Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Dr. D. S. Gaikwad.

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

Subject: Biotechnology Course Title: DSC-A Chemistry

Month			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Basics Concepts in Chemistry Acids and Bases Analytical and Industrial Chemistry Reaction Kinetics	Explanation of important basic terms, Lowry–Bronsted, Solutions concept,types, Analytical processes(Qualitative and Quantities, 1st and 2nd order reactions,
10	3	13		
Month			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Thermodynamics** **Structure and Bonding.** **Concept of Hybridization**	Reversible and irreversible processes, internal energy, Types of bonds. hybridization with respect to $BeCl_2$. BF_3, $SiCl_4$, Dipole moment
10	5	15		
Month			Module/Unit:	Sub-units planned
10	3	13	**Hydrogen Bonding-** **Coordination Complexes**	intra and intermolecular hydrogen bonding, comparison between, ionic and covalent compounds.

(Dr. D.S. Gaikwad)
Name and Signature of Teacher

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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DEPARTMENT OF BIOTECHNOLOGY (ENTIRE)
VIVEKANAND COLLEGE, KOLHAPUR
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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Dr. A. A. Patravale.

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Chemistry

Month			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Fundamentals and Mechanistic Basis of Organic Reaction**	Reaction mechanism-Definition, curved arrownotation,substrate , Reagents, Types of reagents, types of reactions Geometrical isomerism in alkenes
10	3	13		
Month			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Stereochemistry Titrimetric Analysis and Gravimetric Analysis**	tartaricacid E-Z and R-S nomenclatures. Numerical Problems Principle of volumetric analysis, titration, titrant, titrand, endpoint
10	2	12		
Month			Module/Unit: II	Sub-units planned
10	1	11	**Chemistry of Natural Products**	Types if titrations—acid base, redox, precipitation, complexometric,Titration curve Terpenoids-Isoprene rule, structure determinations of citral.

(Dr. A. A. Patravale)
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DEPARTMENT OF BIOTECHNOLOGY (ENTIRE),
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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

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

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

Subject: Biotechnology Course Title: DSC-A - Biochemistry

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Origin of life** **p^{H}, pka value**	Basic concept ,A.I. Oparin concept, definition,H-H Equation, Haemoglobin buffer system buffer system
10	2	12		
Month – Aug-Sept			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Nucleic acids** **Carbohydrates:** **Lipids:**	Nucleosides, nucleotides, polynucleotide, DNA and its different forms with properties Classification, glyceraldehyde, simple aldoses&ketoses,
10	2	12		
Month – Oct- Nov			Module/Unit: II	Sub-units planned
10	2	12	Physical properties,- Chemical properties-	Classification, Simple lipid, state,color, odour,melting point, lipoprotein - LDL, VLDL

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(Mr. S. G. Kulkarni)

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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

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

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Biochemistry

Month- Dec- Jan			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Protein Chromatography**	Amino acid classification (Depending upon R group), structure of amino acids, single letter codes of amino acids, Introduction, Theory, Principle
10	3	13		
Month – Jan-Feb			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Chromatography Enzymes:**	applications of Thin layer chromatography, paper chromatography, column chromatography, Introduction, IUB classification
10	3	13		
Month Feb- March			Module/Unit:	Sub-units planned
10	2	13	**Co-enzymes:**	Thiamine, riboflavin, niacin, pyridoxol phosphate

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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Academic Year: 2018-2019

Annual Teaching Plan

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

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

Subject: Biotechnology Course Title: DSC-A - Plant Science

Month- June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Plant Diversity** **Taxonomy of Angiosperms**	Algae – General characters and economic importance Fungi – General characters and economic importance Gymnosperms – General characters and economicimportance
10	04	14		
Month – July-Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Taxonomy of Angiosperms** **Sexual Reproduction in Angiosperms**	Definition, Aims, objectives and functions nomenclature and its significance Structure of Typical Flower – Floral whorls and functions:- Calyx, corolla
10	04	14		
Month – Aug- Sept			Module/Unit: II	Sub-units planned
10	04	14	**Fruit** **Seed** **Plant Anatomy**	Definition, formation, Types Dormancy of seed- Definition, Causes Tissues- Simple and complex

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Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Animal Science

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Life concepts and characteristics of life**	Understanding the diversity of life, 3 domain systems, Six kingdom system, General classification of animal kingdom
10	04	14		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Host Parasite Relationship**	Protozoan parasite- Plasmodium(Morphology,parasitic adaptations,Life cycle), Nematode parasite
10	04	14		
Month – Aug- Sept			Module/Unit: II	Sub-units planned
10	04	14	**Tissues** **Applied zoology**	Blood (Plasma, Serum, Clotting), Bone, Cartilage. Histological Architecture Vermiculture, Apiculture, Sericulture

(Dr. A.R. Kasarkar)
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Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Miss. Kumbhar.

