

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: V.B.Kankekar.

Programme: B. Sc I Biotechnology (Entire)

Semester: I

Subject: Biotechnology

Course Title: Sub code - OEC07BTE11 Open Elective-I (Bio-Instrumentation-I)

Month – Jul - Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Method of cell disruption: Centrifugation-	Blenders- grinding with abrasives, presses, enzymatic method, sonication; Salt participation- Salting in, salting out, organic solvent precipitation, dialysis, ultra filtration.
10	02	12		
Month – Sep -Oct			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Basic Laboratory Instruments: Introduction, Principle and applications of electrophoresis- Supporting media- Agarose, PAGE. Construction & Working pH meter, Autoclave, Laminar Air Flow	Microscopy : History, Terms in microscopy – Magnification, Refractive index, Numerical aperture, Resolving power
10	02	12		
Month – Oct - Nov				
Lectures	Practicals	Total	Principle, working, ray diagram and applications of Colorimeter, UV-Visible Spectroscopy Introduction to spectroscopy, properties of electromagnetic radiation UV and Visible range. Principle	1. Bright field microscopy 2. Dark field microscopy 3. Phase contrast microscopy 4. Fluorescence microscopy
10	02	12		

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Vivekanand College, Kolhapur (Autonomous)

v Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Dr.A.R.Alawekar

Programme: B. Sc I Biotechnology (Entire)

Subject: **Biotechnology**

Semester: I

Course Title: **Sub code - Sub code - OEC07BTE12 Open Elective-II (Plant Sciences)**

Month – Jul- Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Plant Diversity Outline of General Classification of Plant Kingdom. Algae – General characters and economic importance Fungi – General characters and economic importance Lichens -General account and economic importance	Bryophytes – General characters and economic importance Pteridophytes – General characters and economic importance Gymnosperms – General characters and economic importance
Month – Sep -Oct			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Taxonomy of Angiosperms Taxonomy :- Definition, Aims, objectives and functions	Binomial nomenclature and its significance, Categorize of plant species as per IUCN, Methods of conservation, study of Outline of Bentham & Hookers System of classification of plants.
Month – Oct- Nov			Module/Unit: II	Sub-units planned
10	02	12	Vegetative Reproduction – Cutting, Grafting, Tissue Culture. Sexual Reproduction in Angiosperms:- Structure of Typical Flower Fruit - Definition, formation, Types: Seed – Definition and its types, Plant Anatomy	Dormancy of seed- Definition, Causes and Breaking of seed dormancy, Seed germination- Concept, Types-Epigeal and Hypogeal, factors affecting seed germination.

A.R. Alawekar

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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: V.N.Arekar

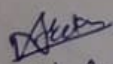
Programme: B. Sc I Biotechnology (Entire)

Semester: I


Subject: **Biotechnology**

Course Title: **Sub code - DSC07BTE11 Biotechnology-I (Biotechnology for Human Welfare-I)**

Month – Jul – Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Introduction to Biotechnology: Interaction between plants and microbes, transfer of paste resistance genes to plants: Biofertilizer -	Biotechnology-Origin and definition, History of Biotechnology, Definition ,types with examples, Mass production and field application and use of – <i>Azotobacter, Rhizobium, Azospirillum</i>
10	02	12		
Month – Sep - Oct			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Biopesticide – Health Biotechnology: Forensic science-	Definition ,types with examples Gene TherapyVaccines Global history and development of forensic science, Sir Alec Jeffrey’s Important Contribution.
10	02	12		
Month – Oct – Nov			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	History of Forensic: Introduction to Forensic science –	Nature, basics of Forensic Science, Forensic Laboratory: Divisions of forensic science laboratory
10	02	12		


 (Miss. V.N. Arekar)
 Name and Signature of Teacher




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Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Mr.S.G.Kulkarni.

Programme: B. Sc I Biotechnology (Entire)

Semester: I

Subject: **Biotechnology**

Course Title: Sub code - DSC07BTE12 Biotechnology-II (Biochemistry-I)

Month – Jul – Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Origin of life: Properties of water: Interactions in aqueous systems. Ionization of water, weak acid weak bases. Ionic Product of Water P^H, pka value definition, H-H Equation, Titration Curve of Amino Acid Biological Buffer Systems- Nucleic acids	- Basic concept, A.I. Oparin concept, Urey Miller's experiment, Introduction to Biomolecules - Carbohydrate, Protein, Lipid, Nucleic Acid e.g. Phosphate, Bicarbonate, Haemoglobin buffer system, Protein buffer system
10	02	12		
Month - Aug – Sep			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Biological Buffer Systems- e.g. Phosphate, Bicarbonate, Haemoglobin buffer system, Protein buffer system Nucleic acids:	Nucleosides, nucleotides, polynucleotide, DNA and its different forms with properties. (A, B, D, & Z), RNA and its types- m-RNA, t-RNA, r-RNA Forces Stabilizing nucleic acid structure.
10	02	12		
Month - Sep – Oct			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Carbohydrates: Classification, glyceraldehydes, simple aldoses & ketoses, open and Ring Structure of Aldoses and Ketoses, Confirmation of D-glucose Lipids: Classification, Simple lipid - Triacyl glycerol & waxes. Compound lipid - Phospholipid,	, biological importance of carbohydrates, reactions of monosaccharide (Oxidation, reduction, Osazone), glycosidic bond, disaccharides (Sucrose, maltose, lactose),
10	02	12		

