

**Maulana Azad College**

8, Rafi Ahmed Kidwai Road, Kolkata - 700013

**Department of Microbiology**

**Curriculum / Lesson Plan : 2022-23**

**Undergraduate Honours / General Course (CBCS) under University of Calcutta**

Semester, [Honours / General], [Period of Semester]	Course Code	Course Name	Brief Description of the Topics	Name of the Faculty	No. of Lectures
Sem - 1 Honours (July - December, 2022)	CC1- (TH+P)	Introduction To Microbiology And Microbial Diversity	Unit-1: History of Development of Microbiology	Dr. Samudra Prosad Banik	15
			Unit-2: Diversity of Microbial World	Dr. Bikash kumar Kundu	15
				Mrs. Bipasha Roy	10
				Dr. Debalina Bhattacharya	5
		Unit-3: An Overview of scope of Microbiology	Dr. Debalina Bhattacharya	5	
		Introduction To Microbiology And Microbial Diversity (Practical)	Dr. Debalina Bhattacharya	20	
			Dr.Samudra Prasad Banik	20	
	Dr Bikash Kumar Kundu		17		
	CC2- (TH+TU)	Bacteriology (Theory)	Unit 1: Cell organization	Dr. Arpan Das	10
			Unit 2: Bacteriological techniques	Dr. Debalina Bhattacharya	5
			Unit 3: Microscopy	Dr. Arpan Das	8
			Unit 4 Growth and nutrition	Dr. Suchitra Sarkar	8
			Unit 5: Reproduction in Bacteria	Mrs. Bipasha Roy	3
Unit 6: Bacterial Systematics			Dr. Avishek Ghosh	8	

			Unit 7: Important archaeal and eubacterial groups	Dr. Avishek Ghosh	15	
				Dr. Debalina Bhattacharya	5	
		Bacteriology (Practical)		Dr. Avishek Ghosh	22	
				Dr. Arpan Das	22	
				Mrs. Bipasha Roy	16	
Sem - 1 General (July - December, 2022)						
Sem - 2 Honours (January - June, 2023)	CC - 3 (TH)	BIOCHEMISTRY (THEORY)	Unit 1 Bioenergetics	Dr. Samudra P. Banik	6	
				Unit 2 Carbohydrates	Dr. Suchitra Sarkar	10
				Unit 3 Lipids	Mrs, Bipasha Roy	10
				Unit 4 Proteins	Dr. Samudra P. Banik	10
				Unit 5. Enzymes	Dr. Arpan Das	10
				Unit 6: Vitamins	Dr. Debalina Bhattacharya	4
			BIOCHEMISTRY (PRACTICAL)		Dr. Samudra P. Banik	15
					Dr. Suchitra Sarkar	10
					Dr. Arpan Das	15
					Dr. Debalina Bhattacharya	10
					Mrs, Bipasha Roy	10
			CELL BIOLOGY (THEORY)	Unit 1 Structure and organization of Cell	Dr. Debalina Bhattacharya	12
				Unit 2 Nucleus	Dr. Arpan Das	4
		Unit 3 Protein Sorting and Transport		Dr. Avishek Ghosh	12	

	CC - 4 (TH+TU)		Unit 4 Cell Signalling	Dr. Bikas Kumar Kundu	10	
			Unit 5 Cell Cycle, Cell Death and Cell Renewal	Dr. Avishek Ghosh	12	
		CELL BIOLOGY (PRACTICAL)		Dr. Avishek Ghosh	40	
				Dr. Bikash Kumar Kundu	20	
Sem - 3 Honours (July - December, 2022)	CC-5 (TH)	VIROLOGY (THEORY)	Unit 1 Nature and Properties of Viruses	Dr. Avishek Ghosh	10	
			Unit 2 Bacteriophages	Mrs. Bipasha Roy	10	
			Unit 3 Viral Transmission, Salient features of viral nucleic acids and Replication	Dr. Avishek Ghosh	14	
					Unit 4 Viruses and Cancer	6
			Unit 5 Prevention & control of viral diseases	Dr. Debalina Bhattacharya	6	
			Unit 6 Applications of Virology		4	
		VIROLOGY (PRACTICAL)		Dr. Avishek Ghosh	30	
				Dr. Debalina Bhattacharya	15	
				Mrs. Bipasha Roy	15	
				Unit 1 Microbial Growth and Effect of Environment on Microbial Growth	Mrs. Bipasha Roy	10
				Unit 2 Nutrient uptake and Transport		8

