

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**COURSE PLAN****June - November 2024**

Department : **BIOTECHNOLOGY**
Name/s of the Faculty : **Dr. S. JAYASHREE**
Course Title : **BIOCHEMISTRY**
Course Code : **23BY/PC/BC14**
Shift : **II**

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | define the principles of biochemistry | K1 |
| CO2 | explain the structure, function, and regulation of biomolecules in biological processes | K2 |
| CO3 | present the underlying relationship between biomolecules for homeostasis of body functions | K3 |
| CO4 | outline the importance of metabolic pathways and enzymes involved | K4-K5 |
| CO5 | integrate biomolecules in various fields of science and research | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---|----------|--|-----------------|----------------|-----|--|----------------------|
| Jun 24 – 26, 2024 (Day Order 4 to 6) | 1 | Biological Foundation of Biochemistry 1.1 Water- Properties, Role of water | K1-K5 | 3 | 1-4 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| Jun 27 – July 4, 2024 (Day Order 1 to 6) | 1 | 1.2 Maintenance of Body Fluids in Various Body Compartments and Related Disorders | K1-K4 | 4 | 1-4 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| | | 1.3 pH- Buffers, Maintenance of pH – Role of Hemoglobin, Respiratory Control, Role of Kidney | K2-K6 | 1 | 2-5 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| July 5 – 12, 2024 (Day Order 1 to 6) | 1 | 1.3 pH- Buffers, Maintenance of pH – Role of Hemoglobin, Respiratory Control, Role of Kidney | K2-K6 | 3 | 2-5 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| | | 1.4 Acidosis, Alkalosis | K3-K6 | 2 | 3-5 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---|----------|--|-----------------|----------------|-------|---|--|
| July 15 – 23, 2024 (Day Order 1 to 6) 5 hrs | 2 | Biomolecules 2.1 Carbohydrates - Biological importance, Classification, Monosaccharides, Hemiketal and Hemiacetal Formation, Anomers, Epimers | K1-K4 | 3 | CO1-4 | Participatory Learning Methods: PowerPoint presentation | Third component Test (Long) Open book test |
| | | 2.2 Disaccharides- Sucrose, Lactose, Polysaccharides - Cellulose, Starch, Glycogen | K2-K4 | 2 | CO2-4 | Participatory Learning Methods: PowerPoint presentation | |
| July 24 – 31, 2024 (Day Order 1 to 6) 5 hrs | 2 | 2.3 Proteins – Biological importance, Classification of Aminoacids, Peptide Bonds | K2-K4 | 2 | CO2-4 | Participatory Learning Methods: PowerPoint presentation | Open book test Quiz |
| | | 2.4 Structural Hierarchy of Proteins | K5-K6 | 3 | CO5-5 | Participatory Learning Methods: PowerPoint presentation | |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|--|----------------------|---|--------------------|----------------|----------------|--|--|
| Aug 1 – 5, 2024 (Day Order 1 - 3) | 3 | Biomolecules 3.1 Lipids – Biological importance, Types based on structure, Fatty Acids – Types, Nomenclature | K1-K3 | 2 | 1-3 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| Aug 6 – Aug 10, 2024 | C.A. Test - I | | | | | | |
| Aug 12 – 14, 2024 (Day Order 4 - 6) | 3 | Biomolecules 3.1 Lipids – Biological importance, Types based on structure, Fatty Acids – Types, Nomenclature 3.2 Classification- Simple Lipids, Complex Lipids, Derived Lipids | K1-K3 K1-K6 | 1 2 | 1-3 1-5 | Participatory Learning Methods: PowerPoint presentation Participatory Learning Methods: PowerPoint presentation | Test (short answers) Test (short answers) |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|--|----------|--|-----------------|----------------|-----|---|----------------------|
| Aug 16 – 23, 2024 (Day Order 1 to 6) | 3 | 3.3 Nucleic Acids – Biological Importance, Structures of Purine and Pyrimidines | K2-K6 | 3 | 2-5 | Participatory Learning Methods: PowerPoint presentation | Presentation |
| | | 3.4 Nucleosides and Nucleotides, DNA Structural Organization | K2-K6 | 2 | 2-5 | Participatory Learning Methods: PowerPoint presentation | Group discussion |
| Aug 27 – Sep 3, 2024 (Day Order 1 to 6) | 3 | 3.4 Nucleosides and Nucleotides, DNA Structural Organization | K2-K6 | 1 | 2-5 | Participatory Learning Methods: PowerPoint Presentation | Test (short answers) |
| | 4 | Cellular Metabolism 4.1 Concepts of Metabolism- Glycolysis, Pentose Phosphate Pathway, Citric Acid Cycle | K1-K6 | 4 | 1-5 | Problem Solving Methods: Case studies | Group discussion |
| Sep 4 – Sep 11, 2024 (Day Order 1 - 6) | 4 | 4.2 Respiratory Chain and Oxidative Phosphorylation | K2-K5 | 3 | 2-4 | Participatory Learning Methods: PowerPoint Presentation | Test (short answers) |
| | | 4.3 Oxidation and Biosynthesis Fatty Acids, Urea Cycle | K3-K5 | 2 | 3-4 | Problem Solving Methods: Case studies | Group discussion |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---|-----------------------|---|-----------------|----------------|-----|--|--|
| Sep 12 – 20, 2024 (Day Order 1 to 6) | 4 | 4.3 Oxidation and Biosynthesis Fatty Acids, Urea Cycle | K3-K5 | 2 | 3-4 | Participatory Learning Methods: PowerPoint presentation Experiential Learning Methods: Model building | Third component Assignment Discussion |
| | | 4.4 Synthesis and Catabolism – Purines and Pyrimidines | K4-K6 | 3 | 4-5 | | |
| Sep 23 – Sep 26, 2023 (Day Order 1 to 4) | 4 | 4.4 Synthesis and Catabolism – Purines and Pyrimidines | K4-K6 | 2 | 4-5 | Participatory Learning Methods: PowerPoint presentation | Test (short answers) |
| Sep 27 – Oct 3, 2024 | C.A. Test - II | | | | | | |
| Oct 4 – 5, 2024 (Day 5 & 6) | 5 | 5.1 Enzyme Nomenclature, Classification, Cofactor, Active Site, Specificity and Factors Affecting Enzyme Action | K1-K6 | 3 | 1-5 | Experiential Learning Methods: Model building | Test (short answers) |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|---|-----------------|---|------------------------|-----------------------|------------|---|---------------------------|
| Oct 7 – 15, 2024 (Day Order 1 to 6) | 5 | 5.1 Enzyme Nomenclature, Classification, Cofactor, Active Site, Specificity and Factors Affecting Enzyme Action | K1-K6 | 1 | 1-5 | Participatory Learning Methods: PowerPoint Presentation | Test (short answers) |
| | | 5.2 Enzyme Regulation- Enzyme inhibition (Competitive inhibition, Uncompetitive inhibition) | K2-K5 | 4 | 2-4 | Experiential Learning Methods: Model building | Quiz |
| Oct 16 – 22, 2024 (Day Order 1 to 6) | 5 | 5.3 Control of Enzyme Quantity, Altering the Catalytic Efficiency of the Enzyme | K2-K5 | 3 | 2-4 | Participatory Learning Methods: PowerPoint presentation | Group discussion |
| | | 5.4 Enzymes in Clinical Diagnosis and Pharmaceutical Industries | K2-K6 | 2 | 2-5 | Problem Solving Methods: Case studies | Case Studies |
| Oct 23 – 24, 2024 (Day Order 1 to 2) | REVISION | | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2024