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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: V.N.More

Programme: B. Sc I Biotechnology (Entire)

Semester: I

Subject: **Biotechnology**

Course Title: **Sub code - MIN07BTE11 (2) Microbiology-I (Introduction to Microbial world)**

Month - Jul- Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Development of microbiology as a discipline - Significance of Scientific contributions in development in Microbiology as a discipline: A. Early contributions B. Scientific contribution leading to diversification of Microbiology	Robert Hook, Anton Van Leeuwenhoek, Louis Pasteur, Robert Koch, John Tyndall. Edward Jenner, Paul Ehrlich, Ellie Metchnikoff, Lister
10	02	12		
Month			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Beneficial and harmful activities of microorganisms in Applied branches of Microbiology and major microbiological institutes in India. Diversity of Microbial World: A. Systematic of Classification-	- Medical, Environmental, Food, Agriculture, Industrial microbiology
10	02	12		
Month			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Bacterial taxonomy: B. Differences in Cellular and Acellular microorganisms C. Different groups microorganisms- Bacteria, Yeast, FungActinomycetes, Algae, Viruses, Protozoa, Viroids and Prions	General principles of bacterial nomenclature Concept of bacterial species & strain. Introduction to Bergey's manual of systematic bacteriology.
10	02	12		

V.N. More

(Miss. V. N. More)
Name and Signature of Teacher



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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: S.S.Patil.

Programme: B. Sc I Biotechnology (Entire)

Semester: I

Subject: **Biotechnology**

Course Title: Sub code MIN07BTE12 Microbiology-II (Techniques in Microbiology)

Month - Jul- Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Concept of Sterilization:- Microbiostasis, Asepsis, Sanitization. Methods of sterilization by Physical agents Checking efficiency of sterilization	Definitions of: Sterilization, Disinfection, Antiseptic, Germicide,
10	02	12		
Month - Aug - Sep			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Checking efficiency of Disinfection- Microscopy and Staining Techniques Microscopy: Microscopy	Phenol coefficient- Rideal Walker coefficient, Chick Martin Test a) General principles of microscopy
10	02	12		
Month Oct- Nov			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Stains and staining procedures - Definition of dye and stain, Classification of stains - Acidic, Basic and Neutral,	Differential staining : Gram staining and Acid fast staining, iv) Special staining: Capsule staining, cell wall staining, endospore staining
10	02	12		

S.S. Patil

(Mrs. S. S. Patil)

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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: R.M.Shetty

Programme: B. Sc I Biotechnology (Entire)

Semester: II

Subject: **Biotechnology**

Course Title: **Sub code - OEC07BTE21 Open Elective -III (Ecology)**

Month -Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Ecosystem- Concept, structure, function. Productivity- Kinds of productivity. Food chain- types of food chain, food web, concept of tropic level. Ecological pyramids- concepts and types.	Energy flow in ecosystem –concept of energy, unit of energy, ecological energetics, laws governing energy transformation, ecological efficiency,
10	02	12		
Month -Feb-Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Biogeochemical cycle Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus cycle Biodiversity	Types of biodiversity, causes of loss of biodiversity, conservation of biodiversity.
10	02	12		
Month -Mar- Apr			Module/Unit: II	Sub-units planned
10	02	12	Population Ecology- Introduction, population characteristics, Natality, Mortality, survivor ship curves, age structure, age pyramid. Population growth- Exponential and logistic, r and k strategists. Evolution :-	Theories of evolution- Lamarekism, Darwinism, Modern synthetic theory & mutational theory. Evidences of evolution and Adaptive radiation. Concept of species and speciation. Hardy-Weinberg law and Equation

R.Shetty

Name and Signature of Teacher

Rajeshwari .M. Shetty .

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Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: N.A.Patel

Programme: B. Sc I Biotechnology (Entire)

Semester: II

Subject: **Biotechnology**

Course Title: **Sub code - OEC07BTE22 Open Elective –IV (Animal Sciences)**

Month –Dec-Jan			Module/Unit: I	Sub-units planned
Lectu res	Practic als	Tot al		
10	02	12	Structure and function of male reproductive system: Structure and function of female reproductive system:	Ovary, influence of hormones On development!of ovarian follicles and oogenesis, reproductive cycles: estrous and! menstrual cycle,ovulation, atresia and corpus luteum formation; pregnancy and lactation; implantation and placentation
Month –Jan-Feb			Module/Unit: I and II	Sub-units planned
Lectu res	Practic als	Tot al		
10	02	12	Reproductive Health Infertility in male and female: causes, diagnosis and management. Sex determination Basic concepts of development	: Potency, commitment, specification(autonomous,regulativeand!syncyti al),!induction,competence,determination and differentiation, morphogenetic gradients, cell fate and cell lineages, genomicequivalence and the cytoplasmic determinants, imprinting
Month –Mar-Apr			Module/Unit: II	Sub-units planned
10	02	12	Cleavage and Early embryonic development: Morphogenesis and organogenesis in animals formation of somite, limb development. Regeneration	Patterns and molecular mechanism of cleavage,blastula formation,gastrulation patterns,concept and functions of primary organizer, neural induction, differential gene expression during formation of germ layers.

