



**K. C. E. SOCIETY'S
MOOLJI JAITHA COLLEGE, JALGAON**

Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21

Date of Preparation: 27/11/2018

Name of Teacher: Ms. Bharti P. Ghule

Class: S.Y.B.Sc.

Subject / Paper: BC-241 Environmental Biochemistry

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
March	Unit-I Pollution and Environmental Problems			
	Pollution: Concept and introduction of pollution and pollutants	01		
	Introduction, effect and control of water pollution.	01		
	Introduction, effect and control of land pollution	01		
	Introduction, effect and control of noise pollution.	01		
	Introduction, effect and control of air pollution.	01		
	Green house effect and global warming. Green house gases. Measures to control green house effect	01		
	Ozone layer: Importance of ozone layer. Depletion of ozone, ozone hole, effects of ozone depletion. Measures to control ozone depletion	01		
	Acid rain: Introduction effects and measures to control acid rain.	01		
April	Unit-II Bioenergy			
	Bioenergy: Introduction. Biomass for energy production: Concept, chemical nature, Sources, utilization.	02		
	Biogas: Introduction, substrates, process, microbial production of biogas, factors affecting biogas production, advantages. Limitations for large scale production.	02		
	Introduction to hydrogen as a biofuel. Production of bio-hydrogen by photosynthetic bacteria and fermentation.	02		
	Energy rich crops: Sugar and starch crops, wood rich plants and petroleum plants.	01		
	Unit-III Biodegradation and Bioremediation			

	Biodegradation: Concept, microorganisms for biodegradation and bioremediation.	02		
	Enzyme system for biodegradation. Factors affecting biodegradation. Xenobiotics.	02		
May	Unit-III Biodegradation and Bioremediation			
	Bioremediation: Concept, types, advantages and disadvantages.	01		
	Types of reaction in bioremediation.	01		
	Bioremediation of contaminated soil, waste land and ground water	02		
	Unit-IV Environmental Toxicology			
	Toxins: Concept and types.	01		
	Introduction, sources and remedies of metal toxins (arsenic, mercury).	01		
	Pesticides: Introduction, classification on the basis of mode of entry	01		
	Classification on the basis of mode of action and chemical nature.	01		
	Application of pesticides. Environmental effects of pesticides.	02		
	June	Impact of pesticide on organisms.	01	
Bio warfare agents: Anthrax, plague, small pox, sarin		01		
Chemical warfare agents: chlorine, hydrogen cyanide, sulphur mustard, lewisite and ricin.		01		

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Signature: _____



Name of Teacher: Ms. Bharti P. Ghule



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/08/2020

Name of Teacher: Bharti Pralhad Ghule

Class: T.Y. B.Sc.

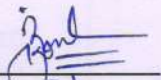
Subject/Paper: BC-503 Clinical Biochemistry

Faculty: Science

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
August	Unit I: Disorders related to Carbohydrate metabolism <ul style="list-style-type: none"> • Regulation of blood glucose level <ul style="list-style-type: none"> • supply of glucose to the blood and removal glucose from blood • Post absorptive state • Postprandial state • Fundamental regulatory mechanism • Hormonal influence on carbohydrateMetabolism • Blood sugar level and its clinical significance • Glycosuria 	01 01 01 01 01 01 01 01	
September	<ul style="list-style-type: none"> • Diabetes Mellitus Unit II Hemoglobinopathies <ul style="list-style-type: none"> • Structure and functions of hemoglobin • Abnormal hemoglobins • Sickle cell anaemia • Methemoglobinemia-Hb-M, Hb-Sabine • High O₂-affinity hemoglobins-Hb-Chesapeake, Hb-Rainier • Hemoglobin interfere in mRNA Formation • Hb-Constant spring • Thalassemia 	01 02 01 02 01 01 01 02	
October	Unit III Enzymes and isoenzymes of clinical importance <ul style="list-style-type: none"> • General consideration • Serum enzymes in heart diseases • Serum enzymes in liver diseases • Serum enzymes in GI tract disease 	01 03 03 02	
November	<ul style="list-style-type: none"> • Serum enzymes in muscle diseases • Serum enzymes in bone diseases • Isoenzymes: definition, clinical significance of LDH and CPK isoenzymes Unit IV Inborn Errors of Metabolism <ul style="list-style-type: none"> • Carbohydrate metabolism disorders • Lactose intolerance 	02 03 02 01 02	

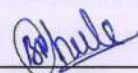
December	• Glycogen storage disease	01	
	• Galactosemia	01	
	• Protein metabolism disorders	01	
	• Phenylketonuria	01	
	• Albinism	01	
	• Maple syrup urine disease	01	
	• Lipids metabolism disorders	01	
	• Gaucher's disease	01	
	• Nieman Pick's disease	01	
January	• Tay Sachs disease	01	
	• Nucleic acid metabolism disorders	01	
	• Lesch Nyhan syndrome	01	
	• Gout	01	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Bharti Pralhad Ghule.

FACULTY: Science

DEPARTMENT: Biochemistry

CLASS: T.Y.BSc

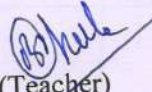
SUBJECT: Fermentation technology

PAPER CODE and TITLE OF PAPER: BC-506

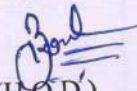
FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
August	Unit I: Basics of Fermentation Technology <ul style="list-style-type: none">• Fermentation: definition and concept• Characteristic of industrial strain• Screening of industrially important microbes• Fermentation media• Inoculum –stock, working culture• Inoculum development• Preservation methods for industrially important microbes	11 01 02 02 01 02 01 02	
September	Unit II Bioreactors <ul style="list-style-type: none">• History of Bioreactors• Parts of Bioreactors and their functions• Controlling system• Types of bioreactors• Conventional Bioreactor-common features	12 02 02 02 02 03	
October	<ul style="list-style-type: none">• Operation of conventional bioreactor Unit III :Types of fermentation and Downstream processing <ul style="list-style-type: none">• Types of fermentation• Chemostat• Turbidostat	02 11 03 01 01	

November	<ul style="list-style-type: none"> • Synchronous culture and its applications. • Introduction to downstream processing 	01 04	
	Unit IV: Industrial Biotechnology <ul style="list-style-type: none"> • Industrial sterilization process • Types of sterilization: Batch ,Continuous, Filtration 	11 01 02	
December	<ul style="list-style-type: none"> • Industrial production of – Enzymes- amylase ,Acid-citric acid ,Alcohol- ethanol, Antibiotic- penicillin • Microbial biomass production 	06 02	
	<ul style="list-style-type: none"> • Bioconversion o Introduction • Biomining and bioleaching- copper 	01 01	
January			


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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Bharti Pralhad Ghule.

FACULTY: Science

DEPARTMENT: Biochemistry

CLASS: T.Y.BSc

SUBJECT: Diagnostic Biochemistry (Practical)

PAPER CODE and TITLE OF PAPER: BC-508

FIRST TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
October	• Estimation of blood glucose in serum by GOD/POD	04	
	• Estimation of reducing sugar in urine	04	
	• Hb estimation by using haematometer its significance	04	
	• Estimation of serum bilirubin.	04	
November	• Serum bilirubin estimation SGOT estimation by 2, 4 DNP method	04	
	• SGPT estimation by 2, 4 DNP method.	04	
	• Serum alkaline phosphatase estimation by colorimetric method.	04	
December	• Serum acid phosphatase estimation by colorimetric method.	04	
	• Estimation of cholesterol by colorimetric method.	04	
	• Estimation of serum uric acid from the given sample.	04	
	• Estimation of serum urea from the given sample	04	
January	• Estimation of serum creatinine from the given sample.	04	
	• Detection of abnormal constituents of urine: - Sugar, protein, ketone bodies and bile pigments	04 04	
	• Estimation of proteins by Biuret method and albumins by Dumas method	04	

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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Bharti Pralhad Ghule

FACULTY: Science

DEPARTMENT: Biochemistry

CLASS: T.Y.BSc


SUBJECT: Immunology

PAPER CODE and TITLE OF PAPER: BC-603

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO. OF LECTURES REQUIRED	REMARKS
February	Unit I Cells and organs of immune system <ul style="list-style-type: none">• Hematopoiesis• Cells of immune system<ul style="list-style-type: none">○ Lymphoid cells- T-cells, B-cells, Natural killer cells, dendritic cells○ Granulocytes- Neutrophils, Eosinophils, Basophils, Monocytes, Macrophages, Mast cells	12 1 1 1 1	
March	<ul style="list-style-type: none">• Organs of immune system<ul style="list-style-type: none">• Primary lymphoid organs- Thymus, Bone marrow, Lymphatic system• Secondary lymphoid organs• Lymph nodes, Spleen• MALT and GALT	1 2 2 1 2	
April	Unit II Immunity and Immune response <ul style="list-style-type: none">• Immunity- definition and types• Innate immunity<ul style="list-style-type: none">• Factors influencing innate immunity• Mechanism of innate immunity• Cellular factor in innate immunity• Adaptive/ acquired immunity<ul style="list-style-type: none">• Active and passive immunity• Immune response• Humoral immune response• Primary and secondary immune Response<ul style="list-style-type: none">• Antibody production• Factors affecting antibody production• Cell mediated immune respons	11 1 3 3 2 1 1	