Department : **Biotechnology**
Name of the Faculty : **Dr.K.Veena Gayathri**
Course Title : **Microbiology**
Course Code : **23BY/PC/MI14**
Shift : **II**

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | To establish knowledge on morphology and classification of microbes | K1, K2 |
| CO2 | To explicit learning on microscopic techniques and culturing methods | K3 |
| CO3 | To comprehend the nutritional requirement, growth pattern and preservation of microbes | K4 |
| CO4 | To demonstrate the understanding on the causes of Microbial Diseases, their control and prevention | K5 |
| CO5 | To appreciate extremophiles and various applications of microbes | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|--|-----------------|--|------------------------|-----------------------|-------------------------------|---|---|
| Jun 24 – 26, 2024 (Day Order 4 - 6) | 1 | Introduction to Microbiology 1.1 History of Microbiology- Scope, Evolution Criteria for Classification - Taxometrics, Bacterial typing | K1-K2 | 3 | 1 | Presentation Problem-Solving Methods Case analysis with mathematical problems | Assignments |
| Jun 27 – July 4, 2024 (Day Order 1 - 6) | 1 | 1.2 Numerical Taxonomy; Chemotaxonomy Phylogenetic Relationships - Cladogram, Dendrogram, Universal Phylogenetic Trees 1.3 Microscopy – Principles and Applications of Bright Field, Dark Field, Phase Contrast | K1-K2 K1-3,K6 | 3 2 | 1 1-2, 5 1-2, 5 | Presentation Experiential Learning Methods Lab Demonstration Participatory Learning Methods Video Demonstration | Tests Assignment Third Component Applications of Fluorescent and Electron Microscopy |
| July 5 – 12, 2024 (Day Order 1 - 6) | 2 | 1.4 Principles and Applications of Fluorescent and Electron Microscopy | K1-3,K6 | 5 | 1-4 | Presentation/ Blackboard | Tests |