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N. A. Patel

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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: **Miss. V. N. More**

Programme: **B. Sc I Biotechnology (Entire)**

Semester: **II**

Subject: **Biotechnology**

Course Title: **Subcode -MIN07BTE21 Microbiology-III(Bacterial Cytology and Cultivation)**

Month –Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Morphology and cytology of Bacteria Morphology of Bacteria – i) Size, ii) Shape, iii) Arrangements Cytology of Bacteria – 1. Cell wall 2. Cell membrane 3. Endospore 4. Capsule	: Composition and detailed structure of Gram positive and Gram negative cell walls, archaebacterial cell wall, Lipopolysaccharide, Sphaeroplasts, protoplasts and L: forms. Effect of antibiotics and enzymes on the cell wall
Month –Feb-Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	5. Flagella 6. Fimbriae and pili 7. Cytoplasm Microbial nutrition	Nutritional requirements of microorganisms : Water; Micronutrients; Macronutrients; Carbon, Energy source; Oxygen and Hydrogen; Nitrogen, Sulphur and Phosphorous and growth factors
Month –Mar-Apr			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Culture media and pure culture techniques Methods for isolation of pure culture Microbial growth: Definition of growth, phases & growth	Common components of media and their functions Peptone, Yeast extract, NaCl, Agar and Sugar. Culture

V. N. More,

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Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: S.S.Patil

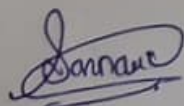
Programme: B. Sc I Biotechnology (Entire)

Semester: II

Subject: **Biotechnology**

Course Title: Sub code - MIN07BTE22 Microbiology -IV (Virology)

Month -Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	General Virology: A. History, Origin and Evolution of viruses B. General characteristics of Viruses C. Structure of viruses	i Enveloped and Non enveloped viruses ii. Capsid symmetries – Icosohedral and Helical iii. Structural components of virus – Protein - Envelope proteins, Matrix proteins and Lipoproteins
10	02	12		
Month -Jan-feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	D. Classification & nomenclature of viruses A. Isolation, Cultivation, Purification and Enumeration of Viruses	i. Isolation and cultivation of viruses- ii. Purification of viruses- iii. Enumeration of viruses- Direct and Indirect method
10	02	12		
Month -Mar-Apr			Module/Unit: II	Sub-units planned
10	02	12	B. Replication of viruses: i. Bacteriophages – T4 phage (Lytic), Lambada phage(Lytic and lysogeny)	ii. Plant viruses – TMV iii. Animal viruses – HIV, nCoV, HPV



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Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: J.J.Gavadi

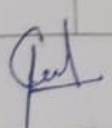
Programme: B. Sc I Biotechnology (Entire)

Semester: II


Subject: **Biotechnology**

Course Title: **Sub code** –DSC07BTE21 Biotechnology –III(Biotechnology for Human Welfare-II)

Month – Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Agriculture Biotechnology- Biotechnology in crop improvement, selection of crop for biotic- abiotic stress resistance, Metabolite engineering, Genetically Modified Crop- Cell Culture – Animal cell culture.	Golden rice, herbicide resistance, insect resistance, disease resistance, bio-fortification and nutrition enhancement, bio energy crops Introduction, history and requirement for ATC lab
Month – Feb - Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Plant cell culture –introduction, history and requirement for PTC lab, sterilization and types of media, Micro propagation – stages of micro propagation Applications Applied biotechnology - Environment –	Bioremediation- degradation of hydrocarbons and agriculture waste, Phyto remediation, Bioleaching, bio sorption.
Month –Mar-apr			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Conservation Biotechnology – FOOD biotechnology- Single cell protein (SCP) – <i>Spirullina</i> Concept of probiotics –	Role of biotechnology in conservation, need for conservation, use of genetically modified organism, DNA hybridization, bar-coding


 Ms. J. J. Gavadi
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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: S.G.Kulkarni

Programme: B. Sc I Biotechnology (Entire)