	Unit III Antigen and Antibody	11	
	• Antigen- Definition	2	
	• Basic terms- hapten, adjuvants, epitopes	1	
	• Antigenicity and immunogenicity	1	
	• Determinants of an antigenicity	1	
may	• Basic structure of antibody	2	
	• Classes of antibodies	1	
	• IgG, IgA, IgM, IgD, IgE- structure and functions	1	
	• Antigenic determinants on immunoglobulins	1	
	• Isotype, Allotype and Idiotype	1	
	Unit IV Immunochemistry	12	
	• General features of antigen-antibody reactions	1	
	• Precipitation reaction- mechanism and Applications	1	
	• Flocculation reaction, Single diffusion, Double diffusion	2	
June	• Radial immunodiffusion, Immunoelectrophoresis, Crossover immunoelectrophoresis	2	
	• Rocket immunoelectrophoresis	1	
	• Agglutination reaction, Slide and tube agglutination, Coombs test and passive agglutination	2	
	• Immunofluorescence	1	
July	• Radioimmunoassay	1	
	• ELISA- types	1	


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ACADEMIC YEAR: 2020-21

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FACULTY: Science

DEPARTMENT: Biochemistry

CLASS: T.Y.BSc

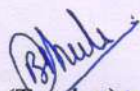
SUBJECT: Toxicology

PAPER CODE and TITLE OF PAPER: BC-606

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO.OF LECTURES REQUIRED	REMARKS
February	Unit I Basic Concepts of Toxicology	12	
	• Toxicology: Definition, history, scope, basic divisions and goals of toxicology	02	
	• Toxicants and toxicity:	01	
	Definition and concept	01	
	Factors that influence toxicity	01	
	Toxicity of chemical mixtures	01	
March	• Dose:	02	
	Definition		
	Selection of dose		
	Effect and response of dose		
	• Dose-response relationship:	02	
	Graded/quantitative response		
	Quantal/quantum response		
	• Statistical concept of toxicity:		
	Concentration-response relationship/	02	
	Threshold limits		
	Criteria for effects and LD ₅₀		
April	Unit II Absorption, Translocation and Excretion of Xenobiotics	12	
	• Membrane permeability and mechanism of chemical transfer	02	
	• Absorption of Xenobiotics:	02	
	Gastro-intestinal tract		
	Skin, Lungs, Parenteral administration	02	
	• Translocation of Xenobiotics:	02	
	Membrane Barriers		
	Binding of xenobiotics to plasma proteins		
	Storage depots: Body fats, brain tissue, erythrocytes and other storage depots		
	• Excretion of Xenobiotics:	04	
○ Renal excretion, Biliary excretion			
○ Gastro-intestinal tract			
○ Expired air			

	<ul style="list-style-type: none"> ○ Sweat, Saliva ○ Milk, Vaginal secretion 		
May	Unit III Mode of Action of Toxicants <ul style="list-style-type: none"> • Effect of toxicants on structural proteins, enzymes, carriers, coenzymes, nucleic acids and lipids • Receptor Concept: Definition, location and chemical nature, Categories of receptors Mechanism of action of receptors Factors affecting functions of receptors Concept of agonism and antagonism Role of receptors in toxicology • Mechanism of action of commonly used toxicants: Metals, Pesticides, Environmental carcinogens, Teratogens, Ionizing and non-ionizing radiations 	11 02 04 01 04	
June	Unit IV Biotransformation of Toxicants <ul style="list-style-type: none"> • Biotransformation: Definition, sites, principal objectives • Mechanism of biotransformation • Phase I reactions: Oxidation, Reduction, Hydrolysis • Phase II reactions: conjugation reactions • Factors affecting biotransformation • Biotransformation of DDT • Bioactivation 	11 02 01 01 01 01 01	
July	<ul style="list-style-type: none"> • Antidotes/antagonists: Definition and classification Mechanism of antidotal therapy Antidotal procedures 	03	



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TEACHING PLAN

ACADEMIC YEAR: 2020-21

NAME OF TEACHER: Bharti Pralhad Ghule.

FACULTY: Science

DEPARTMENT: Biochemistry


CLASS: T.Y.BSc

SUBJECT: Immunology and Toxicology (Practical)


PAPER CODE and TITLE OF PAPER: BC-608

SECOND TERM

MONTH	THEORY / PRACTICALS TO BE COVERED	NO. OF LECTURES REQUIRED	REMARKS
March	1. Differential counting of WBCs	4	
	2. Differential counting of WBCs	4	
April	3. Ag-Ab reaction by Ouchterlony double diffusion method	4	
	4. Radial immunodiffusion	4	
	5. Radial immunodiffusion	4	
May	6. Widal agglutination test (slide test method).	4	
	7. Determination of LC ₅₀ value of a pollutant by using suitable test animal.	4	
	8. Determination of the effect of temperature on the toxicity of a pollutant.	4	
June	9. Determination of the effect of pH on the toxicity of a pollutant	4	
	10. Qualitative evaluation of pesticide residues in vegetable samples.	4	
	11. Determination of combined toxicity of pollutants on suitable organism	4	


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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON**
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/10/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: F.Y. B.Sc.

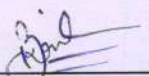
Subject/Paper: BC-111 Basic Biochemistry-I

Faculty: Science

Month	Topic	No. of Lectures required	Remark
October	Unit - I: Carbohydrates <ul style="list-style-type: none"> • Definition, scope of Biochemistry • Biomolecules: Names of Biomolecules, their repeating units and their main function; Definition and biological importance of Carbohydrate • Classification of Carbohydrates: Monosaccharides, Oligosaccharides and Polysaccharides • D & L forms of carbohydrates, epimers of glucose; Cyclic structure of monosaccharides: pyranose and furanose form (glucose and fructose) 	01 01 02 01	
November	Unit - I: Carbohydrates <ul style="list-style-type: none"> • Mutarotation: definition, example & mechanism; Derivatives of monosaccharides • Reactions of glucose – oxidation with bromine water and nitric acid, reduction, acetylation, addition of HCN, NH₂OH and phenyl hydrazine • Disaccharides: sucrose, lactose, maltose • Homopolysaccharides: Starch, Glycogen, Cellulose • Heteropolysaccharides: Mucopolysaccharides, Hyaluronic acid, Chondroitin sulfate Unit - II: Lipids <ul style="list-style-type: none"> • Definition and functions of lipids • Classification of lipids: Simple lipids, Compound lipids and Derived lipids with examples • Fatty acids: definition, nomenclature, Even & odd chain fatty acids, Saturated and unsaturated fatty acids; Essential fatty acids: definition, examples, functions, deficiency 	01 01 01 01 01 01 01	
December	Unit - II: Lipids		

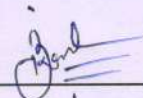
	<ul style="list-style-type: none"> • Triacylglycerol: definition, occurrence, functions, structure • Properties of triacylglycerol: hydrolysis, saponification, rancidity, antioxidant, lipid peroxidation • Purity evaluation of fats and oils: Iodine number, saponification number, Reichert-Meissl number, acid number; Comparative account on animal and plant fat • Functions of phospholipids; Classification of phospholipids - Glycerophospholipids- phosphatidic acid, lecithins, cephalins (structure and importance); • Sphingophospholipids- structure and importance. • Steroids – structure and function of cholesterol and progesterone <p>Unit - III: Amino acids, peptides & proteins</p> <ul style="list-style-type: none"> • Amino acids - definition, general structure, optical isomers, classification of amino acids based on structure, nutrition and metabolic fate. 	01 01 01 01 01 02 01	
January	<p>Unit - III: Amino acids, peptides & proteins</p> <ul style="list-style-type: none"> • Amino acids - definition, general structure, optical isomers, classification of amino acids based on structure, nutrition and metabolic fate. • Chemical properties of amino acids – general reactions of amino acids with NaOH, alcohol, ammonia, ninhydrin, decarboxylation, transamination, oxidative deamination • Peptides – definition and formation of peptide bonds, N- and C- terminals, representation of peptide chain, naming of peptide chain • Protein - definition and levels of organization • Bonds responsible for protein structure - covalent bonds, non-covalent bonds • Classification of proteins based on shape, composition and solubility, biological functions and nutrition; Denaturation of protein - agents and characteristics of denaturation. 	01 02 01 02 01 02	

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Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/11/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: F.Y. B.Sc.

