STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2026

Department : BIOTECHNOLOGY
Name/s of the Faculty : DR. ARUNA SHARMILI S
Course Title : IMMUNOTECHNOLOGY
Course Code : 23BY/PC/IM34
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	describe and discuss the study of immunology	K1, K2
CO2	apply immune-specific cells, structures, and concepts in the field of immunology	K3
CO3	categorize features unique to the immune system	K4
CO4	critically evaluate and estimate the effectiveness of the immune system	K5
CO5	begin to integrate concepts from immunity into real-world applications	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Concepts of Immune System** 1.1 Introduction, Concepts of Innate and Adaptive Immunity 1.2 Humoral and Cell-Mediated Immunity	 K1-K3 K1-K4	 4 1	 1-2 1-3	Power Point Presentation	Group Discussion
Jun 24 – July 1, 2026 (Day Order 1 - 6)	1	**Concepts of Immune System** 1.2 Humoral and Cell-Mediated Immunity 1.3 Cells of the Immune System 1.4 Tissues and Organs of the Immune System	 K1-K4 K1-K5 K1-K6	 1 2 2	 1-3 1- 4 1-5	Power Point Presentation	Group Discussion **III Component MCQ - Cells of the Immune System 10 Marks**
July 2 – July 8, 2026 (Day Order 1 - 6)	1 2	**Concepts of Immune System** 1.4 Tissues and Organs of the Immune System **Immune cells and Molecules** 2.1 B Cell: Development, Activation, Differentiation, Memory Generation	K1-K6 K1-K4	2 3	1-5 1-3	Power Point Presentation and videos	**III Component MCQ- Tissues and Organs of the Immune System 10 Marks** Group Discussion

July 9 – 16, 2026 (Day Order 1 - 6)	2	**Immune cells and Molecules** 2.2 T Cell: Development, Activation, Helper Subset Differentiation, T Cell Memory 2.3 Antigens, Epitopes, Haptens	 K1-K4 K2-K5	 3 2	 1-3 1-4	Power Point Presentation and videos	Group discussion
July 17 – 24, 2026 (Day Order 1 - 6)	2	**Immune cells and Molecules** 2.3 Adjuvants, Pattern Recognition Receptors 2.4 Immunoglobulin	 K2-K5 K2-K6	 2 3	 1-4 1-5	Power Point Presentation	Quiz Seminar Presentation
July 25 – 28, 2026 (Day Order 1- 3)	2	**Immune cells and Molecules** 2.4 Multigene Organization of Immunoglobulin Genes, Basis of Antibody Diversity	 K2-K6	 1	 1-5	Power Point Presentation	Group discussion
July 29 – Aug 3, 2026	**C.A. Test - I**						

Aug 4 - 6, 2026 (Day Order 4 - 6)	2 3	**Immune cells and Molecules** 2.4 Multigene Organization of Immunoglobulin Genes, Basis of Antibody Diversity **Immune Responses** 3.1 Cytokines: Properties, Types, Receptors	 K1-K4 K1-K4	 2 2	 1-3 1-3	Power Point Presentation	Group discussion
Aug 7 – 14, 2026 (Day Order 1- 6)	3	**Immune Responses** 3.2 Major Histocompatibility Complex - General Organization, Structure, Antigen Processing and Presenting Pathways 3.3 Complement System- Components- Activation Pathways	 K2-K4 K3-K6	 3 2	 1-3 2-5	Power Point Presentation	Group discussion **III Component MCQ - Complement System - 10 Marks**
Aug 17 - 24, 2026 (Day Order 1- 6)	3 4	**Immune Responses** 3.3 Complement System- Functions 3.4 Hypersensitivity Reactions - Type I, II, III, IV	 K3-K6 K3-K6	 1 4	 2-5 2-5	Power Point Presentation	Quiz

Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	**Immunopathology** 4.1 Autoimmunity, Transplantation Immunology 4.2 Tumor Immunology	 K1-K4 K2-K4	 4 1	 1-3 1-3	Power Point Presentation	Seminar Presentation
Sep 3 – 11, 2026 (Day Order 1- 6)	4	**Immunopathology** 4.2 Tumor Immunology 4.3 Immunodeficiency Diseases 4.4 Infectious Diseases	 K2-K4 K2-K5 K2-K6	 1 2 2	 1-3 1-4 1-5	Power Point Presentation	Seminar Presentation
Sep 15-17, 2026 (Day Order 1 - 3)	4	**Immunopathology** 4.4 Vaccines	 K2-K6	 1	 1-5	Power Point Presentation	Seminar Presentation with case studies
Sep 18 –23, 2026	**C.A. Test - II**						

Sep 24 - 28, 2026 (Day 4 – 6)	4	**Immunopathology** 4.4 Infectious Diseases and Vaccines **Experimental systems and methods** 5.1 Antibody Generation: Polyclonal and Monoclonal Antibodies 5.2 Cross-Reactivity, Precipitation Reactions	K2-K6	1 2 1	1-5	Power Point Presentation Experiments, Videos	Seminar Presentation with case studies **III Component Assignment on Polyclonal and Monoclonal Antibodies - 20 Marks** Quiz
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	**Experimental systems and methods** 5.2 Agglutination Reactions, RIA, ELISA, Western Blotting 5.3 Immunocytochemistry and Immunohistochemistry, Immunofluorescence	K2-K6 K3-K6	3 2	1-5 2-5	Experiments, Videos	Quiz
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	**Experimental systems and methods** 5.3 Flow Cytometry 5.4 Animal Experimental Systems	K3-K6 K3-K6	1 4	2-5 2-5	Videos, Power Point Presentation	Quiz
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN (June - November 2026)

Department : Biotechnology
Name/s of the Faculty : Dr. S. Jayashree
Course Title : BIOPROCESS AND FERMENTATION TECHNOLOGY
Course Code : 23BY/PC/BF34
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	recall and relate the fundamentals of bioprocess and fermentation technology	K1, K2
CO2	show the methods in bioprocess and fermentation technology	K3
CO3	analyse the different steps in upstream and downstream process of fermentation technology	K4
CO4	evaluate the principles of fermentation technology to retrieve the bioproducts	K5
CO5	design the industrially important techniques for fermentation technology	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Fundamentals of Bioprocess** 1.1 Isolation, Screening and Maintenance of Industrially Important Microbes	K1-K3	3	1-2	Lecture: PowerPoint presentation	MCQ
		1.2 Media Design and Inoculum Development	K1-K3	2	1-2		Quiz
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.2 Media Design and Inoculum Development	K1-K3	1	1-2	Lecture: Powerpoint Presentation	Group discussion
		1.3 Sterilization Methods - Batch Sterilization,	K2-K6	3	1-5		

		Continuous Sterilization, Filter Sterilization 1.4 Types of Fermentation - Solid State, Submerged, Batch, Continuous and Fed Batch	K3-K6	1	2-5		
July 2 – July 8, 2026 (Day Order 1- 6)	1 2	1.4 Types of Fermentation - Solid State, Submerged, Batch, Continuous and Fed Batch **Bioreactors** 2.1 Basic Configuration and Ancillaries of Fermenter	K3-K6 K1-K4	3 2	2-5 1-3	Model building	**Third component: I** Case analysis – 10 Marks
July 9 – 16, 2026 (Day Order 1- 6)	2	2.1 Basic Configuration and Ancillaries of Fermenter 2.2 Types of Bioreactors I - Stirred tank, Air Lift, Photobioreactor	K1-K4 K2-K6	1 4	1-3 1-5	Experiments	Group Discussion
July 17 – 24, 2026 (Day Order 1- 6)	2	2.3 Types of Bioreactors II - Packed Bed, Fluidized Bed Bioreactors 2.4 Enzyme Immobilization Methods - Immobilization of Microbial Enzymes -	K2-K6 K3-K6	4 1	2-5 2-5	Experiments Lecture: Powerpoint presentation	Quiz Case Study