Subject: **Biotechnology**

Semester: II

Course Title: **Sub code - DSC07BTE22 Biotechnology –IV (Biochemistry-II)**

Month –Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10			Protein: Amino acid classification (Depending upon R group), structure of amino acids, single letter codes of amino acids, peptide bond, classification of protein based on composition -Simple, conjugate, derived. Determination of primary structure (Sanger's method, Edman's method, Dansylchloride),	structural level organisation of proteins- Primary, Secondary- forces stabilizing secondary structure types – α – helix, β -sheets, Ramachandran plot..
Month – Feb-Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10			Chromatography : Introduction, Theory, Principle and applications of Thin layer chromatography	, paper chromatography, column chromatography, size exclusion chromatography, Ion exchange chromatography, Affinity chromatography.
Month –Mar- Apr			Module/Unit: II	Sub-units planned
10			Enzymes: Introduction, IUB classification, active site, energy of activation, transition state hypothesis, lock and key hypothesis, Induced fit hypothesis, enzyme inhibition- types competitive, non-competitive, un-competitive. M-M equation, Line weaver- Burk plot Vitamins and Co-enzymes:	Classification, water-soluble (Vitamin B complex Vitamin C) and fat-soluble vitamins (Vitamin A, E, D and K). Structure, dietary requirements, deficiency conditions, coenzyme forms and their mechanism.

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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher : V.N. Arekar.

Programme: B. Sc I Biotechnology (Entire)

Semester: II

Subject: **Biotechnology**

Course Title: **Sub code - SEC07BTE21 Skill Enhancement course (Basics in Cell Biology)**

Month -Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Cell Structure – Discovery of Cell, Cell theory -Definition, discovery, three assumptions of cell theory, exceptions, organismal theory, protoplasm theory, Organization of Prokaryotic cell, Organization of Eukaryotic cell (plant and animal cell), Ultra structure & functions of cell organelles Mitochondria, Chloroplast, E.R., Golgi apparatus, Lysosome, Peroxisome, Ribosomes.	Cell membrane & Membrane transport, Cell membrane –components, Molecular models of cell membrane-Unit membrane model, Protein, crystal model, fluid mosaic model
10	02	12		
Month -Feb-Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Types of membrane transport, Passive transport-simple diffusion, facilitated diffusion, osmosis. Active transport-primary and secondary transport.	Sodium pump, Na ⁺ -K ⁺ ATPase pump, Bulk transport-endocytosis and exocytosis
10	02	12		
Month -Mar-apr			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Credit - II Nucleus -Introduction, morphology, occurrence, shape, size, number, position Ultra structure of nucleus-Nuclear membrane, nucleoplasm, nucleopore complex, nucleus. Chromosome structure - introduction	Cytoskeleton assembly Introduction, Cytoskeleton elements, Microtubules-occurrence, structure, chemical composition, microtubule associated proteins, functions,
10	02	12		

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(Miss. V. N. Arekar)



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Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: V.B. Kankekar

Programme: B. Sc II Biotechnology (Entire)

Semester: III

Subject: Biotechnology

Course Title: DSC 1346C- Biophysics and Enzymology

Month - <u>July-Aug</u> .			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		
10	01	11	Atomic Absorption Spectroscopy X-ray Crystallography NMR-	Introduction, Principle, Instrumentation, Applications. Expression for interplaner distance, Bragg's Law,
Month - <u>Aug-sep</u> .			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		
10	02	12	IR spectroscopy ESR Spectroscopy Factors affecting enzyme activity	Introduction, vibration spectra (without proof), possible modes of vibrations of atoms Temperature, pH, substrate concentration, inhibitors, enzyme concentration Activators
Month - <u>Sep-Oct</u> .			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		
10	01	11	Factors affecting catalytic activity efficiency of enzyme, Allosteric enzymes	Proximity orientation, Strain and Distortion, Covalent catalysis, Acid-base catalysis. Definition, properties

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(Miss. V.B. Kankekar)
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Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. R.M.Shetty.

Programme: B. Sc II Biotechnology (Entire)

Semester: III

Subject: Biotechnology

Course Title: DSC 1345C- Genetics

Month - <u>July-Aug</u>			Module/Unit: I	Sub-units planned
Lectures	Practical	Total		
10	02	12	Mendel's law of Inheritance Deviations of Mendel laws Interaction of gene-Linkage	Mendel's Experiment, Dominance and recessiveness, Principle of segregation Incomplete dominance, co- dominance Definition, coupling and repulsion hypothesis
Month - <u>Aug-sep</u>			Module/Unit: I and II	Sub-units planned
Lectures	Practical	Total		
10	03	13	Crossing over Structural and numerical changes in chromosomes. Mutation:	Mechanism and theory mitochondrial and plastid. Definition, Types (spontaneous and Induced)
Month - <u>Sept-Oct</u>			Module/Unit: II	Sub-units planned
10	02	12	Plasmid- Genetic recombination in bacteria Genetics Disease:	Types, Structure, properties and applications Autosomal and Sex Linked

R. Shetty
Miss. R.M. Shetty.
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Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: J.J.Gavadi.