Subject/Paper: BC-113 Basic techniques in Biochemistry – I (Practical course) Faculty: Science

Month	Topic	No. of Lectures required	Remark
November	1. Safety measures in the laboratory	04	
	2. Introduction of laboratory instruments	04	
December	3. Preparation of normal and molar, and percent solutions.	04	
	4. Preparation of buffers.	04	
	5. Qualitative tests for carbohydrates	04	
	6. Isolation of starch from potato.	04	
January	7. Qualitative tests for lipids	04	
	8. Qualitative tests for amino acids	04	
	9. Isolation of casein from milk.	04	
	10. Estimation of protein by Biuret method.	04	
	11. Use, handling and care of compound microscope.	04	
February	12. Study of various phases of mitosis using suitable sample.	04	
	13. Temporary mounting of available tissues.	04	
	14. Differential staining for DNA and RNA in human cheek epithelial cells.	04	
	15. Visualization of mitochondria by Janus green stain.	04	

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Academic Year: 2020-21.

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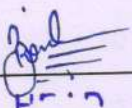
Subject/Paper: BC-121 Basic Biochemistry-II

Faculty: Science

Month	Topic	No. of Lectures required	Remark
June	Unit – I: Enzymes <ul style="list-style-type: none"> • Definition and historical background of enzyme. 01 • Terminologies involved in enzymology 01 • Nomenclature on the basis of – substrate acted upon by enzyme, type of reaction catalysed, substrate acted upon and type of reaction catalysed, substance (product) that is synthesized 01 • Over all chemical reaction taken into consideration (Enzyme commission number). 01 • Classification of enzymes - six major classes with description and examples each with EC number and reaction. 01 • Factors affecting enzyme activity - effect of substrate concentration, enzyme concentration, product concentration, pH, temperature, activators, time, and inhibitors. 02 • Specificity of enzyme action - absolute specificity, group specificity, optical specificity and geometrical specificity. 01 		
July	Unit – I: Enzymes <ul style="list-style-type: none"> • Active site - definition and salient features of active site. Mechanism of enzyme action – lock and key model, induced fit model. 01 • Industrial applications of enzymes 01 Unit - II: Nucleic Acids <ul style="list-style-type: none"> • Definition and types of nucleic acid- DNA and RNA. 01 • Structural components of DNA and RNA- phosphoric acid, pentose sugar, nitrogenous bases - purines and pyrimidine 01 		

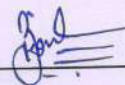
	<ul style="list-style-type: none"> • Nucleosides and tides-deoxy/ ribonucleosides and nomenclature, functions of nucleotides. • DNA: formation of 3'5'-phosphodiester bond, Watson and Crick model of DNA, Chargaff's rule. • Forms of DNA: A-DNA, B-DNA, C-DNA and Z-DNA • Denaturation of DNA: definition and its effect on UV absorption, viscosity, and specific optical rotation. • Effect of pH and temperature on DNA denaturation, definition of renaturation of DNA. 	01 02 01 01 01	
August	<p>Unit - II: Nucleic Acids</p> <ul style="list-style-type: none"> • RNA: Structure, differences with DNA and types of RNA; rRNA: prokaryotic and eukaryotic rRNA and types; tRNA: cloverleaf structure. mRNA - hnRNA, exons, introns, splicing, 5' capping, 3' poly A tail <p>Unit - III: Vitamins</p> <ul style="list-style-type: none"> • Definition, history and nomenclature, • Classification- fat soluble and water soluble vitamins. • Chemistry, dietary sources, recommended dietary allowance, biochemical functions, deficiencies, hyper-vitaminosis of- <ul style="list-style-type: none"> - vitamin A - vitamin D - vitamin E - vitamin K - vitamin C - vitamin B₁ 	02 01 01 01 01 01	
September	<p>Unit - III: Vitamins</p> <ul style="list-style-type: none"> • Chemistry, dietary sources, recommended dietary allowance, biochemical functions, deficiencies, hyper-vitaminosis of- <ul style="list-style-type: none"> - vitamin B₆ - vitamin B₁₂ 	01 01	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/06/2021

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: F.Y. B.Sc.

Subject/Paper: BC-123 Basic techniques in Biochemistry – II (Practical course) Faculty: Science

Month	Topic	No. of Lectures required	Remark
June	1. Qualitative test for amylase	04	
	2. Effect of substrate concentration on enzyme activity	04	
	3. Quantitative determination of DNA and RNA by spectrophotometric method	04	
	4. Thermal denaturation of DNA	04	
July	5. Estimation of ascorbic acid by volumetric method	04	
	6. Monochrome staining	04	
	7. Negative staining	04	
	8. Gram staining	04	
	9. To study motility of bacteria by hanging drop method	04	
August	10. Preparation of culture media for bacterial cultivation	04	
	11. Isolation of bacteria by spread plate method from water/soil sample.	04	
	12. Isolation and culture characterization of bacteria by streak plate technique.	04	
	13. Determination of viable count	04	
September	14. Demonstration of bacterial growth by spectrophotometer	04	
	15. Demonstration of quality of drinking water	04	

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Name of Teacher: Dr. B.R. Kavimandan



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 Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/08/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: S.Y. B.Sc.

Subject/Paper: BC-232 Human Physiology– I

Faculty: Science

Month	Topic	No. of Lectures required	Remarks
August	Unit-I Digestive System <ul style="list-style-type: none"> • Generalised structure of digestive system, Histology of alimentary tract, Functions of digestive system 01 • Structure and functions of different parts of digestive system: Oesophagus, Stomach, Small intestine, Large intestine 02 • Structure and functions of accessory digestive organs: Salivary glands, Liver, Gall bladder, Pancreas 02 • Composition and functions of digestive juices: Saliva, Gastric juice, Pancreatic juice, Intestinal juice, Bile 01 • Gastrointestinal hormones: gastrin, Cholecystokinin, secretin, gastric inhibitory, peptide, motilin 01 • Digestion and absorption of carbohydrate, protein and lipid; Absorption of water and electrolytes 01 		
September	Unit-II Respiratory System <ul style="list-style-type: none"> • Definition and functions of respiration; General structure of respiratory system 01 • Structure and functions of trachea and lungs 01 • Physical properties of lungs: surface tension, elasticity, lung volume and lung capacity 01 • Mechanism of respiration/breathing 01 • Respiratory process: <ul style="list-style-type: none"> ○ Oxygen transport: oxygen exchange in lungs and transport in tissue, dissociation curve for haemoglobin and factors affecting it- CO2 concentration (Bohr's effect and significance), pH, Temperature, 2,3- 		

	<p>diphosphoglycerate</p> <ul style="list-style-type: none"> o CO₂ transport: chemical forms in which CO₂ transports, CO₂ transport in tissue, (Chloride shift), in RBCs and as carbamino compounds <p>• Control of respiration: nervous and chemical factors</p>	01	
October	<p>Unit-III Circulatory system</p> <ul style="list-style-type: none"> • Blood: composition and functions; Plasma: composition; plasma proteins: specific plasma proteins and functions • Structure, functions and life span of RBCs, WBCs, and Platelets • Haematopoiesis: erythropoiesis, granulocytopoiesis, lymphocytopoiesis, thrombocytopoiesis • Haemoglobin: structure, types (HbA, HbF, HbS) and functions • Blood coagulation: definition, blood clotting factors, extrinsic and intrinsic pathways • Blood coagulation tests: Bleeding time, clotting time, prothrombin time; Blood groups: A, B, O and Rh factor, crossmatching, compatibility, Blood transfusion • Lymphatics and lymph: description, properties, formation and functions of lymph 	01 01 02 01 01 01	
November	<p>Unit-IV Excretory system</p> <ul style="list-style-type: none"> • Organisation of urinary tract; Anatomy and functions of kidney • Structure and functions of nephron • Urine formation: glomerular filtration, tubular reabsorption and tubular secretion • Counter current multiplication theory of urine concentration • Characteristics of urine: volume, colour, reaction, specific gravity, turbidity, odour, osmotic pressure • Normal and abnormal constituents of urine • Fluid, and acid-base balance: role of kidney 	01 01 01 01 01 01	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/03/2021

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: S.Y. B.Sc.

