – Outlier and inlier.	12	
		Paper 2: Environmental Geology and Engineering Geology	6	Pollution- air, water and soil pollution - causes and effect. Heavy metal pollution in ground water. Greenhouse effect, Global Warming and their effect on the environment. Ozone depletion	16	
		Mining Geology (SEC)		Methods of mining- Surface methods- Alluvial mining –pan & betea, sluicing, Hydraulicking, Dredging. Open cast mining (benches, explosives, working slope) and quarrying. Mining equipments – Dragline, power showels		
		Basics of Crystallography, Mineralogy and Petrology		physical and chemical composition of common rock-forming minerals. Nature of light and principles of optical mineralogy. Introduction to the petrological microscope		

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3	Miss. Tejasvi Pawashe	Industrial Minerals (OEC)	2	Properties of minerals and rocks, and their occurrences Physical properties, chemical composition, and diagnostic criteria for the identification of minerals. Ore minerals and gangue minerals, tenor and grade of the ore for industrial processing of minerals Selection criteria followed for quarrying of decorative and dimensional rock blocks/slabs. National mineral policy	4	
		Structural Geology and Hydrogeology	4	Sea water intrusion in coastal aquifers. Ground water management, Surface and subsurface water interaction, Ground water levelfluctuations, Basic concepts of water balance studies,	4	
		Paper I: Hydrogeology & Geochemistry	6	Subsurface distribution of water: Zone of aeration, zone of saturation, groundwater table, perched water table Aquifers: Definition, Classification- Confined and unconfined aquifers, aquiclude, aquifuge, aquitard and Darcy's Law. Seepage: Definition, factors controlling seepage, influent and effluent seepage. Springs: Definition, classification- gravity and non gravity; types of springs- bedding plane, contact, thermal and artesian. Wells and types of wells- dug well, bore well and artesian well	12	

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TEACHING PLAN

DEPARTMENT: GEOLOGY

Aug

Month : ~~July~~ 2023

Sl. No.	Name of the staff	Name of Topic	Semester	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
1	Mr. Suraj Subhash Mesne	Basics of Crystallography, Mineralogy and Petrology	2	Introduction to analytical techniques like XRD (X-ray diffraction), SEM (secondary electron microscopy).	4	
		Gems and Ornamental Stones (OEC)		Ornamental stones Introduction to petrology. Classification of rocks. Properties of Igneous, Sedimentary and Metamorphic rocks Suitability of rocks for ornamental purposes Occurrence and distribution rocks in Indian sub-continent with particular reference to Karnataka. Evaluation, Quarrying , cutting and polishing of rocks		
		Structural Geology and Hydrogeology	4	Basic Concepts (Draw down, specific capacity) Elementary concepts related to equilibrium and Non-equilibrium conditions for water flow to a well in confined and unconfined aquifers , Surface-based groundwater exploration methods, Introduction to subsurface borehole logging methods	6	
		Paper I: Hydrogeology & Geochemistry Paper 2: Environmental Geology and Engineering Geology	6	Geochemical Cycle Stability of Minerals Building matenals - sand, building and dimension stones, aggregates, lime and cement, clays and clay products. Use of Dolerite, Granite, Gneiss, Marble, Slate and Sandstone as decorative stones	8	
		Basics of Crystallography, Mineralogy and Petrology	2	Sedimentary structures. Sandstones, Conglomerates, Mudstones and shales Diagenesis of sandstones and shales, Limestones, Dolomites Metamorphic rocks- Metamorphism, types of metamorphism, classification of metamorphic rocks, common textures and Structures.	12	

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2	Mr. Yogesh Maruti Kutre	Structural Geology and Hydrogeology	4	Disruptive Dislocations – Joints and Faults. Joints: Definition, Dip, Strike, Joint plane, block Joint, Joint set, Joint system. Classification – I. Geometrical: . II. Genetic. Master joints. Importance of joints. Fractures and Faults: Definition-Elements of fault. Classification – I. Geometrical. a) Based on attitude of faults as compared to the adjacent beds: Dip, Strike, Diagonal and Bedding faults. b) Based on Apparent movement, normal and reverse faults. II. Genetic. Thrust faults, over thrust, and under thrust. Gravity faults - Step fault, Ridge fault, Trough faults. Criteria for recognition of faults in the field.	12	
		Paper 2: Environmental Geology and Engineering Geology	6	Hazards: Definition, types of hazards- natural (volcano, earthquake, tsunami, landslide, cyclone and flood) and manmade hazards (soil erosion, coastal erosion). Hazard/disaster management – hazard zoning maps, risk assessment. Waste management. Nuclear waste, Plastic waste, Electronic waste – effects. Environmental Hot spots. Desertification –causes and mitigation	16	
		Mining Geology (SEC)		Underground/subsurface mining (stoping- open stopes, supported stopes). Advantages and limitations. Types of Stopes – open stopes, supported stopes, pillar supported stopes – timber supported stopes. Mine Closure methods. Impact of mining on environment.		
3	Miss. Tejasvi Pawashe	Basics of Crystallography, Mineralogy and Petrology	2	identification of common rock forming mineral	4	
		Industrial Minerals (OEC)		Properties, occurrences and distribution of the following minerals/rocks in India, with special reference to Karnataka:		
		Structural Geology and Hydrogeology	4	issues related to groundwater resources development and management, Rain water harvesting and artificial recharge of groundwater.	4	

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	Paper I: Hydrogeology & Geochemistry	6	Occurrence of Groundwater in different terrains - weathered hard and stratified rocks Water harvesting: Rainwater harvesting and its importance Groundwater recharge structures Water quality parameters - Temperature, pH, conductivity, dissolved oxygen (DO), turbidity	12	

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DEPARTMENT OF ENGLISH

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF: AMRUTA PATIL
CLASS: B.Sc. II Semester

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
1. Meaning and Introduction of Prose 2. Meaning and Introduction of Poetry 3. Meaning and introduction of Translation from English to Kannada and Kannada to English 15 short paragraphs with 5-6 sentences as model Paragraphs. (a) Paragraph Translation from Kannada to English (b) Paragraph Translation from English to Kannada	6 hrs
TOPICS TO BE COVERED IN THE MONTH OFJUNE 2023	
Unit-II Poetry 1. A Prayer For My Daughter – W.B.Yeats 2. Still I Rise – Maya Angelou 3. How Did You Die- Edmund Vance Cooke 4. **Grammar** **Unit-III** **Reading Vocabulary Building** 1. Synonyms 2. Homonyms 3. Homophones 4. Suffixes 5. Prefixes 6. Collocations 7. Often Confused Words.	9+3=12 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
Unit-IProse 1. Zero Budget Natural Farming – Shibu 2. Milka Singh: The Flying Sikh- Sonia Sanwalka 3. On Saying Please – A.G.Gardiner **GRAMMAR Unit-III** 1. Reading Passage to give a Title. 2. Reading Passage on Specific fields for Vocabulary building. 3. Barriers for Effective listening 1hr chapter. 4. Types of Listening 5. Techniques to improve listening skills. 6. Listening activities – Listening to pre- recorded audio and movies	15+13=28 hrs

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TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
Unit – IV Grammar 1. Reported Speech 2. Dialogue Writing 3. Verbal Communication and Non-Verbal Communication 4. Summarising 5. Speech Writing 6. Essay Writing 7. Short Paragraphs based on themes with message on nation,freedom fighters, and achievers.	14hrs
TOTAL	60 hrs

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DEPARTMENT OF ENGLISH

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF: AMRUTA PATIL
CLASS: B.Sc. IV Semester

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
1. Meaning and Introduction of Novella 2. Meaning and Introduction of Poetry 3. Introduction of Communicative English	6 hrs
TOPICS TO BE COVERED IN THE MONTH OF JUNE 2023	
Unit-II **Listening, Decoding and Speaking Skills** **Listening to poems (any best rendering on you tube or any channel)** 1. "Invictus" – William Ernest Henley 2. " On Killing a Tree " – Gieve Patel **TED Talks** 1. A Well Educated Mind – Shashi Tharoor 2. India's Environmental Crisis Unspoken and Unheard 3. Gender Equality and Empower all Women	5 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
Unit-I Text: Carvalho – K.P.Poornachandra Tejaswi Pecha Kucha Presentation Group Discussion Interview	18 +4=22 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
2. Technical writing Scientific Precis Writing Copy Writing Article Writing 3. Email writing Casual and Professional – Appreciation , Congratulation , Promotion Letter , Leave Letter	10hrs

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4. Social Media Blog Writing, Podcast, Writing on Face Book , Twitter , Quora , Instagram	6hrs
TOTAL	56hrs

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DEPARTMENT OF MARATHI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. Sonali B.Kangale
CLASS : B.Sc.Ist Semester
TEXT : **कथासंग्रह-'निवडक मराठी कथा'- संपादक डॉ.वसंत शेकडे**

TOPICS TO BE COVERED IN THE MONTH OF SEPTEMBER 2022	Teaching Hours
- मराठी साहित्याचा थोडक्यात परिचय - मराठी कथा स्वरूप आणि वाटचाल	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF OCTOBER 2022	
- लेखक परिचय सांगून निवडक सात कथांचे विवेचन १. मृणालिनीचे लावण्य' - दिवाकर कृष्ण २. 'संस्कार '- वामनराव चोरघडे - प्रसार माध्यमांसाठी लेखन कौशल्य	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2022	
३ .'मरीआईचा गाडा' - अण्णाभाऊ साठे ४. 'तलावातले चांदणे' - गंगाधर गाडगीळ ५. 'वळीव' - शंकर पाटील - प्रस्तुत कथांमधील व्यक्तिरेखांचे चित्रण - संदर्भ लेखन -चर्चा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2022	
६. 'भुताचा जन्म'- द.मा.मिरासदार ७. 'कृष्णविवर'- जयंत नारळीकर - या कथांचे विवेचन, व्यक्तिरेखांचे चित्रण - 'निवडक मराठी कथां'चे वाङ्मयीन विशेष, रसग्रहण - सविस्तर उत्तर लेखन चर्चा	13 hrs
TOTAL	64 hrs

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(Prof. Sonali B. Kangale)

DEPARTMENT OF MARATHI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. Sonali B.Kangale
CLASS : B.Sc.II Semester
TEXT : **कादंबरी - 'माझी काटेमुंढरीची शाळा' - गो.ना.मुनघाटे**

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
-'कादंबरी' साहित्य प्रकाराचे स्वरूप व विशेष, - मराठी कादंबरीची वाटचाल	12 hrs
TOPICS TO BE COVERED IN THE MONTH OFJUNE 2023	
- लेखक गो. ना. मुनघाटे यांचा परिचय व साहित्यसंपदा - प्रकरण एक ते पाठ पर्यंतचे अध्यापन - 'माझी काटेमुंढरीची शाळा' मधील आशयविश्व - मराठी भाषा आणि पत्रकारिता- विषय विवेचन	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
- प्रकरण सहा ते सोळा पर्यंतचे अध्यापन - व्यक्तिचित्रणे व संदर्भ लेखन -चर्चा - बातमी लेखन स्वरुप व संकलन कार्य	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
- प्रकरण सतरा ते बावीस पर्यंतचे अध्यापन - 'माझी काटेमुंढरीची शाळा' वाङमयीन वैशिष्ट्ये, - सविस्तर उत्तरलेखन - चर्चा	13 hrs
TOTAL	64 hrs

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DEPARTMENT OF MARATHI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. Sonali B. Kangale
CLASS : B.Sc.III Semester
TEXT : **कवितासंग्रह- 'बहिणाबाईची गाणी'- संपा. बहिणाबाई चौधरी**

TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2022	Teaching Hours
- मराठी साहित्याचे प्रकार - साहित्यप्रकार 'कविता'- स्वरूप आणि वाटचाल - कवयित्री बहिणाबाईंचा परिचय आणि साहित्य संपदा	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2022	
-निवडक 14 कवितांचा अभ्यास २.माझी माय सरसोती, ३.माहेर, ४.माहेराची वाट, ६.संसार, ८.घरोट (जातें), ९.मन, ११.लपे करमाची रेखा, १२.आता माझा माले जीव - कवितांचा आशय, शब्दार्थ - 'बहिणाबाईंची गाणी' मधील जीवनविषयक तत्त्वज्ञान	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JANUARY 2023	
१७. देव अजब गारोडी, २२.खोप्यामधी खोपा, २४. गुढी उभारनी - कवितांचा आशय - 'बहिणाबाईंची गाणी' मधील निसर्ग - जाहिरात लेखन कौशल्य - विवेचन - साहित्यातील विषयांवर विद्यार्थ्यांचा परिसंवाद(seminar)	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF FEBRUARY 2023	
२६. सासुरवाशीन, २७.योगी आणि सासुरवाशीण, ४१.देव दिसला देव कुठे - कवितांचा आशय - 'बहिणाबाईंची गाणी' मधील स्त्री संवेदना - सविस्तर उत्तर लेखन - चर्चा	13 hrs
TOTAL	64 hrs