CC-6	MICROBIAL PHYSIOLOGY AND METABOLISM (THEORY)	Unit 3 Chemoheterotrophic Metabolism - Aerobic Respiration	Dr. Suchitra Sarkar	10
		Unit 4 Chemoheterotrophic Metabolism Anaerobic respiration and fermentation		6
		Unit 5 Chemolithotrophic and Phototrophic Metabolism	Dr. Bikas Kumar Kundu	10
		Unit 6 Nitrogen Metabolism - an overview	Dr. Arpan Das	6
	MICROBIAL PHYSIOLOGICAL AND METABOLISM (PRACTICAL)		Dr. Arpan Das	15
			Dr. Avishek Ghosh	10
			Mrs Bipasha Roy	10
			Dr. Samudra Prosad Banik	15
			Dr. Debalina Bhattacharya	10
CC-7 (TH)	MOLECULAR BIOLOGY (THEORY)	Unit 1 Structures of DNA and RNA / Genetic Material	Dr. Samudra Prosad Banik	10
		Unit 2 Replication of DNA (Prokaryotes and Eukaryotes)		8
		Unit 3 Transcription in Prokaryotes and Eukaryotes		8
		Unit 4 Post-Transcriptional Processing	Dr. Debalina Bhattacharya	6
		Unit 5 Translation (Prokaryotes and Eukaryotes)		8

		MOLECULAR BIOLOGY (PRACTICAL)	Unit 6 Regulation of gene Expression in Prokaryotes and Eukaryotes	Mrs Bipasha Roy	10
				Dr. Samudra Prosad Banik	15
				Dr. Avishek Ghosh	15
				Dr. Suchitra Sarkar	15
				Dr. Debalina Bhattacharya	15
	SEC-A2 (TH)	BIOFERTILIZERS AND BIOPESTICIDES	Unit 1 Biofertilizers	Dr. Arpan Das	13
			Unit 2 Non - Symbiotic Nitrogen Fixers		5
			Unit 3 Phosphate Solubilizers	Dr. Bikas Kumar Kundu	5
			Unit 4 Mycorrhizal Biofertilizers		7
			Unit 5 Bioinsecticides	Dr. Arpan Das	9
Sem - 4 Honours (January - June, 2023)	CC-8	MICROBIAL GENETICS (THEORY)	Unit 1 Genome Organization and Mutations	Dr. Debalina Bhattacharya	14
			Unit 2 Plasmids	Mrs. Bipasha Roy	8
			Unit 3 Mechanisms of Genetic Exchange	Dr. Arpan Das	10
			Unit 4 Phage Genetics	Dr. Samudra Prosad Banik	8
			Unit 5 Transposable elements		10

		MICROBIAL GENETICS (PRACTICAL)		Dr. Debalina Bhattacharya Dr Samudra Prosad Banik Mrs. Bipasha Roy Suchitra Sarkar	Dr.	60
	CC-9	ENVIRONMENTAL MICROBIOLOGY (THEORY)	Unit 1 Microorganisms and their Habitats	Dr. Bikas Kumar Kundu, Mrs. Bipasha Roy, Dr. Debalina Bhattacharya		10
			Unit 2 Microbial Interactions	Mrs. Bipasha Roy		10
			Unit 3 Biogeochemical Cycling	Dr. Bikas Kumar Kundu		10
			Unit 4 Waste Management	Dr. Arpan Das		10
			Unit 5 Microbial Bioremediation			5
			Unit 6 Water Potability	Dr Samudra Prosad Banik		5
		ENVIRONMENTAL MICROBIOLOGY (PRACTICAL)	Dr. Bikas Kumar Kundu, Dr. Arpan Das, Mrs. Bipasha Roy, Dr. Debalina Bhattacharya, Dr Samudra Prosad Banik		60	
			Unit 1 Introduction to Genetic Engineering	Dr. Suchitra Sarkar		4
			Unit 2 Molecular Cloning-Tools and Strategies			15
			Unit 3 Methods in Molecular Cloning	Dr. Debalina Bhattacharya		12