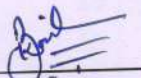
Subject/Paper: BC-242 Human Physiology– II

Faculty: Science

Month	Topic	No. of Lectures required	Remark
March	Unit-I Nervous System <ul style="list-style-type: none"> • Nervous system, Structure of nerve, cranial and spinal nerves • Nervous tissue: Neurons: structure, functions and types • Synapse: definition, classification • Mechanism of synaptic transmission • Properties of synapse • Types of synapse: structural and functional basis • Neurotransmitters: excitatory and inhibitory- structure and functions • Reflex action: definition, types- conditioned and unconditioned, Reflex arc: components and types 	01 01 01 01 01 01 01 01	
April	Unit-II Reproductive system <ul style="list-style-type: none"> • Male reproductive system: anatomy, histology and functions of testis • Structure of sperm, spermatogenesis, hormonal control of spermatogenesis, Semen: accessory glands • Female reproductive system: anatomy and histology • Ovary: anatomy, histology, functions • Maturation of graafian follicle, ovum • Menstrual cycle, Oogenesis and its hormonal regulation • Male and female gonad hormones: chemistry and functions • Fertilization: molecular events during fertilization Unit-III Endocrine system <ul style="list-style-type: none"> • Concept , General characteristics of and properties of hormones • Molecular mechanism of hormone action, Control of endocrine system 	01 01 01 01 01 01 01 01 01 01	
May	Unit-III Endocrine system <ul style="list-style-type: none"> • Transport and clearance of hormones from blood, Mode of action of hormones 	01	

	<ul style="list-style-type: none"> • Pituitary gland: anatomy, histology, hormones and their functions • Thyroid and Parathyroid gland: anatomy, histology and hormones and their functions • Pancreas and Pineal gland: anatomy and histology, hormones and their functions • Adrenal gland: anatomy and histology and hormones and their functions <p>Unit-IV Biochemistry of specialized tissue and receptors</p> <ul style="list-style-type: none"> • Taste (gustation): histology of tongue, papillae, histology of taste buds • Taste sensations and constitution related to taste, Mechanism of taste perception, Factors affecting taste sensation • Smell (olfaction): olfactory receptors, physiology of olfaction, pathways of olfactory impulses. 	01 01 01 01	
June	<p>Unit-IV Biochemistry of specialized tissue and receptors</p> <ul style="list-style-type: none"> • Muscles: structure and functions of striated and unstriated muscles • Mechanism of muscle contraction and relaxation, Role of actin, myosin, troponin, tropo-myosin, titin, nebulin, Ca²⁺ in muscle contraction and relaxation • Skin: structure and functions, Glands in skin: sweat, eccrine, sebaceous gland • Mechanism of secretion of sweat, types of sweating, pigmentation of skin 	01 01 01 01	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21

Date of Preparation/Revision: 01/08/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

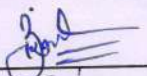
Class: T.Y. B.Sc.


Subject/Paper: BC-502 Plant Biochemistry and Biofertilizers

Faculty: Science

Month	Topic	No. of Lectures required	Remark
August	Unit I: Photosynthesis, Photorespiration and ATP generation <ul style="list-style-type: none"> • Definition of photosynthesis, Ultra structure of chloroplast • Chemistry of Chlorophyll • Mechanism of Photosynthesis <ul style="list-style-type: none"> ○ Photosystem I and II ○ Light (Hill) reaction: Cyclic and non-cyclic photophosphorylation ○ Dark reaction: C3 and C4 pathways ○ Kranz anatomy ○ Significance of photosynthesis and Factors affecting photosynthesis-external and internal • Photorespiration: <ul style="list-style-type: none"> ○ Definition ○ Metabolism of Photorespiration ○ Significance of photorespiration • Electron transport chain: <ul style="list-style-type: none"> ○ Components of ETC ○ Oxidative phosphorylation ○ Redox potential and sites of ATP synthesis 	01 01 01 02 02 01 01 01 02	
September	Unit II: Phytohormones <ul style="list-style-type: none"> • Definition and types of phytohormones • Mechanism of action, physiological effect and applications of <ul style="list-style-type: none"> ○ Auxins ○ Cytokinins ○ Gibberellins ○ Abscisic acid ○ Ethylene • Seed dormancy and seed germination 	01 08 02	
October	Unit III: Secondary Metabolites <ul style="list-style-type: none"> • Introduction and biosynthetic pathway of secondary metabolites • Classification of Isoprenoid /terpenoids: classification, chemistry, distribution and role of isoprenoids <ul style="list-style-type: none"> ○ Nitrogen containing secondary plant products: Classification 	02 02	

	<ul style="list-style-type: none"> ▪ Alkaloids: chemistry distribution classification and physiological role ▪ Cyanogenic glycosides and Glucosinolates: chemistry and functions ▪ Non-protein amino acids: chemistry and functions ○ Plant phenolics: chemistry, biological functions, classification <ul style="list-style-type: none"> ▪ Chemistry and functions of lignin, flavonoids and tannins 	02	
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		01	
		01	
		02	
November	Unit IV: Biofertilizers <ul style="list-style-type: none"> • Biological nitrogen fixation <ul style="list-style-type: none"> ○ Nitrogen cycle ○ Symbiotic and asymbiotic nitrogen fixation ○ Mechanism of nitrogen fixation • Genetic engineering- nitrogenase and hydrogenase gene • Biofertilizers <ul style="list-style-type: none"> ○ Symbiotic nitrogen fixer ○ Asymbiotic nitrogen fixer ○ Phosphate solubilising bacteria ○ Organic fertilizers ○ Benefits and limitations of biofertilizers • Composting –mixed culture composting, vermicomposting 	03	
		02	
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Name of Teacher: Dr. B.R. Kavimandan

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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
 Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/08/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: T.Y. B.Sc.

Subject/Paper: BC-504 Metabolism

Faculty: Science

Month	Topic	No. of Lectures required	Remark
August	Unit-I Carbohydrate metabolism <ul style="list-style-type: none"> • Glycolysis: steps; balance sheet; bioenergetics; fate of pyruvate 02 • Tricarboxylic acid cycle: oxidation of pyruvate to acetyl Co-A; steps of TCA cycle; balance sheet; bioenergetics 02 • Glyoxylate cycle 01 • HMP pathway: functions of HMP pathway; steps 01 • Glycogenolysis: steps of conversion of glycogen to glucose under the influence of epinephrine and glucagon 02 • Gluconeogenesis: from pyruvate and amino acids 02 • Glycogen biosynthesis 02 		
September	Unit-II Amino acid metabolism <ul style="list-style-type: none"> • Proteolysis: digestion of proteins; enzymes involved in digestion of protein, Flow sheet of amino acid oxidation 02 • Transamination: Transamination of L-aspartate, L-alanine, L-leucine, and L-tyrosine; mechanism of the reaction 02 • Oxidative deamination: general reaction; oxidative deamination of glutamate 01 • Transmethylation: mechanism of transmethylation involving methionine as methyl group donor 02 • Decarboxylation: general reaction; decarboxylation of histidine, tryptophan and arginine 01 • Nitrogen excretory products: 03 <ul style="list-style-type: none"> ○ Synthetic pathway ○ Glutamine pathway ○ Direction excretion ○ Creatine and Creatinine ○ Urea cycle 		
October	Unit-III Lipid metabolism <ul style="list-style-type: none"> • Activation of fatty acids and transportation into mitochondria 01 • β-oxidation of saturated even carbon fatty 02 		

	acids: steps, balance sheet, bioenergetics <ul style="list-style-type: none"> • β-oxidation of saturated odd carbon fatty acids: steps, fate of propionyl Co-A 01 • β-oxidation of unsaturated fatty acids: fatty acids having one and two double bonds 02 • Biosynthesis of fatty acids: formation of malonyl Co-A; enzymes and functions of fatty acid synthetase complex; steps of fatty acid biosynthesis 03 • Elongation of saturated fatty acid and desaturation of fatty acids 02 		
November	Unit-IV Nucleotides metabolism <ul style="list-style-type: none"> • Biosynthesis of purine ribonucleotides: steps of AMP and GMP biosynthesis 02 • Regulation of purine nucleotide biosynthesis 01 • Biosynthesis of pyrimidine ribonucleotide: steps of UMP and CMP biosynthesis 01 • Regulation of pyrimidine biosynthesis 01 • Biosynthesis of Deoxyribonucleotides: conversion of ribose sugar to 2'deoxyribose sugar 01 • Formation of deoxythymidylic acid: steps 01 • Regulation of deoxyribonucleotide biosynthesis 01 • Degradation of purines, Salvage of purines 01 • Purine nucleotide cycle 01 • Pyrimidine degradation 01 		

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON
Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation/Revision: 01/08/2020

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: T.Y. B.Sc.