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

Subject: Biotechnology Course Title: DSC-A - Mathematics

Month- June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Complex Numbers**	Operations on complex numbers, Complex conjugate, Modules and argument of complex number and simple
10	01	11		
Month – July-Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Matrices** **Differential equation**	Definition and types of Matrices, Algebra of Matrices Definition of ordinary differential equation and degree, order of differential equation
10	01	11		
Month – Aug- sept			Module/Unit: II	Sub-units planned
10	01	11	**Partial differentiation**	Introduction, Simple examples on evaluation of partial, derivatives, Composite function with examples

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(Miss. Kumbhar)

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Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Miss. Kumbhar.

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Statistics

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Introduction to statistics and collection of data**	Meaning of statistics, Scope of statistics in Biological andmedical sciences
10	01	11	**Graphical representation**	Histogram ,bar chart, line diagram, pie chart& ogive CurvesMeasures of central tendency
Month – Jan- Feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Correlation and Regression, probability & testing of Hypotheisis**	Concept of correlation between two variables and types of correlation, Method of obtaining correlation
10	02	12		
Month – Feb- March			Module/Unit: II	Sub-units planned
10	02	12	**Limits of probability**	Probability of complementary event, Additive law of probability. Simple illustrative examples. Definition of conditional probability

(Ms. Kumbhar)

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Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Mr. R. R. Mane.

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

Subject: Biotechnology Course Title: DSC-A - Computer

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Computer basics** **Operating System**	Block Dig.(I/O/Secondary storage), Applications, Generations, Types of computer functions, process management, multiprogramming, multitasking
10	02	12		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Office Operation** **Database Management System**	Microsoft Word-concept of toolbar, character Need of database, data models- Hierarcical, Network, Relational, Object Oriented, Main components
10	02	12		
Month – Aug- sept			Module/Unit: II	Sub-units planned
10	02	12	**Basic of Bioinformatics**	Internet, World wide web, Web browser, Search Engine (Google), Searching data from Search

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VIVEKANAND COLLEGE ESTD. JUNE 1964

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Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Mr. R. R. Mane.

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Computer

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Introduction to Programming**	Algorithm, Flowchart, Pseudocode Fundamentals of C, Character set, keywords, identifiers
10	03	13		
Month- Jan- Feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Input/output Print**	scanf(), getchar(), putchar(), gets(), puts(), enum, sizeof()operatorFormatting input/output
10	03	13		
Month – Feb- March			Module/Unit: II	Sub-units planned
10	01	11	**Loop**	continue & break statementArray- declaration, initialization of One dimensional & twodimensional array, character array, strlen

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(Mr. R.R. Mane)

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Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

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

Subject: Biotechnology Course Title: DSC-A - Bio techniques & Instrumentation

Month- June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Protein Purification: Centrifugation**	Method of cell disruption (Blenders, grindingwith abrasives, presses, enzymatic method, sonication) Basic principles, RCF
10	2	12		
Month – July- Augt			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Centrifugation** **Microscopy** **UV-Visible Spectroscopy**	Preparative centrifugation General principles of microscopy- Image formation, magnification,numerical aperture
10	3	13		
Month – Augt- Sept			Module/Unit: II	Sub-units planned
10	3	13	**Basic Laboratory Instruments:**	Introduction, Principle andapplications of electrophoresis- Supporting media

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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - 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
10	1	11		
Month – Jan- Feb			Module/Unit: I & II	Sub-units planned
Lectures	Practicals	Total	**Nucleus -**	Introduction,morphology,occurrence,shape,size,number,positionUltr a structure of nucleus- Nuclear membrane,
10	2	12		
Month – Feb- March			Module/Unit: II	Sub-units planned
10	-	10	**Cytoskeleton assembly**	Introduction, Cytoskeleton elements, Microtubules- occurrence ,structure ,chemical

P.D.Patil.