	CC-10	RECOMBINANT DNA TECHNOLOGY (THEORY)	Unit 4 DNA Amplification and DNA sequencing	Mrs. Bipasha Roy	9
			Unit 5 Construction and Screening of Genomic and cDNA libraries		6
			Unit 6 Applications of Recombinant DNA Technology	Dr. Samudra Prosad Banik	6
		CC-10: RECOMBINANT DNA TECHNOLOGY (PRACTICAL)		Dr. Suchitra Sarkar, Mrs. Bipasha Roy, Dr. Debalina Bhattacharya, Dr. Samudra Prosad Banik	60
	SEC-B1:	FOOD FERMENTATION TECHNIQUES (THEORY)	Unit 1 Fermented Foods	Dr. Avishek Ghosh	4
			Unit 2 Milk Based Fermented Foods		8
			Unit 3 Grain Based Fermented Foods		6
			Unit 4 Vegetable Based Fermented Foods		4
			Unit 5 Fermented Meat and Fish		4
			Unit 6 Probiotic Foods		4

Sem - 5 Honours (July - December, 2022)	CC-11 (TH)	FOOD AND DAIRY MICROBIOLOGY (THEORY)	Unit 1 Foods as a substrate for microorganisms	Mrs. Bipasha Roy	6
			Unit 2 Microbial spoilage of various foods		8
			Unit 3 Principles and methods of food preservation		8
			Unit 4 Fermented foods	Dr. Avishek Ghosh	8
			Unit 5 Food borne diseases (causative agents, foods involved, symptoms and preventive measures)		10
			Unit 6 Food sanitation and control		5
			Unit 7 Cultural and rapid detection methods of food borne pathogens in foods and introduction to predictive microbiology		5
		FOOD AND DAIRY MICROBIOLOGY (PRACTICAL)		Dr. Avishek Ghosh Mrs. Bipasha Roy	60
			Unit 1 Introduction to industrial microbiology	Dr. Arpan Das	2
			Unit 2 Isolation of industrially important microbial strains and fermentation media		10

CC-12	INDUSTRIAL MICROBIOLOGY (THEORY)	Unit 3 Types of fermentation processes, bio-reactors and measurement of fermentation parameters		12
		Unit 4 Down-stream processing		6
		Unit 5 Microbial production of industrial products	Dr. Debalina Bhattacharya	18
		Unit 6 Enzyme immobilization	Dr. Arpan Das	4
	INDUSTRIAL MICROBIOLOGY (PRACTICAL)		Dr. Arpan Das Dr. Debalina Bhattacharya	60
DSE-A1 (TH)	ADVANCES IN MICROBIOLOGY (THEORY)	Unit 1: Evolution of Microbial Genomes	Dr. Samudra Prosad Banik	10
		Unit 2: Metagenomics	Dr. Debalina Bhattacharya	15
		Unit 3 Molecular Basis of Host-Microbe Interactions	Mrs. Bipasha Roy Dr. Bikas Kumar Kundu	15
		Unit 4: Systems and synthetic biology	Dr. Suchitra Sarkar	10
	ADVANCES IN MICROBIOLOGY (PRACTICAL)		Dr. Suchitra Sarkar Dr. Debalina Bhattacharya	60
	INHERITANCE BIOLOGY (THEORY)	Unit 1 Introduction to Genetics	Dr. Samudra Prosad Banik	4
		Unit 2 Mendelian Principles		8
		Unit 3 Linkage and Crossing over	Dr. Bikas Kumar Kundu	6
		Unit 4 Extra-Chromosomal Inheritance	Dr. Suchitra Sarkar	7