Subject/Paper: BC-507 Techniques in Plant Biotechnology & Molecular Biology-I

Faculty: Science

Month	Topic	No. of Lectures required	Remark
August	1. Isolation of DNA from <i>E. Coli</i>	04	
	2. Estimation of DNA by DPA method	04	
	3. Estimation of RNA by orcinol method	04	
	4. Estimation of chlorophyll pigments by spectrophotometric method	04	
September	5. Estimation of any one secondary metabolite	04	
	6. Industrial production of alcohol	04	
	7. Industrial production of citric acid	04	
	8. Industrial production of amylase	04	
October	9. Preparation of manure by vermicomposting	04	
	10. Determination of activity of Phosphate solubilizing bacteria.	04	
	11. Separation of plant pigments by paper chromatography	04	
	12. Isolation of nitrogen fixing bacteria from root nodules.	04	
November	13. Isolation of nitrogen fixing bacteria from soil sample.	04	
	14. Demonstration of working of fermenter	04	
	15. Solve the problems based Mendel's laws	04	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON

Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation: 25/02/2021

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: T.Y. B.Sc.

Course code & Title: BC-602 Plant Biotechnology and Biomembranes

Faculty: Science

Month	Topic	No. of Lectures required	Remark
March	Unit-I Plant Tissue Culture <ul style="list-style-type: none"> • Introduction to PTC • PTC laboratory requirements <ul style="list-style-type: none"> ○ Laboratory space ○ Culture media composition • Terms used in PTC • Basic technique of plant tissue culture • Applications of PTC • Types of cultures- Callus culture, Cell culture • Protoplast isolation, fusion and culture 	01 02 01 01 01 02 02	
April	Unit-II Micropropagation and Genetic Engineering of Plants <ul style="list-style-type: none"> • Micropropagation: <ul style="list-style-type: none"> ○ Definition and technique ○ Multiplication by axillary buds and apical shoots- meristem, shoot tip cultures and bud cultures ○ Organogenesis-direct and indirect ○ Somatic embryogenesis-direct and indirect ○ Factors affecting ○ Applications and disadvantages • Agrobacterium mediated gene transfer <ul style="list-style-type: none"> ○ Organisation of Ti plasmid ○ T-DNA transfer and integration ○ Ti plasmid derived vector systems ○ Plant transformation techniques using Agrobacterium ○ Advantages and limitation of Agrobacterium mediated gene transfer 	01 02 01 01 01 01 01 01 01	
May	Unit-III Membrane transport and Special molecules of Transport <ul style="list-style-type: none"> • Principles and mechanism of <ul style="list-style-type: none"> ○ Osmo-regulation ○ Diffusion- types • Features of uniport, symport and antiport transport systems • Role of proteins in the process like exocytosis, endocytosis- phagocytosis and pinocytosis, receptor mediated endocytosis (cholesterol) 	02 01 03	

	transport), and ATP, ADP- exchanger. • Special molecules of Transport: <ul style="list-style-type: none"> ○ ATPases and its types (Sodium-Potassium pump, ABC, P type, V type ATPases), Sodium, proton Potassium and chloride dependent processes. ○ Phosphotransferase system ○ Group translocation 	04 01 01	
June	Unit-IV Membrane receptors and drug targets <ul style="list-style-type: none"> • Cell signaling definition and its types • Membrane receptors <ul style="list-style-type: none"> ○ Structure and functions ○ Types-enzyme linked; ion-channel linked, & G-protein linked receptors with example; ○ Methods to study membrane receptors ○ Purification of adrenergic and cholinergic receptors ○ Second messengers-Introduction, definition, examples and their roles. • Penetrating the defenses: <ul style="list-style-type: none"> ○ How antimicrobial agents reach their targets, ○ cellular permeability barrier to drug penetration, ○ some examples of modes of penetration of antimicrobial agents 	01 01 02 01 01 01 02 02 01	

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Name of Teacher: Dr. B.R. Kavimandan



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Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21

Date of Preparation: 25/02/2021

Name of Teacher: Dr. Bhushan R. Kavimandan

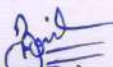
Class: T.Y. B.Sc.

Course code & Title: BC-604 Enzymology


Faculty: Science

Month	Topic	No. of Lectures required	Remark
March	Unit-I Basic concepts in enzymology <ul style="list-style-type: none"> • Definition of enzymes, Terminologies involved in enzymology • Nomenclature of enzymes • Classification (IUB) of enzymes • Factors affecting enzyme activity - effect of substrate concentration, enzyme concentration, product concentration, pH, temperature, activators, time, light and radiation. • Specificity of enzyme action - absolute specificity, group specificity, optical specificity and geometrical specificity. • Active site - definition and salient features of active site. 	01 02 02 03 02 02	
April	Unit-II Enzyme Kinetics and Inhibition <ul style="list-style-type: none"> • Mechanism of enzyme action – lowering of activation energy, lock and key model, induced fit model. • Michaelis Menten Equation: derivation, Km Vmax • Transformation of Michaelis –Menten equation: Lineweaver-Burk plot, Eadie-Hofstee plot • Inhibition: Reversible inhibition- competitive, non-competitive and uncompetitive inhibition with examples. • Factors contributing to the catalytic efficiency of enzymes: proximity and orientation of the substrate, covalent catalysis, acid-base catalysis, factor of strain in enzyme catalysis 	02 02 03 04 04	
May	Unit-III Regulatory enzymes <ul style="list-style-type: none"> • Allosteric enzymes: definition, feedback inhibition, positive and negative modulator, heterotropic and homotropic control • Mechanism of regulatory activity of allosteric enzymes- sequential and symmetry model, kinetics of allosteric enzymes, • Aspartate transcarbamoylase- kinetics and inhibition • Covalently modulated enzymes: definition, explanation with example of glycogen phosphorylase enzyme • Covalent activation of zymogen: pepsinogen, 	02 02 01 02 02	

	trypsinogen, chymotrypsinogen • Classes of proteolytic enzymes: serine, aspartate, cysteine and metalloproteases	03	
June	Unit-IV Applications of enzymes • Enzyme Immobilization: methods • Applications of immobilized enzymes and cells ○ Manufacture of commercial products ○ Analytical applications ○ Therapeutic applications • Enzyme based biosensors and their applications • Other applications of enzymes	03 01 01 01 04 02 01	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA COLLEGE (AUTONOMOUS), JALGAON

Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21.

Date of Preparation: 25/02/2021

Name of Teacher: Dr. Bhushan R. Kavimandan

Class: T.Y. B.Sc.

Course code & Title: BC-607 Techniques in Plant Biotechnology
and Molecular Biology-II

Faculty: Science

Month	Topic	No. of Lectures required	Remark
March	• Preparation of MS media for PTC.	04	
	• Development of somatic embryo from suitable tissue.	04	
	• Development of seedling by aseptic germination of available seed.	04	
	• Development of shoots by shoot tip culture method.	04	
April	• Development of callus from suitable tissue.	04	
	• Isolation of protoplast.	04	
	• DNA digestion using restriction endonucleases.	04	
	• Separation of fragments produced by restriction endonucleases digestion by agarose gel electrophoresis	04	
May	• Amplification of DNA fragment using PCR.	04	
	• Separation of fragments produced by PCR by agarose gel electrophoresis.	04	
	• Isolation of plasmid from micro-organism.	04	
	• To study cell membrane permeability using potato.	04	
June	• Determine the DNA sequence using Sanger's Dideoxy method.	04	
	• Perform BLAST of the given DNA sequence.	04	
	• Demonstration of Southern blotting.	04	

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Name of Teacher: Dr. B.R. Kavimandan



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MOOLJI JAITHA (AUTONOMOUS) COLLEGE, JALGAON**

Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 12/10/2020

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: F.Y.B.Sc.

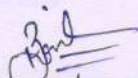
Subject / Paper: BC-112 Cell Biology

Faculty: Science

Month	Theory/Practicals to be covered	No. of Lectures required	Remarks
October	Unit – I: Ultra structure of cell	01	
	Definition of cell		
	Elemental composition of cell	01	
	Characteristics of prokaryotic and eukaryotic cell	01	
	Comparative account on plant and animal cell	01	
November	Comparative account on plant and animal cell	01	
	Structure and functions of - cell wall	01	
	Structure and functions of - cell membrane (Fluid Mosaic model)	01	
	Structure and functions of - cytoplasm, mitochondria, Golgi complex,	01	
	Structure and functions of - endoplasmic reticulum (smooth and rough)	01	
	Structure and functions of - chloroplast, nucleus	01	
December	Structure and functions of - Ribosomes, lysosomes	01	
	Unit – II: Cell division	01	
	Introduction to cell division		
	Mitosis- interphase, different phases and significance of mitosis	03	
	Meiosis- different phases of meiosis-I and II and its significance	03	
	Comparative account on mitosis and meiosis	01	
	Unit – III: Tissues and cell junctions	01	
Tissues- definition and types			
January	Epithelial tissues- general characteristics, functions and classification	01	
	Simple and compound epithelial tissues- types, brief description, functions and locations	02	
	Connective tissues- general characteristics and functions	01	
	Types of connective tissues (cartilage, bone and blood)- brief overview, functions and locations	02	
	Muscular tissues (skeletal, cardiac and smooth)-concise	02	

	description, functions and locations		
February	Nervous tissues (neuron and neuroglia)-introductory description, functions and locations	01	
	Cell junctions (complexes)- definition and types- tight junction, belt desmosome, spot desmosome and gap junction	02	

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Name of Teacher: Dr. Suresh P. Kamble



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Department of Biochemistry

TEACHING PLAN

Academic Year: 2020-21

Date of Preparation/Revision: 22/04/2021

Name of Teacher: Dr. Suresh P. Kamble

Class: F.Y. B.Sc.