		Principles and Applications					
July 25 – 28, 2026 (Day Order 1- 3)	2	2.4 Enzyme Immobilization Methods - Immobilization of Microbial Enzymes - Principles and Applications	K3-K6	2	2-5	Lecture: Powerpoint presentation	**Third Component II** Fermented Products Analysis – 20 Marks
July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	2	2.4 Enzyme Immobilization Methods - Immobilization of Microbial Enzymes - Principles and Applications	K3-K6	1	2-5	Case study	Group discussion
	3	**Downstream Processing** 3.1 Extraction of Enzymes - Removal of Insolubles - Filtration, Centrifugation	K1-K4	2	1-3	Lecture: Powerpoint presentation	
Aug 7 – 14, 2026 (Day Order 1- 6)	3	3.1 Extraction of Enzymes - Removal of Insolubles - Sedimentation, Flocculation	K1-K4	1	1-3	Lecture: Powerpoint presentation	Group discussion
		3.2 Cell Disruption – Physical and Chemical Methods	K2-K4	4	1-3		

Aug 17 - 24, 2026 (Day Order 1- 6)	3	3.3 Separation Technique - Membrane Separation, Ultrafiltration, Solvent Extraction 3.4 Purification and Drying Techniques - Affinity and Gel Permeation Chromatography - Crystallization - Drying - Spray Dryer and Freeze	K3-K5 K3-K6	4 1	2-4 2-5	Lecture: Powerpoint presentation	Group discussion
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	3 4	3.4 Purification and Drying Techniques - Affinity and Gel Permeation Chromatography - Crystallization - Drying - Spray Dryer and Freeze Dryer **Mass Transfer** 4.1 Mass Transfer - Diffusion Theory - Film Theory	K3-K6 K1-K4	3 2	2-5 1-3	Industry visit (Field trip) Lecture: Powerpoint presentation	Report Writing Open book test
Sep 3 – 11, 2026 (Day Order 1- 6)	4	4.1 Mass Transfer - Diffusion Theory - Film Theory 4.2 Types of Mass Transfer I - Liquid-Solid, Liquid-Liquid	K1-K4 K2-K6	1 4	1-3 1-5	Lecture: Powerpoint presentation	**Third component: III** Model – 20 Marks

Sep 15-17, 2026 (Day Order 1 - 3)	4	4.3 Types of Mass Transfer II - Gas-Liquid	K2-K6	2	1-5	Lecture: Powerpoint presentation	Case analysis
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	4	4.3 Types of Mass Transfer II - Gas-Liquid 4.4 Microbial Growth Kinetics - Batch	K2-K6 K4-K6	1 2	1-5 3-5	Lecture: Powerpoint presentation	Quiz
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	**Bioproducts from Fermentation** Technology 5.1 Production, Harvest, Recovery and Uses - Enzymes, Vitamins 5.2 Production, Harvest, Recovery and Uses - Aminoacids, Organic Solvents	K1-K6 K1-K6	3 2	1-5 1-5	Lecture: Powerpoint presentation	Quiz
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.2 Production, Harvest, Recovery and Uses - Aminoacids, Organic Solvents 5.3 Production, Harvest, Recovery and Uses - Baker's Yeast, Milk Products - Probiotics 5.4 Production, Harvest, Recovery and Uses - Single Cell Protein, Beverages - Wine	K1-K6 K2-K6 K2-K6	1 2 2	1-5 1-5 1-5	Case study	Group discussion

Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**

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STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **Biotechnology**

Name of the Faculty : **Dr.K. Veena Gayathri**

Course Title : **Environmental Biotechnology**

Course Code : **23BY/PC/ET34**

Shift : **II**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	relate the fundamentals of the environment, ecological factors	K1
CO2	illustrate global environmental issues and treatment methods	K2
CO3	identify the causes of industrial pollution and manage solid wastes	K3
CO4	compare diverse strategies involved in environmental management	K4-K5
CO5	integrate different methods in the removal of the pollutants and address concerns about transformation in the environment	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods

Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Principles of Ecology** 1.1 The Environment- Physical Environment- Biotic Abiotic Interactions, Ecosystem-types	K1-K3	2 3	1-2 1-2	Presentation Presentation	Assignments
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.1 The Environment- Physical Environment- Biotic and Abiotic Interactions, Ecosystem-types 1.2 Habitat and Niche, Resource Partitioning; Character Displacement 1.3 Community Ecology- Nature of Communities; Community Structure and Attributes Population Ecology- Characteristics of a Population	K1-K3 K1, K2, K6 K1, K3, K6	1 3 1	1-2 1,2, 5 1, 2, 5	Presentation Survey on college Environment Presentation / Web search	Questionnaire Tests Tests
July 2 – July 8, 2026 (Day Order 1- 6)	2	1.3 Community Ecology- Nature of Communities; Community Structure and Attributes Population Ecology- Characteristics of a Population 1.4 Concept of meta Population- Models of meta-population	K1-K3, K6 K1-K3, K6 K1-K6	1 2 2	1-3, 5 1-5 1-5	Presentation / Model building Presentation/ Case Study Presentation/ Case Study	Tests Group Discussion Group Discussion

		Environmental Pollution and Management 2.1 Water, Soil and Air Pollution Its Sources Effects & Control, Global Environmental Problems-management					
July 9 – 16, 2026 (Day Order 1- 6)	2	2.1 Water, Soil and Air Pollution Its Sources Effects & Control, Global Environmental Problems-management 2.2 Principles of Conservation, conservation strategies: In-situ and ex-situ conservation; Bio-indicators	K1-K6 K3, K5-K6	2 3	1-5 2-3,5	Presentation/ Case Study Presentation/ Case Study	Tests Tests

July 17 – 24, 2026 (Day Order 1- 6)	2	2.2 Principles of Conservation, conservation strategies: In-situ and ex-situ conservation; Bio-indicators 2.3 Remote Sensing and GIS -Applications in Ecological Mapping and Environmental Hazard Predictions	K3, K5-K6 K3-K6	1 4	2-3,5 3-5	Presentation/ Online Mapping tools Practical Demonstration	Open Book
July 25 – 28, 2026 (Day Order 1- 3)	3	2.4 Sewage and wastewater Treatment Systems: Primary, Secondary and Tertiary Treatments; Biological Treatment methods	K1-K6	2	1-5	Seminar/ Web demonstration	Assignment
July 29 – Aug 3, 2026	**C.A. Test - I**						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	**Industrial Waste Management** 3.1 Industrial Waste Management- Dairy, Paper and Pulp, Textile, and Leather Industry	K3-K6	3	2-5	Presentation	Test
Aug 7 – 14, 2026 (Day Order 1- 6)	3	3.2 Biomedical and Pharmaceutical Wastes 3.3 E-waste- Radioactive and Nuclear Power Waste Management	K3-K4, K6 K3-K4, K6	3 2	3-5 3-5	Collections and Reuse strategies Demonstration of Tools Used for Waste Management	**Third component** E-Wastes management

							Assignment - 10 Marks
Aug 17 - 24, 2026 (Day Order 1- 6)	4	3.3 E-waste- Radioactive and Nuclear Power Waste Management 3.4 Solid Waste: Sources and Management (Composting, Vermiculture and Methane Production) **Recombinant DNA Technology Application in the Environment** 4.1 Molecular Biology Tools for Environmental Management, rDNA Technology in Waste Treatment	K3-K4, K6 K3-K4, K6 K3-K6	1 3 1	2,3,5 2,3, 5 2,4,5	Presentation Group Discussions Presentation	Group Discussion Test Questionnaire
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	4.1 Molecular Biology Tools for Environmental Management, rDNA Technology in Waste Treatment 4.2 Genetically Modified Organisms in Waste Management	K3-K6 K3, K5-K6	4 1	2, 4, 5 2, 4, 5	Seminar Presentation	**Third Component** Test on rDNA Technology in waste management

Sep 3 – 11, 2026 (Day Order 1- 6)	4	4.2 Genetically Modified Organisms in Waste Management 4.3Metagenomics, Nanoscience in Environmental Management	K3, K5-K6 K3, K5-K6	2 3	2,4,5 2,4,5	Seminar Presentation	Third Component Seminar-Waste Management GMOS 20 Marks Test
Sep 15-17, 2026 (Day Order 1 - 3)	5	4.4 Biosensors Development to Monitor Pollution	K3,K5-K6	2	2-5	Presentation	Test
Sep 18 –23, 2026	**C.A. Test – II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	**Biotechnological Applications in the Environment** 5.1 Bioremediation of Petroleum Hydrocarbons	K3-K6	3	2-5	Presentation Model making	Seminar Test
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	5.2 Biodegradation of Xenobiotics and Pesticides 5.3 Microbes in Bioleaching Process-Metal Recovery by Leaching Process, Microbial Fuel Cell	K3-K6 K3-K6	3 2	2-5 2-5	Presentation Presentation	Test Questionnaire
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.3 Microbes in Bioleaching Process-Metal Recovery by	K3-K6	3	2-5	Presentation	Essay type Questions on Metal Recovery

