STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN
November 2023 – April 2024

Department : BIOTECHNOLOGY
Name/s of the Faculty : DR. ARUNA SHARMILI S AND DR. J. ANBUMALARMATHI
Course Title : ANIMAL AND PLANT BIOTECHNOLOGY
Course Code : 23BY/PC/AP24
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	recall the basics of animal/plant biotechnology	K1, K2
CO2	apply the concepts of animal/plant biotechnology	K3
CO3	analyse the various techniques of animal/plant biotechnology	K4
CO4	evaluate the developments in animal/plant biotechnology in various fields of biology	K5
CO5	create new techniques/applications in plant and animal biotechnology	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 22 – 23, 2023 (Day Order 1 & 2)	1	**Animal Biotechnology Cell Culture Technology-I** 1.1 Type of Cell Culture Facilities	K1- K4	1	1-3	Lecture and PowerPoint presentation	Group discussion
Nov 24-30, 2023 (Day Order 1 to 6)	1	**Animal Biotechnology Cell Culture Technology-I** 1.1 SOP, GLP 1.2 Culture Vessels and Substrates	K1- K4 K3-K4	2 1	1-3 2-3	Lecture and PowerPoint presentation	Group discussion
	3	**Plant Tissue Culture** 3.1 Plant Tissue Culture - Principles and Methodology, Protoplast Technology and Somatic Embryogenesis	K1-K4	3	1-3		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Dec 1-7, 2023 (Day Order 1 to 6)	1	**Animal Biotechnology Cell Culture Technology-I** 1.3 Culture Vessels and Substrates 1.4 Types of Cell Culture Media and Supplements	 K3-K4 K3-K5	 2 1	 2-3 2-4	Lecture and PowerPoint presentation	Group discussion
	3	**Plant Tissue Culture** 3.2 Somaclonal Variation, Synthetic Seeds	K2-K5	3	1-4		
Dec 8-9, 2023 (Day Order 1, 3)	1	**Animal Biotechnology Cell Culture Technology-I** 1.4 Types of Cell Culture Media and Supplements	 K3-K5	 2	 2-4	Lecture and PowerPoint presentation	Quiz

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Dec 11-15, 2023 (Day Order 2 to 6)	1	**Animal Biotechnology Cell Culture Technology-I** 1.4 Types of Cell Culture Media and Supplements	K3-K5	2	2-4	Lecture and PowerPoint presentation	Group discussion
	3	**Plant Tissue Culture** 3.2 Screening of Secondary Metabolites 3.3 Production of Haploid Plants	K2-K5 K3-K6	1 2	1-4 2-5		
Dec 16 – 22, 2023 (Day Order 1 to 6)	1	**Animal Biotechnology Cell Culture Technology-I** 1.5 Media Preparation and Sterilization	K3-K6	3	2-5	Lecture and PowerPoint presentation	Group discussion
	3	**Plant Tissue Culture** 3.3 Germplasm Conservation 3.4 Applications of Tissue Culture in Agriculture	K3-K6 K4-K6	2 1	2-5 3-5		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 3 – 6, 2024 (Day Order 1 to 4)	1 3	**Animal Biotechnology** **Cell Culture Technology-I** 1.5 Media Preparation and Sterilization **Plant Tissue Culture** 3.4 Applications of Tissue Culture in Agriculture	K3-K6 K4-K6	1 1	2-5 3-5	Lecture and PowerPoint presentation	Group discussion
Jan 8 – 12, 2024	**C.A. Test - I**						
Jan 13, 2024 (Day Order 1)	2	**Cell Culture Technology-II** 2.1 Type of Cell Culture	K1-K3	1	1-2	Lecture and PowerPoint presentation	Group discussion
Jan 18 -20, 2024 (Day Order 4 to 6)	2 3	**Cell Culture Technology-II** 2.1 Type of Cell Culture **Plant Tissue Culture** 3.4 Applications of Tissue Culture in Horticulture	K1-K3 K4-K6	1 2	1-2 3-5	Lecture and PowerPoint presentation	Group discussion Assignment-III Component