Subject/Paper: BC-122 Basic Microbiology

Faculty: Science


Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
May	Unit – I: Characteristics of microbes <ul style="list-style-type: none"> • Types of microorganisms • General characteristics of microbes • Significance of microbes • Nutrition of microbes • Classification and mode of reproduction. 	01 01 01 01 01		
June	<ul style="list-style-type: none"> • Major characteristics of microorganisms-morphological, chemical, metabolic, antigenic, and genetic characteristics. • Role of microorganisms in infection, fermentation, environment and agriculture. • Morphology and fine structure of bacteria • Structure and functions of cell organelles Unit - II: Growth, Nutrition and Isolation of microorganisms <ul style="list-style-type: none"> • Concept of growth. Growth curve – lag, log, stationary and death phase • Mathematical expression of growth – growth rate and generation time. • Measurement of growth 	02 01 01 01 02		
July	<ul style="list-style-type: none"> • Measurement of growth...continue • Nutritional classification of microorganisms • Media– ingredients, types on the basis of physical state, composition and use. • Methods of isolation of bacteria on solid media, Staining Unit - III: Control of microorganisms Definitions:- sterilization, disinfection	01 02 02 02 01		
August	<ul style="list-style-type: none"> • Antisepsis, sanitization, 	03		

	decontamination, pasteurization, preservation, germicidal and bactericides	03 02		
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Signature : 

Name of Teacher: Dr. Suresh P. Kamble



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MOOLJI JAITHA (AUTONOMOUS) COLLEGE, JALGAON**

Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 01/08/2020

Name of Teacher: Dr. Suresh Pandurang Kamble _____

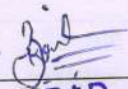
Class: S.Y.B.Sc.

Subject / Paper: BC-230 BC SEC-I Microbial Isolation and Identification Techniques - I

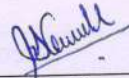
Faculty: Science

Month	Theory/Practicals to be covered	No. of Lectures required	Remarks
August	The light microscope: Lenses and the bending of light, Microscopic resolution, Bright-field microscope	02	
	Dark-field microscope, Phase contrast microscope	02	
	Fluorescence microscope, Inverted microscope	02	
	Electron microscopy: Transmission Electron Microscope (TEM), Scanning Electron Microscope (SEM)	02	
September	Types of media: Culture Media- solid and broth, selective, differential and enrichment media.	01	
	Media used for isolation of microorganisms like bacteria, fungi, actinomycetes, yeasts and cyanobacteria.	02	
	Characteristic of bacteria, fungi, actinomycetes, yeasts and cyanobacteria.	02	
	Isolation techniques: Concept of isolation techniques: streak plate method, pour plate method, spread plate methods	02	
	Bacterial isolation by candle jar method and fungi isolation by slide culture technique.	01	
	Methods of measurement of Microbial Growth	01	
October	Direct Counts: Counting chambers, Electronic counters – flow cytometry on membrane filters.	02	
	Viable Counting Methods: Spread plate techniques; Pour plate techniques, Membrane filter technique, Turbidity, Most Probable Number (MPN).	02	
	Measurement of cell mass: Dry weight analysis,, Measurement of cell components	02	
	Bergey's Manual: Introduction Morphological characteristic of microorganisms: Form, Size, Elevation, Margin/border, Surface,	02	

	Opacity, Colour		
November	Staining techniques: principles and procedures (Gram staining, acid fast staining, spore staining, capsule staining, Flagella staining, cell wall staining, metachromatic granules staining). .	03	
	Fungi: Lacto phenol cotton blue, arbuscular mycorrhizal staining.	01	
	Measure the size of microorganisms by micrometry by using Ocular micrometer and stage micrometer	01	

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 Name of Teacher: Dr. Suresh P. Kamble



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MOOLJI JAITHA (AUTONOMOUS) COLLEGE, JALGAON

Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 01/08/2020

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: S.Y.B.Sc.

Subject / Paper: BC-233 Practical course Practical course based on BC-231, BC-232

Faculty: Science

Month	Practicals to be covered	No. of Lectures Required	Remarks
August	• Enumeration of RBCs and WBCs for determining health status.	4	
	• Determination of blood groups (A, B, AB, O and Rh) and its significance.	4	
	• Determination of gastric juice acidity.	4	
	• Qualitative analysis of some common food adulterants: Pulses, oil, fats, milk and milk products, beverages, spices and condiments.	4	
September	• Determination of rancidity in edible oil and its applications.	4	
	• Microbial examination of food.	4	
	• Determination of moisture content in food sample.	4	
	• Isolation and colony morphology study of microorganism	4	
October	• Capsule staining of micro-organisms	4	
	• Determination of microorganism size by micrometry	4	

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TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 25/02/2021

Name of Teacher: Dr. Suresh Pandurang Kamble _____ **Class: S.Y.B.Sc.**

Subject / Paper: BC-240 SEC-II Microbial Isolation and Identification Techniques - II _____

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
March	Unit I: Biochemical tests for identification of microorganisms Concepts, principles and procedures: <ul style="list-style-type: none"> • Catalase test, Starch hydrolysis test • Coagulase test, • Oxidase test, Methyl Red/Voges-Proskauer (MP/VP) • Kligler's Iron agar (KIA), Nitrate broth, Urease test • Casein hydrolysis, Tyrosine hydrolysis, Beta-galactosidase • Arginine dihydrolase, Lysine decarboxylase, Ornithine decarboxylase, Indole production, TSI test, Sugar fermentation acid and gas production test 	01 01 01 01 04		
April	Unit II: Microbial isolation on different media Selective agar test: <ul style="list-style-type: none"> • Mannitol salt agar (MSA), Blood agar plates (BAP), Bile Esculin Agar, Nitrate broth, Spirit blue agar, MacConkey agar, Simon's Citrate Agar, Sulphur Indole Motility Media (SIM), Motility agar Selective and differential media: <ul style="list-style-type: none"> • Eosin Methylene blue (<i>E.coli</i>), Xylose lysine deoxycholate agar (<i>Salmonella</i> and <i>Shigella</i>), Mannitol salt agar (<i>Staphylococcus</i> and <i>Micrococcus</i>), Cetrimide agar 	04 03		

	(<i>Pseudomonas</i>), Azide dextrose broth (<i>Streptococcus</i>)			
May	<ul style="list-style-type: none"> Ashby's Mannitol agar (<i>Azotobacter</i>), Yeast extract Mannitol agar (<i>Rhizobium</i>) 	01		
	Unit III: Primary screening techniques <ul style="list-style-type: none"> Enzyme producing microorganisms: amylase, gelatinase, Lipase 	02		
	<ul style="list-style-type: none"> Organic acid producing microorganisms by using pH indicator dyes, Calcium carbonate tests 	02		
	<ul style="list-style-type: none"> Antibiotic producing microorganisms by crowded plate technique Probiotic producing microorganisms by MRS medium 	01 01		
June	<ul style="list-style-type: none"> Phosphate solubilizing microorganisms by Pikovaskaya's Agar 	01		
	Unit IV: Preservation of microorganisms Background and Introduction	01		
	A) Preservation in continuous metabolic active state: <ul style="list-style-type: none"> Short term preservation (Agar slants, Agar stabs) Periodic transfer in fresh media Long-term preservation (Glycerol stocks, Gelatin discs, Mineral oil, Storage in soil) A) Suspended metabolic state: <ul style="list-style-type: none"> Freeze drying (Lyophilization) Drying in vacuum Cryopreservation Storage in silica gel Quality control of preserved stock cultures 	03 03		

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Department Of Biochemistry

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Academic Year: ~~2019-20~~ ²⁰²⁰⁻²¹ Date of Preparation/ Revision: 25/02/2021

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: S.Y.B.Sc.

