MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

NAAC Accredited & ISO 21001: 2018 Certified

PROGRAMME REGISTER: 2023-26

DEPARTMENT OF BIOCHEMISTRY

INDEX

PROGRAMME OUTCOMES
(POs) 2023-26

Students of all Undergraduate Programmes at the time of graduation will be able to possess

PO1: Essential Knowledge:

Have comprehensive discipline knowledge and understanding, the ability to engage with different schools of thought and to apply their knowledge in practice including in multidisciplinary or multi-professional contexts.

PO2: Creative, Critical Thinking and Problem-Solving Abilities:

Be effective problem-solvers, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Teamwork and Communication Skills:

Convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

PO4: Motivated, Self-directed, and Life-long Learning:

Exhibit life-long skills; broad-based multiple career oriented general skills; self and field-based learning skills; digital skills; preparedness for living, learning and working in any environment.

PO5: Professionalism and Leadership Readiness:

Engage in professional behaviour and have the potential to be entrepreneurial and take leadership roles in their chosen occupations and communities.

PO6: Intercultural and Ethical Competency:

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

PO7: Self-awareness and Emotional Intelligence:

Be self-aware and reflective, flexible and resilient and act with integrity and take responsibility for their actions as empowered women.

PO8: Social Responsibility and Effective Citizenship:

Exhibit social responsibility and compassionate commitment; Be sensitive to and demonstrate institution in matters of environment, gender and other social issues to promote an equitable society and sustainable development.

PROGRAMME SPECIFIC OUTCOMES

(PSOs) 2023-26

At the end of the programme students will be able to possess/exhibit:

PSO1: Quantitative Analysis:

Interpret principles, classifications, concepts, theories and mechanisms learnt.

PSO2: Practical and Analytical Skills:

Analyze hypotheses, procedures, properties, experimental facts and draw conclusions.

PSO3: Logical and Critical Thinking:

Apply knowledge and techniques in sample analysis, problem-solving, results, and production.

PSO4: Teamwork and Communication:

Develop communicative competence, creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

Course Outcomes

(COs) 2023 - 26

S. No.	Sem	Course Code	Course Title	Course Outcomes (COs)
1.	I	23SCCCCB14	Introduction to Classical Biology	**CO1:** Understand the fundamental principles of taxonomic classification, ecological and environmental concepts.
				CO2: Gain knowledge of the classification, morphology, reproduction and physiological processes of plants
				CO3: Develop a comprehensive understanding of the structure hereditary and molecular processes of prokaryotic and eukaryotic cells.
				CO4: Acquire knowledge on classification Physiology and development of animals
				CO5: Learn about chemical bonds and different branches of chemistry and their applications
2.	I	23SCCCAB14	Introduction to Applied Biology	**CO1:** Learn the basics of microbiology, immunology and their roles in health, disease and the environment.
				CO2: Explore the structure, function and metabolism of biomolecules.
				CO3: Outline the fundamentals of biotechnology, genetic engineering and their applications.
				CO4: Demonstrate different analytical tools, techniques and their applications.
				CO5: Gain knowledge on collection, storage and analysis of biological data using statistical and bioinformatics tools.
3.	II	23BCCCBM23	Biomolecules	**CO1:** Schematize the structure of biomolecules
				CO2: Classify the carbohydrates lipids proteins and amino acids with examples
				CO3: Summarize the physical, chemical properties of biomolecules
				CO4: Analyze the biochemical reactions undergone by Biomolecules
				CO5: Understand the importance of biomolecules in living organisms.
4.	II	23BCP1BM21	Biomolecules – Practical	**CO1:** Prepare all the Laboratory reagents, buffers, and solutions
				CO2: Calibrate of pH meter, weighing machine.

				CO3: Perform qualitative estimation of different biomolecules.
5.	II	23BCCCCB23	Cell Biology	**CO1:** Gain the knowledge about the differences between prokaryotes and eukaryotes
				CO2: Understand the role of MPF in cell cycle regulation.
				CO3: Analyze different signal transduction pathways involved in cell communication
				CO4: Realize the role of endoplasmic reticulum in protein sorting and targeting.
				CO5: Learn the different types of membrane transport and their role.
6.	II	23BCP2CB21	Cell Biology -Practical	**CO1:** Perform quantitative estimation of different biomolecules.
				CO2: Analyze the viability and examine the division mechanisms of cells
				CO3: Isolate the cell organelles from different tissues.
7.	III	23BCCCAT33	Analytical Techniques	**CO1:** Learn about different homogenization techniques.
				CO2: Understand the importance of different biophysical techniques.
				CO3: Learn the principles of different Biophysical Instruments and their use for research purpose.
				CO4: Acquire Knowledge about isolation and microbiological methods
				CO5: Use isolation and microbiological methods for research purpose.
8.	III	23BCP3AT31	Analytical techniques practical	**CO1:** Different biomolecules and plant-based compounds.
				CO2: Able to do biochemical characterization of lipids
				CO3: Efficiently extract various phytoconstituents.
9.	III	23BCCCBM33	Basic Microbiology	**CO1:** Understand the basic concepts in microbiology.
				CO2: Classify microorganisms like Mold, yeast and mycoplasma.
				CO3: Summarise the different microbial interactions
				CO4: Gain the knowledge about microbial diseases.
				CO5: Know about basic characteristics of a virus and viral diseases.