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 22-29, 2024 (Day Order 1 to 6)	2	**Cell Culture Technology-II** 2.1 Type of Cell Culture 2.2 Establishing Cell Lines and Molecular Characterization	 K1-K3 K3-K4	 2 1	 1-2 2-3	Lecture and PowerPoint presentation	Group discussion
	4	**Plant Genetic Transformation Techniques** 4.1 Selectable and Scoreable Markers, Reporter Genes and Promoters Used in Plant Vectors	 K1-K3	 3	 1-2		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 30 - Feb 2, 2024 (Day Order 1 to 4)	2 4	**Cell Culture Technology-II** 2.2 Establishing Cell Lines and Molecular Characterization **Plant Genetic Transformation Techniques** 4.2 Techniques for Plant Transformation – *Agrobacterium tumefaciens* – Mediated Gene Transfer Method	K3-K4 K4-K6	3 1	2-3 3-5	Lecture and PowerPoint presentation	Group discussion
Feb 3, 2024 (Day Order 2)	4	**Plant Genetic Transformation Techniques** 4.2 Techniques for Plant Transformation – *Agrobacterium tumefaciens* – Mediated Gene Transfer Method	K4-K6	1	3-5	Lecture and PowerPoint presentation	Group discussion

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 5- 6, 2024 (Day Order 5 to 6)	4	**Plant Genetic Transformation Techniques** 4.2 Techniques for Plant Transformation – *Agrobacterium tumefaciens* – Mediated Gene Transfer Method	K4-K6	2	3-5	Lecture and PowerPoint presentation	Group discussion
Feb 7 – 14, 2024 (Day Order 1 to 6)	2 4	**Cell Culture Technology-II** 2.3Quantitation, Contamination **Plant Genetic Transformation Techniques** 4.3 Techniques for Plant Transformation – Direct Gene Transfer Methods	K3-K6 K4-K6	3 3	2-5 3-5	Lecture and PowerPoint presentation	Group discussion Quiz

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 15 – 22, 2024 (Day Order 1 to 6)	2	**Cell Culture Technology-II** 2.3 Cryopreservation 2.4 Scale-up, Cell Bank Preparation	 K3-K6 K4-K6	 1 2	 2-5 3-5	Lecture and PowerPoint presentation	Group discussion
	4	**Plant Genetic Transformation Techniques** 4.3 Techniques for Plant Transformation – Direct Gene Transfer Methods 4.4 Chloroplast Transformation	 K4-K6 K4-K6	 1 2	 3-5 3-5		
Feb 23 – 24, 2024 (Day Order 1 & 5)	2	**Cell Culture Technology-II** 2.4 Scale-up, Cell Bank Preparation	 K4-K6	 1	 3-5	Lecture and PowerPoint presentation	Group discussion
	4	**Plant Genetic Transformation Techniques** 4.4 Chloroplast Transformation	 K4-K6	 1	 3-5		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	2	**Cell Culture Technology-II** 2.4 Scale-up, Cell Bank Preparation	K4-K6	2	3-5	Lecture and PowerPoint presentation	Group discussion
	4	**Plant Genetic Transformation Techniques** 4.4 Chloroplast Transformation	K4-K6	1	3-5		
	5	**Application of Animal and Plant Biotechnology** 5.3 GM Strategies for Insect Resistance – Environmental Impact of BT Crops, Herbicide Tolerance, Delay of Fruit Ripening, Golden Rice	K1-K6	2	1-5		
Mar 2, 2024 (Day Order 1)	2	**Cell Culture Technology-II** 2.4 Scale-up, Cell Bank Preparation	K4-K6	1	3-5	Lecture and PowerPoint presentation	Group discussion
Mar 4 –8, 2024	**C.A. Test - II**						

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5	**Application of Animal and Plant Biotechnology** 5.1 Production and Application of Transgenic Animal: Disease Model, Biological Model, Food Source 5.4 Transgenics for Abiotic Stress Tolerance – Drought Salinity, Cytoplasmic Male Sterility, Edible Vaccines	 K1-K6 K1-K6	 3 4	 1-5 1-5	Lecture and PowerPoint presentation	Assignment-III Component Group discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	5	**Application of Animal and Plant Biotechnology** 5.2 Manipulation of Reproduction: *In vitro* Fertilization, Embryo Transfer Technology in Farm Animals	 K3-K6	 2	 2-5	Lecture and PowerPoint presentation, videos	Group discussion
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN
November 2023 – April 2024