Subject / Paper: BC-243 Practical course Based on BC-241 & BC-242

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
March	1. Recording of blood pressure by sphygmomanometer and its significance	04		
	2. Determination of bleeding time and clotting time and its significance	04		
	3. Determination of sodium and potassium content in blood serum samples by flame photometer	04		
April	4. Analysis of wastewater for BOD and COD.	04		
	5. Estimation of chlorides in water and hardness of water	04		
	6. Soil analysis: pH, salt concentration by conductometry	04		
	7. Estimation of phosphate by Fisk-Subbarow method	04		
May	8. IMViC test	04		
	9. Screening of organic acid/antibiotic/enzyme producing microorganisms	04		
	10. Isolation of yeast from sugarcane juice/sweet sample	04		

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Academic Year: 2020-21

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Department Of Biochemistry

TEACHING PLAN

Date of Preparation/ Revision: 01/08/2020

Name of Teacher: Dr. Suresh Pandurang Kamble


Class: T.Y.B.Sc.

Subject / Paper: BC-501 Genetics


Faculty: Science

Month	Topic	No. of Lectures Required	Remarks
August	<ul style="list-style-type: none"> • Unit I: Genetics • Mendel's law – Introduction, Law of dominance, Law of segregation 	4	
	<ul style="list-style-type: none"> • Law of independent assortment 	2	
	<ul style="list-style-type: none"> • Incomplete dominance 	2	
	<ul style="list-style-type: none"> • Test cross and back cross 	1	
	<ul style="list-style-type: none"> • Concept of multiple alleles: characters, symbolism example ABO types, Lethal genes 	2	
	<ul style="list-style-type: none"> • Unit II: Chromosomes and structural organization of prokaryotic and eukaryotic cells: chromosomes morphology 	01	
September	<ul style="list-style-type: none"> • Chromosome structure, Types of chromosome 	03	
	<ul style="list-style-type: none"> • Chromosome number-introduction 	01	
	<ul style="list-style-type: none"> • Chromosome number and variation in numbers 	03	
	<ul style="list-style-type: none"> • Structural organization of prokaryotic DNA, Structural organization of eukaryotic DNA 	02	
	<ul style="list-style-type: none"> • Central dogma 	01	
	<ul style="list-style-type: none"> • Unit III: DNA replication and transcription in bacteria: DNA replication in E coli: Replication origin and unwinding of strands, Template DNA 	02	
October	<ul style="list-style-type: none"> • RNA primer, polymerization 	01	
	<ul style="list-style-type: none"> • Replication fork, leading strand, lagging strand and Okazaki fragment 	02	
	<ul style="list-style-type: none"> • Transcription components: template, activated precursors, divalent metal ions 	02	
	<ul style="list-style-type: none"> • RNA polymerase sigma factor 	01	
	<ul style="list-style-type: none"> • Transcription process: initiation, elongation 	02	

	and termination,		
	<ul style="list-style-type: none"> • Fine structure of genes Gene regulation: lac operon 	02	
November	<ul style="list-style-type: none"> • UNIT-IV Prokaryotic Translation and Mutations: Activation and transfer of amino acids to Trna, Translation- initiation, elongation, termination 	03	
	<ul style="list-style-type: none"> • Post translational modification-Methylation, Phosphorylation, Glycosylation, acetylation etc. 	02	
	<ul style="list-style-type: none"> • Mutations- definition, Gene mutations 	01	
	<ul style="list-style-type: none"> • Mutations- Base pair substitutions- transition, transversion and inversion 	02	
	<ul style="list-style-type: none"> • Frameshift mutations- deletion and insertion, Missense mutation, 	01	
December	<ul style="list-style-type: none"> • nonsense mutations, Mutations in termination codons 	01	
	<ul style="list-style-type: none"> • Silent mutations: Mutagens: definition, Chemical- base analogues, agents modifying purines and pyrimidines, Physical- radiations 	02	

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 Name of Teacher: Dr. Suresh P. Kamble



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Academic Year: 2020-21

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Department Of Biochemistry

TEACHING PLAN

Date of Preparation/ Revision: 01/08/2020

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: T.Y.B.Sc.

Subject / Paper: BC-505 Biophysical Chemistry

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
August	<ul style="list-style-type: none"> Unit-I Acids and Bases: Properties of water in relation to life process, Expansion on freezing, Uniquely high surface tension, Uniquely high heat capacity, High solvent power 	4		
	<ul style="list-style-type: none"> Concept of Acid and Base: Arrhenius theory, Lewis acid and base, Lowry-Bronsted Theory, Acid-Base equilibria in water: Law of Mass Action, Ionisation of water, Equilibrium constant and Ionisation constant of water 	4		
	<ul style="list-style-type: none"> Concept of pH, Buffers- Concept and definition, Henderson-Hasselbalch equation 	2		
September	<ul style="list-style-type: none"> Biological buffer systems: Phosphate buffer system and Bicarbonate buffer system 	1		
	<ul style="list-style-type: none"> Unit-II Diffusion, Osmosis and Colloidal phenomena: Diffusion- definition and types 	01		
	<ul style="list-style-type: none"> Fick's laws of diffusion- first and second, Methods of determination of diffusion coefficient, Significance of diffusion coefficient 	03		
	<ul style="list-style-type: none"> Osmosis- definition: Osmotic pressure- definition and its measurement, Tonicity- types, Significance of osmosis in biology 	03		
	<ul style="list-style-type: none"> Colloids- concept: Classification of colloids- lyophilic and lyophobic colloids, Brownian movement, Tyndall effect, Donnan membrane equilibrium 	04		
October	<ul style="list-style-type: none"> Unit-III Viscosity, Surface tension and Adsorption: Viscosity- concept 	02		
	<ul style="list-style-type: none"> Factors affecting viscosity 			
	<ul style="list-style-type: none"> Measurement of viscosity: Capillary flow 	01		

	<ul style="list-style-type: none"> Measurement of viscosity: Rotation of a cylinder immersed in solution, Rate of fall of a ball through solution 	02		
	<ul style="list-style-type: none"> Applications of viscometry, Significance of viscosity in biological systems 	03		
	<ul style="list-style-type: none"> Surface tension- concept: Factors affecting surface tension, Measurement of surface tension 	02		
	<ul style="list-style-type: none"> Adsorption- concept: Kinds of adsorption interactions, Characteristics of adsorption, 	02		
November	<ul style="list-style-type: none"> Importance of adsorption phenomena 	01		
	<ul style="list-style-type: none"> Unit-IV Bioenergetics: Energy, Free energy and Energetic coupling 	01		
	<ul style="list-style-type: none"> Energy rich compounds: ATP, causes of energy richness of ATP 	02		
	<ul style="list-style-type: none"> Energy rich compounds: Other energy rich compounds 	01		
	<ul style="list-style-type: none"> Thermodynamics- definition: First and second law of thermodynamics 	02		
December	<ul style="list-style-type: none"> Enthalpy, Entropy, Standard free energy change 	02		
	<ul style="list-style-type: none"> Exergonic and endergonic reactions, Redox potential and its measurement 	02		

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Name of Teacher: Dr. Suresh P. Kamble



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Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 01/08/2020

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: T.Y.B.Sc.

Subject / Paper: BC-509 Biophysical Chemistry (Practical)

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
August	• Preparation of phosphate buffer of suitable pH and morality	4		
	• Determination of viscosity of suitable liquid by viscometer	4		
	• Estimation of lambda max and extinction coefficient of given Chromophore.	4		
September	• Purification of protein by salt precipitation and solvent fractionation procedure.	4		
	• Quantitative estimation of protein by lowery's method.	4		
	• Determination of diffusion of the sugar across a semipermeable membrane.	4		
	• Study of osmosis by potato osmometer	4		
October	• To study cell membrane permeability using beetroot	4		
	• To study the effect of temperature on permeability of beetroot membrane	4		
	• Preparation of RBC ghost cells and to study the effect of different solutes on permeability of RBC membrane	4		
	• To study the effect of pH on permeability of beetroot membrane	4		
November	• Purification and estimation of casein from milk	4		
	• Demo calculation of the isoelectric point of a protein	4		
	• Separation of carbohydrates by paper chromatography	4		
	• Preparation of lactalbumin from milk	4		

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Signature: Dr. Suresh P. Kamble
Name of Teacher: Dr. Suresh P. Kamble

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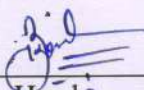
Academic Year: 2020-21 Date of Preparation/ Revision: 25/1/2021

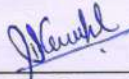
Name of Teacher: Dr. Suresh Pandurang Kamble
Subject / Paper: BC-601 Genetic Engineering