Programme: B. Sc II Biotechnology (Entire)

Semester: III

Subject: Biotechnology

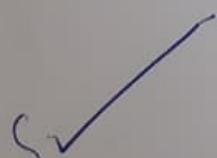
Course Title: DSC 1350C - Plant Tissue Culture

Month – Jul - Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	01	11	Introduction to plant tissue culture Infrastructure & Organization Of Plant Tissue Culture Laboratory- General and aseptic laboratory	Definition, History ,Cellular totipotency, techniques in plant tissue culture. different work areas, equipments and instruments
Month – Sep – Oct			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Culture Medium Callus Culture Techniques Somatic Embryogenesis Organogenesis Anther & Pollen Culture Technique	Composition of basal M.S. medium Introduction, principle, protocol, morphology Introduction, principle, protocol, applications
Month – Oct - Nov			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Micropropagation Different Pathways of Micropropagation Plant Protoplast Culture	Introduction, stages of Micropropagation, factors affecting, advantages and applications.



Ms. J. J. Gavadi

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Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Mr. A. L. Upadhye.

Programme: B. Sc II Biotechnology (Entire)

Semester: III

Subject: Biotechnology

Course Title: DSC 1349C - Molecular Biology- I

Month – Jul- Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Experimental Evidences for DNA as a genetic material Properties and Function of DNA	Griffith's Exp., Avery, Macleod, McCarty Exp., Blender Exp., RNA As a genetic material Gierer and Schram expt. Tm, Cot Curve, Purity of DNA,
10	01	11		
Month – Sep - Oct			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Organization of genome Nucleic Acid biosynthesis DNA Replication	Viral (Lambda, T4), Bacteria (<i>E. coli</i>), Eukaryote, Typical Structure of chromosome De novo synthesis of Purine and Pyrimidine ring
10	02	12		
Month – Oct -Nov			Module/Unit: II	Sub-units planned
10	02	12	DNA Replication DNA Repair	Semi conservative model of replication DNA repair- Direct repair, Excision repair

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(Mr. A. L. Upadhye)

Name and Signature of HOD

Head

Department of Biotechnology (Entire)

Vivekanand College, Kolhapur (Autonomous)



Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. V.N.Arekar.

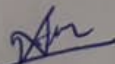
Programme: B. Sc II Biotechnology (Entire)

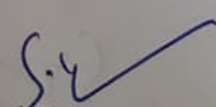
Semester: III

Subject: Biotechnology

Course Title: DSC 1348C – Ecology

Month – July – Aug .			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	01	11	Ecosystem Productivity Food chain Ecological pyramids Energy flow in ecosystem	Concept, structure, function. Kinds of productivity. types of food chain, food web concept of energy, unit of energy
Month – Aug – Sep .			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Biogeochemical cycle Concept - Habitat and Niche Population Ecology	Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus cycle Introduction, population characteristics, Natality Mortality, survivor ship curves
Month – Sep – Oct .			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Population growth Evolution Hardy-Weinberg law and Equation	Exponential and logistic, r and k strategists Evidences of evolution and Adaptive radiation


Miss. V. N. Arekar,
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Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Mr. S. G. Kulkarni.

Programme: B. Sc II Biotechnology (Entire)

Semester: III

Subject: Biotechnology

Course Title: DSC 1347C - Metabolic Pathways

Month- <u>July-Aug</u> .			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Metabolism Carbohydrates Metabolism	Introduction to metabolism, anabolism & catabolism, catabolism & its three stages, Reactions and energetics of Glycolysis, Gluconeogenesis
10	01	11		
Month - <u>Aug-Sept</u> .			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Carbohydrates Metabolism Lipid Metabolism	Shuttle system- Malate Aspartate shuttle system Phosphate shuttle system. Cori Cycle Biosynthesis of fatty acid with respect to Palmitic acid
10	02	12		
Month - <u>Sept-Oct</u> .			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Respiration:- Anaerobic Respiration	Aerobic:-Flow of electrons in ETC, Redox potential components of ETC, Alcoholic and Lactic acid fermentation
10	01	11		

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Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Mr. A. L. Upadhye.

Programme: B. Sc II Biotechnology (Entire)

Semester: IV

Subject: Biotechnology

Course Title: DSC 1349D – Molecular Biology-II

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Transcription in prokaryote and Eukaryote Genetic Code	Mechanism of transcription-Enzyme involved, initiation, elongation and termination Properties of genetic code. Assignment of codons
10	01	11		
Month – Feb - Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Genetic Code Translation in prokaryote and Eukaryote	Wobble Hypothesis, Variation in genetic code Structure and role of ribosome in translation, Amino acid
10	02	12		
Month – Mar - April			Module/Unit: II	Sub-units planned
10	02	12	Regulation of gene expression in prokaryote and eukaryote Regulation of gene expression at transcriptional and translation level.	Regulation of gene expression, in Prokaryotes. a) Lac operon b) Tryptophan operon c) Arabinose operon.

Name and Signature of Teacher

(Mr. A. L. Upadhye)



Name and Signature of HOD

Department of Biotechnology (Entire)
Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Miss. R.M.Shetty.