Department : BIOTECHNOLOGY
Name/s of the Faculty : DR. S. JAYASHREE AND DR. ARUNA SHARMILI S
Course Title : RESEARCH METHDOLOGY
Course Code : 23BY/PC/RM24
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	tell the concepts and research design	K1
CO2	explain the steps in research and data analysis	K2
CO3	relate advanced critical thinking and assessment	K3
CO4	outline the importance of writing and statistics in research	K4
CO5	evaluate, formulate, analyze and interpret the research ideas	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 22 – 23, 2023 (Day Order 1 & 2)	3	**Biostatistics** 3.1 Introduction – Definition	K1-K4	1	1-4	Lecture	Group discussion
Nov 24-30, 2023 (Day Order 1 to 6)	2	**Principles of Research** 1.1 Research Definition -Types of Research - Descriptive, Analytical, Applied	K1-K5	2	1-5	Lecture	Group discussion
	3	**Biostatistics** 3.1 Introduction – Definition, Statistical Terms	K1-K4	3	1-4		
Dec 1-7, 2023 (Day Order 1 to 6)	2	**Principles of Research** 1.1Fundamental, Quantitative, Qualitative, Conceptual and Empirical 1.2 Significance of Research - Methods vs Methodology	K1-K5	2	1-5	Lecture	Group discussion Assignment-III component
	3	**Biostatistics** 3.2 Application of Biostatistics 3.3 Sampling Methods	K1-K4	3	1-4		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Dec 8-9, 2023 (Day Order 1, 3)	3	**Biostatistics** 3.3 Sampling Methods (conti..)	K1-K4	1	1-4	Lecture	Group discussion
Dec 11-15, 2023 (Day Order 2 to 6)	1	**Principles of Research** 1.3 Research Formulation - Defining and Formulating the Research Problem	K2-K6	2	2-5	Lecture	Group discussion
	3	**Biostatistics** 3.4 Data Collection – Classification of Data	K2-K5	3	2-5		
Dec 16 – 22, 2023 (Day Order 1 to 6)	1	**Principles of Research** 1.4 Criteria for Good Research Data	K3-K6	2	3-5	Lecture	Group discussion Assignment-III component
	3	3.4 Data Collection – Representation of data	K2-K6	3	2-5		
Jan 3 – 6, 2024 (Day Order 1 to 4)	1	**Principles of Research** 1.4 Essential Steps in the Research Collection	K3-K6	2	3-5	Lecture	Group discussion
	4	**Descriptive Statistics** 4.1 Measures of Central Tendency - Mean	K1-K6	2	1-5		

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 8 – 12, 2024	**C.A. Test - I**						
Jan 13, 2024 (Day Order 1)	**NO CLASS**						
Jan 18 -20, 2024 (Day Order 4 to 6)	2 4	**Research Communication and Proposal** 2.1 Essentials of the Scientific Report **Descriptive Statistics** 4.1 Measures of Central Tendency - Median, Mode	K1-K6 K1-K6	2 2	1-5 1-5	Lecture	Group discussion
Jan 22-29, 2024 (Day Order 1 to 6)	2 4	**Research Communication and Proposal** 2.2 Preparing Manuscripts **Descriptive Statistics** 4.2 Measures of Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation, Standard Error	K1-K6 K1-K6	2 3	1-5 1-5	Lecture	Group discussion

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 30-Feb 2, 2024 (Day Order 1 to 4)	2 4	**Research Communication and Proposal** 2.2 Cross-Referencing **Descriptive Statistics** 4.3 Correlation Analysis	K1-K6 K2-K6	1 2	1-5 2-5	Lecture	Group discussion
Feb 3, 2024 (Day Order 2)	4	**Descriptive Statistics** 4.3 Correlation Analysis (Conti…)	K2-K6	1	2-5	Lecture	Group discussion
Feb 5- 6, 2024 (Day Order 5 to 6)	2 4	**Research Communication and Proposal** 2.2 Proof Reading, Plagiarism **Descriptive Statistics** 4.3 Correlation Analysis (Conti…)	K1-K6 K2-K6	1 1	1-5 2-5	Lecture	Group discussion
Feb 7 – 14, 2024 (Day Order 1 to 6)	2 4	**Research Communication and Proposal** 2.3 Oral and Poster Presentation **Descriptive Statistics** 4.4 Regression Analysis	K3-K6 K2-K6	2 3	3-5 2-5	Lecture	Group discussion