(Miss. P.D. Patil)

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DEPARTMENT OF BIOTECHNOLOGY (ENTIRE)
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(AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

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

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

Subject: Biotechnology Course Title: DSC-A- Microbiology

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Microbiology : Definition, History, Introduction to types ofMicroorganisms** **Morphology and cytology of Bacteria** **Viruses**	Bacteria, Algae, Fungi, Protozoa and Viruses Morphology of Bacteria – i) Size, ii) Shape, iii) Arrangements Cytology of Bacteria –
10	1	11		
Month – July- Aust			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Bacterial taxonomy** **Microbial nutrition** **Concept of Sterilization**	General principles of bacterial nomenclature.- a) Taxonomic ranks Nutritional requirements of microorganisms Definitions of: Sterilization, Disinfection, Antiseptic, Germicide
10	2	12		
Month – Aug- Sept			Module/Unit: II	Sub-units planned
10	1	11	**Stains and staining procedures**	Definition of dye and stain, Classification of stains – Acidic, Basicand Neutral, Principles, Procedure, Mechanism and application

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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC-B - Microbiology

Month – Dec-Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Culture media and pure culture techniques** **Methods for isolation of pure culture**	Common components of media and their functionsPeptone Streak plate
10	3	13		
Month – Jan-Feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Microbial growth** **Water Microbiology** **Air microbiology**	Definition of growth, phases & growth curve - a] Continuous culture Sources of microorganisms in water - Sources of microorganism in air
10	3	13		
Month- Feb- March			Module/Unit: II	Sub-units planned
10	1	11	**Medical microbiology**	Definition, Host, parasite, Saprophytes, Commensals, Infection,Etiological agent, General principles of prevention and control of microbial diseases Disease

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DEPARTMENT OF BIOTECHNOLOGY (ENTIRE)

VIVEKANAND COLLEGE, KOLHAPUR

(AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. Mulla.

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

Subject: Biotechnology Course Title: DSC-A - Physics

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Elasticity**	Introduction, definitions of stress and strain in solids, types of strainand stress, Hooks law, definition of Young's modulus
10	01	11		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Viscosity and Surface Tension**	streamline and turbulent flows, concept of viscosity,coefficient of viscosity, effect of temperature and pressure on viscosityof liquids, concept of pressure energy
10	01	11		
Month- Aug- Sept			Module/Unit: II	Sub-units planned
10	01	11	**Sound waves:**	mechanical and electromagnetic waves, transverse andlongitudinal waves with characteristics, principle of superposition ofwaves (Statement only), phenomenon of beats

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Name and Signature of Teacher

VIVEKANAND COLLEGE * KOLHAPUR (CHS) * ESTD. JUNE 1964

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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. Mulla.

Programme: B. Sc I Biotechnology (Entire) Semester: II

Subject: Biotechnology Course Title: DSC- B - Physics

Month- Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Optics correlated with microscopy**	Concept of interference and diffraction, Diffraction gratin (Descriptiononly), concept of polarization and plane polarized light
10	01	11		
Month- Jan- Feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Bioelectricity**	Introduction, electricity observed in living systems-examples, origin ofbioelectricity, resting potential and action potential, Nernst equation
10	01	11		
Month- Feb March			Module/Unit: II	Sub-units planned
10	01	11	**Semiconductor Devices and Digital Electronics**	Light EmittingDiode (LED), seven segment display, photodiode,optocoupler, spectral distribution of solar energy, solarcellconstruction,

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Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

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

Programme: B. Sc II Biotechnology (Entire) Semester: III

Subject: Biotechnology Course Title: DSC 1345C- Genetics

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practical	Total	**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
10	02	12		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practical	Total	**Crossing over** **Structural and numerical changes in chromosomes.** **Mutation:**	Mechanism and theory mitochondrial and plastid. Definition, Types (spontaneous and Induced)
10	03	13		
Month –Aug- Sept			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

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VIVEKANAND COLLEGE * ESTD. JUNE 1964 * KOLHAPUR-416 003

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VIVEKANAND COLLEGE, KOLHAPUR
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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018-2019

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 – Jan- Feb			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 – Feb- March			Module/Unit: II	Sub-units planned
10	02	12	**Immune response** **Antigen Antibody reactions** **Hypersensitivity**	definition, nature, types of antigen, factors affecting antigenicity. primary and secondary immune response

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Name and Signature of Teacher

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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc II Biotechnology (Entire) Semester: III

Subject: Biotechnology Course Title: DSC 1346C- Biophysics and Enzymology

Month – June- July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Atomic Absorption Spectroscopy** **X-ray Crystallography** **NMR-**	Introduction, Principle, Instrumentation, Applications. Expression for interplaner distance, Bragg's Law,
10	01	11		
Month – July- Aug			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**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
10	02	12		
Month – Aug- Sep			Module/Unit:	Sub-units planned
10	01	11	**Factors affecting catalytic activity efficiency of enzyme, Allosteric enzymes**	Proximity orientation, Strain and Distortion, Covalent catalysis, Acid-base catalysis. Definition, properties

(Mr. S. G. Kulkarni)
Name and Signature of Teacher

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

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Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc II Biotechnology (Entire) Semester: IV

