



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2019-20 (Term-I)

Details of Classes to be taught

Sr. No.	Class	Name of Asst. Prof.	Subject	Paper
1	B.Sc. II	Manisha A. Dhotre	Biotechnology	Course Title: Metabolism Course Code : U-MET-401 Course Title: Lab Course XII Course Code: U-LAC-412

1. Summary of Lesson Plan

Name of Teacher: Manisha A. Dhotre

Class : B.Sc. BT. II (Third Semester)

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Metabolism	Unit 1 1.Respiration 2.aerobic respiration – glycolysis and its regulation 3.Krebs cycles and its regulation 4.Substrate Level Phosphorylation 5.oxidative phosphorylation: ETC and its inhibitors 6.Electrochemical proton gradient chemiosmotic theory, ATP synthase, 7.P/O ratio,pasteur effect, warburg effect, respiratory quotient 8. Alchohol and Lactic acid Fermentation, cori cycle.	18-06-19 To 15-07-19	01 02 02 01 03 03 01 02	Classroom Group Discussion	Unit – I 27/07/19 Unit – II 14/08/19 Unit – III 29/08/19
		Unit II 1.Photosynthesis 2. photosynthetic pigments, concept		01		

		of photosynthetic unit, Hill reaction, oxygenic & anoxygenic photosynthesis 3. Light reaction: Cyclic and Non Cyclic 4. Photophosphorylation 5. Dark reaction: C ₃ , C ₄ , CAM, Photorespiration	15-07-19 To 07-08-19	03 03 01 04		
		Unit III 1. Glyoxylate PW. 2. Pentose Phosphate Pathway 3. Entner-Doudoroff PW 4. Carbohydrate metabolism – Gluconeogenesis, Glycogenesis, Glycogenolysis. 5. Lipid Metabolism – Biosynthesis of FA 6. Fatty acid oxidation, alternative PW of fatty acid oxidation 7. Ketone bodies	07-08-19 To 05-09-19	01 02 01 04 04 03 01		
		Unit IV 1. Amino acid Metabolism: Amino acid synthesis 2. Amino acid catabolism 3. urea cycle. 4. Nucleotide Metabolism Nucleotide synthesis: De-Novo 5. Salvage PW 6. Nucleotide degradation.	05-09-19 To 10-10-19	03 02 01 02 02 02		

	<p>of photosynthetic unit, Hill reaction, oxygenic & anoxygenic photosynthesis</p> <p>3. Light reaction: Cyclic and Non Cyclic</p> <p>4. Photophosphorylation</p> <p>5. Dark reaction: C₃, C₄, CAM, Photorespiration</p>	<p>15-07-19 To 07-08-19</p>	<p>03</p> <p>03</p> <p>01</p> <p>04</p>		
	<p>Unit III</p> <p>1. Glyoxylate PW.</p> <p>2. Pentose Phosphate Pathway</p> <p>3. Entner-Doudoroff PW</p> <p>4. Carbohydrate metabolism – Gluconeogenesis, Glycogenesis, Glycogenolysis.</p> <p>5. Lipid Metabolism – Biosynthesis of FA</p> <p>6. Fatty acid oxidation, alternative PW of fatty acid oxidation</p> <p>7. Ketone bodies</p>	<p>07-08-19 To 05-09-19</p>	<p>01</p> <p>02</p> <p>01</p> <p>04</p> <p>04</p> <p>03</p> <p>01</p>		
	<p>Unit IV</p> <p>1. Amino acid Metabolism: Amino acid synthesis</p> <p>2. Amino acid catabolism</p> <p>3. urea cycle.</p> <p>4. Nucleotide Metabolism Nucleotide synthesis: De-Novo</p> <p>5. Salvage PW</p> <p>6. Nucleotide degradation.</p>	<p>05-09-19 To 10-10-19</p>	<p>03</p> <p>02</p> <p>01</p> <p>02</p> <p>02</p> <p>02</p>		

Sr. No.	Subject	Practicals	Date	No. of Practical
1	Metabolism	Hydrolysis of Sucrose and Starch	02/07/19 To 24/10/19 Batch B,C,D	03
2		Qualitative Test for Amino Acids		03
3		Qualitative Test for Proteins		03
4		To Perform Fatty acid Titration		03
5		Estimation of Ketone Bodies		03
6		Determination of Urinary Titrable acidity		03
7		Estimation of Urinary Creatinine		03
8		Estimation of Enzyme activity of Acid Phosphatase		03
9		Estimation of Enzyme activity of β -amylase		03
10		Estimation of Total Serum Cholesterol by Zak and Henley's method		03
11		Determination of Serum Bilirubin by Van de Bergh reaction		03
12		Solution of Problems in Biochemistry and Metabolism		03

Date: 17 June,2019


Course Teacher


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Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	M.Sc. II	Manisha A. Dhotre	Biotechnology	Course Title: Microbial Biotechnology Course Code: P-MIB-335 Course Title: Lab Course X Course Code: P-LAC-339