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|---|----------------------|--|-------|-------------|-----|--|------------|
| July 15 – 23, 2024 (Day Order 1 - 6) | 2 | Microbial Classification 2.1 Classification of Bacteria 2.2 Classification of Fungi – General Properties – Reproduction | K1-K5 | 3 2 | 1-4 | Presentation | Tests |
| July 24 – 31, 2024 (Day Order 1 - 6) | 2 | 2.2 Classification of Fungi – General Properties – Reproduction 2.3 Classification of Viruses - General Properties – Multiplication – Reproduction 2.4 Classification of Algae | K1-K5 | 1 3 1 | 1-4 | Presentation | Tests |
| Aug 1 – 5, 2024 (Day Order 1 - 3) | 3 | 2.4 Classification of Algae | K1-K4 | 2 | 1-3 | Participatory Learning Methods Presentation and Learning by Doing in the Lab | Assignment |
| Aug 6 – 10, 2024 | C.A. Test – I | | | | | | |
| Aug 12 – 14, 2024 (Day Order 4-6) | 3 | 3.2 Microbial Growth- Growth Curve, Measurement of Growth-methods | K1-K4 | 3 | 1-3 | Participatory Learning Methods Presentation/ Lab demonstration | Quiz |

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|---|---|---|---------------------------------|---------------------|----------------|--|---|
| Aug 16 – 23, 2024 (Day Order 1-6) | 3 | 3.3 Factors Influencing the Growth of Microorganisms – Temperature, pH, Osmotic pressure, Moisture, Radiations and Different Chemicals 3.4 Physical and Chemical Methods of Microbial Control | K3-K5 | 3 2 | 2-4 2-4 | Experiential Learning Methods Presentation/ Lab demonstration | Assignment Physical and Chemical Methods of Microbial Control |
| Aug 27 – Sep 3, 2024 (Day Order 1-6) | 4 | 3.4 Physical and Chemical Methods of Microbial Control Microbial Diseases 4.1 Medical Microbiology-Disease Transmission, Patterns and Spread of Infection 4.2 Respiratory Tract Infection-Tuberculosis, Viral Influenza, Fungal Pneumonia | K3-K5 K1-K5 K1-K5 | 1 2 2 | 1-4 | Participatory Learning Methods Presentation / Model building | Test |
| Sep 4 – 11, 2024 (Day Order 1-6) | 4 | 4.2 Respiratory Tract Infection-Tuberculosis, Viral Influenza, Fungal Pneumonia 4.3 Gastrointestinal Infection-Dysentery, Gastroenteritis | K1-K5 | 2 3 | 1-4 | Participatory Learning Methods Seminar / Group Discussion | Seminar Third Component |

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|--|-----------------------|--|--------------------|------------|-----|--|---------|
| Sep 12 - 20, 2024 (Day Order 1-6) | 4 | 4.3 Gastrointestinal Infection-Dysentery, Gastroenteritis 4.4 Urinary Tract Infections – Leptospirosis, Sexually Transmitted Diseases – HIV, Syphilis | K1-K5 K1-K5 | 1 4 | 1-4 | Seminar Participatory Learning Methods Group Discussion | Seminar |
| Sep 23 - 26, 2024 (Day Order 1-4) | 5 | Industrial Microbiology & Extremophiles 5.1 Microbial products- Biofertilisers, Bio-pesticides | K4-K6 | 3 | 3-5 | Participatory Learning Methods Presentation/ Model building | Test |
| Sep 27 – Oct 3, 2024 | C.A. Test – II | | | | | | |
| Oct 4 – 5, 2024 (Day 5 & 6) | 5 | 5.2 Industrial Production of Antibiotics – Streptomycin | K3-K4 | 2 | 3-5 | Participatory Learning Methods Presentation/ / Model building | Test |
| Oct 7 - 15, 2024 (Day Order 1 to 6) | 5 | 5.2 Industrial Production of Antibiotics – Streptomycin 5.3 Extremophiles- habitant & Classification, Halophiles, Thermophiles, Alkaliphiles, Acidophiles | K4-K6 | 1 3 | 3-5 | Participatory Learning Methods Presentation/ Case studies | Test |

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| Oct 16 - 22, 2024 (Day Order 1 to 6) | 5 | 5.4 Biotechnological applications of Extremophiles | K4-K6 | 3 | 3-5 | Participatory Learning Methods Presentation/ Case survey | Test |
| Oct 23 - 24, 2024 (Day Order 1 to 2) | REVISION | | | | | | |