Class: T.Y.B.Sc.
Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
February	Unit I: Introduction to Genetic engineering <ul style="list-style-type: none"> • Concepts of Genetic engineering Enzymes involved in genetic engineering- • Restriction endonucleases • DNA ligases, Alkaline phosphatase • DNA modifying enzymes • Prokaryotic and eukaryotic cells as hosts 	01 03 02 04 01		
March	Unit II: Vectors and methods of gene transfer <ul style="list-style-type: none"> • Vectors- Plasmids, Bacteriophages, Cosmids • Artificial chromosome vectors, Shuttle vectors • Construction of rDNA- strategies • Methods of gene transfer- transformation, conjugation, Electroporation, Liposome mediated gene transfer, transduction • Direct transfer of DNA, Particle bombardment, microinjection, PEG mediated gene transfer 	02 02 01 04 03		
April	Unit III: Gene Libraries <ul style="list-style-type: none"> • Concept of gene libraries • Creation of human gene library, Use of long chain PCR for gene library construction • cDNA libraries- cDNA synthesis, construction of cDNA libraries, RT-PCR for cDNA libraries • Screening Strategies- screening by DNA hybridization, DNA probes, colony hybridization 	01 02 04 04		
May	Unit IV: Techniques in Genetic Engineering <ul style="list-style-type: none"> ○ DNA Sequencing: Technique, applications, limitations of: <ul style="list-style-type: none"> • Maxam Gilbert technique 	02		

	<ul style="list-style-type: none"> • Sanger's Dideoxynucleotide method • Pyrosequencing • DNA chip 	02		
	○ Polymerase Chain Reaction: principle, technique, applications of PCR in various fields	02		
		02		
		03		

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 Name of Teacher: Dr. Suresh P. Kamble

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Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 25/1/2021

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: T.Y.B.Sc.

Subject / Paper: BC-605 Analytical Techniques

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
February	Unit I: Spectrophotometry <ul style="list-style-type: none"> • Concept of electromagnetic radiations, electromagnetic spectrum • Laws of absorption- Lambert and Beer Law • Chromophore concept- auxochrome, various chromic shifts • Instrumentation for UV-Visible and infra-red spectrophotometry • Applications of UV-Vis spectrophotometry <ul style="list-style-type: none"> ○ Theory and applications of infra-red spectroscopy • Spectrofluorimetry: Fluorescence and phosphorescence 	01 01 02 02 01		
March	<ul style="list-style-type: none"> • Theory and instrumentation of fluorimetry, Advantages, disadvantages and applications • Flame spectrophotometry- concept, Instrumentation for emission flame photometry and atomic absorption, spectrophotometry Applications of both Unit II: Chromatography <ul style="list-style-type: none"> • Concept of distribution coefficient, Modes of chromatography • Classification of chromatography, Paper chromatography • Principle and applications of: <ul style="list-style-type: none"> ○ Thin layer chromatography ○ Gel filtration chromatography ○ Ion exchange chromatography ○ Affinity chromatography 	02 02 01 01 07		

April	○ Gas liquid chromatography	01		
	○ Liquid chromatography	02		
	Unit III: Electrophoresis			
	● Principle of electrophoresis, Migration of an ion in an electric field, Factors affecting electrophoretic mobility	03		
	● Principle and applications of:			
Paper electrophoresis	01			
Agarose gel electrophoresis	01			
Polyacrylamide gel electrophoresis	01			
SDS- Polyacrylamide gel electrophoresis	01			
May	Isoelectric focusing	02		
	Capillary electrophoresis	01		
	Immuno electrophoresis	01		
	Unit IV: Centrifugation and radioactivity			
	● Basic principles of centrifugation	01		
● Instrumentation for centrifugation: low speed, high speed and ultra-centrifuges	03			
● Applications of centrifugation: preparative techniques, analytical measurements	02			
June	● Radioactivity: introduction, isotopes in Biochemistry, units of radioactivity	01		
	● Detection and measurement of radioactivity: Liquid Scintillation Counting, Geiger-Muller Counting	02		
	● Applications of radioisotopes	01		
	● Radioisotopes and safety	01		

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Name of Teacher: Dr. Suresh P. Kamble



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Department Of Biochemistry

TEACHING PLAN

Academic Year: 2020-21 Date of Preparation/ Revision: 25/01/2021

Name of Teacher: Dr. Suresh Pandurang Kamble

Class: T.Y.B.Sc.

Subject / Paper: BC-609 Analytical Biochemistry and Enzymology

Faculty: Science

Month	Topic	Lectures Allotted	Review (Complete/ Incomplete)	Action plan if incomplete
February	Estimation of maltose by DNSA method	04		
	To determine the effect of enzyme-amylase concentration on the rate of reaction	04		
	To determine the effect of substrate concentration on the activity of amylase and determine K_m and V_{max} of the reaction	04		
March	To determine the effect of pH on activity of amylase	04		
	To determine the effect of temperature on activity of amylase			
	Immobilization of suitable enzyme/yeast cells	04		
	Separation of amino acids using Paper layer chromatography	04		
April	Separation of amino acids using Thin layer chromatography	04		
	Separation of amino acids using paper electrophoresis	04		
	Separation of protein by SDS-PAGE	04		
	Separation of protein by native PAGE	04		
May	Partial purification of suitable enzyme	04		
	Study the inhibition of suitable enzyme	04		
	Estimation of suitable enzyme activity	04		
	Demonstration of Ion exchange chromatography	04		

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Name of Teacher: Dr. Suresh P. Kamble

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MOOLJI JAITHA COLLEGE, JALGAON**

Department of BIOCHEMISTRY.....

TEACHING PLAN

Academic Year: 2020-21..... Date of Preparation/Revision:

Name of Teacher: Ms. Vinita K.S Tiwari

Class: SYBSC.....

Subject/Paper: BT 231 FOOD BIOCHEMISTRY

Faculty: science.....

Month	Topic	Lectures Allotted	Review (Complete/Incomplete)	Action plan if incomplete
August	Unit I: Energy value of food and its measurement <ul style="list-style-type: none"> • Nutritive value of different foods • Classification of food based on function • Five food group plan as per ICMR • Energy value of food: carbohydrate, protein, lipid • Energy unit: calorie, kilo calorie, Joule, mega Joule • Physiological energy value of food: loss in digestion and metabolism Determination of energy value using Bomb calorimeter • Respiratory quotient: definition, RQ for carbohydrate, fat and protein • Relation between RQ and energy output • Specific dynamic action of food (SDA) • Basal Metabolic Rate: definition, determination, factors affecting BMR • Recommended dietary allowance: definition, factors affecting RDA, RDA for adult man 	02 02 02 02	Complete	
September	Unit II Food adulterations <ul style="list-style-type: none"> • Adulteration: Definition, types- Intentional and incidental (definition and one example) • Common adulterants in different foods. • Contamination of food with harmful microorganism: <ul style="list-style-type: none"> ○ Food intoxication: <i>Botulism, Clostridium perfringens, Bacillus cereus, Salmonella, Shigella dysenteriae, etc</i> ○ Fungal contamination- <i>Fusarium</i> and <i>Cladosporium, Penicillium islandicum, Claviceps purpurea, Aspergillus flavus</i> • Parasitic infection • Food laws and standards: Prevention of food adulteration act 1954; Bureau of Indian Standards, Agmark, Consumer protection act 1986, Hazard analysis critical control point (HACCP) 	02 02 02 01	Complete	

	<p>Unit III: Food spoilage and food preservation</p> <ul style="list-style-type: none"> • Food spoilage, factors determining food spoilage- intrinsic, extrinsic modes of processing and preservation, implicit parameters • Micro-organisms involved in food spoilage: bacteria, yeast and molds, Food spoilage by enzymes, and insect. • Chemical spoilage: lipid oxidation, enzymatic oxidation, lipolysis, discoloration 	02 01 02		
october	<p>• Methods of food preservation : Low temperature, high temperature, drying, irradiation, chemicals</p> <p>Unit IV: Food additives, food allergy and diet modification</p> <ul style="list-style-type: none"> • Food additives: Concept, importance of food additives, • Examples of food additives • Food allergy: Concept, classification immediate and delayed allergy. Clinical signs and symptoms • Food as allergen :Animal origin - cow milk, goat milk, egg, fish, meat. Plant origin: cereals, soybean, peanut, other legumes, edible fungi, fats, oils, vegetables, fruits and beverages. • Detection of food allergy : history taking, diet diaries, elimination diet, provocative diet, pulse acceleration test, leukopenic index, x-ray, skin testing. 	02 01 01 02 01	COMPLETE	
November	<ul style="list-style-type: none"> • Therapeutic diet / diet modification in diseases: Definition and types of therapeutic diet. • Concept and significance of balanced diet. • Representative diets in: diabetes mellitus, cardio vascular diseases, anemia with brief rationale for each type of diet 	02 01	COMPLETE	

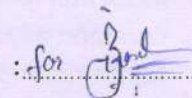
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**DEPARTMENT OF BIOCHEMISTRY
M.J.COLLEGE (AUTONOMOUS) JALGAON**

Signature :



Name of Teacher: ...Vinita K.S Tiwari