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 15 – 22, 2024 (Day Order 1 to 6)	2 5	**Research Communication and Proposal** 2.3 Writing Thesis **Inferential Statistics** 5.1 Hypothesis Testing Null Hypothesis, Alternate Hypothesis 5.2 Students T- Test	K3-K6 K1-K6	2 3	3-5 1-5	Lecture	Group discussion Equiz-III component
Feb 23 – 24, 2024 (Day Order 1 & 5)	2	**Research Communication and Proposal** 2.4 Project Proposal Writing	K3-K6	2	3-5		
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	2 5	**Research Communication and Proposal** 2.4 Grant Application **Inferential Statistics** 5.2 Chi-Square Test	K3-K6 K1-K6	2 3	3-5 1-5	Lecture	Group discussion

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Mar 2, 2024 (Day Order 1)	**NO CLASS**						
Mar 4 –8, 2024	**C.A. Test - II**						
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	2 5	**Research Communication and Proposal** 2.4 Funding Agencies for Project **Inferential Statistics** 5.3 ANOVA- One Way and Two Way Classification	K3-K6 K2-K6	2 4	3-5 2-5	Lecture	Group discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	5	**Inferential Statistics** 5.4 MS-Excel for Data Analysis	K3-K6	1	3-5	Hands-on training	-
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN
November 2023 – April 2024

Department : BIOTECHNOLOGY
Name/s of the Faculty : DR. S. JAYASHREE
Course Title : MARINE BIOTECHNOLOGY
Course Code : 23BY/PE/MT15
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	describe and compare the structure of marine ecosystems	K1,K2
CO2	present the function of marine environment	K3
CO3	research the ecological significance and impacts of the marine environment	K4
CO4	evaluate the importance of marine environment and resources	K5
CO5	integrate marine-related habitats, techniques and products	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 22 – 23, 2023 (Day Order 1 & 2) 2hrs	1	**Introduction to Marine Biotechnology** 1.1 Marine Environment – Marine	K1-K6	2	1-5	Power Point, Videos and Lecture	Group Discussion
Nov 24-30, 2023 (Day Order 1 to 6) 5hrs	1	1.1 Marine Environment –Estuaries, Coral Reefs 1.2 Marine Flora- Classification of Plankton	K1-K6	5	1-5	Power Point, Videos and Lecture	Quiz
Dec 1 – 7, 2023 (Day Order 1 to 6) 5hrs	1	1.2 Marine Flora- Methods of Collection, Preservation 1.3 Sea Weeds Classification, Distribution, and Ecological Role	K1-K6 K2-K6	5	1-5	Power Point, Videos and Lecture	Group Discussion
Dec 8 – 9, 2023 (Day Order 1, 3) 2hrs	1	1.3 Mangroves - Classification, Distribution, and Ecological Role	K2-K6	2	1-5	Power Point, Videos and Lecture	Quiz
Dec 11– 15, 2023 (Day Order 2 to 6) 4hrs	2	**Extreme Marine Environment and Microbial Diversity** 2.1 Hydrothermal Vents	K1-K5	4	1-4	Power Point, Videos and Lecture	Quiz
Dec 16 – 22, 2023 (Day Order 1to 6) 5hrs	2	2.2 Hyperthermophilic Microorganisms and their Applications 2.3 Biotechnological Applications of Extremozymes from Extremophilic Organisms	K1-K5 K3-K6	5	1-4 2-5	Power Point and Lecture	Group Discussion