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DEPARTMENT OF MARATHI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. Sonali B.Kangale
CLASS : B.Sc.IV Semester
TEXT : **नाटक- 'रायगडाला जेव्हा जाग येते'- प्रा.वसंत कानेटकर**

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
- 'नाटक' स्वरूप व वाटचाल - 'मराठी नाटक' या साहित्य प्रकाराचा इतिहास	12 hrs
TOPICS TO BE COVERED IN THE MONTH OFJUNE 2023	
- नाटककार प्रा.वसंत कानेटकर यांचा परिचय आणि साहित्य संपदा व त्यांच्या सुप्रसिद्ध नाटयकृतींचे विवेचन - नाटकाचे आशयविश्व, कथानक आणि पात्र परिच - पहिल्या अंकामधील पहिल्या प्रवेशाचे विवेचन	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
- पहिल्या अंकातील दुसरा प्रवेश - दुसऱ्या अंकातील पहिला,दुसरा,तिसरा प्रवेश- विवेचन व व्यक्तिरेखाचित्रण - संदर्भ लेखन - चर्चा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
- तिसऱ्या अंकातील पहिला, दुसरा, तिसरा प्रवेश-विवेचन - सविस्तर उत्तर लेखन - चर्चा - अभिनय कौशल्य - विषय विवेचन	13 hrs
TOTAL	64 hrs

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DEPARTMENT OF KANNADA

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Dr. Sunanda M. Kurani

CLASS : B.Sc.Ist Semester **TEXT :** ಕನ್ನಡ ಸಂವರ್ಧನೆ

TOPICS TO BE COVERED IN THE MONTH OF SEPTEMBER 2022	Teaching Hours
ಘಟಕ 1. ಕನ್ನಡ ನಾಡು ನುಡಿ ಪ್ರಜ್ಞೆ **1** ಕನ್ನಡಾಂಬೆಯ ಹಿರಿಮೆ– ಬೆನಗಲ್ ರಾಮರಾವ್ **2.** ಹೊತ್ತಿತೊ ಹೊತ್ತಿತೊ ಕನ್ನಡ ದೀಪ–ಸಿದ್ದಯ್ಯ ಪುರಾಣಿಕ **3.**ಕರ್ನಾಟಕದ ಇತಿಹಾಸ ಮತ್ತು ಕನ್ನಡ ಸಾಹಿತ್ಯ– ಎಂ. ಚಿದಾನಂದಮೂರ್ತಿ **4** ಕನ್ನಡ ಸಂವರ್ಧನೆ– ಡಿ. ಆರ್. ನಾಗರಾಜ್	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF OCTOBER 2022	
ಘಟಕ 2. ಭೂಮಿ 1.ಬೀಜ ಮತ್ತು ಭೂಮಿ– ವಂದನಾ ಶಿವ 2.ನೆಲ ಮುಗಿಲು –ಚನ್ನವೀರ ಕಣವಿ 3.ನಮ್ಮೂರ ಕೆರೆ– ಶಿವರಾಮ ಕಾರಂತ 4.ನನ್ನೊಳು ನದಿಯೋ ನದಿಯೊಳು ನಾನೋ –ಪಾರ್ವತಿ ಪಿಟಗಿ	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2022	
ಘಟಕ 3. ವೈಜ್ಞಾನಿಕ ಮನೋಧರ್ಮ 1ಜ್ಯೋತಿಷ್ಯ ಅರ್ಥಪೂರ್ಣವೋ ಅರ್ಥರಹಿತವೂ– ಎಚ್ ನರಸಿಂಹಯ್ಯ 2.ದೇವರು ಪೂಜಾರಿ– ಕುವೆಂಪು 3.ಮೂರು ಘಂಟೆಗಳು– ಎಚ್. ಎಸ್. ಕೆ. 4.ವಿಜ್ಞಾನ ಪ್ರಶ್ನೆಃ ಸಹಸ್ರಬುದ್ಧೆ (ಅನುಃ ಕೆ. ಪುಟ್ಟಸ್ವಾಮಿ)	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2022	
ಘಟಕ 4. ಸಂಕೀರ್ಣ 1.ಸೋದರರ ಸಮರ –ರತ್ನಾಕರವರ್ಣಿ 2.ಬಿತ್ತನೆ ಹಾಡು – ಜಾನಪದ ಕವಿಗ್ವಿ 3.ಗಡ್ಡೇದ ಬಸವಣ್ಣ– ಜಾನಪದ ಕತೆ 4.ಸಾಹಿತ್ಯದಲ್ಲಿ ವೈಚಾರಿಕತೆ– ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ	13 hrs
TOTAL	64 hrs

PRINCIPAL
G.S.Sc. College, Belagavi

IQAC Co-ordinator
GSS College, Belagavi

Head
Department Of Marathi
G.S.S. College,Belgaum

(Dr. S. M. Kurani)

DEPARTMENT OF KANNADA

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Dr. Sunanda M. Kurani

CLASS : B.Sc.IInd Semester TEXT : ತೆರೆದ ಮನ

TOPICS TO BE COVERED IN THE MONTH OF MAY 2023	Teaching Hours
ಘಟಕ 1. ಘಟಕ–1. ಜೀವನ ಕಲೆ 1 ಜೀವನ ಕಲೆ –ಡಿ.ವ್ಹಿ.ಜಿ 2 ಕೂಲಿ ಮಾಡುತಿದ್ದಾಕೆ ಸಾಪ್ಟವೇರ್ ಕಂಪನಿಯ ಸಿ ಇ ಓ ಆಗಿದ್ದಾಳೆ– ಎ. ಆರ್. ಮಣಿಕಾಂತ 3 ಆದರ್ಶ ಇಲ್ಲದಿದ್ದರೆ ಜೀವನವಿಲ್ಲ– ಡಾ.ಪಾಟೀಲ ಪುಟ್ಟಪ್ಪ 4 ತೆರದ ಮನ– ಎಚ್ ನರಸಿಂಹಯ್ಯ 5 ಚೈತನ್ಯದ ಪೂಜೆ–ದ.ರಾ ಬೇಂದ್ರೆ	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF JUNE 2023	
ಘಟಕ–2: ಕನಸು 1. ಕಲ್ಕಿ– ಕುವೆಂಪು 2. ಧನಿಯರ ಸತ್ಯನಾರಾಯಣ– ಕೊರಡ್ಡಲ್ ಶ್ರೀನಿವಾಸರಾವ್ 3. ನನ್ನ ಇಷ್ಟದ ಪುಸ್ತಕಗಳು– ಡಾ. ಎ. ಪಿ. ಜೆ. ಅಬ್ದುಲ್‌ಕಲಾಂ 4. ನಾನೊಂದು ಕನಸು ಕಂಡೆ! – ಅಕ್ಕಮಹಾದೇವಿ	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
ಘಟಕ–3. ಮಳೆ 1. ಬಣ್ಣದ ಗುಬ್ಬಾರು– ಜನಪದ 2. ಧಾರವಾಡದಲ್ಲಿ ಮಳೆಗಾಲ– ಚೆನ್ನವೀರ ಕಣವಿ 3. ಬರ– ವೀರಭದ್ರ ಕೌದಿ 4. ನಾನು ಪುಟ್ಟ ಮಳೆ ನೋಡಿದ್ದು– ಪ್ರತಿಭಾ ನಂದಕುಮಾರ 5. ಮಳೆ ನಿಂತ ಮೇಲೆ – ಮಾವಿನಕೆರೆ ರಂಗನಾಥ	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
ಘಟಕ–4. ಸಂಕೀರ್ಣ 1. ಕಾಫಿ ಚಟ ಅನುವಂಶಿಕವೇ ಪರಿಸರ ಪ್ರೇರಿತವೇ– ಸುಧೀಂದ್ರ ಹಾಲ್ದೊಡ್ಡೇರಿ 2. ಮಹಿಳೆ ಮತ್ತು ವಿಜ್ಞಾನ– ನೇಮಿಚಂದ್ರ 3. ವಿಗ್ರಹಗಳೋ ಗ್ರಹಗಳೋ– ಶ್ರೀ ಶಿವಮೂರ್ತಿ ಮುರುಘರಾಜೇಂದ್ರ ಮಹಾಸ್ವಾಮಿಗಳು 4. ನ್ಯಾನೋ ತಂತ್ರಜ್ಞಾನ– ಜಿ. ಆರ್ ಲಕ್ಷ್ಮಣರಾವ್	13 hrs
TOTAL	64 hrs

PRINCIPAL
G.S.Sc. College, Belagavi

Department of Marathi
G.S.S. College,Belgaum

(Dr. Sunanda M. Kurani)

IQAC Co-ordinator
GSS College, Belagavi

DEPARTMENT OF HINDI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Dr. Nitu Tiwari
CLASS : B.Sc.Ist Semester
TEXT : KAHANI KUNJA

TOPICS TO BE COVERED IN THE MONTH OF SEPTEMBER 2022	Teaching Hours
• प्रेमचंद की कफ़न कहानी • जयशंकर प्रसाद की कहानी आकाश दीप • यशपाल की कहानी आदमी का बच्चा	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF OCTOBER 2022	
• कमलेश्वर की कहानी खोयी हुई दिशाएं • मोहन राकेश की कहानी अपरिचित • अमरकांत ,डिप्टी कलेक्टरी	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2022	
• उदय प्रकाश ,साईकिल कहानी • संजीव जी की कहानी ब्लैक होल	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2022	
• ओमप्रकाश बाल्मीकि, सलाम • हिन्दी भाषा के बिबिध रूप	13 hrs
TOTAL	64 hrs

PRINCIPAL
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Dr Nitu Tiwari

DEPARTMENT OF HINDI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Dr.Nitu Tiwari

CLASS : B.Sc.3rd Semester

पुस्तक का नाम : एकांकी कलश संचार माध्यम

TOPICS TO BE COVERED IN THE MONTH OF November	Teaching Hours
रीढ़ की हड्डी , जगदीश चन्द्र माथुर साम्यवादी साम्यहीन ,भुवनेश्वर	13 hrs
TOPICS TO BE COVERED IN THE MONTH OF OCTOBER 2022	
अधिकार के रक्षक ,उपेंद्रनाथ अश्क समरेखा विषमरेखा, विष्णु प्रभाकर	13 hrs
TOPICS TO BE COVERED IN THE MONTH OF January 2022	
दो कलाकार,भागवती चरण वर्मा जान से प्यारे, ममता कालिया	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF February 2022	
संचार माध्यम् और हिंदी मुद्रित माध्यम और इलेक्ट्रॉनिक माध्यम	19 hrs
TOTAL	64 hrs

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Dr. Nitu Tiwari

PRINCIPAL
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DEPARTMENT OF HINDI

Monthly Teaching Plan (2023)

NAME OF THE STAFF : DR. NITU TIWARI
CLASS : B.Sc.2nd Semester
पुस्तक का नाम : काव्य कुसुम संपादक: राजेंद्र पॉवर

TOPICS TO BE COVERED IN THE MONTH OF MAY 2023	Teaching Hours
• अयोध्या सिंह उपाध्याय ,कर्मवीर • रामधारी सिंह दिनकर: हिमालय • सच्चिदानंद हीरानंद वत्सायन : हीरोशिमा • वैद्यनाथ मिश्र : कालिदास	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF JUNE 2023	
• भवानी प्रसाद मिश्र : जाहिल मेरे बाने • सर्वेश्वर दयाल: देश कागज पर बना नक्शा नहीं होता • सुमित्रा नंदन पंत : यह धरती कितना देती • अटल बिहारी वाजपेयी: कदम मिलाकर चलना होगा	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
• चंद्रकांत देवताले : औरत • कुंवर नारायण : आठवीं मंजिल पर • एकांत श्रीवास्तव : दातुन बेचने वाले बच्चे • प्रतिभा कटियार : ओ अच्छी लड़कियों	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AGUST 2023	
• पत्र लेखन • आवेदन पत्र • निवेदन पत्र • मुहावरे, कहावते ,नमूना प्रश्न पत्र	3 hrs
TOTAL	64 hrs