Programme: B. Sc II Biotechnology (Entire)

Semester: IV

Subject: Biotechnology

Course Title: DSC 1350D Animal Tissue Culture

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	History and Introduction of Animal Cell culture Requirements of Animal cell culture Culture media Laboratory design and layout	History of animal cell culture, Characteristics of animal cell inculture, substrate for cell growth, Natural media, synthetic media (serum containing media, serum free media, balanced salt
10	01	11		
Month- Feb - Mar			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Characterization of cultured cells Measurement of growth parameters of cultured cells Basic technique of mammalian cell culture	Characteristics of cultured cells, cell adhesion, cell proliferation, cell differentiation Morphology of cells, species of origin of cells, Identification of tissue of origin
10	02	12		
Month – Apr - May			Module/Unit: II	Sub-units planned
10	02	12	Scale up of Animal cell culture Contamination Applications of cell culture Stem Cell technology	Scale up in suspension-stirrer culture, continuous flow culture, Airlift fermenter culture, Sources of contamination, types of microbial contamination

Name and Signature of Teacher

Miss. Rajeshwari M. Shetty



Name and Signature of HOD

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Department of Biotechnology (Entire)
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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. V. N. More.

Programme: B. Sc II Biotechnology (Entire)

Semester: IV

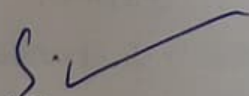
Subject: Biotechnology

Course Title: DSC – 1345 D Immunology

Month – Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Introduction- Types of immunity Types of Defense Introduction to cells and organs of immune system	i) Innate (specific and non-specific) ii) Acquired (Active and Passive) first line of defense (barriers at the portal of entry, physical and chemical barriers)
10	02	12		
Month – Feb-March			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Introduction to cells and organs of immune system Antigen and Antibody	Organs of immune system-primary and secondary lymphoid organs- structure and their role definition, nature, basic structure of immunoglobulin
10	03	13		
Month – May-April			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Immune response Antigen Antibody reactions Hypersensitivity	definition, nature, types of antigen, factors affecting antigenicity, primary and secondary immune response
10	02	12		

V. N. More

Name and Signature of Teacher



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Department of Biotechnology (Entire)
Vivekanand College, Kolhapur



Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Miss. V. B.Kankekar

Programme: B. Sc II Biotechnology (Entire)

Semester: IV

Subject: Biotechnology

Course Title: DSE 1346D- Advances in Cell Biology

Month- <u>Dec - Jan</u> .			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Secretary pathway and protein trafficking Cell signaling	Secretary pathway-ER associated ribosomal translation, co-translational vectoral transport of nascent polypeptide chain Introduction, general principles of cell signaling
10	02	12		
Month- <u>Feb - Mar</u>			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Cell signaling Cell division cycle	Types of cell signaling- contact dependent signaling, autocrine, paracrine Introduction, definition, phases of cell cycle Cell cycle checkpoint
10	03	13		
Month - <u>Apr - May</u> .			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Cell division	Introduction and types of cell division-amitosis, mitosis and meiosis Role of spindle fibers in chromosome separation
10	02	12		

(Signature)

(Miss. V. B. Kankekar)
Name and Signature of Teacher



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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. V.N. Arekar


Programme: B. Sc II Biotechnology (Entire)

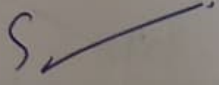
Semester: IV

Subject: Biotechnology

Course Title: DSC 1348D Environmental Biotechnology

Month - Jan - Feb			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Water Pollution Air Pollution Soil Pollution	Definition, Sources and Types-Physical, Chemical and Biological London and LA Smogs (Mechanisms of Formation Sources, Role of pesticide in soil pollution, control
10	01	11		
Month- Mar- Apr			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Environmental Toxicology Environmental Impact Assessment Bio Fuel production	classification and concept, Pesticide Toxicity - Classification Introduction, History, Process, salient features and Importance Production of Bio ethanol
10	02	12		
Month- May- June			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Bioremediation Techniques	Definition, Principle, <i>In situ</i> and <i>Ex situ</i> Bioremediation, Bioremediation of waste waters (MSW, BSW and ISW), Activated Sludge Process, Lagoons
10	02	12		


Miss V. N. Arekar
Name and Signature of Teacher


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Vivekanand College, Kolhapur (Autonomous)
Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Mr. S. G. Kulkarni.


