

**Maulana Azad College**

**8, Rafi Ahmed Kidwai Road, Kolkata - 700013**

**Department of Microbiology**

**Curriculum / Lesson Plan : 2023-24**

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

Sem - 3 Honours (July - December, 2023)	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	
	CC-6	MICROBIAL PHYSIOLOGY AND METABOLISM (THEORY)	Unit 1 Microbial Growth and Effect of Environment on Microbial Growth	Mrs. Bipasha Roy	10
			Unit 2 Nutrient uptake and Transport		8

		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, 2024)	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 Samudra Prosad Banik Bipasha Roy Suchitra Sarkar	Dr Mrs. 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, Samudra Prosad Banik	Dr	60	
CC-10	RECOMBINANT DNA TECHNOLOGY (THEORY)	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

		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, 2024)	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
	CC-12	INDUSTRIAL MICROBIOLOGY (THEORY)	Unit 1 Introduction to industrial microbiology	Dr. Arpan Das	2
			Unit 2 Isolation of industrially important microbial strains and fermentation media		10

		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
DSE-B1 (TH)	INHERITANCE BIOLOGY (THEORY)	Unit 1 Introduction to Genetics	Dr. Samudra Prosad Banik	4
		Unit 2 Mendelian Principles	Dr. Bikas Kumar Kundu	8
		Unit 3 Linkage and Crossing over		6

			Unit 4 Extra-Chromosomal Inheritance	Dr. Suchitra Sarkar	7
			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, 2025)	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	60
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, Suchitra Sark Dr.	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, Debalina Bhattacharya Dr.	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

		(THEORY)	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, Suchitra Sarkar, Bipasha Roy, Debalina Bhattacharya	60

**Curriculum / Lesson Plan : 2023-24**

**Course Curriculum Framework: Major (Hons. with research/ Hons. without research) under University of Calcutta**

Semester, [Major/MDC], [Period of Semester]	Course Code	Course Name	Brief Description of the Topics	Name of the Faculty	No. of Lectures
SEMESTER-I July to December 2023	MCB-IDC (Major/ Minor/ MDC) TH+TU	Introduction & Scope of Microbiology	Unit 1: History of Development of Microbiology	Dr. Samudra P. Banik	4
			Unit 2: Diversity of Microorganisms	Dr. Bikas K. Kundu	2
				Mr. Bipasha Roy	5
				Dr. Avishek Ghosh	1
			Unit 3: Microscopy	Dr. Arpan Das	2
			Unit 4: Sterilisation	Dr. Samudra P. Banik	1
			Unit 5: Microbes in Human Health & Environment	Dr. Debalina Bhattacharya	4
				Dr. Suchitra Sarkar	5
				Dr. Arpan Das	2
			Unit 6: Industrial Microbiology	Dr. Arpan Das	1
				Dr. Bikas K. Kundu	2
			Unit 7: Food & Dairy Microbiology	Dr. Avishek Ghosh	4
CC-101-TH	INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY	Unit 1 History of Development of Microbiology	Dr. Samudra P. Banik	20	
		Unit 2 Diversity of Microbial	Dr. Debalina Bhattacharya	3	

	CC-101-P		World	Dr. Bikas K. Kundu	28
				Mrs. Bipasha Roy	5
			Unit 3 Overview of Scope of Microbiology	Dr. Debalina Bhattacharya	3
			Practical	Dr. Bikas K. Kundu	6
				Dr. Debalina Bhattacharya	4
				Dr. Suchitra Sarkar	4
	Mrs. Bipasha Roy	5			
	SEC101	FOOD FERMENTATION TECHNIQUES AND PACKAGING	Unit 1-6	Dr. Avishek Ghosh	70
			Unit 7: Controlling the Microbiological Quality of Foods	Dr. Arpan Das	20
			Unit 8: Food Packaging Techniques	Mrs. Bipasha Roy	10
	MCB-IDC-TH	INTRODUCTION & SCOPE OF MICROBIOLOGY	Unit-1: History of Development of Microbiology	Dr. Samudra P. Banik	6
			Unit 2: Diversity of Microorganisms	Mrs. Bipasha Roy	4
				Dr. Bikas K. Kundu	2
			Unit 3: Microscopy	Dr. Arpan Das	6
			Unit 4: Sterilisation	Dr. Suchitra Sarkar	4
			Unit 5: Microbes in Human Health & Environment	Dr. Debalina Bhattacharya	2
				Dr. Arpan Das	2
Mrs. Bipasha Roy				2	
Unit 6: Industrial Microbiology	Dr. Arpan Das	6			
Unit 7: Food & Dairy Microbiology	Dr. Avishek Ghosh	6			
SEMESTER-II January to June 2024	MCB-CC102-TH	BACTERIOLOGY	Unit 1: Cell organization	Dr. Arpan Das	7
				Dr. Samudra P. Banik	7
			Unit 2: Bacteriological Techniques	Dr. Debalina Bhattacharya	9

			Unit 3 Stains and staining techniques	Dr. Bikas K. Kundu	9
			Unit 4 Microscopy	Dr. Arpan Das	11
			Unit 5 Growth and Nutrition	Dr. Suchitra Sarkar	13
			Unit 6 Reproduction in Bacteria	Mrs. Bipasha Roy	11
			Unit 7 Important archaeal and eubacterial group	Dr. Avishek Ghosh	11
				Dr. Debalina Bhattacharya	2
			CC102-P	Practical	Dr. Arpan Das
	Dr. Avishek Ghosh	4			
	Mrs. Bipasha Roy	4			
	Dr. Debalina Bhattacharya	4			
	Dr. Suchitra Sarkar	4			
	SEC 2	AI FOR EVERYONE	Unit 1- 5	Dr. Rajendra Saha, Dept of Chemistry	100
	MCB-IDC-TH	INTRODUCTION & SCOPE OF MICROBIOLOGY	Unit-1: History of Development of Microbiology	Dr. Samudra P. Banik	6
			Unit 2: Diversity of Microorganisms	Mrs. Bipasha Roy	4
				Dr. Bikas K. Kundu	2
			Unit 3: Microscopy	Dr. Arpan Das	6
			Unit 4: Sterilisation	Dr. Suchitra Sarkar	4
Unit 5: Microbes in Human Health & Environment			Dr. Debalina Bhattacharya	2	
			Dr. Arpan Das	2	
			Mrs. Bipasha Roy	2	
Unit 6: Industrial Microbiology	Dr. Arpan Das	6			
Unit 7: Food & Dairy Microbiology	Dr. Avishek Ghosh	6			