PRINCIPAL
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DEPARTMENT OF HINDI

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Dr. Nitu Tiwari
CLASS : B.Sc.4th Semester
पुस्तक का नाम : 'सपनों की होम डिलिवारी' - ममता कलियां

TOPICS TO BE COVERED IN THE MONTH OF MAY 2023	Teaching Hours
• उपन्यास का अर्थ ,परिभाषा, • ममता कलिया का जीवन परिचय	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF JUNE 2023	
• सपनो की होम डिलीवरी उपन्यास के पत्रों का परिचय • उपन्यास का कथोपकथन • आधुनिक युग की समस्याओं पर चर्चा	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
• सपनों की होम डिलीवारी उपन्यास की कथावस्तु • उपन्यास तत्वों के आधार पर समीक्षा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AGUST 2023	
• पत्र लेखन • आवेदन पत्र,निमत्रण पत्र,बैंक सम्बन्धी पत्र,व्यापारिक पत्र।	13 hrs

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DEPARTMENT OF SANSKRIT

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. AVADHOOT JOSHI
CLASS : B.Sc.I Semester
TEXT : वाल्मिकीरामायणम्

TOPICS TO BE COVERED IN THE MONTH OF SEPTEMBER 2023	
वाल्मिकी परिचयम् रामायण परिचयम्	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF OCTOBER 2023	
- वाल्मिकी नारद संभाषणम् - रामस्य गुणवर्णनम्	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2023	
कैकेयी वरयाचनम् रामस्य वनगमनम् वने अनुभूत कष्टपरम्परा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2023	
सीत अपहरणम् सुग्रीव परिचयम् व्याकरण विभागः	13 hrs
TOTAL	64 hrs

PRINCIPAL
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Head
Department Of Marathi
G.S.S. College, Belgaum

DEPARTMENT OF SANSKRIT

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. AVADHOOT JOSHI
CLASS : B.Sc.II Semester
TEXT : विक्रम भेताल

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
- विक्रम राजायाः पूर्वजन्म वृत्तान्तः - विक्रमराजस्य परिचयम् - विक्रमरजस्य राज पद्धतिः	12 hrs
TOPICS TO BE COVERED IN THE MONTH OFJUNE 2023	
- मन्दाकिनि कथा - शूद्रकविरव कथा - हरिस्वामिकथा - व्याकरण विभागः	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
-सत्वशील कथा - धर्मध्वज कथा - यशिधन कथा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
- विष्णुस्वामि कथा - चन्द्रवतीकथा - कथोपसंहारः	13 hrs
TOTAL	64 hrs

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Head
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PRINCIPAL
G.S.Sc. College, Belagavi

DEPARTMENT OF SANSKRIT

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. AVADHOOT JOSHI
CLASS : B.Sc. III Semester
TEXT : अभिज्ञाशाकुन्तला

TOPICS TO BE COVERED IN THE MONTH OF NOVEMBER 2022	
कालिदास परिचयम् नाटक परिचयम्	12 hrs
TOPICS TO BE COVERED IN THE MONTH OF DECEMBER 2022	
पात्रपरिचय शुकुन्तला वृत्तान्तः व्याकरणम्	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JANUARY 2023	
दुष्यन्तस्य परिचयम् दुष्यन्तस्य मृययार्थं वनगमनम् कण्व ऋषे आश्रमगमनम्	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF FEBRUARY 2023	
दुष्यन्त शुकुन्तला विवाहः दुर्वासस्य शापः दुष्यन्तस्य राजभवन गमनम्	13 hrs
TOTAL	64 hrs

PRINCIPAL
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G.S.S. College,Belgaum

DEPARTMENT OF SANSKRIT

Monthly Teaching Plan (2022-2023)

NAME OF THE STAFF : Prof. AVADHOOT JOSHI
CLASS : B.Sc. IV Semester
TEXT : हीतोपदेशः

TOPICS TO BE COVERED IN THE MONTH OF MAY2023	Teaching Hours
- कवि परिचयम् - कुतः पञ्चतन्त्रः प्रारब्धः	12 hrs
TOPICS TO BE COVERED IN THE MONTH OFJUNE 2023	
- चित्रग्रीवकथा - व्याघ्रकथा - मृग काक कथा - व्याकरण विभागः	20 hrs
TOPICS TO BE COVERED IN THE MONTH OF JULY 2023	
- जरद्गव कथा - जम्बूक कथा - सुबुद्धिकथा	19 hrs
TOPICS TO BE COVERED IN THE MONTH OF AUGUST 2023	
- चन्दनदास कथा - कल्याणवटी कथा - व्याकरणम्	13 hrs
TOTAL	64 hrs

PRINCIPAL
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Head
Department Of Marathi
G.S.S College,Bel

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Monthly teaching plan.

DEPARTMENT : ZOOLOGY

TEACHING PLAN — **May-June 2023**

Sl. No.	Name of the staff	Name of Topic	Semester	Division	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
1	Prof. A. A. Halgekar	Nervous System and Endocrinology in Humans	II (DSC)	-	Structure of Neuron, resting membrane potential(RMP) Origin of action potential and its propagation across the myelinated and non-myelinated nerve fibers. Types of synapse.	5	
		Introduction to Immune System	IV (DSC)	-	Defense against diseases: Introduction, First and second line of defense, Innate and acquired immunity; Antigen-presenting cells (APCs), Role of Band T-lymphocytes (humoral immunity and cell-mediated immunity), primary and secondary immune response.	5	
		Wildlife and its Conservation	VI (6.2A)	-	Wildlife conservation methods, Wildlife in India, Causes for the depletion of wildlife, Wildlife conservation techniques, methods and measures	5	
2	Dr. B. B. Goundadkar	Metabolism of Carbohydrates and Lipids	II (DSC)	-	B Oxidation and Omega oxidation of saturated fatty acids with even and odd number of carbon atoms; Biosynthesis of palmitic acid; Ketogenesis	5	
		General Concepts of Parasitology	II (OEC)	-	Introduction, Parasites, parasitoids, host, zoonosis; Origin and evolution of parasites; Basic concept of Parasitism, symbiosis, phoresis, commensalisms and mutualism; Host-parasite interactions and adaptations; Life cycle of human parasites; Occurrence, mode of infection and prophylaxis	5	
		Biostatistics I	IV (DSC)	-	Measures of central tendency: Mean, Median, Mode.Data summarizing: Frequency distribution, Graphical presentation – bar diagram, pie diagram, histogram.	5	
		Functional anatomy of male reproduction	VI (6.1)	-	Outline and histological of female reproductive system in rat and human;Ovary: folliculogenesis, ovulation, corpus luteum formation and regression;	4	
		Ecology Part A	VI (6.2A)	-	Earth as living planet, sub divisions of ecology, scope of ecology, biosphere Abiotic factors: Light and Temperature (effect on animals and plants)	4	

Head
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GSS College, Belagavi

G.S.Sc. College, Belgaum

Head, Department of Zoology

DEPARTMENT : ZOOLOGY

TEACHING PLAN

May-June 2023

Sl. No.	Name of the staff	Name of Topic	Semester	Division	Portion to be covered	No of Classess Alloted for the Month	Signature of the staff
3	Dr. Amrapalli Rajput	Structure and functions of biomolecules:	II (DSC)	-	Structure and biological importance of carbohydrates (monosaccharides, disaccharides, polysaccharides and glycoconjugates) Lipids (saturated and unsaturated fatty acids).	4	
		Molecular diagnosis and clinical parasitology	II (OEC)	-	General concepts of molecular diagnosis for parasitic infections Advantages and disadvantages of molecular diagnosis Fundamental techniques used in molecular diagnosis of endoparasites	4	
		Applications of genetic engineering	IV (DSC)	-	Transgenic animals (transgenic cow, transgenic fish), transgenic plants (cry-protein), gene silencing (knock out and knock in mouse). Gene therapy. Biosensors and its applications.	5	
		Reproductive Health:	VI (6.1)	-	Infertility in male and female.: causes, diagnosis and management. Assisted reproductive technology (GIFT, ZIFT, ET, ICSI, sperm-bank, frozen embryo, in-vitro-fertilization). Modern contraceptive technology.	10	
		Rearing of silkworms and reeling of silk: Part-B	VI (SEC)	-	Silkworm rearing technology. Early and late rearing. Types of mountages. Spinning, harvesting and storage of cocoons. Silkworm reeling techniques	4	
4	Mr. S. K. Borkar	Digestion	II (DSC)	-	Structural organization and functions of the gastrointestinal tract and associated glands. Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals, and vitamins.	7	
		Parasitic Nematodes	II (OEC)	-	Study of morphology, lifecycle, pathogenicity, prophylaxis, and control measures of *Ascaris lumbricoides* *Ancylostoma duodenale* *Wuchereria bancrofti* Nematode plant interaction: Gall formation	7	
		Antigens and Antibodies	IV (DSC)	-	Antigens and Hapten: Properties (foreignness, molecular size, heterogeneity). Band T cell epitopes. Structure of Ig G and functions of different classes of immune globulins. Major histocompatibility complex –Structure of MHCI&II.	6	
		Reproductive Endocrinology	VI (6.1)	-	Gonadal hormones and mechanism of hormone action, steroids, glycoprotein hormones, and prostaglandins	7	
		Habitats	VI (6.2 A)	-	Freshwater habitat Lotic and Lentic systems. Zonation of Sea, Marine Biota, Estuarine ecology, and Mangroves. Terrestrial habitat: A brief account of Biomes. Ecological Adaptations of Freshwater, Marine and Terrestrial fauna.	14	

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MONTHLY LESSON PLAN

Name of Staff: Dr. Jalaja Udoshi / Prof. Snehalata Bandagi
Academic Year: 2022-23
Subject: C Programming semester: I

Serial No	Month	Topics to be covered
1	September	**Introduction to C Programming:** Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.C Programming Basic Concepts: C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants.Input and output with C: Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions.
2	October	**C Operators & Expressions:** Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion.**Control Structures:** Decision making Statements - Simple if, if_else, nested if_else, else_if ladder, Switch Case, goto, break & continue statements; Looping. Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.
3	November	**Derived data types in C:** Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. **Strings:** Declaring & Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat; Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc.)
4	December	**User Defined Functions:** Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.**User defined data types:** Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.

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MONTHLY LESSON PLAN

Name of Staff: Dr. Jalaja Udoshi / Prof. Snehalata Bandagi
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Name of Staff: Dr. Jalaja Udoshi / Prof. Snehalata Bandagi
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		Oriented Programming: Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading.
4	August	UNIT-V : GU Interface: The tkinter Module; Window and Widgets; Layout Management- pack; grid and place. Python SQLite: The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on TablesInsert, Select, Update. Delete and Drop Records. Data Analysis: NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and DataFrames, Creating DataFrames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on DataFrames. Data Visualisation: Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.

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MONTHLY LESSON PLAN

Name of Staff: Prof. Sheela Mense

Academic Year: 2022-23

Subject: Data Structure using C

Semester : II

Serial No	Month	Topics to be covered
1	May	**Unit 1 :** Introduction to data structures: Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures. Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - malloc, calloc, realloc and free. Pointers in C: Understanding pointers -Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers;.
2	June	Unit 2: Recursion: Definition; Types of recursions; Recursion Technique Examples - GCD, Binomial coefficient nCr, Towers of Hanoi; Comparison between iterative and recursive functions. Sorting and Searching: Arrays as abstract data types, Representation of linear arrays in memory, Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Selection sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching
3	July	**Unit 3 :** Stacks: Basic Concepts – Definition and Representation of stacks; Operations on stacks – Push, Pop; Applications of stacks; Infix, postfix and prefix notations; Conversion from infix to postfix using stack; Evaluation of postfix expression using stack; Application of stack in function calls. Queues: Basic Concepts – Definition and Representation of queues; Types of queues, - Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues;
4	August	Linked list: Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly linked list, Circular linked list Doubly Circular Linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Trees: Definition; Tree terminologies – node, root node, parent node, ancestors of a node, siblings, terminal & non-terminal nodes, degree of a node, level, edge, path, depth; Binary tree: Type of binary trees - strict binary tree, complete binary tree, binary search tree and heap tree; Array representation of binary tree. Traversal of binary tree; preorder, in order and post order traversal.