Programme: B. Sc II Biotechnology (Entire)

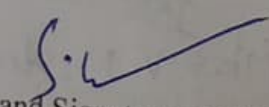
Semester: IV

Subject: Biotechnology

Course Title: DSC 1347D -Plant Biochemistry

Month - <u>Dec-Jan</u> .			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Plant Water Relation Photosynthesis:	Absorption of water- Mechanism, Theories Ultra structure of chloroplast, Photosynthetic pigments, red drop and Emerson's enhancement
10	01	11		
Month - <u>Feb- March</u> .			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Photosynthesis: Nitrogen Metabolism	CAM, photorespiration Role of nitrogen in plants, source of nitrogen, nitrogen fixation- symbiotic & Non-symbiotic
10	01	11		
Month - <u>March-Apr.</u>			Module/Unit: II	Sub-units planned
10	-	10	Introduction to Plant Hormones Secondary metabolite Concept	Biosynthesis of plant hormones- Auxin, Cytokinin, Gibberellin Classification and its biological application


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Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. V. B. Kanekar.

Programme: B. Sc III Biotechnology (Entire)

Semester: VI

Subject: Biotechnology

Course Title: D5E-1355-F-Advances in Genetic Engineering

Month - <u>Dec-Jan</u>			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Isolation of Gene PCR and its application	Isolation desired gene from DNA, Isolation of specific gene with PCR, cDNA and genomic library Primer designing
10	02	12		
Month- <u>Feb- march</u>			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Bar-coding Cloning methodologies Screening of recombinants	Principle and Application Somatostatin, Insertion of foreign DNA into host cells, Agrobacterium mediated gene transfer Direct selection, Insertional inactivation
10	02	12		
Month - <u>march-Apr.</u>			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Application of r-DNA technology	Production of transgenic-knockout mice, In medicines -Insulin and Somatostatin, Introduction to Gene Silencing
10	01	11		

(Miss. V. B. Kanekar)
Name and Signature of Teacher



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Department of Biotechnology (Entire)
Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Miss. V.N.More.

Programme: B. Sc III Biotechnology (Entire)

Semester: V

Subject: Biotechnology

Course Title: DSE-1355-E-Basics in Genetic Engineering

Month - <u>July- Aug.</u>			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Enzymes in r-DNA technology Cloning Vectors Bacteriophage vectors	Introduction and Scope, Enzymes and its applications, Restriction enzymes- types , Cloning & expression λ phage vector
10	02	12		
Month- <u>Aug - sep</u>			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Plant vector Nucleic Acid Hybridization	Ti plasmid, Ri plasmid, shuttle vector- e.g. pJBD 219 Probe Preparation, Methods of labeling probes. Radio labeling – Nick translation, End labeling
10	02	12		
Month- <u>Sep-Oct.</u>			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	DNA Sequencing and blotting technique	Probe Preparation, Methods of labeling probes. Radio labeling – Nick translation, End labeling
10	01	11		

V.N.MOR

Name and Signature of Teacher



Name and Signature of HOD

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Head
 Department of Biotechnology (Entire)
 Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-24

Annual Teaching Plan

Name of the teacher: S.S.Patil.

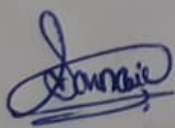
Programme: B. Sc III Biotechnology (Entire)

Semester: VI

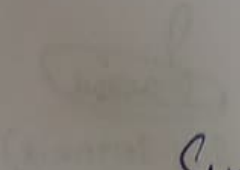
Subject: **Biotechnology**

Course Title: DSE-1352-F- Food and Microbial Biotechnology

Month - Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Microbial Production of Pharma product Organic products Industrial Enzyme	Edible mushroom, Single Cell Protein- Spirulina, Yeast, Antibiotics - Penicillin, Citric acid, Vitamins (B ₁₂), Amino acids- Lysine,
Month Feb- march			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Fermented Foods and Beverages Food Spoilage, preservation & toxicity	Nutraceutical Dairy Products - Cheese, Probiotic - Homo and Heterolactic fermentation, Types of spoilage- Physical, Chemical and Biological (auto and microbial), Preservation methods
Month march-Apr.			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total		
10	02	12	Fermentation economics Quality Assurance of fermentation product:	Contribution of various expense heads to a process Detection and quantification of the product by physicochemical,


 (Mrs. S. S. Patil)
 Name and Signature of Teacher




 Name and Signature of HOD

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Department of Biotechnology (Entire)
 Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Miss. S. V. Sarnaik.

Programme: B. Sc III Biotechnology (Entire)

Semester: V

Subject: Biotechnology

Course Title: DSE-1356-E-Industrial Biotechnology

Month – July – Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Introduction to Industrial Biotechnology Microbial Screening, Scale up and strain improvement	Concept and range of fermentation technology, Types of fermentations (Batch, continuous, dual, multiple) Primary and secondary screening, Primary screening of antibiotics
10	02	12		
Month – Aug-Sep .			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Microbial Screening, Scale up and strain improvement Fermentation Media	, Strain improvement-concept and methods - mutation, genetic recombination , Criteria for typical fermentation medium
10	02	12		
Month – Sep- oct .			Module/Unit: II	Sub-units planned
10	02	12	Downstream Process and Product Recovery	Downstream Processes in fermentation and bioprocess technology Solid and liquid separation, Flocculation and Flotation

(Miss. S. v. Sarnaik)
Name and Signature of Teacher



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Department of Biotechnology (Entire)
Vivekanand College, Kolhapur (Autonomous)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss. R.M.Shetty.