Name of Teacher: Manisha A. Dhotre

Class : M.Sc. BT. II (Third Semester)


Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Microbial Biotechnology	Unit 1 Microbial Production of Organic Acids: Production, recovery and applications of: 1. Citric acid 2. Lactic acid Microbial Production of Organic Solvents: Production, recovery and applications of: 1. Alcohol 2. Glycerol 3. Acetone Microbial Production of Vitamins: Production, recovery and applications of vitamins: 1. Vitamin-B12 2. Riboflavin	18-06-19 To 10-07-19	04 04	Classroom Group Discussion	Unit – I 30/07/19 Unit – II 16/08/19 Unit –III 29/08/19
		Unit II Microbial Production of Amino Acids: Production, recovery and applications of amino acids:		04		

		reactions, Condensations 2. Transformation of steroids and sterols 3. Transformation of nonsteroid compounds: L-Ascorbic acid, Prostaglandins, Antibiotics.				
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Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Microbial	Fermentative production of amylase by <i>Bacillus subtilis</i> .	01/07/19 to 24/10/19 Batch A and B	02
2	Biotechnology	Fermentative production of alpha amylase from fungi <i>Aspergillus niger</i>		02
3		Production of Sauerkraut by microorganism		02
4		Ethanol fuel production from Tissue Paper Waste or Molasses.		02
5		Estimation of Alcohol by specific gravity method		02
6		Estimation of Alcohol by Idometry test		02
7		I] Isolation and identification of lipase producer. II] Production and estimation of lipase producing organism.		02
8		Production of alkaline protease from <i>Bacillus</i> species.		02
9		I] Isolation and screening of Lactic acid producing bacteria II] Production and estimation of Lactic acid.		02
10		Isolation and Characterization of microorganisms used as Biofertilizer		04
11		Production of Extracellular Polysaccharide from <i>Rhizobium</i> Species isolated from leguminous Plant (<i>Glycine max</i>)		04
12		Production of fermented milk by Lactobacillus.		04

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Structured Work Plan for Teaching
Academic Year 2019-20 (Term-II)

Details of Classes to be taught

Sr. No.	Class	Name of Asst. Prof.	Subject	Paper
1	B.Sc. II	Manisha A. Dhotre	Biotechnology	Course Title: Enzymology Course Code : U-ENZ-498 Course Title: Lab Course XV Course Code: U-LAC-502

1. Summary of Lesson Plan

Name of Teacher: Manisha A. Dhotre

Class : B.Sc. BT. II (Fourth Semester)


Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Metabolism	Unit I ENZYMES & ENZYME CATALYSIS: 1.General Features of enzymes 2.Characteristics of enzymes 3.Classification - IUB system, rationale, overview and specific examples, 4.Enzyme substrate complex, Concept of active centre, binding sites 5.Types of Specificity 6. Effect of different factors on reaction rate 7.Factors affecting catalytic efficiency - proximity and orientation effects, distortion or strain, acid - base and nucleophilic catalysis	10-12-19 To 03-01-20	01 01 02 01 01 02	Classroom Group Discussion	Unit – I 09/01/20 Unit – II 15/02/20 Unit – III 26/03/20


		<p>8.Methods for studying fast reactions</p> <p>9. Chemical modification of enzymes</p> <p>10.Isoenzymes and multiple forms of enzymes.</p> <p>11.Examples of Enzymatic Reactions: Lysozyme and Chymotrypsin, Zymogen, Ribozyme.</p>		02 01 01 03		
		<p>Unit II. APPLICATION AND CHARACTERISATION OF ENZYMES</p> <p>1.Commercial application of enzymes in food pharmaceutical and other industries</p> <p>2. Commercial application of Enzymes for analytical and diagnostic applications</p> <p>3.Production and Purification of Crude Enzyme extracts from plant, animal and microbial sources-some case studies</p> <p>4.Methods of characterization of enzyme</p> <p>5..development of enzymatic assays.</p>	04-01-20 To 22-01-20	02 02 03 01 02		
		<p>Unit III ENZYME KINETICS:</p> <p>1.Michaelis - Menten Equation - form and derivation, steady state enzyme kinetics</p> <p>2.Significance of Vmax and Km,</p> <p>3.Bisubstrate reactions</p> <p>4.Graphical procedures in enzymology - advantages and disadvantages of alternate plotting</p> <p>5. Enzyme inhibition - types of inhibitors - competitive, non-competitive and uncompetitive, their</p>	23-01-20 To 10-02-20	02 01 01 02 03		

		mode of action and experimental determination. 6.Enzyme activity, international units, specific activity, turnover number 7. end point kinetic assay		01 01		
		Unit IV ENZYME REGULATION & IMMOBILIZED ENZYMES 1.Product inhibition, feedback control 2.enzyme induction and repression and covalent modification, Allosteric regulation 3. Relative practical and economic advantage for industrial use, effect of partition on kinetics and performance with particular emphasis on charge and hydrophobicity (pH, temperature and Km) 4.Various methods of immobilization - ionic bonding, adsorption, covalent bonding (based on R groups of amino acids), microencapsulation and gel entrapment. Immobilized multienzyme systems 5.Biosensors - glucose oxidase, cholesterol oxidase, urease and antibodies as biosensors.	11-02-20 To 25-03-20	01 03 02 03 04		