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MONTHLY LESSON PLAN

Name of Staff: Dr. Jalaja Udoshi / Prof. Snehalata Bandagi
Academic Year: 2022-23
Subject: C Programming semester: I

Serial No	Month	Topics to be covered
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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2021-2022)

NAME OF THE STAFF: Prof. Ravina Vernekar.

CLASS:M.Sc. II Semester

Syllabus Alloted	Paper	Unit
	2.3 – Genetics and Plant Breeding.	Unit IV– Plant Breeding.

TOPIC TO BE COVERED IN THE MAY 2022
Plant Breeding Introduction and Modes of Reproduction.
TOPIC TO BE COVERED IN THE MONTH OF JUNE 2022
Methods of Hybridisation in Self pollinated and Cross pollinated plants.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2022
Plant Introduction, Domestication and Acclimatization, Patterns of evolution in plants.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2022
Heterosis – genetic basis of Heterosis, Breeding plant for resistance to abiotic and biotic stresses. Marker Assisted Selection (MAS) in plant breeding.

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CLASS: M.Sc. II Semester Practical

Syllabus Alloted	Paper
	Practical 2.6 Based on 2.2 and 2.3

PRACTICAL TO BE COVERED IN THE MONTH OF MAY 2022
2.6 – Based on 2.3 1. Preparation of stains, Fixatives, preservatives, and pre-treatments to plant material. 2. Study of Mitosis.
PRACTICAL TO BE COVERED IN THE MONTH OF JUNE 2022
2.6 Based on 2.3. 1. Karyotype analysis of *Allium cepa*. 2. Determination mono-hybrid, di-hybrid and test cross ratio.
PRACTICAL TO BE COVERED IN THE MONTH OF JULY 2022
2.6– Based on 2.3. 1. Techniques of emasculation and hybridisation. 2. Genetic problems on linkage and crossing over, gene mapping and population genetics.
PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2022 1. Mutation induction by EMS. 2. Polyploidy induction by colchicine.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2021-2022)

NAME OF THE STAFF: Prof. Ravina Vernekar.

CLASS:M.Sc. II Semester

Syllabus Alloted	Paper	Unit
	2.3 – Genetics and Plant Breeding.	Unit IV– Plant Breeding.

TOPIC TO BE COVERED IN THE MAY 2022
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Heterosis – genetic basis of Heterosis, Breeding plant for resistance to abiotic and biotic stresses. Marker Assisted Selection (MAS) in plant breeding.

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CLASS: M.Sc. II Semester Practical

	Paper
Syllabus Alloted	Practical 2.6 Based on 2.2 and 2.3

PRACTICAL TO BE COVERED IN THE MONTH OF MAY 2022
2.6 – Based on 2.3 1. Preparation of stains, Fixatives, preservatives, and pre-treatments to plant material. 2. Study of Mitosis.
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PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2022
1. Mutation induction by EMS. 2. Polyploidy induction by colchicine.

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migration- Floristic regions of the world. Phytogeographical regions of India, Hansen's classifications, distribution of plants based on altitude and latitude, contisin, tricontisin and endemic distribution.

TOPIC TO BE COVERED IN THE MONTH OF APRIL 2023

Unit III– Plant Geography. Cladistics: Introduction – advantages and problems. Cladistics (Phylogeny) – concepts, parsimony, cladograms and trees; characters: apomorphic and plesiomorphic characters, homologous vs analogous; character states, binary and multistate characters.

Unit IV– Plant distribution and Plant migration. Age and area hypothesis- Wills theory. Plant migration and barriers for plant migration.

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CLASS: M.Sc. I Semester Practical

Syllabus Alloted	Paper
	Practicals- II (1.4 -EVOLUTIONARY BIOLOGY AND PLANT GEOGRAPHY)

PRACTICAL TO BE COVERED IN THE MONTH OF JANUARY 2023
1. Study of homologous, analogous and vestigial organs with suitable examples. 2. Patterns of Evolution in plants-vegetative and reproductive structures in Algae and Fungi. 3. Stellar evolution in Pteridophytes.
PRACTICAL TO BE COVERED IN THE MONTH OF FEBUARY 2023
1. Evolution of Sporophytes in Bryophytes. 2. Study of fossil forms –Lepidodendron, Lepidocarpon, Stigmaria and Lygenopteris. 3. Study of Heterospory.
PRACTICAL TO BE COVERED IN THE MONTH OF MARCH 2023
1. Study of Vavilov centers and Zhnkoskycenters with plant in each region. 2. Plant Phytogeography. 3. Study of adaptive radiation, micro and macro evolution with examples.
PRACTICAL TO BE COVERED IN THE MONTH OF APRIL 2023
1. Calculating gene frequencies in population by Hardy-Weinberg law. 2. Study of molecular evolution with suitable example's.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2022-2023)

NAME OF THE STAFF: Prof. Ravina Vernekar.

CLASS: M.Sc. IV Semester

	Paper	Unit
Syllabus Allotted	4.2 – Ecology and Environmental Biology.	Unit-III - Major aquatic ecosystems of the world UNIT IV – Study of Intellectual Property Rights.
	4.3 – Plant Biotechnology.	Unit II – Plant tissue culture. Unit IV – Industrial Biotechnology.
	4.4 – Research methodologies and techniques in Botany.	UNIT IV – Computer application in Biology.

TOPIC TO BE COVERED IN THE MONTH OF JUNE 2023
4.2 – Unit III – Major aquatic ecosystems of the world- fresh water ecosystem, marine ecosystem, Plant indicators in pollution. Global environment problem, ozone depletion, global warming and climatic change. 4.3 – Unit III – introduction, alcohol production(beer), Antibiotic production (penicillin), production of vitamins (vitamin B12), production of single cell protein – algal protein (spirulina), fungal protein (mushroom) and economic aspects, genetic engineering of plants for delayed ripening and better shelf life. 4.4 – Unit IV – Equipment's and instruments -Laminar air flow, autoclaves, thermo bath, and incubators.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2023
4.2– Unit III – Basics of chemical ecology, Plant mimicry, Pollination ecology, carbon sequestration, Ecosystem services, Ecology and climate change. 4.3 – Unit III – Biofuels: introduction, production of biogas, structure of biogas plant, biochemistry of methane production, biogas research in India, uses of biogas, biofertilizers - introduction, types, blue green algae, seaweeds, azolla, vesicular arbuscular mycorrhizal fungi and rhizobium. 4.4 – Unit IV –culture techniques: basic laboratory principles and techniques, principles, types, plant media preparation.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2023
4.2 – Unit IV– Study of Intellectual Property Rights – patents, trademark, geographical indication, copyright; IPR and Traditional Knowledge; Bio-piracy of traditional knowledge, National and international organizations and treaty related to traditional knowledge – WIPO, TKDL, TRIPS, CBD. 4.3 – Unit II – plant tissue culture: scope and importance of tissue culture, basic

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CLASS: M.Sc. II Semester Practical

Syllabus Alloted	Paper
	Practical 2.6 Based on 2.2 and 2.3

PRACTICAL TO BE COVERED IN THE MONTH OF JUNE 2023
2.6 – Based on 2.3 3. Preparation of stains, Fixatives, preservatives, and pre-treatments to plant material. 4. Study of Mitosis.
PRACTICAL TO BE COVERED IN THE MONTH OF JULY 2023
4.6 Based on 2.3. 3. Karyotype analysis of *Allium cepa*. 4. Determination mono-hybrid, di-hybrid and test cross ratio.
PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2023
2.6– Based on 2.3. 3. Techniques of emasculation and hybridisation. 4. Genetic problems on linkage and crossing over, gene mapping and population genetics.
PRACTICAL TO BE COVERED IN THE MONTH OF SEPTEMBER 2023
3. Mutation induction by EMS. 4. Polyploidy induction by colchicine.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2022-2023)

NAME OF THE STAFF: Prof. SMEETA V CHAVAN
CLASS: M.Sc. I Semester

	Paper	Unit
Syllabus Alloted	1.2 Biodiversity and Conservation Biology	Unit I– Unit II– Unit III– Unit IV–

TOPIC TO BE COVERED IN THE JANUARY 2022
Unit I Biodiversity: Definition, levels of diversity - genetic, species and ecosystem diversity. Endemism - concept, types, endemism in Western Ghats, Biodiversity hotspots - general and with special reference to India; Mega-diversity regions. Importance of biodiversity, magnitude and distribution of Biodiversity. Biodiversity documentation assessment - Inventory and monitoring, Biodiversity indices, Biodiversity database
TOPIC TO BE COVERED IN THE MONTH OF FEBUARY 2022
Unit II Threats to biodiversity, IUCN threatened plant categories, methods of conservation: In-situ methods – Protected area network, National parks, Biosphere reserves, sacred grooves. Ex-situ methods: Botanical gardens, Germplasm collection seed bank, pollen bank. Human wildlife conflict, conservation case studies
TOPIC TO BE COVERED IN THE MONTH OF MARCH 2022
Unit III Environmental movements: Global and regional. Environmental laws: Forest Conservation Act, Biodiversity bill (2002); Community Biodiversity Register (PBR); Convention on International Trade in Endangered Species (CITES), Ramsar Convention, Intellectual Property Rights (IPR).
TOPIC TO BE COVERED IN THE MONTH OF APRIL 2022
Unit IV Biodiversity Management: Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Aforestation, Green belt, Social forestry, Agro forestry. Remote sensing and biodiversity management

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2021-2022)

NAME OF THE STAFF: Prof. Ravina Vernekar.

CLASS:M.Sc. II Semester

Syllabus Alloted	Paper	Unit
	2.3 – Genetics and Plant Breeding.	Unit IV– Plant Breeding.

TOPIC TO BE COVERED IN THE MAY 2022
Plant Breeding Introduction and Modes of Reproduction.
TOPIC TO BE COVERED IN THE MONTH OF JUNE 2022
Methods of Hybridisation in Self pollinated and Cross pollinated plants.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2022
Plant Introduction, Domestication and Acclimatization, Patterns of evolution in plants.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2022
Heterosis – genetic basis of Heterosis, Breeding plant for resistance to abiotic and biotic stresses. Marker Assisted Selection (MAS) in plant breeding.

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CLASS: M.Sc. II Semester Practical

Syllabus Alloted	Paper
	Practical 2.6 Based on 2.2 and 2.3

PRACTICAL TO BE COVERED IN THE MONTH OF MAY 2022
2.6 – Based on 2.3 1. Preparation of stains, Fixatives, preservatives, and pre-treatments to plant material. 2. Study of Mitosis.
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PRACTICAL TO BE COVERED IN THE MONTH OF JULY 2022
2.6– Based on 2.3. 1. Techniques of emasculation and hybridisation. 2. Genetic problems on linkage and crossing over, gene mapping and population genetics.
PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2022
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TOPIC TO BE COVERED IN THE MONTH OF APRIL 2023
Unit III– Plant Geography. Cladistics: Introduction – advantages and problems. Cladistics (Phylogeny) – concepts, parsimony, cladograms and trees; characters: apomorphic and plesiomorphic characters, homologous vs analogous; character states, binary and multistate characters. Unit IV– Plant distribution and Plant migration. Age and area hypothesis- Wills theory. Plant migration and barriers for plant migration.

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CLASS: M.Sc. I Semester Practical

Syllabus Alloted	Paper
	Practicals- II (1.4 -EVOLUTIONARY BIOLOGY AND PLANT GEOGRAPHY)

PRACTICAL TO BE COVERED IN THE MONTH OF JANUARY 2023
1. Study of homologous, analogous and vestigial organs with suitable examples. 2. Patterns of Evolution in plants-vegetative and reproductive structures in Algae and Fungi. 3. Stellar evolution in Pteridophytes.
PRACTICAL TO BE COVERED IN THE MONTH OF FEBUARY 2023
1. Evolution of Sporophytes in Bryophytes. 2. Study of fossil forms –Lepidodendron, Lepidocarpon, Stigmaria and Lygenopteris. 3. Study of Heterospory.
PRACTICAL TO BE COVERED IN THE MONTH OF MARCH 2023
1. Study of Vavilov centers and Zhnkoskycenters with plant in each region. 2. Plant Phytogeography. 3. Study of adaptive radiation, micro and macro evolution with examples.
PRACTICAL TO BE COVERED IN THE MONTH OF APRIL 2023
1. Calculating gene frequencies in population by Hardy-Weinberg law. 2. Study of molecular evolution with suitable examples.

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DEPARMENT OF BOTANY

MONTHLY TEACHING PLANNING (2022-2023)

NAME OF THE STAFF: Prof. Ravina Vernekar.