Subject: Biotechnology Course Title: DSE 1346D- Advances in Cell Biology

Month- Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Secretary pathway and protein trafficking** **Cell signaling**	Secretary pathway-ER associated ribosomal translation, co-translationalvectoral transport of nascent polypeptide chain Introduction, general principles of cell signaling
10	02	12		
Month- Jan- Feb			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 – Feb-March			Module/Unit: II	Sub-units planned
10	02	12	**Cell division**	Introduction and types of cell division-amitosis, mitosis and meiosis Role of spindle fibers in chromosome separation

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Academic Year: 2018-2019

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- June- July			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 – July- Aug			**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 – Aug- Sept			**Module/Unit: II**	Sub-units planned
10	01	11	**Respiration:-** **Anaerobic Respiration**	Aerobic:-Flow of electrons in ETC, Redox potential components of ETC, Alcoholic and Lactic acid fermentation

(Mr. S. G. Kulkarni)
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Vivekanand College, Kolhapur (Autonomous)

Department of Biotechnology (Entire)

Academic Year: 2018- 2019

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 – Dec- Jan			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 – Jan- Feb			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 – Feb- March			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

(Mr. S. G. Kulkarni)

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Department of Biotechnology (Entire)

Academic Year:

Annual Teaching Plan

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

Programme: B. Sc II Biotechnology (Entire) Semester: III

Subject: Biotechnology Course Title: DSC 1348C – Ecology

Month – June-July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**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
10	01	11		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Biogeochemical cycle** **Concept - Habitat and Niche** **Population Ecology**	Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus cycle Introduction, population characteristics, Natality Mortality, survivor ship curves
10	02	12		
Month – Aug- Sept			Module/Unit: II	Sub-units planned
10	02	12	**Population growth** **Evolution** **Hardy-Weinberg law and Equation**	Exponential and logistic, r and k strategists Evidences of evolution and Adaptive radiation

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Annual Teaching Plan

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

Programme: B. Sc II Biotechnology (Entire) Semester: IV

Subject: Biotechnology Course Title: DSC 1348D Environmental Biotechnology

Month – Dec- Jan			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- Jan- Feb			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, salientfeatures and Importance Production of Bio ethanol
10	02	12		
Month- Feb- March			Module/Unit: II	Sub-units planned
10	02	12	**Bioremediation Techniques**	Definition, Principle, *Insitu and Exsitu* Bioremediation, Bioremediation of waste waters (MSW, BSW and ISW), Activated Sludge Process, Lagoons

(Mr. A. L. Upadhye)

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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 – June- July			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 – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Organization of genome Nucleic Acid biosynthesis DNA Replication**	Viral (Lambda, T4), Bacteria (E. *coli*), Eukaryote, Typical Structure of chromosome De novo synthesis of Purine and Pyrimidine ring
10	02	12		
Month – Aug- Sept			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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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 – June- July			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 – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Organization of genome Nucleic Acid biosynthesis DNA Replication**	Viral (Lambda, T4), Bacteria (E. *coli*), Eukaryote, Typical Structure of chromosome De novo synthesis of Purine and Pyrimidine ring
10	02	12		
Month – Aug- Sept			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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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, elongationand termination Properties of genetic code. Assignment of codons
10	01	11		
Month – Jan- Feb			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 – Feb- March			Module/Unit: II	Sub-units planned
10	02	12	**Regulation of gene expression in prokaryote and eukaryote** **Regulation of gene expression at transcriptional and translationlevel.**	Regulation of gene expression, in Prokaryotes. a)Lacoperon b) Tryptophan operon c) Arabinose operon.

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Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

Programme: B. Sc II Biotechnology (Entire) Semester: III

Subject: Biotechnology Course Title: DSC 1350C - Plant Tissue Culture

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**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
10	01	11		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**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
10	02	12		
Month – Aug-Sept			Module/Unit: II	Sub-units planned
10	02	12	**Micropropagation** **Different Pathways of Micropropagation** **Plant Protoplast Culture**	Introduction, stages of Micropropagation, factors affecting, advantages and applications.