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| STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI COURSE PLAN June - November 2024 | | |
| Department | : Biotechnology | |
| Name/s of the Faculty | : Dr. J. Anbumalarmathi | |
| Course Title | : Molecular Biology and Recombinant DNA Technology | |
| Course Code | : 23BY/PC/MR14 | |
| Shift | : II | |
| COURSE OUTCOMES (COs) | | |
| COs | Description | CL |
| CO1 | understand and recall the basic concepts in molecular biology and recombinant DNA technology | K1, K2 |
| CO2 | apply the biological processes on the aspects of molecular biology | K3 |
| CO3 | analyze the different types of vectors, molecular and cloning techniques | K4 |

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| CO4 | evaluate the applications of molecular biology, and recombinant DNA technology | K5 |
| CO5 | formulate and execute research using molecular and cloning techniques | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|--|------------|--|-----------------|----------------|-----|--|----------------------|
| Jun 24 – 26, 2024 (Day Order 4 - 6) | 1 | Cell Structure, Function and Genetic Material | | | | Participatory Learning Method: Group discussion | Quiz |
| | | 1.1 Structure, Organization and Function of Cells – Prokaryotes and Eukaryotes | K1, K2 | 2 | 1 | | |
| Jun 27 – July 4, 2024 (Day Order 1 - 6) | 1 | 1.2 Plasma Membrane – Passive transport | K2-K6 | 1 | 1-5 | Lecture: Powerpoint presentation | Test (short answers) |
| | | 1.2 Active Transport | K2-K6 | 1 | 1-5 | | |
| | | 1.3 Cytoskeleton – Microfilaments, Intermediate Filaments and Microtubules | K3-K6 | 3 | 2-5 | | |
| July 5 – 12, 2024 (Day Order 1 - 6) | 1 2 | 1.4 Cell - Cell Communication | K4-K6 | 1 | 3-5 | Lecture: Powerpoint presentation | Open book test |
| | | 1.4 Cell - Cell Communication – Mechanism and Types | K4-K6 | 2 | 3-5 | | |
| | | Replication, Repair and Protein Synthesis | | | | | |
| | | 2.1 DNA Replication - Prokaryotes and Eukaryotes | K1-K3 | 2 | 1-2 | | |
| | | 2.2 DNA Damage | K2-K5 | 1 | 1-4 | | |

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|---|----------------------|---|-------|---|-----|--|--|
| July 15 – 23, 2024 (Day Order 1 - 6) | 2 | 2.2 DNA Repair - Direct, Mismatch, Base-Excision, Nucleotide Excision | K2-K5 | 2 | 1-4 | Lecture: Powerpoint presentation | Quiz |
| | | 2.3 Protein Synthesis - Transcription and Translation – Prokaryotes | K2-K6 | 3 | 1-5 | | |
| July 24 – 31, 2024 (Day Order 1 - 6) | 2 | 2.4 Protein Synthesis - Transcription and Translation – Eukaryotes | K2-K6 | 4 | 1-5 | Lecture: Powerpoint presentation | Quiz |
| | 3 | Gene Regulation 3.1 Transcriptional Regulation in Prokaryotes | K1-K5 | 1 | 1-4 | | |
| Aug 1 – 5, 2024 (Day Order 1 - 3) | 3 | 3.1 <i>lac</i> and <i>trp</i> Operon | K1-K5 | 2 | 1-4 | Experiential Learning Method: Poster presentation | Open book test |
| Aug 6 – 10, 2024 | C.A. Test - I | | | | | | |
| Aug 12 – 14, 2024 (Day Order 4-6) | 3 | 3.2 Transcriptional Regulation in Eukaryotes – DNA Methylation and Histone Modification, Protein Processing | K2-K5 | 3 | 1-4 | Lecture: Powerpoint presentation | Test (detailed answers) |
| Aug 16 – 23, 2024 (Day Order 1-6) | 3 | 3.2 Folding, Sorting and Transport | K2-K5 | 1 | 1-4 | Experiential Learning Method: Model building | Third component: Seminar presentation on transcriptional regulation |
| | | 3.3 Regulation of Cell Cycle | K3-K5 | 4 | 2-4 | | |