CLASS: M.Sc. IV Semester

	Paper	Unit
Syllabus Allotted	4.2 – Ecology and Environmental Biology.	Unit-III - Major aquatic ecosystems of the world UNIT IV – Study of Inteliectual Property Rights.
	4.3 – Plant Biotechnology.	Unit II – Plant tissue culture. Unit IV – Industrial Biotechnology.
	4.4 – Research methodologies and techniques in Botany.	UNIT IV – Computer application in Biology.

TOPIC TO BE COVERED IN THE MONTH OF JUNE 2023
4.2 – Unit III – Major aquatic ecosystems of the world- fresh water ecosystem, marine ecosystem, Plant indicators in pollution. Global environment problem, ozone depletion, global warming and climatic change. 4.3 – Unit III – introduction, alcohol production(beer), Antibiotic production (penicillin), production of vitamins (vitamin B12), production of single cell protein – algal protein (spirulina), fungal protein (mushroom) and economic aspects, genetic engineering of plants for delayed ripening and better shelf life. 4.4 – Unit IV – Equipment's and instruments -Laminar air flow, autoclaves, thermo bath, and incubators.
TOPIC TO BE COVERED IN THE MONTH OF JULY 2023
4.2– Unit III – Basics of chemical ecology, Plant mimicry, Pollination ecology, carbon sequestration, Ecosystem services, Ecology and climate change. 4.3 – Unit III – Biofuels: introduction, production of biogas, structure of biogas plant, biochemistry of methane production, biogas research in India, uses of biogas, biofertilizers - introduction, types, blue green algae, seaweeds, azolla, vesicular arbuscular mycorrhizal fungi and rhizobium. 4.4 – Unit IV –culture techniques: basic laboratory principles and techniques, principles, types, plant media preparation.
TOPIC TO BE COVERED IN THE MONTH OF AUGUST 2023
4.2 – Unit IV– Study of Intellectual Property Rights – patents, trademark, geographical indication, copyright; IPR and Traditional Knowledge; Bio-piracy of traditional knowledge, National and international organizations and treaty related to traditional knowledge – WIPO, TKDL, TRIPS, CBD. 4.3 – Unit II – plant tissue culture: scope and importance of tissue culture, basic

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CLASS: M.Sc. II Semester Practical

Syllabus Alloted	Paper
	Practical 2.6 Based on 2.2 and 2.3

PRACTICAL TO BE COVERED IN THE MONTH OF JUNE 2023
2.6 – Based on 2.3 3. Preparation of stains, Fixatives, preservatives, and pre-treatments to plant material. 4. Study of Mitosis.
PRACTICAL TO BE COVERED IN THE MONTH OF JULY 2023
4.6 Based on 2.3. 3. Karyotype analysis of *Allium cepa*. 4. Determination mono-hybrid, di-hybrid and test cross ratio.
PRACTICAL TO BE COVERED IN THE MONTH OF AUGUST 2023
2.6– Based on 2.3. 3. Techniques of emasculation and hybridisation. 4. Genetic problems on linkage and crossing over, gene mapping and population genetics.
PRACTICAL TO BE COVERED IN THE MONTH OF SEPTEMBER 2023 3. Mutation induction by EMS. 4. Polyploidy induction by colchicine.

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2.6.

2) 2.6.1

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Monthly Teaching plan (2022-2023) – Even Semester

Name of the staff: Dr. Rutuja R. Kolte

Class: M. Sc. Botany Semester II (Paper 2.3)

	Topics to be covered in the month of June 2023
Theory	• Plant identification • Elementary knowledge of Binomial nomenclature • Herbarium techniques and deposition of specimen in herbaria
	Topics to be covered in the month of July 2023
Theory	• Plant identification • Herbarium techniques and deposition of specimen in herbaria
	Topics to be covered in the month of August 2023
Theory	• Ethnic communities of India, ethnobotany and folk medicine
	Topics to be covered in the month of September 2023
Theory	• Applications of ethnobotany

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Class: M. Sc. Environmental Science Semester II (Paper 2.1)

Topics to be covered in the month of June 2023

Theory

- Bioremediation: concept, microorganisms involved, processes and technologies
- Bio-leaching: Concept, methods, microorganisms involved, advantages and disadvantages

Topics to be covered in the month of July 2023

Theory

- Bio-absorption: Concept, limitations
- Landfill technologies
- Cell immobilization: as a tool in waste treatment, Techniques, Advantages, environmental applications
- Aerobic Vs anaerobic degradation

Topics to be covered in the month of August 2023

Theory

- Bio-degradation of specific hazardous wastes
- Biodegradation of hydrocarbons
- Bio-oxidation of phenolic compounds

Topics to be covered in the month of September 2023

Theory

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Class: M. Sc. Botany (Paper 4.4)

Topics to be covered in the month of June 2023

Theory

- Foundation of the research
- Types of research
- Literature review
- Layout of research paper
- Journals in botanical sciences
- When and where to publish
- Ethical issues related to publishing
- Plagiarism and self-plagiarism
- Biostatistics: measuring central tendencies

Practicals

- Estimation of dissolved oxygen
- Estimation of biological oxygen demand
- Estimation of Phosphate
- Estimation of sulphate

Topics to be covered in the month of July 2023

Theory

- Research methods vs methodology
- Documentation and presentation of data
- Analysis and interpretation of data
- Manuscript preparation
- Standard deviation
- Dispersion
- Variability
- variance and coefficient of variation

Practicals

- Estimation of hardness of water
- Estimation of Calcium in given water
- Estimation of Chemical oxygen Demand
- Estimation of major cations:

Topics to be covered in the month of August 2023

Theory

- Correlation and regression
- ANOVA
- Chi square test for goodness of fit and independence

Practicals

- Estimation of major cations

Topics to be covered in the month of September 2023

Theory

- Continuation of Biostatistics

Practicals

- Continuation and Repetition of practicals

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P. G. DEPARTMENT OF CHEMISTRY

Monthly Teaching Plan

June – 2023

SECOND SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHIT-2.1 : INORGANIC CHEMISTRY-II

SL. NO.	TOPIC	TEACHER
1.	UNIT-III **SOLID STATE AND STRUCTURAL CHEMISTRY** Types of solids, close packing of identical solid spheres, tetrahedral and octahedral voids, packing fraction, radius ratio. **Crystallographic systems:** Bravias lattices, Miller indices, external features of crystals. Structures of selected crystals: normal and inverse spinels, hexagonal structures, pervoskites. **Defects in solids:** Point defects (stoichiometric and non-stoichiometric), line defects and plane defects, stacking faults and grain boundaries	**Mr. R. M. Pandit**

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Monthly Teaching Plan

June – 2023

SECOND SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT-2.4: SPECTROSCOPY-II

SL. NO.	TOPIC	TEACHER
1.	UNIT-I **NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY** Proton NMR : Introduction, chemical shift, units, measurement, precisional frequency, internal standard, instrumentation, CWNMR, FTNMR, Solvents in NMR, T1 and T2 resonance, factor affecting chemical shift.	**Dr. V. A. Sunagar**

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Monthly Teaching Plan

June – 2023

FOURTH SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-4.1: ORGANIC CHEMISTRY-IVA

SL. NO.	TOPIC	TEACHER
1.	UNIT -IV **STEROIDS, Vitamins AND PROSTAGLANDINS** **Steroids:** Introduction, classification; Diels hydrocarbon- its importance and synthesis, stereochemistry of cholesterol. Structural elucidation of cholesterol-Blanc's rule, location of double bond, hydroxy group, angular methyl groups and side chain in cholestrerol, total synthesis. **Prostaglandins:** Introduction, classification and biological importance, constitution of PGE_1, synthesis of PGE_1 by Corey's and Upjohn's approach. **Vitamins:** Definition, Classification and biological importance, synthesis of vitamin C from D(+)-Glucose, synthesis of vitamin A.	**Dr. Tasneem Taj**

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June – 2023

FOURTH SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-4.3: ORGANIC CHEMISTRY-IVC

SL. NO.	TOPIC	TEACHER
1.	UNIT–III **DRUGS AFFECTING THE CENTRAL NERVOUS SYSTEM:** **Sedatives and hypnotics** -Barbiturates (structure-activity relationship, metabolism); benzodiazepines (structure -activity relationship , metabolism) Synthesis of phenobarbital, hexobarbital nitrazepam and oxazepam. **Anesthetics** : General anesthetics; local anesthetics- Mode of action, structure-activity relationships. Synthesis of methohexital and chloro-procaine. Synthesis of meperidine , methadone and 6,7 -benzomorphans.	Dr. Tasneem Taj

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June – 2023

FOURTH SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT-4.4: SPECTROSCOPY-IV

SL. NO.	TOPIC	TEACHER
1.	UNIT–I FLAME EMISSION and CHIROPTICAL SPECTROSCOPY **Flame emission spectroscopy:** Introduction, principle, flames and flame spectra variation of emission intensity with flames, flame background, metallic spectra in flame. Total consumption and premix, Butters interference, roll on temperature on absorption, and applications.	Mr. R. M. Pandit

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June – 2023

FOURTH SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-4.2: ORGANIC CHEMISTRY-IVB

SL. NO.	TOPIC	TEACHER
1.	**UNIT-I** **INSECT PHEROMONES** Introduction, Juvenile hormones, precocines, pyretheroids and antifeedant. Regulation of insect behavior by pheromones. Use of pest control. Synthesis of: i. Z-7,8-epoxy-2-methyl oxtadecane ii. Faranal . iii. Gradisol . iv. Brevicomin . v. (+)-Disperlure vi. 3,11-Dimethyl-2-nonacosanone vii. Bombykol	Dr. Tasneem Taj

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Monthly Teaching Plan

April – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHIT-1.1 : INORGANIC CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	**UNIT–II** **CHEMISTRY OF NON-TRANSITION ELEMENTS-I** **Electron Rich Compounds:** Compounds of Noble gases, Preparation and structure and bonding in Xenon compounds (XeF2, XeF4, XeF6, XeOF4, XeO2F2, XeO3, XeO4) based on VBT and VSEPR.	**Mr. R. M. Pandit**

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April – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHPT-1.3 : PHYSICAL CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	**UNIT-II** **THERMODYNAMICS-I** Review of basic principles of thermodynamics (I and II laws of thermodynamics, concept of free energy and entropy, combined form of first and second laws of thermodynamics. Entropy change during spontaneous process. Helmholtz and Gibbs free energies. Thermodynamic criteria of equilibrium and spontaneity. Variation of free energy with temperature and pressure. Third law of thermodynamics-calculation of absolute entropies. Real gases and fugacity, Variation of fugacity with temperature and pressure. Thermodynamics of dilute solutions: Raoult's law, Henry's law. Ideal and non-ideal solutions: Liquid-liquid solutions, liquid-solid solutions, multicomponent systems and excess thermodynamic properties. Maxwell's relation (to be derived). Thermodynamic equations of equipartition of energy, Classius-Clapeyron equation (to be derived) and its application. Entropy of vaporization. Vant-Hoff's equation, integrated form of van't Hoff's equation. (problems to be solved).	**Mr. R. M. Pandit**

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April – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHES-1.5: ANALYTICAL CHEMISTRY

SL. NO.	TOPIC	TEACHER
1.	**UNIT–I** Methods for sampling solid, liquid and gaseous samples. Effect of sampling uncertainties. Sampling hazards, need for quality assurance: ISO 9000 series of quality of system.	Mr. R. M. Pandit

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April – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHOT-1.2 : ORGANIC CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1	**UNIT-II** **Elimination reactions:** Introduction, types of elimination-E_1, E_2, E_{1cB} mechanisms, orientation during elimination reactions-Saytzeff and Hoffmann rules, pyrolytic eliminations, Chugave, Cope eliminations, Hoffmann degradation and dehalogenation of vicinal di halides, substitution v/s elimination with suitable example.	**Dr. Tasneem Taj**

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March - 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHES-1.5: ANALYTICAL CHEMISTRY

