

Maulana Azad College**8, Rafi Ahmed Kidwai Road, Kolkata - 700013****Department of Microbiology****Curriculum / Lesson Plan : 2024-25****Undergraduate Honours / General Course (CBCS) under University of Calcutta**

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. Mazharul Abbasi	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. Aftab Hossain Mondal	8
			Unit 8 Immunological Disorders and Tumor Immunity	Dr. Debalina Bhattacharya	8
			Unit 9 Immunological Techniques	Dr. Arpan Das	10

	IMMUNOLOGY (PRACTICAL)		Dr. Aftab Hossain Modal, 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. Mazharul Abbasi, Dr. Bikas Kumar Kundu, Dr. Avishek Ghosh, Dr. Suchitra Sarkar	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	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. Mazharul Abbasi	10
			Unit 5 Centrifugation	Dr. Avishek Ghosh	10
		INSTRUMENTATION AND BIOTECHNIQUES (PRACTICAL)		Dr. Aftab Hossain Mondal, Dr. Arpan Das, Dr. Avishek Ghosh, Dr. Suchitra Sarkar, Mrs Bipasha Roy, Dr. Debalina Bhattacharya	60

Curriculum / Lesson Plan : 2024-25

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 2024	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
					33
	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 World	Dr. Debalina Bhattacharya	3
				Dr. Bikas K. Kundu	28
				Mrs. Bipasha Roy	5
			Unit 3 Overview of Scope of Microbiology	Dr. Debalina Bhattacharya	3
	CC-101-P		Practical	Dr. Bikas K. Kundu	6
				Dr. Debalina Bhattacharya	4
				Dr. Suchitra Sarkar	4
				Mrs. Bipasha Roy	5
				Dr. Arpan Das	2
	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	
SEMESTER-II January to June 2025	MCB-CC102-TH	BACTERIOLOGY	Unit 1: Cell organization	Dr. Arpan Das	7
				Dr. Aftab Hossain Mondal	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	4
				Dr. Avishek Ghosh	4
				Mrs. Bipasha Roy	4
				Dr. Debalina Bhattacharya	4
				Dr. Suchitra Sarkar	4
	SEC		AI FOR EVERYONE	Unit 1- 5	Dr. Rajendra Saha, Dept of Chemistry
SEMESTER- 3 July to December 2025	MCB-CC201-TH	BIOMOLECULES AND BIOENERGETICS	Unit 1 Bioenergetics	Dr. Avishek Ghosh	12
			Unit 2 Carbohydrates	Dr. Suchitra Sarkar	14
			Unit 3 Lipids	Mrs. Bipasha Roy	10
			Unit 4 Amino acids & Proteins	Dr. Avishek Ghosh Dr. Mazharul Abbasi	12
			Unit 5 Enzymes	Dr. Arpan Das	14
			Unit 6 Nucleic Acids	Dr. Avishek Ghosh	12
			Unit 7 Vitamins	Dr. Debalina Bhattacharya	6
	CC201-P (PRACTICAL)		Practical	Dr. Mazharul Abbasi	6
				Dr. Suchitra Sarkar	6
				Mrs. Bipasha Roy	3
				Dr. Debalina Bhattacharya	3
				Dr. Avishek Ghosh	2
	CC202-TH	MICROBIAL PHYSIOLOGY AND METABOLISM	Unit 1 Microbial Growth and Effect of Environment on Microbial Growth	Mrs. Bipasha Roy	20
			Unit 2 Nutrient uptake and Transport		10
			Unit 3 Chemoheterotrophic Metabolism - Aerobic Respiration	Dr. Suchitra Sarkar	14

			Unit 4 Chemoheterotrophic Metabolism- Anaerobic respiration and fermentation	Dr. Bikas K. Kundu	14
			Unit 5 Chemolithotrophic and Phototrophic Metabolism		12
			Unit 6 Nitrogen Metabolism - an overview	Dr. Arpan Das	10
			PRACTICAL	Dr. Debalina Bhattacharya	5
				Dr. Aftab Hossain Mondal	5
				Dr. Avishek Ghosh	5
				Mrs. Bipasha Roy	5
	SEC201-TH	BIOFERTILIZERS AND BIOPESTICIDES	Unit 1 Basics of Biofertilizers	Dr. Arpan Das	20
			Unit 2 Symbiotic N ₂ fixers		20
			Unit 3 Non-Symbiotic Nitrogen Fixers		12
			Unit 4 Phosphate Solubilizers	Dr. Suchitra Sarkar	12
			Unit 5 Mycorrhizal Biofertilizers	Dr. Bikas K. Kundu	12
			Unit 6 Basics of Biopesticides	Dr. Debalina Bhattacharya	12
			Unit 7 Bioinsecticides derived from microbes	Dr. Arpan Das	12
SEMESTER-IV January to June 2026	CC203-TH	MOLECULAR BIOLOGY	Unit 1 Genetic Material and its Features	Dr. Suchitra Sarkar	18
			Unit 2 Replication of prokaryotic DNA	Dr. Mazharul Abbasi	18
			Unit 3 Transcription in Prokaryotes and Eukaryotes	Dr. Debalina Bhattacharya	10
					10
			Unit 4 Translation (Prokaryotes and Eukaryotes)	Dr. Debalina Bhattacharya	10
			Unit 5 Regulation of gene Expression in Prokaryotes and Eukaryotes	Mrs. Bipasha Roy	7
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	CC203-P		PRACTICAL	Dr. Debalina Bhattacharya	10
				Dr. Arpan Das	10

	CC204-TH	MICROBIOLOGICAL ANALYSIS OF AIR AND WATER	Unit 1 Aeromicrobiology	Dr. Bikas K. Kundu	15
			Unit 2 Air Sample Collection and Analysis		15
			Unit 3 Control Measures		15
			Unit 4 Water borne pathogens, water borne diseases	Dr. Avishek Ghosh	15
			Unit 5 Microbiological Analysis of Water	Dr. Arpan Das	20
	CC204-P		PRACTICAL	Dr. Samudra P. Banik	10
				Dr. Arpan Das	10
	CC205-TH	ENVIRONMENTAL MICROBIOLOGY	Unit 1 Microorganisms and their Habitats	Dr. Bikas K. Kundu	15
				Mrs. Bipasha Roy	8
				Dr. Debalina Bhattacharya	10
			Unit 2 Microbial Interactions	Mrs. Bipasha Roy	12
			Unit 3 Biogeochemical Cycling	Dr. Bikas K. Kundu	15
			Unit 4 Waste Management	Dr. Arpan Das	12
			Unit 5 Microbial Bioremediation	Dr. Arpan Das	8
	CC205-P		PRACTICAL	Dr. Avishek Ghosh	6
				Dr. Bikas K. Kundu	8
				Dr. Arpan Das	6
	CC206-TH	FOOD AND DAIRY MICROBIOLOGY	Unit 1 to Unit 7	Dr. Avishek Ghosh	80
	CC206-P		PRACTICAL	Dr. Avishek Ghosh	8
				Mrs. Bipasha Roy	12