Jan 3 – 6, 2024 (Day Order 1 to 4) 3hrs	3	**Unit 3** **Marine Pollution** 3.1 Effects of Pollutants to Marine Organisms - Bio Concentration Bioaccumulation and Bio Magnification	K1-K4	3	1-3	Power Point and Lecture	Assignment III component
Jan 8 – 12, 2024	**C.A. Test – I**						
Jan 13, 2024 (Day Order 1) 1hr	3	3.1 Effects of Pollutants to Marine Organisms - Role of (GESAMP)	K1-K4	1	1-3	Power Point and Lecture	Group Discussion
Jan 18 - 20, 2024 (Day Order 4 to 6) 3hrs	3	3.2 Pollution – Impact of sewage, Oil	K2-K4	3	1-3	Power Point and Lecture	Seminar
Jan 22 - 29, 2024 (Day Order 1 to 6) 5hrs	3	3.2 Pollution – Radioactive	K2-K4	5	1-3	Power Point and Lecture	Debate
Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 3hrs	3	3.4 Biofouling - Marine Fouling and Boring Organisms	K3-K6	3	2-5	Power Point, Videos and Lecture	Quiz
Feb 3, 2024 (Day Order 2) 1hr	3	3.4 Biofouling - Boring Organisms	K3-K6	1	2-5	Power Point, Videos and Lecture	Group Discussion
Feb 5- 6, 2024 (Day Order 5 to 6) 2hrs	4	**Unit 4** **Monitoring Marine Environment** 4.1. Light Devices	K1-K4	2	1-3	Power Point, Videos and Lecture	Seminar

Feb 7 – 14, 2024 (Day Order 1 to 6) 5hrs	4	4.1. Water Sampling Devices 4.2 Salinity and Dissolved Oxygen	K1-K4	5	1-3	Power Point, Videos and Lecture	Seminar
Feb 15 – 22, 2024 (Day Order 1 to 6) 5hrs	4	4.3 Heavy Metals and Petroleum Carbon Analysis	K3-K6	5	2-5	Power Point, Videos and Lecture	Seminar
Feb 23 – 24, 2024 (Day Order 1 & 5) 2hrs	5	**Unit 5** **Marine Bioactive Products** 5.1 Pharmaceutical Products	K1-K5	2	1-5	Power Point, Videos and Lecture	MCQ III component
Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 4hrs	5	5.2 Flavour Modifiers, Food Colouring Agents, Food Supplements	K1-K6	4	1-5	Power Point, Videos and Lecture	Quiz
Mar 2, 202 (Day Order 1) 1hr	5	5.2 Food Supplements	K1-K6	1	1-5	Power Point, Videos and Lecture	Group Discussion
Mar 4 –8, 2024	**CA Test – II**						
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 6hrs	5	5.3 Other Marine Products - Agarose, Carrageen	K3-K6	6	2-5	Power Point, Videos and Lecture	Quiz
Mar 18 - 19, 2024 (Day Order 2 to 3) 1hr	5	5.3 Other Marine Products - Alginates	K3-K6	1	2-5	Power Point, Videos and Lecture	Quiz
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN
November 2023 – April 2024

Department : Biotechnology
Name of the Faculty : Dr.K.Veena Gayathri
Course Title : Virology
Course Code : 23BY/PE/VR15
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	define the terms in virology and virus-host interactions	K1-K2
CO2	relate virus replication and its diseases	K3
CO3	investigate the mechanism of disease transmission	K4
CO4	evaluate various viral diseases, growth, symptoms prevention, and control	K5
CO5	integrate concepts in virology to viral diseases	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 22 – 23, 2023 (Day Order 1 & 2)	1.1	Viruses – Properties and Importance	K1-K2, K6	2	1	Lecture: Black board Powerpoint presentations	Question and answers
Nov 24-30, 2023 (Day Order 1 to 6)	1.2	Classification of Viruses – Baltimore Classification and Taxonomy	K1-K2,	5	1,5	Lecture: Powerpoint presentations	Brief answers test
Dec 1-7, 2023 (Day Order 1 to 6)	1.2	Classification of Viruses – Baltimore Classification and Taxonomy	K1-K2,	5	1,5	Lecture: power point presentation Black board	Brief answers test
Dec 8-9, 2023 (Day Order 1, 3)	1.3	Identification of Viruses - Methods and Detection techniques – Immunological and Molecular Methods	K1-K3, K6	1	1-2,5	Lecture: power point presentation Black board	Assignment
Dec 11-15, 2023 (Day Order 2 to 6)	2.1	Multiplication Cycle, Virus Attachment, and Entry into Cells	K1-K6	4	1-5	Lecture: power point presentation Black board	Assignment
Dec 16 – 22, 2023 (Day Order 1 to 6)	2.2	Viral Nucleic Acid-Synthesis-RNA Synthesis- DNA-Genome Replication in DNA Viruses	K1-K6	5	1-5	Lecture: power point presentation Black board	Brief answers test