SL. NO.	TOPIC	TEACHER
1.	**UNIT–II** **CHROMATOGRAPHY** Dynamics of chromatography (Zone spreading, eddy diffusion) chromatograms, retention time and column efficiency, plate theory and rate theory, Van-Deemeters equation, column resolution, factors influencing resolution. THIN LAYER CHROMATOGRAPHY Introduction, stationary and mobile phase systems, Rf value calculation, various technique of developments, visualization and applications. **ION EXCHANGE CHROMATOGRAPHY** Introduction, principle, classification of ion exchange resins, mechanism of ion exchange,synthesis of ion exchange resins (cation and anion), characteristics of ion exchange resins (size, capacity, cross linking and swelling and resistance) applicationsin analytical and metal separations. **HIGH PERFORMANCE LIQUID CHROMATOGRAPHY** Introduction, principles, instrumentation, mobile phase, stationary phase, types of column, various detectors used, and applications.	**Dr. Tasneem Taj**
2	**UNIT-I** **DATA ANALYSIS** accuracy and precision. Distribution of random errors, frequency distributions normal error curves. Statistical treatment of finet samples, measure central tendency -mean, medium, range, average deviation, relative average deviation, standard deviation and variance. Students' confidence interval of the mean. Testing for significance, comparison of two means and two standard deviations. Criteria for rejection of an observation-Q test, control chart, propagation of errors, significant figures. Least square methods	**Mr. R. M. Pandit**

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March - 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHOT-1.2 : ORGANIC CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	SUBSTITUTION REACTIONS **Aromatic electrophilic substitution reactions:** General mechanism of electrophilic substitution in aromatic systems using examples of nitration, halogenations, sulphonation and Friedal Craft alkylation and acylation.	Dr. V. A. Sunagar

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March – 2023

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	**Unit II** MB spectra of nitropruside	**Mr. R. M. Pandit**

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February – 2023

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.1: ORGANIC CHEMISTRY-III A

SL. NO.	TOPIC	TEACHER
1.	**UNIT –IV** **MEDICINAL CHEMISTRY** **Antimalarials:** Introduction, classification, synthesis and drug action-Chloroquin and Pamaquin. **Analgesics:** Introduction, classification, synthesis and drug action-Paraacetomol, aspirin, salol, phenyl butazone, antipyrine.	**Dr. Tasneem Taj**

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February – 2023

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	**Unit II** **Mossbauer spectroscopy:** Theory and principles, experimental methods, isomer shift, quadrapole interactions, electron density, magnetic interactions; time and temperature dependent effect, application-Iodine trihalides, Prussian blue, trisiron dodecacarbonyl, tin halides, hexacyano ferrate	**Mr. R. M. Pandit**

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January – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHOT-1.2 : ORGANIC CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	**UNIT-II** **ADDITION AND ELIMINATION REACTIONS** **Addition reactions:** Types of addition reactions, mechanism and stereochemistry of addition, effect of substrates and solvents during addition. Addition to Carbon-Carbon double bond-addition of hydrogen halide(Markonikov's rule), bromine. Addition to carbon-hetero multiple bonds (C=O)-Introduction, structure and reactivity, HCN, bisulphate, Grignard reagent	Dr. Tasneem Taj

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February – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHIT-1.1 : INORGANIC CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	**Unit I** **Chemical Bonding:** Energetics of solubility of ionic salts in polar solvents, solvation energy, relative effects of ionic radii on lattice energy and ion-solvation energy, relative solubility of ionic compounds (alkali metal halides and silver halides, sulphates and hydroxides of alkaline earth metals). **Covalent bonding:** **Valence bond theory:** hybridization of atomic orbitals, Examples for compound having different hybridization (*sp*, *sp*2, *sp*3, *dsp*2, *sp*3d, *sp3*d2). **VSEPR theory:** Predicting molecular geometries, Bent's rule of hybridization, illustration of Bent's rule with respect to CH3F, PCl3F2), limitations of VSEPR theory. **Molecular orbital theory:** Symmetry and overlap, molecular orbital diagrams of diatomic homo nuclear molecules/ions (up to second period elements), hetero-nuclear molecules/ions (HCl, LiF, CO, NO, NO+ and triatomic molecules–linear (CO2) and angular (NO2).	**Mr. R. M. Pandit**

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February – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHPT-1.3 : PHYSICAL CHEMISTRY-I

SL. NO.	TOPIC	TEACHER
1.	**UNIT–III** **ELECTROCHEMISTRY –I** Theory of ionic conductance in solutions, ionic atmosphere, relaxation and electrophoretic effects, Debye-Huckel theory of strong electrolytes, Debey-Huckel-Onsagar equation(derivation) and Debey-Huckel limiting law(derivation), quantitative and qualitative treatment of Debye-Huckel limiting law, Onsagar activity co-efficient, mean ionic strength (Debey-Huckel limiting law). A brief survey of Helmholtz-Perrin, Gouy-Chapman and Stern electrical double layer (No Derivation). Liquid junction potential and its determination. Fundamentals of batteries, classification of batteries, battery characteristics, primary batteries, dry cell, alkaline MnO2 batteries and other batteries, secondary batteries-lead acid, alkaline storage batteries	**Mr. R. M. Pandit**

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February – 2023

FIRST SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHES-1.5: ANALYTICAL CHEMISTRY

SL. NO.	TOPIC	TEACHER
1.	**UNIT-II** **CHROMATOGRAPHY** Introduction, Principles, classifications, fundamentals of chromatography (Partition coefficient, Retardation factor, retention volumes), Dynamics of chromatography (Efficiency)	**Dr. Tasneem Taj**
2	**UNIT-I** **DATA ANALYSIS** Types of instrumental analysis, analytical methods on the basis of simple size. Errors, types of errors, determinate and indeterminate errors,	**Mr. Ranjeet Pandit**

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P. G. DEPARTMENT OF CHEMISTRY

Monthly Teaching Plan

January – 2023

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.1: ORGANIC CHEMISTRY-III A

SL. NO.	TOPIC	TEACHER
1.	**Unit II : Photochemistry:** Photochemistry of cyclic dienones, α,β – unsaturated carbonyl compounds, quinones, Photochemistry of aromatic compounds, photofries rearrangement, Barton reaction. **Unit : III : Pericyclic Compounds:** Corelation diagram with FMO theory, wrt (4 + 2) , (2 + 2) cyclo addition, reaction and sigmatropic rearrangement reaction.	**Dr. V. A. Sunagar**
2	**UNIT –IV** **MEDICINAL CHEMISTRY** Introduction, definition of drug, requirements of drugs, chemotherapy, pharmacokinetics, pharmacodynamics, metabolites and anti metabolites, prodrug and soft drugs, agonists and anti-agonists, concept of drug receptor, elementary treatment of drug receptor interactions, theories of drug activity-occupancy theory, rate theory, induced fit theory, classification of drugs. **Analgesics:** Introduction, classification, synthesis and drug action-Paraacetomol, aspirin, salol, phenyl butazone, antipyrine. **Sulphonamides:** Introduction, classification, synthesis and SAR studies of sulphathiazole, sulphanilamide, sulphadiazine.	**Dr. Tasneem Taj**

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THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.3: ORGANIC CHEMISTRY-III C

SL. NO.	TOPIC	TEACHER
1	**UNIT-I** **POLYMER CHEMISTRY** **Characterization**: Isolation and purification of polymers-Fractional precipitation, partial dissolution, gradient elution and Gel permeation chromatography. Principles of determination of molecular weights-End group analysis, viscosity, light scattering, osmometry, cryoscopy, ebulliometry and ultracentrifugation method. Characterization of the above polymers by Thermogravimetry	**Mr. R. M. Pandit**

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Monthly Teaching Plan

January – 2023

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	**UNIT–II** **Mossbauer spectroscopy:** Theory and principles, experimental methods	Mr. R. M. Pandit

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Monthly Teaching Plan

December – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.1: ORGANIC CHEMISTRY-III A

SL. NO.	TOPIC	TEACHER
1.	**Unit II: Photochemistry:** Norrish type I and Norrish type II reactions Paterno–Buchi reaction **Unit III: Pericyclic Reaction:** Molecular orbital symmetry of allylic system, electrocyclic reaction, correlation diagram, FMO theory	**Dr. V. A. Sunagar**
2.	UNIT -IV MEDICINAL CHEMISTRY Introduction and terminology	**Dr. Tasneem Taj**

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Monthly Teaching Plan

December – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	UNIT-II NUCLEAR QUADRUPOLE RESONANCE and MOSSBAUER SPECTROSCOPY **Nuclear quadrupole resonance spectroscopy:** Consequence of nuclear spin larger than ½, prolate and oblate nucleus, nuclear quadrapolar charge distribution-theory and instrumentation, relationship between electric field gradients and molecular structure, applications and interpretation of eQq data, effect of crystal lattice on the magnitude of eQq, structural information from NQR spectra.	Mr. R. M. Pandit

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Monthly Teaching Plan

NOVEMBER – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.3: ORGANIC CHEMISTRY-III C

SL. NO.	TOPIC	TEACHER
1.	**PETROCHEMICALS** Newer Reactions: Japp-Klingaman reaction, Meerwein arylation, Nef reaction, Raush asymmetric allylation, Sharpless asymmetric dihydroxylation, Ugi-multicomponent reaction and Williamson ether synthesis.	**Dr. Tasneem Taj**
2.	**POLYMER CHEMISTRY** **Preparation and Significance**: Preparation of polymers based on different types of monomers. Industrial applications.	**Mr. R. M. Pandit**

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P. G. DEPARTMENT OF CHEMISTRY

Monthly Teaching Plan

NOVEMBER – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	**Nuclear quadrupole resonance spectroscopy:** Consequence of nuclear spin larger than ½, prolate and oblate nucleus. nuclear quadrapolar charge distribution-theory and instrumentation	**Mr. R. M. Pandit**

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Monthly Teaching Plan

DECEMBER – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.3: ORGANIC CHEMISTRY-III C

SL. NO.	TOPIC	TEACHER
1.	**AMINO ACIDS AND SOLUTION PHASE PEPTIDE SYNTHESIS** Amino acids, classification, stereochemistry, acid and base properties, biologically active amino acids, peptides and proteins–enzymatic hydrolysis, N-terminus protection, protecting reagents both acid and base labile, C-terminus protection, Amide bond formation: methods and strategies, Acyl chlorides synthesis, Coupling reactions with acyl chlorides, Limitations of acyl chlorides, Acyl fluorides, fluorinating agents, Acyl azides, Acylimidazoles using CDI, Anhydrides: Symmetric anhydrides, Mixed anhydrides, N-carboxy anhydrides or Leuch's anhydrides Esters, Active esters of pentafluorophenol and Succinimidyl esters synthesis and applications, Phosphonium salts and Uronium salts reagents in peptide formation.	**Dr. Tasneem Taj**
2.	**Polymer Chemistry**: Nylon, Urea formaldehyde, phenol-formaldehyde and melamine resin. polycarbonates and its applications. **Rubbers:** Natural and synthetic rubbers. Polymers degradation reactions. Thermal, oxidative and radiative processes. Synthesis and properties of Buna-S and butyl rubber	**Mr. R. M. Pandit**

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P. G. DEPARTMENT OF CHEMISTRY

Monthly Teaching Plan

DECEMBER – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	**Nuclear quadrupole resonance spectroscopy:** Relationship between electric field gradients and molecular structure, applications and interpretation of eQq data, effect of crystal lattice on the magnitude of eQq, structural information from NQR spectra.	**Mr. R. M. Pandit**

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Monthly Teaching Plan

October - November – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHORT-3.1: ORGANIC CHEMISTRY-III A

SL. NO.	TOPIC	TEACHER
1.	**Unit II : Photochemistry:** Introduction, Basics of photochemistry, Laws of photochemistry, electronic transitions, Jablonski diagram, Energy transfer, quantum efficiency, photochemistry of carbonyl compounds. **Unit : III : Pericyclic Compounds:** Classification of pericyclic reactions, molecular orbital symmetry, frontier orbitals of ethylene, 1,3-butadiene, 1, 3, 5-hexatriene, allyl system,	**Dr. V. A. Sunagar**

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Monthly Teaching Plan

October - November – 2022

THIRD SEMESTER

Synopsis of portion to be taught in the chapter during the month.

CHGT- 3.4: SPECTROSCOPY-III

SL. NO.	TOPIC	TEACHER
1.	Unit II Introduction of spectroscopy, NQR	Mr. R. M. Pandit

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PG DEPARTMENT OF MICROBIOLOGY
G.S.Sc COLLEGE BELAGAVI
MONTHLY TEACHING PLAN

Prof. Shushant I. Ijgan.