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Enzymology	To study effect of α amylase activity on starch	16/12/19 To 31/03/20 Batch C,D,E	03
2		Determination of α amylase activity		03
3		To study effect of pH on α amylase activity		03
4		To study effect of Substrate on α amylase activity		03
5		To study effect of Salt on α amylase activity		03
6		To study effect of Temperature α amylase activity		03
7		To study effect of Time on α amylase activity		03
8		A) Immobilization of Yeast cells by Calcium-Alginate Entrapment method B) Determination of viability of immobilized Cells by invertase activity		03
9		Hydrolysis of sucrose by yeast β -Fructofuranosidase		03
10		Determination of Hydrolyzed Sucrose solution by Benedict Method		03
11		Indirect Estimation of Lactate Dehydrogenase		03
12		A) Purification of HRP by Affinity Chromatography B) Estimation of HRP activity		03
13		Problems Based on MM equation and Lineweaver-Burk plot		03

Date: 09 Dec,2019


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Structured Work Plan for Teaching
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Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	M.Sc. II	Manisha A. Dhotre	Biotechnology	Course Title: Food and Nano Biotechnology Course Code:P-FNB-434 Course Title: Lab Course XIV Course Code: P-LAC-437

Name of Teacher: Manisha A. Dhotre

Class : M.Sc. BT. II (Fourth Semester)

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Food and Nano Biotechnology	Unit-I: Biotechnology for Food Ingredients <ul style="list-style-type: none"> Metabolic engineering of bacteria for food ingredients Biotechnology of microbial polysaccharides in food Microbial biotechnology for food flavor production Aspects of Food Production. <ul style="list-style-type: none"> Food safety: HACCP System to food protection, Responsibility for food safety. Food Additives: Definition, Types and Functional characteristics. 	10-12-19 To 02-01-20	02 02 02 01	Classroom Group Discussion	Unit – I 04/01/20 Unit – II 18/02/20 Unit –III 27/03/20


		<ul style="list-style-type: none"> • Natural Colors: Types, Applications • Sweeteners: Types and Applications. • Causes of food spoilage • Food Preservation Methods 		01 01 02 02		
		Unit-II: Fermented Food Products <ul style="list-style-type: none"> • Fermentation technology for traditional food of the Indian subcontinent • Solid state fermentations for food applications • Genetic engineering of bakers yeast Biotechnology of wine yeast • Biotechnology of beta carotene from Dunaliella • SCP: Spirulina and Chlorella 	03-01-20 To 25-01-20	02 01 02 02 02		
		Unit-III : <ul style="list-style-type: none"> • Molecular evolution and diversity of food borne pathogens • Application of microbial molecular techniques for food systems • Application of ELISA assays for detection and quantitation of toxins in foods and <i>E.coli</i> in food • Biosensors for food quality assessment • Biotechnological approaches 	27-01-20 To 22-02-20	02 02 02 02		


		mode of action and experimental determination. 6.Enzyme activity, international units, specific activity, turnover number 7. end point kinetic assay		01 01		
		Unit IV ENZYME REGULATION & IMMOBILIZED ENZYMES 1.Product inhibition, feedback control 2.enzyme induction and repression and covalent modification, Allosteric regulation 3. Relative practical and economic advantage for industrial use, effect of partition on kinetics and performance with particular emphasis on charge and hydrophobicity (pH, temperature and Km) 4.Various methods of immobilization - ionic bonding, adsorption, covalent bonding (based on R groups of amino acids), microencapsulation and gel entrapment. Immobilized multienzyme systems 5.Biosensors - glucose oxidase, cholesterol oxidase, urease and antibodies as biosensors.	11-02-20 To 25-03-20	01 03 02 03 04		

Sr. No.	Subject	Practicals	Date	No. of Practical
1	Food and Nano Biotechnology	Determination of quality of milk sample by methylene blue reduction test	16/12/19 to 31/03/20 Batch A and B	02
2		Determination of physiological properties of milk		02
3		Determination of calcium and phosphorous in milk		02
4		Efficiency of pasteurization of milk by phosphates test		02
5		Quantitative analysis of milk by standard plate count (SPC) method		02
6		Estimation of Ascorbic Acid		02
7		Isolation and characterization of food fermenting micro-organisms from idli batter		02
8		Isolation of probiotics micro-organisms from various sources		02
9		Effect of temperature on growth of probiotics micro-organisms		02
10		Effect of pH on growth of probiotics micro-organisms		02
11		Effect of salt concentration on growth of probiotics micro-organisms		02
12		Estimation of lactic acid		02
13		Production of nanoparticles		02

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