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 3 – 6, 2024 (Day Order 1 to 4)	2.3	Viral replication in Host Cells	K1-K6	3	1-5	Lecture: power point presentation Black board	Brief answers test
Jan 8 – 12, 2024	**C.A. Test – I**						
Jan 13, 2024 (Day Order 1)	3.1	Acutely Cytopathic Infection- Persistence, Latent, Transforming, Abortive, Null Infections	K1-K6	1	1-5	Lecture: power point presentation Black board	Brief answers test
Jan 18 -20, 2024 (Day Order 4 to 6)	3.2	Host Interactions- Transmission of Viruses- Horizontal, Vertical	K1-K6	3	1-5	Lecture: power point presentation Black board	Brief answers test
Jan 22-29, 2024 (Day Order 1 to 6)	3.3	Mechanism of Virus Latency- Switch On and Off Viral Genes	K1-K6	5	1-5	Lecture: power point presentation Black board	Questionnaire
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	4.1	Gastrointestinal, Respiratory Common Signs and Symptoms	K1-K6	3	1-5	Lecture: power point presentation Black board	**Third Component** Seminar Presentation
Feb 3, 2024 (Day Order 2)	4.1	Sexually transmitted viral infections – Common Signs and Symptoms	K1-K6	1	1-5	Lecture: power point presentation Black board	**Third Component** Seminar Presentation

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 5- 6, 2024 (Day Order 5 to 6)	4.2	Carcinogenesis (Papilloma and Herpes Virus)	K1-K6	2	1-5	Lecture: power point presentation Black board	Questionnaire
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.2	Tumor Viruses- Hepatitis B and Herpes Virus	K1-K6	5	1-5	Lecture: power point presentation Black board	Questionnaire
Feb 15 – 22, 2024 (Day Order 1 to 6)	4.2	Tumor Viruses- Hepatitis B and Herpes Virus	K1-K6	5	1-5	Lecture: power point presentation Black board	Questionnaire
Feb 23 – 24, 2024 (Day Order 1 & 5)	4.3	Prion Diseases- Spectrum of Disease, Etiology, Pathogenesis	K1-K6	2	1-5	Lecture: power point presentation Black board	**Third Component** Seminar Presentation
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	5.1	Diagnosis Techniques for Viral Infections – Serological and Molecular Techniques	K1-K6	4	1-5	Lecture: power point presentation Black board	Questionnaire
Mar 2, 2024 (Day Order 1)	5.2	Cultivation of Viruses (Embryonated Eggs, Organ Cultures, Primary and Secondary Cell Cultures)	K1-K6	1	1-5	Lecture: power point presentation Black board	Questionnaire
Mar 4 –8, 2024	**C.A. Test – II**						

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.3	Introduction to Vaccines, Production and Types of Viral Vaccines	K1-K6	1,5	1-5	Lecture: power point presentation Black board	E-Quiz
Mar 18 - 19, 2024 (Day Order 2 to 3)	5.3	Introduction to Vaccines, Production and Types of Viral Vaccines	K1-K6	1	1-5	Lecture: power point presentation Black board	E-Quiz
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN
November 2023 – April 2024

Department **:** Biotechnology
Name/s of the Faculty **:** Dr, J. Anbumalarmathi
Course Title **:** Applications of Biotechnology
Course Code **:** 23BY/PE/AB23
Shift **:** II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	describe the basics of biotechnology	K1
CO2	apply bio-products in various fields of biotechnology	K2
CO3	assess the methods involved in research, medicine, and industries	K3
CO4	integrate biotechnological implications in agriculture, food and medicine	K4