SEMESTER	MONTH	TOPIC TO BE COVERED	HRS
		P-2 Unit-1: Microbial Taxonomy: Taxonomic ranks, nomenclature rules, identification, Classification systems, microbial diversity, and evolution.	6
		Unit- 2: Classical taxonomy: Haeckle's three kingdom concepts, Whittaker's five-kingdom concept, the three-domain concept of Carl Woose criteria used for classification of microorganisms, and Classification according to Bergey's manual of systematic bacteriology.	10
1	M.Sc I Sem JANUARY	**P-3** Unit 1: Isolation techniques of microorganisms: Isolation of pure cultures; dilution, spread plate, streak plate, pour plate, micromanipulator method, colony morphology and other characteristics of cultures. maintenance and preservation of pure cultures, culture collection center-national and international. Unit 3: Automated microbial identification system.	7
		P-4 Unit 1: Introduction to Bioinformatics: Introduction to Biological Databases - Types of databases (Primary, secondary and complex databases), Bioinformatics platforms: NCBI, DDBJ EMBL, PUBMED, Nucleic Acid Sequence databases	
2	M.Sc I Sem FEBRUARY	**P-2** Unit- 3: Recent trends in microbial taxonomy: a) Chemo-taxonomy – Cell wall components, lipid composition, isoprenoid sequences, b) Cytochrome composition, amino acids, sequences of proteins, protein profile, DNA c) DNA homology, RNA homology, G+C ratio, RNA sequencing. d) Numerical taxonomy. e) Serological Methods. f) Molecular methods in taxonomy. Unit-4: Microbial Diversity: Concepts and scope, methods used in the study of microbial taxonomy and diversity Unit- 5: Diversity of microorganisms at different levels of Assessment and measure of microbial diversity, Factors influencing microbial diversity. **P-3** Unit 3: Analysis of metagenomes: Metagenomics, Culture independent analysis of microbes, phospholipids.	

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		P- 4 Protein sequence database; Genomics, Transcriptomics, Proteomics and Metabo...lics, PDB retrieval, Database visualization, Accessing bibliographic database, Integrated Information Retrieval, Extra 2 system. Bioinformatics software: Schrodinger, Perl and BioPerl, Rosetta/Remoneblod.	
		Unit 2: Sequence alignment and phylogenetic: Pairwise sequence alignment: Eg. BLAST, FASTA, CONTIG sequence Multiple Sequence Alignment: Eg. Clustal W, Clustal X,	10+4
		P-2 Microbial interaction- Basic principles and types, intra and inter-specific illustrations Unit- 7: Ecology of microbial cells and population ecology, Distribution and significance of Viruses, Bacteria, Fungi, Algae, and Protozoa.	4+6
		P-3 Fatty acids analysis, Fluorescent in situ hybridization (FISH), Genomic in situ hybridization (GISH).	2
M.Sc I Sem	**MARCH**	P-4 Phylogenetic analysis with reference to nucleic acids – PHYLIP, MEGA, NTYSIS (3D and 2D) Primer designing: Primer 3, applied biosystems. Unit 3 Structural biology: Modeling: Protein secondary structure prediction – Chou Fasman rules– neural networks discriminant analysis. Prediction of transmembrane segments in membrane proteins. Protein 3D structure prediction homology - identification of active sites/pockets, threading potential energy functions – energy minimization molecular dynamics simulated annealing. Drug Design and discovery: steps in drug discovery, ADME, Lead identification, QSAR.	4+8
		P-2 Microbial diversity as a source of innovations in biotechnology, Biotechnological approaches to improve microbial diversity and bio-productivity.	10
M.SC I Sem	**April**	P-4 Unit 4: Commercial application of bioinformatics: Definition, genome technology, High throughput sequencing and assembly. Genomics in medicine, Disease monitoring, profiles for therapeutic molecular targeting. Diagnostics, drug discovery and genomics, Gene evolution, Comparative proteomics and its applications, IPR and Bioinformatics patents.	

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GOVINDRAM SEKSARIA SCIENCE DEGREE COLLEGE,BELGAVI
DEPARTMENT OF MICROBIOLOGY
MONTHLY TEACHING PLAN

YEAR: 2022 -2023
NAME OF STAFF: PROF. PRIYANKA KUNDEKAR
PAPER : 1.3 MICROBIAL AND BIOCHEMICAL TECHNIQUE
SEMESTER: SEMESTER-1

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JANUARY	**Unit 1:** Isolation techniques of microorganisms: Isolation of pure cultures; dilution, spread plate, streak plate, pour plate, micromanipulator method, colony morphology and other characteristics of cultures. maintenance and preservation of pure cultures, culture collection center-national and international. Microscopy: Working principle of phase contrast microscopy, fluorescent microscopy, electron microscopy (TEM and SEM), confocal microscopy, fluorescent microscope, scanning probe microscopy and their staining techniques: image processing methods in microscopy. Micrometry.	12
2	FEBRUARY	Unit 2: Measurement of microbial growth: Direct microscopic count, standard plate count, membrane filtration, MPN, Indirect method: turbidity, metabolic activity and dry weight. Automated microbial identification system. Unit 3 : Analysis of metagenomes: Metagenomics, Culture independent analysis of microbes, phospholipids. Fatty acids analysis, Fluorescent in situ hybridization (FISH), Genomic in situ hybridization	12

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		(GISH). Unit 4 : Spectrophotometry: Principle and applications of spectrophotometer UV/visible, fluorescence	
3	MARCH	Spectroscopy: Principle and applications of circular dichroism, NMR and ESR spectroscopy, X-ray diffraction. Mass spectroscopy. Unit 5 : Chromatography: Principles and applications of Chromatography: Thin layer chromatography (TLC), Gel filtration chromatography, Ion exchange chromatography, Affinity chromatography, Gas chromatography (GC) and High performance liquid chromatography[(HPLC)	12
4	APRIL	Electrophoresis: Definition, principles and applications; different types of 11 Electrophoresis- PAGE, SDS-PAGE, IEF, 2D-PAGE, Agarose gel electrophoresis, PFGE. Unit 6 : Isotope techniques: Stable and radioactive isotopes, radio isotopic labelling, autoradiography, scintillation counters, non-radioactive labelling, safety guidelines.	12

YEAR: 16-8-2022 TO 30-9-23
NAME OF STAFF: PROF. RAHUL SAWANT
PAPER : 1.1 GENERAL MICROBIOLOGY
SEMESTER: SEMESTER-1

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JANUARY	**Unit 1:** History and Scope of Microbiology: Introduction to Microbiology, Spontaneous generation theory, Contributions of Antony van Leeuwenhoek, Louis Pasteur,	9

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		Robert Koch, Joseph Lister, Edward Jenner, and Alexander Fleming. Beneficial and harmful microorganisms, Introduction to branches of Microbiology: a) Air, b) Water, c) Sewage, d) Soil, e) Dairy, f) Food, g) Medical, h) Industrial, i) Biotechnology j) Geo microbiology	
2	FEBRUARY	**UNIT 5** : Fungi: History and scope of Mycology; General Characteristics of Fungi; Classification and Identification of fungi- Basidiomycetes, Ascomycetes, Deuteromycetes, Oomycetes, Hypochytriomycetes and Symbiotic fungi (Lichens); Growth and reproduction of fungi- effect of nutritional and environmental factors on fungal growth	

YEAR: 2022 -2023
NAME OF STAFF: PROF. AKSHATA BHUJGURAV
PAPER : 1.1 GENERAL MICROBIOLOGY
SEMESTER: SEMESTER-1

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JANUARY	**Unit 2:** Prokaryotic and Eukaryotic cells: Introduction and evolution of Prokaryotic and Eukaryotic cells, Structural organization of Prokaryotic and Eukaryotic cells, Major groups of Microorganisms – Viruses, Bacteria, Algae, Fungi and Protozoa. Unit-3: Viruses: History and development of virology; Types and classification of viruses; Structural organization of viruses with examples: Capsids, Nucleic acids, Envelope; Structure of T4 bacteriophage,	12

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		TMV, HIV. Brief introduction about Viroid, Virions, and Prions.	
2	FEBRUARY	Unit-4: Bacteria: Morphology of Bacteria size, shape, arrangements, Structure, and functions of Cell wall, Cell membrane, Capsule and slime layer, Flagella, Pilli, Nuclear material, Mesosome, Ribosome; General Characteristics of bacteria Spirochetes, Rickettsia, Chlamydia, Mycoplasma, Cyanobacteria, Actinomycetes, Archeabacteria; Growth and reproduction of bacteria- effect of nutritional and environmental factors on bacterial growth	9
3	MARCH	**Unit- 7**: Protozoa: History of Protozoa; Classification, Growth, and reproduction of Protozoa., General Characteristics of Protozoa: Paramoecium, Amoeba, Euglena, Trypanosoma, and plasmodium.	5

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YEAR: 2022 -2023
NAME OF STAFF: PROF. SHUSHANT JIGAN
PAPER: MBH- 2.1 Microbial Physiology and Biochemistry, 2.2 Microbial Genetics and 2.4 Biostatistics
SEMESTER: SEMESTER-2

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JUNE	**MBH- 2.1** **Unit 3:** Fungal and bacterial secondary metabolism: Secondary metabolites and regulation of secondary metabolism. Antibiotics: Definition, Discovery, classification, structure and mode of action. Biosynthesis of secondary metabolites -beta-lactum antibiotics, patulin, Aflatoxin, ergot alkaloids. Fungal toxins: Types of toxins, aromatic and phenolic toxins, terpenoid toxins, polysaccharides and glycoproteins. Bacterial toxins: Exo and endotoxins, enterotoxins. Pigments: Melanin, carotenoids. Fungal hormones: Sirenin (Allomyces) Sterols(Achlya). Trisporic acid(Ascomycetes), peptide hormones (Basidiomycetes). Bioluminescence in microorganisms: Mechanism and significance. **MBH- 2.2** Unit 1: Prokaryotic Genome: E. coli chromosome- coiled, supercoiled (plectonemic, solenoid), folded fiber model. Mycoplasma genitalium and E. coli genome. **MBS-2.4: Biostatistics** Unit 1: Population and sample: Random sample, use of a table of random numbers, parameters and statistics, sampling distribution of sample means Standard error; confidence intervals.	17
2	JULY	**MBH- 2.1 : Unit 4** Biochemistry Water: Properties of water, weak interaction in aqueous systems, ionization of water, pH, weak acids and weak bases, buffers, types of buffers and	26

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		their importance. Carbohydrates: Definition, classification, structural properties and importance of sucrose, lactose, maltose, starch, cellulose, agar. Amino acids, peptides and proteins: Definition, classification, structure, general properties, assay methods of proteins. Lipids and fats: Definition, classification, structure and importance of lipids and fats. **MBH- 2.2 Microbial Genetics** Genetic recombination: Genetic recombination in bacteriophages and E. coli, 17 synopsis of homologous duplexes, breakages and re-union role of RecA and other recombinases, generalized & specialized transduction, transformation and conjugation, legitimate & illegitimate recombination, gene conversion, overview of bacterial genetic map. **MBS-2.4: Biostatistics : Unit 2:** Probability: types of events, sample space, definition, conditional probability, addition and multiplication rules of probability, and some simple problems. Probability distributions-Binomial, Poisson, and Normal distributions and a few simple problems.	
3	AUGUST	**MBH- 2.1 : Unit 5** Nucleotides: Structure and properties of nucleotides and nucleosides. Vitamins: Definition, classification, structure and importance. Porphyrins: Definition, structure, properties and importance of chlorophyll, cytochrome and hemoglobin. **MBH- 2.2 Microbial Genetics** **Unit 3:** Gene and Mutation: Gene as unit of mutation, molecular basis of spontaneous and induced mutations and their role in evolution; mutagens, types of mutations, transposon mutagenesis, site directed mutagenesis; environmental mutagenesis; Ame's and other toxicity testing. Genetics of fungi-alteration of generation, induction	21