	DSE-B1 (TH)		Unit 5 Characteristics of Chromosomes	Dr. Samudra Prosad Banik	15
			Unit 6 Recombination	Mrs. Bipasha Roy	3
			Unit 7 Human genetics	Dr. Suchitra Sarkar	3
		INHERITANCE BIOLOGY (PRACTICAL)		Dr. Bikas Kumar Kundu Dr. Samudra Prosad Banik	60
Sem -6 Honours (January - June, 2023)	CC-13	IMMUNOLOGY (THEORY)	Unit 1 Introduction	Dr. Samudra Prosad Banik	2
			Unit 2 Immune Cells and Organs	Mrs. Bipasha Roy	6
			Unit 3 Antigens	Dr. Suchitra Sarkar	4
			Unit 4 Antibodies		6
			Unit 5 Major Histocompatibility Complex	Mrs. Bipasha Roy	4
			Unit 6 Complement System	Dr. Avishek Ghosh	2
			Unit 7 Generation of Immune Response	Dr. Samudra Prosad Banik	8
			Unit 8 Immunological Disorders and Tumor Immunity	Dr. Debalina Bhattacharya	8
			Unit 9 Immunological Techniques	Dr. Arpan Das	10
			IMMUNOLOGY (PRACTICAL)		Dr. Samudra Prosad Banik, Dr. Arpan Das Dr. Avishek Ghosh, Mrs Bipasha Roy, Dr. Debalina Bhattacharya, Dr. Suchitra Sarkar
	CC-14 (TH)	MEDICAL MICROBIOLOGY (THEORY)	Unit 1 Normal microflora of the human body and host pathogen interaction	Dr. Debalina Bhattacharya	7
			Unit 2 Sample collection, transport and diagnosis	Dr. Arpan Das	5
			Unit 3 Bacterial diseases	Dr. Suchitra Sarkar	10
Unit 4 Viral diseases			Dr. Avishek Ghosh	10	
Unit 5 Protozoan diseases			Mrs. Bipasha Roy	5	

		Unit 6 Fungal diseases	Dr. Debalina Bhattacharya Mrs. Bipasha Roy	5
		Unit 7 Antimicrobial agents: General characteristics and mode of action	Dr. Debalina Bhattacharya	8
	MEDICAL MICROBIOLOGY (PRACTICAL)		Dr. Debalina Bhattacharya, Mrs. Bipasha Roy, Dr. Samudra Prosad Banik, Dr. Bikas Kumar Kundu, Dr. Avishek Ghosh, Dr. Suchitra Sark	60
DSE-A2 (TH)	PLANT PATHOLOGY (THEORY)	Unit 1 Introduction and History of plant pathology	Dr. Arpan Das	5
		Unit 2 Stages in development of a disease	Dr. Debalina Bhattacharya	2
		Unit 3 Plant disease epidemiology	Dr. Bikas Kumar Kundu	5
		Unit 4 Host Pathogen Interaction	Dr. Debalina Bhattacharya, Dr. Bikas Kumar Kundu	15
		Unit 5 Control of Plant Diseases	Dr. Bikas Kumar Kundu	8
		Unit 6 Specific Plant diseases	Mrs. Bipasha Roy	11
	Dr. Arpan Das		4	
PLANT PATHOLOGY (PRACTICAL)		Dr. Bikas Kumar Kundu Dr. Avishek Ghosh , Dr. Arpan Das, Dr. Debalina Bhattacharya	60	
DSE-B2 (TH)	INSTRUMENTATION AND BIOTECHNIQUES (THEORY)	Unit 1 Microscopy	Dr. Arpan Das	10
		Unit 2 Chromatography	Dr. Samudra Prosad Banik	10
		Unit 3 Electrophoresis	Dr. Avishek Ghosh	10
		Unit 4 Spectrophotometry	Dr. Samudra Prosad Banik	10
		Unit 5 Centrifugation	Dr. Avishek Ghosh	10

		INSTRUMENTATION AND BIOTECHNIQUES (PRACTICAL)		Dr. Samudra Prosad Banik, Dr. Arpan Das, Dr. Avishek Ghosh, Dr. Suchitra Sarkar, Mrs Bipasha Roy, Dr. Debalina Bhattacharya	60
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