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|---|-----------------------|--|-------|---|-----|---|----------------------|
| Aug 27 – Sep 3, 2024 (Day Order 1-6) | 3 | 3.4 Cancer and Apoptosis - Intrinsic and Extrinsic Pathways | K3-K6 | 4 | 2-4 | Lecture: Powerpoint presentation | Open book test |
| | 4 | Vectors and Gene Cloning 4.1 Restriction Modification Systems - Types and Nomenclature | K1-K3 | 1 | 1-2 | | |
| Sep 4 – 11, 2024 (Day Order 1-6) | 4 | 4.1 Restriction Enzymes TYPE I, II, III, Enzymes Used in Recombinant DNA Technology | K1-K3 | 2 | 2-5 | Lecture: Powerpoint presentation | Group discussion |
| | | 4.2 Plasmid Vectors and their Properties, Vectors- pBR 322, pUC, M13 Vectors | K4-K6 | 3 | 3-5 | | |
| Sep 12 - 20, 2024 (Day Order 1-6) | 4 | 4.2 Phagemids, Shuttle Vectors | K4-K6 | 1 | 3-5 | Lecture: Powerpoint presentation | Quiz |
| | | 4.3 Genomic Library and cDNA Library Construction | K4-K6 | 4 | 3-5 | | |
| Sep 23 - 26, 2024 (Day Order 1-4) | 4 | 4.4 Marker Genes- Recombinant Selection and Screening | K4-K6 | 2 | 3-5 | Experiential Learning Method: Experiment | Test (short answers) |
| Sep 27 – Oct 3, 2024 | C.A. Test – II | | | | | | |

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|---|-----------------|--|-------|---|-----|---|---|
| Oct 4 – 5, 2024 (Day 5 & 6) | 5 | Sequencing and Applications of rDNA Technology 5.1 DNA Sequencing, Polymerase Chain Reaction and Blotting Techniques | K1-K6 | 3 | 1-5 | Experiential Learning Method: Experiment | Test (detailed answers) |
| Oct 7 - 15, 2024 (Day Order 1 to 6) | 5 | 5.2 Molecular Markers and its Applications - RFLP, RAPD, SSR | K2-K6 | 2 | 1-5 | Experiential Learning Method: Experiment | Third component: Assignment on CRISPR technology |
| | | 5.3 CRISPR – Caspase Technology | K3-K6 | 3 | 2-5 | Lecture: Powerpoint presentation | |
| Oct 16 - 22, 2024 (Day Order 1 to 6) | 5 | 5.3 CRISPR – Caspase Technology | K3-K6 | 1 | 2-5 | Problem Solving Method: Case study | Open book test |
| | | 5.4 Applications of Recombinant DNA Technology in Vaccines, Gene Therapy | K5-K6 | 4 | 4-5 | | |
| Oct 23 - 24, 2024 (Day Order 1 to 2) | REVISION | | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2024

Department : BIOTECHNOLOGY
Name/s of the Faculty : DR. ARUNA SHARMILI S
Course Title : FOOD BIOTECHNOLOGY
Course Code : 23BY/PE/FB15
Shift : II

COURSE OUTCOMES (COs)

| COs | Description | CL |
|------------|--|-----------|
| CO1 | define the biotechnological aspects of food | K1, K2 |
| CO2 | compute the food constituents for the food industry | K3 |
| CO3 | outline the importance of the food processing sector | K4 |
| CO4 | summarise the requirements of food safety | K5 |
| CO5 | develop innovative techniques for the food industry | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | COs | Teaching Learning Methodology | Assessment Methods |
|--|----------|--|------------------|----------------|----------------|---|--------------------|
| Jun 24 – 26, 2024 (Day Order 4 - 6) | 1 | Fundamentals of food science 1.1 Composition of food Carbohydrates, Protein, Fats, Water, Vitamins, Minerals, Antinutrients | K1-3 | 3 | 1-3 | Participatory Learning Methods: Power Point Presentation | Open book test |
| Jun 27 – July 4, 2024 (Day Order 1 - 6) | 1 | Fundamentals of food science 1.1 Composition of food Carbohydrates, Protein, Fats, Water, Vitamins, Minerals, Antinutrients 1.2 Food Microbiology – Sources of Microorganisms | K1-3 K4-5 | 2 3 | 1-3 3-4 | Participatory Learning Methods: Power Point Presentation Participatory Learning Methods: Group discussions | Open book test |
| July 5 – 12, 2024 (Day Order 1 - 6) | 1 | Fundamentals of food science 1.3 Factors Affecting Growth and Survival of Microorganisms in Foods - Intrinsic and Extrinsic Factors 1.4 Bacterial and Fungal Toxins | K4-6 K4-6 | 2 3 | 3-5 3-5 | Participatory Learning Methods: Power Point Presentation | Open book test |