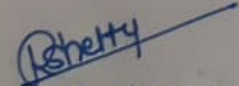
Programme: B. Sc III Biotechnology (Entire)


Semester: VI

Subject: Biotechnology

Course Title: DSE-1354-F- Bioinformatics

Month – <u>Dec- Jan</u>			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Introduction to Bioinformatics Introduction to Genomics	Multidisciplinary approach of bioinformatics, Computers in Biology and Medicine Introduction, Databases, Data, Nucleic acid sequence database, Gene Bank, EMBL s
10	02	12		
Month – <u>Feb- march</u>			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Literature Database: Pub Med and Pub Med central Sequence Alignment and Phylogenetic analysis Phylogenetic analysis tools	Primary Protein sequences databases, Secondary sequences Databases, Structural Pair wise sequence alignment, Multiple sequence alignment, Local and Global sequence alignment
10	02	12		
Month – <u>march-Apr.</u>			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Structure-based drug designing Ligand-based drug designing	Introduction; Structure-based drug designing approaches, Target Identification and Validation; Ligand-based drug
10	00	10		


R.M. Shetty
Name and Signature of Teacher


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Head

Department of Biotechnology (Entire)
Vivekanand College, Kolhapur (Autonomous)



Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: J.J.Gavadi

Programme: B. Sc III Biotechnology (Entire)

Semester: V

Subject: **Biotechnology** Course Title: DSE-1354-E- Bio safety, Bioethics and Intellectual Property Rights

Month <i>July - Aug</i>			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Bioethics Basic Principles of Bioethics Regulatory bodies for Bioethics in India	Overview of National Regulations of Bioethics and Overview of National Regulations of Bioethics Role of Institutional Ethical Committee * Role of Institutional Ethical Committee
10				
Month <i>Aug - Sept</i>			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Biosafety Intellectual Property Rights.	Introduction to Biosafety. * Concepts, symbols and significance in experimental biological sciences. International laws on Biosafety
10				
Month <i>Sept - Oct</i>			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Significance of IPR in Biotechnology	Introduction to Intellectual Property Rights (IPR) and Indian Patent Law. *World Trade Organization and its related intellectual Budapest Treaty; , Protection of GMOs
10				

J.J. Gavadi
 MS. J. J. Gavadi
 Name and Signature of Teacher



S. V. ...
 Name and Signature of HOD

Head
 Department of Biotechnology (Entire)
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Vivekanand College, Kolhapur (Autonomous)

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Academic Year: 2023- 2024

Annual Teaching Plan

Name of the teacher: Miss. J.J. Gavadi

Programme: B. Sc III Biotechnology (Entire)

Semester: VI

Subject: Biotechnology

Course Title: DSE-1353-F- Application of Biotechnology in Health

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Stem cells and Transgenic Technology Vaccines- Principle and Practices	Characteristics of stem cells , Concept of stem cell progenitors Concept and types of vaccine, Subunit vaccines- Hepatitis B vaccine, Foot and Mouth disease Vaccine
10	02	12		
Month – Feb- march			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Vaccines- Principle and Practices Monoclonal Antibodies Gene Therapy	AIDS Vaccine, DNA Vaccines, Edible Vaccines, Recombinant vaccines- Cholera Vaccine Introduction, Hybridoma Technology <i>in vivo</i> gene therapy
10	02	12		
Month – March- Apr.			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Public health	Introduction, DNA sample preparation, Methods of Diagnosis – Nucleic acid hybridization (Radioactive and Non radio detection). Detection of infectious disease
10	02	12		

Ms. J.J. Gavadi
Name and Signature of Teacher



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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2023-2024

Annual Teaching Plan

Name of the teacher: Miss.R.M.Shetty.

Programme: B. Sc III Biotechnology (Entire)

Semester: V

Subject: Biotechnology Course Title: DSE-1357-E-Application of Biotechnology in Agriculture

Month – July-Aug			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Methods for crop Improvement Somatic hybridization Plant Breeding Markers	Introduction and Acclimatization, Breeding for self and cross pollinated plants and vegetative reproducing plants protoplast, fusion technique
10	02	12		
Month – Aug-Sep.			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	Germplasm Conservation Transgenic Plants Biofertilizer	<i>In-situ</i> conservation Herbicide resistant – Glyphosate resistance, Phosphinothricin resistance Mass production and field application – <i>Rhizobium</i> , <i>Azotobacter</i> , <i>Azospirillum</i> , <i>Acetobacter</i>
10	02	12		
Month – Sep-Oct.			Module/Unit:II	Sub-units planned
Lectures	Practicals	Total	Biopesticide	Definition, production and applications of Bacterial, fungal, viral and Plant origin Biopesticides
10	02	12		

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Miss. R. M. Shetty.

Name and Signature of Teacher

S.Y.

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