		Leaching Process, Microbial Fuel Cell 5.4 Phyto-remediation – Rhizo-filtration, Phyto-extraction, Phyto-stimulation Phyto-stabilization and Phyto-transformation	K3-K6	2	2-5	Presentation	Test
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : BIOTECHNOLOGY
Name/s of the Faculty : Dr. S. JAYASHREE
Course Title : HUMAN DISEASES AND MANAGEMENT
Course Code : 23BY/PE/HD23
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	describe the basic concepts of diseases	K1

CO2	explain the mechanisms of diseases	K2
CO3	predict diagnosis and treatment of diseases	K3
CO4	outline the management of various diseases	K4

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	**Bacterial and Viral Diseases** 1.1 Bacterial Diseases I - Typhoid	K1-K4	3	1-4	PowerPoint presentation	MCQ
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.2 Bacterial Diseases II - Tuberculosis	K1-K4	3	1-4	PowerPoint presentation	Group Discussion
July 2 – July 8, 2026 (Day Order 1- 6)	1	1.3 Viral Diseases - AIDS	K1-K4	3	1-4	PowerPoint presentation	Third Component I Quiz on Bacterial Diseases – 10 marks
July 9 – 16, 2026 (Day Order 1- 6)	2	**Parasitic and Fungal Diseases** 2.1 Parasitic Diseases I - Malaria	K1-K4	3	1-4	PowerPoint presentation	Group discussion
July 17 – 24, 2026 (Day Order 1- 6)	2	2.2 Parasitic Diseases II - Amoebiasis	K1-K4	3	1-4	PowerPoint presentation	Group discussion
July 25 – 28, 2026 (Day Order 1- 3)	2	2.3 Fungal Diseases – Candidiasis	K1-K4	1	1-4	PowerPoint presentation	Group discussion
July 29 – Aug 3, 2026	**C.A. Test - I**						

Aug 4 - 6, 2026 (Day Order 4 - 6)	2	2.3 Fungal Diseases – Candidiasis	K1-K4	2	1-4	PowerPoint presentation	Third component - II Poster presentation- Parasitic diseases- 20 Marks
Aug 7 – 14, 2026 (Day Order 1- 6)	3	**Pathology I** 3.1 Parkinson's Disease	K1-K4	3	1-4	PowerPoint presentation	Group discussion
Aug 17 - 24, 2026 (Day Order 1- 6)	3	3.2 Atherosclerosis	K1-K4	3	1-4	Case studies	Group discussion
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	3	3.3 Bronchial Asthma	K1-K4	3	1-4	Case studies	Group discussion
Sep 3 – 11, 2026 (Day Order 1- 6)	4	**Pathology -II** 4.1 Peptic Ulcer 4.2 Urinary Tract Infection	K1-K4	3	1-4	PowerPoint presentation	Third component - III Assignment – Pathology - 20 marks
Sep 15-17, 2026 (Day Order 1 - 3)	4	**Pathology -II** 4.3 Cancer of Breast	K1-K4	1	1-4	PowerPoint presentation	Case studies
Sep 18 –23, 2026	**C.A. Test - II**						
Sep 24 - 28, 2026 (Day 4 – 6)	5	**Immunopathology** 5.1 Allergy	K1-K4	2	1-4	PowerPoint presentation	Quiz

Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	5.2 Auto-immune disorders I – Type I Diabetes	K1-K4	3	1-4	PowerPoint Presentation	Test (short answers)
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.3 Auto-immune disorders II – Rheumatoid Arthritis	K1-K4	3	1-4	PowerPoint presentation	Group discussion
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION**						