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Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

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- Jan- Feb			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 – Feb- March			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

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Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc III Biotechnology (Entire) Semester: V

Subject: Biotechnology Course Title: DSE-1355-E-BasicsinGeneticEngineering

<table>
<tr><td colspan="3">Month – June- July</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Enzymes in r-DNA technology
Cloning Vectors
Bacteriophage vectors</td><td rowspan="2">Introduction and Scope, Enzymes and its applications, Restriction enzymes- types , Cloning & expression λ phage vector</td></tr>
<tr><td>10</td><td>02</td><td>12</td></tr>
<tr><td colspan="3">Month- July- Aug</td><td>Module/Unit: I and II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Plant vector
Nucleic Acid Hybridization</td><td rowspan="2">Ti plasmid,Ri plasmid, shuttle vector- e.g. pJBD 219
Probe Preparation, Methods of labeling probes. Radio labeling – Nick translation, End labeling</td></tr>
<tr><td>10</td><td>02</td><td>12</td></tr>
<tr><td colspan="3">Month- Aug- Sept</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>10</td><td>01</td><td>11</td><td>DNA Sequencing and blotting technique</td><td>Probe Preparation, Methods of labeling probes. Radio labeling – Nick translation, End labeling</td></tr>
</table>

(Mr. A. L. Upadhye)

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Annual Teaching Plan

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

Programme: B. Sc III Biotechnology (Entire) Semester: VI

Subject: Biotechnology Course Title: DSE-1355-F-Advances in Genetic Engineering

Month – Dec- Jan			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- Jan-Feb			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 – Feb- March			Module/Unit: II	Sub-units planned
10	01	11	**Application of r-DNA technology**	Production of transgenic-knockout mice, **In medicines** –Insulin and Somatostatin, Introduction to Gene Silencing

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Department of Biotechnology (Entire)

Academic Year: 2018- 2019

Annual Teaching Plan

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

Programme: B. Sc III Biotechnology (Entire) Semester: V

Subject: Biotechnology Course Title: DSE-1356-E-IndustrialBiotechnology

Month – Dec- Jan			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 – Jan- Feb			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 – Feb- March			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

V.N.More

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

Programme: B. Sc III Biotechnology (Entire) Semester: VI

Subject: Biotechnology Course Title: DSE-1356-F-FoodandMicrobialBiotechnology

Month – Dec- Jan			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Microbial Production of Industrial product** **Organic products**	Edible mushroom, Single Cell Protein- Spirulina, Yeast Citric acid, Vitamins (B_{12}), Amino acids- Lysine,
10	02	12		
Month – Jan- Feb			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Fermented Foods and Beverages Food Spoilage, preservation & toxicity**	Sauerkraut, Beverages – Beer, Wine (Red table and white table), Champagne Types of spoilage- Physical, Chemical and Biological (auto and microbial), Preservation methods- High and Low temperatures
10	02	12		
Month – Feb- March			Module/Unit: II	Sub-units planned
10	02	12	Impact of GM food on Human health	Risk analysis and regulations , food safety, sustainability

V.N.More

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Academic Year: 2018- 2019

Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

Programme: B. Sc III Biotechnology (Entire) Semester: V

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

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

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Annual Teaching Plan

Name of the teacher: Miss. P. D. Patil.

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 – Jan- Feb			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 *in vivo* gene therapy
10	02	12		
Month – Feb - March			Module/Unit: II	Sub-units planned
10	02	12	**Public health**	Introduction, DNA sample preparation, Methods of Diagnosis – Nucleic acid hybridization (Radioactive and Non radio detection). Detection of infectious disease

(Miss. P. D. Patil)

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Department of Biotechnology (Entire)

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. S. S. Sutar.

Programme: B. Sc III Biotechnology (Entire) Semester: V

Subject: Biotechnology Course Title: DSE-1358-E-Developmental Biology (Plant and Animal)

Month – June- July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	**Plant development** **Meristem organization** **Plant Embrology** **Gamatogenesis**	Major phases of plant development, Vegitative development, Plant meristem, Organization of shoot, Development of male and female gamatophyte
10	-	10		
Month – July- Aug			Module/Unit: I and II	Sub-units planned
Lectures	Practicals	Total	**Embryogenesis** **Apomixsis** **Polyembryony** **Animal embryology**	Introduction, definition, Types and significance, Genetic control, Types of egg and sperms in animal, Types
10	-	10		
Month – Aug- Sept			Module/Unit: II	Sub-units planned
10	-	10	**Gamatogenesis** **Differentiation and regeneration**	Types of cleavages, Embryonic induction, Foetal membranes, Cell lineages and differentiation definition.

(Mr. S. S. Sutar)

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Academic Year: 2018-2019

Annual Teaching Plan

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

Programme: B. Sc III Biotechnology (Entire) Semester: VI

Subject: Biotechnology Course Title: DSE-1354-F- Bioinformatics

Month – Dec- Jan			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 – Jan- Feb			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 – Feb- March			Module/Unit: II	Sub-units planned
10	00	10	**Structure-based drug designing** **Ligand-based drug designing**	Introduction; Structure-based drug designing approaches, Target Identification and Validation; Ligand-based drug

(Mr. A. L. Upadhye)

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