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 22 – 23, 2023 (Day Order 1 & 2) 1 hr.	1	**Introduction to Biotechnology** 1.1 Fundamentals of Fermentation	K1-K2	1	1-2	Lecture: power point presentation	Group discussion
Nov 24-30, 2023 (Day Order 1 to 6) 3hrs.	1	1.1Fermenter-Process-Upstream and Downstream Fermentation Technology	K1-K2	3	1-2	Lecture: power point presentation	Quiz
Dec 1-7, 2023 (Day Order 1 to 6) 3hrs.	1	1.2 Production -Bread, Wine- Applications of Enzymes in Food Industry	K1-K4	3	1-4	Lecture: power point presentation	Test (short answers)
Dec 8-9, 2023 (Day Order 1, 3) 1hr.	1	1.3 Introduction – Antibiotics	K1-K4	1	1-4	Lecture: power point presentation	Quiz

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Dec 11-15, 2023 (Day Order 2 to 6) 3hrs.	1 2	1.4Antibiotic Production – Penicillin-Using microbes **Bioproducts** 2.1Bio-fertilizers	K1-K4 K1-K4	2 1	1-4	Lecture: power point presentation	**Third component** Assignment-Biofertilizer
Dec 16 – 22, 2023 (Day Order 1 to 6) 3hrs.	2	2.1 Composting and Vermicomposting	K1-K4	3	1-4	Lecture: power point presentation	Group discussion
Jan 3 – 6, 2024 (Day Order 1 to 4) 2hrs.	2	2.2 Mushroom – Types	K1-K4	2	1-4	Lecture: power point presentation	Group discussion
Jan 8 – 12, 2024	**C.A. Test – I**						
Jan 13, 2024 (Day Order 1)		No class					
Jan 18 -20, 2024 (Day Order 4 to 6) 2hrs.	2	2.2 Mushroom Cultivation 2.2 Genetically Modified Microbes	K1-K4 K2-K4	1 1	1-4 2-4	Lecture: power point presentation	Group discussion

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jan 22-29, 2024 (Day Order 1 to 6) 3hrs.	2 3	2.2 Genetically Modified Microbes-Applications **Bioconversion** 3.1 Biofuels	K2-K4 K1-K4	2 1	2-4 1-4	Lecture: power point presentation	Quiz
Jan 30 – Feb 2, 2024 (Day Order 1 to 4) 2hrs.	3	3.1 Biofuels 3.2 Ethanol Production	K1-K4 K2-K4	1 1	1-4 2-4	Lecture: power point presentation	Group discussion
Feb 3, 2024 (Day Order 2) 1hr.	3	3.2 Ethanol Production	K2-K4	1	2-4	Lecture: power point presentation	Test (short answers)
Feb 5- 6, 2024 (Day Order 5 to 6) 1hr.	3	3.3 Biogas production	K2-K4	1	2-4	Lecture: power point presentation	Quiz
Feb 7 – 14, 2024 (Day Order 1 to 6) 3hrs.	4	**Genetic Engineering** 4.1 Introduction to Cloning 4.2 Production of Transgenic - Animals (Mouse, Sheep)	 K1-K4 K2-K4	 2 1	 1-4 2-4	Lecture: power point presentation	Test (detailed answers)

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Feb 15 – 22, 2024 (Day Order 1 to 6) 3hrs.	4	4.2 Production of Transgenic – Animals (Cattle) 4.3 Transgenic Plants (BT cotton, Edible Vaccines)	K1-K4 K2-K4	1 2	1-4 2-4	Lecture: power point presentation	**Third Component** Test- Production of transgenic animals (detailed answers)
Feb 23 – 24, 2024 (Day Order 1 & 5)		No class					
Feb 26 – Mar 1, 2024 (Day Order 2 to 6) 3hrs.	5	**Applications** 5.1 DNA Fingerprinting in Forensic Science Diseases	K3-K4	3	3-4	Lecture: power point presentation	Quiz
Mar 2, 2024 (Day Order 1)		No class					
Mar 4 –8, 2024		**C.A. Test – II**					
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) 3hrs.	5	5.1 Genetic Diseases 5.2 Cancer Therapy	K3-K4 K3-K4	1 2	3-4 3-4	Lecture: power point presentation	Quiz

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Mar 18 - 19, 2024 (Day Order 2 to 3) 1hr.	5	5.3 Marine Products from Microbes	K1-K4	1	1-4	Lecture: power point presentation	Test (detailed answers)
Mar 20-22, 2024 (Day Order 4 to 6) 2hrs.	**REVISION**						