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		of mutation in Neurospora crassa and yeast, cytoplasmic inheritance and biochemical mutants. **MBS-2.4: Biostatistics : Unit 2:** Probability distributions-Binomial, Poisson, and Normal distributions and a few simple problems. Statistical Inference-Estimation, standard error, the confidence interval for means and proportion. Testing of hypothesis: basic concepts and definitions, types of errors.	
4	SEPTEMBER	**MBH- 2.1 : Unit 5** Enzymes: Classification, nomenclature, general properties, activation energy, transition state, binding energy, turnover number, enzyme kinetics and Michaelis-Menten Equation, Importance of Km and Vmax, coenzymes, activators, inhibitors, isoenzymes, multi enzyme complex, allosteric enzymes, mechanism of enzyme action. **MBH- 2.2 Microbial Genetics** Eukaryotic Genome: Structure of chromatin, chromosome, centromere, telomere, nucleosome, genome organization, split gene, overlapping genes and Cot curves, chromatin remodeling; types of histones, histone modifications-methylation, acetylation, phosphorylation and their effects on structure and function of chromatin, DNA methylation, repetitive and non-repetitive DNA sequence. Law of DNA constancy, C value paradox and genome size, karyotype and idiogram, chromosome banding pattern, types of chromosomes. Organelle genome **MBS-2.4: Biostatistics : Unit 2:** Tests based on Normal, student's t, chi-square, and F distributions, interpretation of' `p'value. Statistical package- Features of statistical software, SPSS for various applications in the Biostatistical program.	20

Total No of Classes: 84

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DEPARTMENT OF MICROBIOLOGY
MONTHLY TEACHING PLAN

YEAR: 2022 -2023
NAME OF STAFF: PROF. PRIYANKA KUNDEKAR
PAPER: MBH-2.3: Molecular Biology
SEMESTER: SEMESTER-2

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JUNE	**Unit 1:** Concepts of molecular biology: Introduction, flow of information, central dogma of molecular biology. Structure of DNA, DNA polymorphism (A, B, Z DNA). Structure and function of different types of RNA.	4
2	JULY	Unit 1 : DNA damage and repair: Types of DNA damage – deamination, oxidative damage, alkylation, pyrimidine dimers; Repair pathways – photo-reactivation, excision repair, post replication repair, SOS repair,	4
3	AUGUST	Unit 1: methyl directed mismatched repair, very short patch repair. Unit 2: DNA Replication: DNA replication in prokaryotes and viruses (Rolling circle and M13 bacteriophages replication)	4
4	SEPTEMBER	Unit 2: DNA Replication : Asymmetric replication, looped rolling circle, semi conservative replication, primer or template, concotamy formation –P1. Origin of replication, replication fork- leading and lagging strands, enzymes involved at different steps of replication. Fidelity of replication. Extra chromosomal replicons.	4

Total No of Classes: 16

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YEAR: 2022 -2023
NAME OF STAFF: PROF. RAHUL SAWANT
PAPER: MBH-2.3: Molecular Biology
SEMESTER: SEMESTER-2

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JUNE	**Unit 3:** Transcription: Transcription factors and machinery, formation of initiation complex, transcription activators and repressors, RNA polymerases. Initiation, elongation and termination. Heat shock response, stringent response. Inhibitors of RNA synthesis and their mechanism.	4
2	JULY	**Unit 3: Transcription:** Polycystronic and monocystronic mRNA. Control of elongation and termination. Alternate sigma factors. Post transcriptional modifications of mRNA capping, editing, splicing, polyadenylation, modifications of tRNA and rRNA	4
3	AUGUST	**Unit 4: Translation** Genetic code- Features and character, wobble hypothesis. Ribosome assembly, initiation factors and their regulation, formation of initiation complex, Initiation, elongation and termination of polypeptide chain, elongation factors and releasing factors	4
4	SEPTEMBER	**Unit 4: Translation** translational proof-reading, inhibitors of translation and their mechanism, post translational modification of proteins-glycosylation. Control of translation in eukaryotes. Differences between prokaryotic eukaryotic translation.	4

Total No of Classes: 16

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YEAR: 2022 -2023
NAME OF STAFF: PROF. AKSHATA BHUJGURAV
PAPER: MBH- 2.2 Microbial Genetics and 2.3: Molecular Biology
SEMESTER: SEMESTER-2

SR.NO	MONTH	SYLLABUS TO BE COVERED	No of HRS
1	JUNE	**MBH- 2.2 Microbial Genetics** **Unit 5 :** Gene transfer mechanisms: Bacterial transformation; Host cell restriction; Transduction, complementation; conjugation and transfection **2.3: Molecular Biology** **Unit 5:** Regulation of gene expression: Transcriptional control. Operon concept, catabolite repression. Inducible and repressible systems. Negative gene regulation – E. coli lac operon	8
2	JULY	**MBH- 2.2 Microbial Genetics** **Unit 5:** mechanisms and applications, genetic analysis of virus. : Bacteria and yeast genomes. **2.3: Molecular Biology** Unit 5: Positive regulation – E. coli ara operon; Regulation by attenuation – his and trp operons, anti-termination – N protein and nut sites, DNA binding protein, enhancer sequences, identification of protein binding site on DNA.	8
3	AUGUST	**MBH- 2.2 Microbial Genetics** Unit 6: Plasmids and Bacteriophages: Plasmids, F-factors - description and their uses in genetic analysis, Colicins and Col Factors, R plasmids. **2.3: Molecular Biology** Unit 5: Maturation and processing of RNA– methylation, cutting and modification of tRNA degradation system	8

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4	SEPTEMBER	**MBH- 2.2 Microbial Genetics** Unit 6 : Lysogeny and lytic cycle in bacteriophages, Life cycle and their uses in microbial genetics. Lytic phages-T7 and T4, Lysogenic phages Lamda, M13 and ΦX174. **2.3: Molecular Biology** Unit 6: Control of gene expression at transcription and translation level: Regulation of phages, viruses, prokaryotic and eukaryotic gene expression, role of chromatin in regulating gene expression. Gene silencing: Transcriptional and post transcriptional gene silencing-RNAi pathway (siRNA and miRNA).	8

Total No of Classes: 32

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Rani Channamma University
PG. DEPARTMENT OF ENVIRONMENTAL SCIENCE
M. Sc. Environmental Science

PROGRAMME OUTCOMES (PO'S)

The post graduates are able to

1) Acquire in–depth knowledge and integrate with existing knowledge to sensitize the people about global and local environmental issues.
2) Develop an ability to identify, critically analyze, formulate and solve environmental problems using basic principles of nature conservation.
3) Get acquainted with environmental and social impacts of any developmental activity.
4) An ability to design a system and process to meet desired needs of society within realistic limitations such as health, safety, security and environmental considerations.
5) An ability to design and conduct experiments, interpret data, and provide well informed conclusions.
6) Communicate effectively socio-economic problems related to environment by appropriate documentations and presentations.
7) Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8) Apply ethical principles and commit to professional ethics and responsibilities and follow the norms of the any surrounding practice.

PROGRAM SPECIFIC OUTCOMES (PSO's):

I: Professional skills -Ability to monitor the present status of environmental parameters through monitoring for design and development of new concept or technology.

II: Industrial Skills- Successfully tackle with the industrial pollution problems through appropriate technology and tools.

III: Environmental and Social values within individual -Inclusion of environmental and social values within the individual's life.

IV: Problem solving approach: Identify, formulate, review literature and analyze complex environmental problems and suggest suitable solutions reaching substantiated conclusions using first principles of natural science.

V: Successful development of Career and Entrepreneurship -To prepare the students with broad environmental perspective and become a successful in career and entrepreneurship.

VI: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with understanding of the limitations.

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2.6.1.2

Monthly teaching plan – PG. Environmental Science

January 2023 - MSc Environmental Science – Sem I

Paper	1.1 - Introduction to Environmental Science	Faculty
	Topics to be covered	Rahul Prabhukhanolkar
	Unit -1 a) Introduction to Environmental Science: Meaning, scope and interdisciplinary nature of Environmental Science, principles background and scope of environmental science, Environmental Science and technology, Media and people, decision making and applications of Environmental Science. b) Environmental ethics: Nature and origin of environmental ethics, ecological consciousness, western and Eastern views, philosophy of environment, Environment, community and equity, Integrating ethical values and knowledge, self centered development and environment.	
Paper	1.4 - Environmental Biology and Conservation	Rahul Prabhukhanolkar
	Topics to be covered	
	Unit – 1 Ecology - Definition of ecology and sub divisions, Relation to other sciences, Relevance to civilization, levels of organization, hierarchy, Cake and other ecological models, Concept of ecosystem, its structure and function, cybernetic nature and stability of Ecosystem, Energy in ecological systems, concept of productivity, food chains, food web and trophic levels, ecological pyramids, Concept of habitat, niche and guild, concept of ecotone and edge effect, succession, natural selection, Concept of Gaia hypothesis. Limiting factors and their tolerance- Liebig's law of minimum, Shelford's law of tolerance, limiting factors - temperature, radiation, and water, micronutrients etc.	
Practical	1.Determination of pH and Conductivity of different water and soil samples 2. Determination of calcium and magnesium by EDTA complex metric method 3. Determination of Carbonates and Bicarbonates in water samples	Rahul Prabhukhanolkar

February 2023 - MSc Environmental Science – Sem I

Paper	1.1 - Introduction to Environmental Science	Faculty
	Topics to be covered	Rahul Prabhukhanolkar
	Unit- 2 Global and national environmental issues: Greenhouse effect, Acid rain, Global Warming, Ozone depletion, Climate change, Carbon Sequestration, Clean Development Mechanism, Carbon credits, Carbon footprint, Deforestation, Biodiversity loss, Desertification.	
Paper	1.4 - Environmental Biology and Conservation	Rahul Prabhukhanolkar
	Topics to be covered	
	Unit – 2 – Population & System ecology - a) Population and community ecology- Basic	

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March 2023 - MSc Environmental Science – Sem I

Paper	1.1 - Introduction to Environmental Science	Faculty
	Topics to be covered	Rahul Prabhukhanolkar
	Unit -3 Human impact on environment and its consequences- Hunting and gathering, agriculture societies, Human history Rise and Fall of civilisations, Age of colonisation, industrial societies, impact of cultural change on environment, population explosion, degradation of natural resources, pollution of air, water and soil, urbanization, industrialization, food security, public Health, energy crises.	
Paper	1.4 - Environmental Biology and Conservation	Rahul Prabhukhanolkar
	Topics to be covered	
	Unit – 3 - Biomes of the world: Bio-geographical realms, Classification of biomes – Tundra, Taiga, Grassland, Desert, Evergreen and deciduous forests, Tropical rain forests and their characteristics, flora and fauna; Classification of Aquatic Habitats – Fresh water pond, Wetlands, Rivers – their characteristics, flora and fauna; Marine Habitats – Pelagic, Benthic, Inter-tidal Estuarine; Mangroves ecosystem, flora and fauna of India. Biogeography of ecosystems in India. Concept of Bioindicators, Bio-indicators as plants, animals, Ecosystem services and ecosystem dynamics Ecosystem services, Ecosystem functioning and ecosystem services provided by different ecosystems at present – provisioning services, regulating services, habitat or supporting services, cultural services	
Practical	1.Identification of Common birds 2. Vegetation analysis using quadrats and analysis in excel (Density, frequency, abundance) 3. Vegetation analysis using line transects and analysis in excel 4. Vegetation analysis by using belt transect and analysis in excel 5. Assessment of Bird diversity (Transact & point count)	

April 2023 - MSc Environmental Science – Sem I

Paper	1.1 - Introduction to Environmental Science	Faculty
	Topics to be covered	Rahul Prabhukhanolkar
	Unit- 4 Concept of carrying capacity (13 hrs) Biotic and abiotic components of environment, concept of sustainability and carrying capacity, tragedy of commons, human population and food, water and energy security, present status of environment and future scenarios.	
Paper	1.4 - Environmental Biology and Conservation	Rahul Prabhukhanolkar
	Topics to be covered	
	Unit – 4 Biodiversity & Conservation- Biodiversity as life support system for man, types of biodiversity, ecosystem, species and genetic, Values of biodiversity, Indian ethos of wildlife conservation, Hotspots of Biodiversity, Causes for loss of biodiversity, measurement of biodiversity; IUCN criteria, Red list, Criteria for conservation, Approaches to conservation, Design criteria(habitat constituents, reserve design, reserve shape and size, population size, need for buffers, wildlife corridors, landscape connectivity, administrative, political and economic considerations), Methods of biodiversity conservation – in situ conservation (sanctuaries, national parks and biosphere reserve); ex situ conservation (zoo, botanical gardens; gene/germ plasma banks), Convention on Biological Diversity (CBD), Biodiversity conservation efforts in the country.	
Practical	6. Assessing mammal diversity (camera trapping & sign survey) 7. Calculation of diversity index 8. Study of forest ecosystem (assessment for forest structure, measurement of GBH, canopy estimation, vegetation analysis) 9. Study of grassland ecosystem (grassland vegetation analysis). 10. Study of River /wetland ecosystem (Vegetation mapping, wetland bird analysis)	

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