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|---|---|---|------|---|-----|---|----------------|
| July 15 – 23, 2024 (Day Order 1 - 6) | 1 | Fundamentals of food science | | | | Participatory Learning Methods: Power Point Presentation | Open book test |
| | | 1.4 Food-Borne Intoxications | K4-6 | 1 | 3-5 | | |
| | 2 | Food constituents | | | | | |
| | | 2.1 Food Texture- Brittleness, Chewiness, Gumminess, Oiliness, Greasiness | K1-6 | 2 | 1-5 | | |
| | | 2.2 Food Flavours – Natural: Herbs, Spices, Aromatic Seeds, Fruits, Vegetables Added Flavours: Natural Extracted Flavours, Synthetic Flavours, Plant Flavours; | K1-6 | 2 | 1-5 | | |

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|---|-----------------------------|---|---|--------------------------------|--------------------------------------|--|---|
| <p>July 24 – 31, 2024 (Day Order 1 - 6)</p> | <p>2</p> | <p>Food constituents 2.2 Flavour Additives: Monosodium Glutamate (MSG), Nucleotides, Maltol, Salt, Sodium Restricted Flavouring, Herbs and Spices 2.3 Food Colorants- Natural: Plants and Microbes; Inorganic; Synthetic 2.4 Functional Food – Oat Bran Fibre, Soy Protein, Fish Oil, Fatty Acids, Prebiotics- Probiotics</p> | <p>K1-6 K1-6 K1-6</p> | <p>1 2 2</p> | <p>1-5 1-5 1-5</p> | <p>Participatory Learning Methods: Power Point Presentation</p> | <p>Assignment Open book test</p> |
| <p>Aug 1 – 5, 2024 (Day Order 1 - 3)</p> | <p>2 3</p> | <p>Food constituents 2.4 Functional Food – Plant Sterols and Stanols Food Processing and Adulteration 3.1. Cereals</p> | <p>K1-6 K1-6</p> | <p>1 1</p> | <p>1-5 1-5</p> | <p>Participatory Learning Methods: Power Point Presentation</p> | <p>Open book test</p> |
| <p>Aug 6 – 10, 2024</p> | <p>C.A. Test - I</p> | | | | | | |

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|---|---|---|------------------|------------|----------------|---|----------------|
| Aug 12 – 14, 2024 (Day Order 4-6) | 3 | Food Processing and Adulteration 3.1. Pulses, Spices, Plantation Crop (Cashewnut, Coconut) | K1-6 | 3 | 1-5 | Participatory Learning Methods: Power Point Presentation | Open book test |
| Aug 16 – 23, 2024 (Day Order 1-6) | 3 | Food Processing and Adulteration 3.2 Fruits and Vegetables; Flesh foods- Meat, Poultry, Seafood 3.3 Food adulteration- Adulteration to Improve Physical and Sensory Properties | K1-6 K1-6 | 4 1 | 1-5 1-5 | Participatory Learning Methods: Power Point Presentation | Quiz |
| Aug 27 – Sep 3, 2024 (Day Order 1-6) | 3 | 3.3 Food adulteration- Adulteration to Improve Physical and Sensory Properties 3.4 Food Substitution Organic and Synthetic Adulterants | K1-6 K3-6 | 3 2 | 1-5 2-5 | Participatory Learning Methods: Power Point Presentation | Open book test |

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|--------------------------------------|---|---|------|---|-----|---|---------|
| Sep 4 – 11, 2024 (Day Order 1-6) | 4 | Food Preservation | | | | Participatory Learning Methods: Power Point Presentation | Seminar |
| | | 4.1 Traditional Food Preservation Methods- Curing, Boiling, Sugaring, Pickling, Canning, Fermentation | K1-6 | 3 | 1-5 | | |
| Sep 12 - 20, 2024 (Day Order 1-6) | 4 | 4.2 Low- Refrigeration, Freezing, Cryopreservation | K1-6 | 2 | 1-5 | Participatory Learning Methods: Power Point Presentation | Seminar |
| | | Food Preservation | | | | | |
| | | 4.2 High Temperature- Pasteurisation, Sterilisation, Ultra Heat Treatment | K1-6 | 2 | 1-5 | | |
| | | 4.3 Chemicals-Benzoates, Nitrates, Sulphites Biopreservation- Bacteriocins, Bacteriophages | K1-6 | 3 | 1-5 | | |

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| Sep 23 - 26, 2024 (Day Order 1-4) | 4 | Food Preservation 4.3 Biopreservation- Endolysins, Lactic Acid Bacteria | K1-6 | 1 | 1-5 | Participatory Learning Methods: Power Point Presentation | Seminar |
| | | 4.4 Non-thermal methods- High-pressure Processing, Pulsed Electric Field, Ultrasound, Pulsed Light, | K1-6 | 3 | 1-5 | | |
| Sep 27 – Oct 3, 2024 | C.A. Test - II | | | | | | |
| Oct 4 – 5, 2024 (Day 5 & 6) | 4 | 4.4 Non-thermal methods- Ultraviolet Light, Irradiation | K1-6 | 1 | 1-5 | Participatory Learning Methods: Power Point Presentation | Seminar |
| | 5 | Food Packaging and Safety 5.1 Introduction – Labels and Barcodes, Shelf life, E- number | K1-3 | 1 | 1-5 | | Quiz |

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|---|-----------------|--|------|---|-----|---|---------|
| Oct 7 - 15, 2024 (Day Order 1 to 6) | 5 | Food Packaging and Safety | K1-3 | 1 | 1-2 | Participatory Learning Methods: Power Point Presentation | Quiz |
| | | 5.1 Introduction – Labels and Barcodes, Shelf life, E- number | | | | | |
| | | 5.2 Food Packaging Materials - Biodegradable and Non- degradable | K2-6 | 4 | 1-5 | | Seminar |
| Oct 16 - 22, 2024 (Day Order 1 to 6) | 5 | 5.3 Packaging of Fresh and Processed Foods | K4-6 | 3 | 3-5 | Participatory Learning Methods: Power Point Presentation | Quiz |
| | | 5.4 Quality Assurance – BIS, AGMARK, GMP, FSSAI, FDA, HACCP | K3-6 | 2 | 2-5 | | |
| Oct 23 - 24, 2024 (Day Order 1 to 2) | REVISION | | | | | | |

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2024

Department : **Biotechnology**
Name/s of the Faculty : **Dr. K. Veena Gayathri and Dr. J. Anbumalarmathi**
Course Title : **Bioinstrumentation**
Course Code : **23BY/PE/BI15**
Shift : **II**

COURSE OUTCOMES (Cos)

| Cos | Description | CL |
|------------|--|-----------|
| CO1 | recall the instrumentation used in biotechnological research | K1 |
| CO2 | discuss the basic concept of qualitative and quantitative analysis | K2 |
| CO3 | present the classification of bio instruments | K3 |
| CO4 | outline construction, and working principle of various bioinstruments | K4-K5 |
| CO5 | summarize the applications of bioinstruments in different fields of research | K6 |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|--|----------|--|-----------------|----------------|-----|--|----------------------|
| Jun 24 – 26, 2024 (Day Order 4 - 6) | 1 | Microscopy and Spectroscopy 1.1 Microscopy- Cryomicroscopy and Confocal Microscopy | K1-K6 | 2 | 1-5 | Experiential Learning Method: Presentation/Lab demonstration | Test (Essay) |
| | 3 | Separation Techniques 3.1 Centrifugation - Basic Principles of Sedimentation | K1-K4 | 1 | 1-4 | Lecture: PowerPoint presentation | Test (short answers) |
| Jun 27 – July 4, 2024 (Day Order 1 - 6) | 1 | 1.1 Microscopy- Cryomicroscopy and Confocal Microscopy | K1-K6 | 3 | 1-4 | Presentation/ Lab demonstration | Test (Essay) |
| | 3 | 3.1 Types of Rotors, Preparative centrifugation | K2-K3 | 2 | 2-3 | Experiential Learning Method: Learning by doing | Test (short answers) |
| KJuly 5 – 12, 2024 (Day Order 1 - 6) | 1 | 1.2 UV- Spectroscopy, FTIR | K2-K3 | 3 | 3-5 | Participatory Learning Method: Presentation | Test (Essay) |
| | 3 | 3.1 Analytical Ultracentrifugation | K1-K4 | 2 | 1-4 | Participatory Learning Method: Group discussion | Quiz |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|---|----------------------|---|-----------------|----------------|-----|--|----------------------|
| July 15 – 23, 2024 (Day Order 1 - 6) | 1 | 1.2 UV- Spectroscopy, FTIR, 1.3 Mass Spectroscopy, NMR | K2-K3 | 3 | 1-4 | Participatory Learning Method: Presentation | Test (Essay) |
| | 3 | 3.2 Chromatography - TLC, Affinity Chromatography | K2-K4 | 2 | 1-4 | Experiential Learning: Experiment | Open book test |
| July 24 – 31, 2024 (Day Order 1 - 6) | 1 | 1.3 Mass Spectroscopy, NMR | K3-K6 | 3 | 2-5 | Participatory Learning Method: Presentation | Test (Essay) |
| | 3 | 3.2 Ion-Exchange Chromatography 3.3 HPLC | K2-K6 K1-K4 | 2 | 1-4 | Lecture: powerpoint presentation | Test (short answers) |
| Aug 1 – 5, 2024 (Day Order 1 - 3) | 2 | 1.3 Mass Spectroscopy, NMR | K3-K6 | 1 | 3-5 | Experimental learning method: Experiments | Quiz |
| | 3 | 3.3 Gas Chromatography | K4-K6 | 1 | 1-4 | Problem-solving method: Case study | Test (MCQs) |
| Aug 6 – 10, 2024 | C.A. Test – I | | | | | | |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|--------------------------------------|----------|--|-----------------|----------------|-----|--|---|
| Aug 12 – 14, 2024 (Day Order 4-6) | 2 | Molecular and Analytical Techniques 2.1 PCR, Sequencer | K1-K4 | 2 | 3-5 | Participatory Learning Method: Presentation | Group Discussion (Third Component) Test (short answers) |
| | 5 | Radiation and Preservation Techniques 5.1 Measurement of Radioactivity in Biological Sample- Gas Ionization (GM counter) | K1-K6 | 1 | 1-5 | Lecture: power point presentation | |
| Aug 16 – 23, 2024 (Day Order 1-6) | 2 | 2.1 PCR, Sequencer | K1-K4 | 1 | 1-5 | Experimental learning method: Learning by doing | Seminar (Third Component) Group discussion |
| | | 2.2 FACS, Microarray | K2-K6 | 2 | | | |
| | 4 | Electrophoresis 4.1 Electrophoresis – Basic Principles | K1-K6 | 2 | 1-5 | Experiential Learning Method: Model building | |
| | 5 | 5.2 Scintillation Counter | | | | | |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|---|----------|--|-----------------|----------------|-----|--|--|
| Aug 27 – Sep 3, 2024 (Day Order 1-6) | 2 | 2.2 FACS, Microarray 2.3 Kjeldal Unit | K2-K6 K3-K6 | 1 2 | 1-5 | Experimental learning method: Learning by doing | Seminar |
| | 5 | 5.2 Safety Aspects in Handling Radioactive Isotope | K1-K6 | 2 | 1-5 | Lecture: power point presentation | Group discussion |
| Sep 4 – 11, 2024 (Day Order 1-6) | 2 | 2.3 Kjeldal Unit | K3-K6 | 2 | 2-4 | Experimental learning method: Learning by doing | Seminar |
| | 4 | 2.3 Biosensors – Types and Applications | | 1 | | | |
| | 5 | 5.2 Biological Applications of Radioisotopes | K1-K6 | 2 | 1-5 | Lecture: power point presentation | Test (short answers) |
| Sep 12 - 20, 2024 (Day Order 1-6) | 4 | 4.1 Electrophoresis - Basic Principles ,PAGE – | K1-K6 | 3 | 2-4 | Participatory Learning Method: Presentation | Seminar |
| | 5 | 5.2 Biological Applications of Radioisotopes | K1-K6 | 2 | 1-5 | Lecture: power point presentation | Third component Assignment on Biological applications of radioisotopes |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|--|-----------------------|---|-----------------|----------------|-----|---|----------------------|
| Sep 23 - 26, 2024 (Day Order 1-4) | 4 | 4.1 Native and SDS-PAGE | K1-K6 | 2 | 3-5 | Participatory Learning Method: Presentation Lecture: powerpoint presentation | Seminar |
| | 5 | 5.3 Lyophilization | K2-K4 | 1 | 3-5 | | Quiz |
| Sep 27 – Oct 3, 2024 | C.A. Test – II | | | | | | |
| Oct 4 – 5, 2024 (Day 5 & 6) | 4 | 4.2 Agarose Gel Electrophoresis, 2-Dimensional Gels | K2-K4 | 1 | 3-5 | Participatory Learning Method: Presentation | Seminar |
| | 5 | 5.3 Spray Dyer | K3-K6 | 1 | 3-5 | Experiential Learning Method: Learning by doing | Test (short answers) |
| Oct 7 - 15, 2024 (Day Order 1 to 6) | 4 | 4.3 DGGE, Microchip Electrophoresis | K3-K6 | 3 | 3-5 | Participatory Learning Method: Presentation | Seminar |
| | 5 | 5.3 Spray Dyer | K3-K6 | 2 | 3-5 | Lecture: powerpoint presentation | Quiz |

| Week | Unit No. | Content | Cognitive Level | Teaching Hours | Cos | Teaching Learning Methodology | Assessment Methods |
|---|-----------------|--|------------------------|-----------------------|------------|--|---------------------------|
| Oct 16 - 22, 2024 (Day Order 1 to 6) | 4 | 4.3 DGGE Microchip Electrophoresis | K3-K6 | 2 | 3-5 | Participatory Learning Method: Presentation | Test |
| | 5 | 5.3 Lyophilization - Types 5.3 Spray Dyer | K3-K6 | 2 | 3-5 | Lecture: power point presentation | Group discussion |
| Oct 23 - 24, 2024 (Day Order 1 to 2) | REVISION | | | | | | |