10.	III	23BCP4BM31	Basic Microbiology - Practical	**CO1:** Understand the concept of basic microbiology. Sterilization Techniques.
				CO2: Discuss the staining techniques to study the morphology of microorganisms.
				CO3: Know about isolation of microorganisms from various sources.
11.	III	23BCCCGP33	General Physiology	**CO1:** Describe the different components of blood and process of blood clotting
				CO2: Discuss the mechanism of muscle contraction and nerve impulse propagation
				CO3: Summarise the process of urine formation and importance of renal system.
				CO4: Understand the role of different enzymes and hormones in digestion
				CO5: Classify the hormones based upon their function and origin.
12.	III	23BCP5GP31	General Physiology - Practical	**CO1:** Recognise and analyse blood cells and blood groups.
				CO2: Estimate different biochemical parameters from blood sample
13.	III	23BCCCGT33	Genetics	**CO1:** Understand the organization of genetic material and its significance.
				CO2: Discuss the mechanism of gene regulation mapping and reprogramming.
				CO3: Describe the process of bacterial gene transfer methods
				CO4: Explain the regulation of lytic and lysogenic cycles.
				CO5: Classify different types of mutations and mutagens
14.	III	23BCP6GT31	Genetics - Practical	**CO1:** Isolate the DNA From the various sources like bacteria, onion and leaves.
				CO2: Gain knowledge on karyotyping and chromosomal aberrations.
15.	IV	23BCCCCL43	Bioenergetics & Metabolism of Carbohydrates & Lipids	**CO1:** Analyse different energy transformation laws.
				CO2: Gain knowledge about the physiological importance of ETC and enzymes

				CO3: Explain the utilization of glucose in various metabolic pathways
				CO4: Describe the key pathways involved in lipid metabolism.
				CO5: Discuss the inborn errors of lipid metabolism.
16.	IV	23BCP7CL41	Bioenergetics & Metabolism of Carbohydrates & Lipids - Practical	**CO1:** Isolate different proteins from milk and milk products
				CO2: Efficiently estimate various biochemical parameters from serum
17.	IV	23BCCCCB43	Clinical Biochemistry	**CO1:** Describe the water – electrolyte balance and acid-base balance in humans.
				CO2: Identify and classify abnormal haemoglobin and haemoglobinopathies
				CO3: Explain the importance of RFT in assessing kidney function
				CO4: Understand the role of enzymes in liver and pancreatic function tests.
				CO5: Discuss the significance of iso enzymes in disease diagnosis.
18.	IV	23BCP8CB41	Clinical Biochemistry-Practical	**CO1:** Correlate the normal values to those present in diseased conditions.
				CO2: Estimate different biochemical parameters from a serum sample.
19.	IV	23BCCCIG43	Immunology	**CO1:** Understand the basic concepts of immunology.
				CO2: Explain the components of innate immunity.
				CO3: Describe the mechanism behind adaptive immunity
				CO4: Discuss various antigen antibody interactions
				CO5: Classify autoimmunity hypersensitivity and immuno deficiencies
20.	IV	23BCP9IG41	Immunology Practical	**CO1:** Understand the plant defensive mechanism
				CO2: Perform Blood Grouping and immunodiffusion

Mapping of COs with PSOs & POs

S.No.	Sem	Course Code	Course Title	COs	PSOs	POs
1.	I	23SCCCCB14	Introduction to Classical Biology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
2.	I	23SCCCAB14	Introduction to Applied Biology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
3.	II	23BCCCBM23	Biomolecules	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
4.	II	23BCP1BM21	Biomolecules – Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
5.	II	23BCCCCB23	Cell Biology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
6.	II	23BCP2CB21	Cell Biology -Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
7.	III	23BCCCAT33	Analytical Techniques	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4,

						PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
8.	III	23BCP3AT31	Analytical techniques practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
9.	III	23BCCCBM33	Basic Microbiology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
10.	III	23BCP4BM31	Basic Microbiology - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
11.	III	23BCCCGP33	General Physiology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
12.	III	23BCP5GP31	General Physiology - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
13.	III	23BCCCGT33	Genetics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7

				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
14.	III	23BCP6GT31	Genetics - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
15.	IV	23BCCCCL43	Bioenergetics & Metabolism of Carbohydrates & Lipids	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
16.	IV	23BCP7CL41	Bioenergetics & Metabolism of Carbohydrates & Lipids - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
17.	IV	23BCCCCB43	Clinical Biochemistry	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
18.	IV	23BCP8CB41	Clinical Biochemistry-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
19.	IV	23BCCCIG43	Immunology	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7

				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
20.	IV	23BCP9IG41	Immunology Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4, PO5, PO6, PO7

Mapping of Courses with PSOs

Course Title	PSO1 Quantitative Analysis	PSO2 Practical and Analytical Skills	PSO3 Logical, Critical Thinking	PSO4 Teamwork and Communication
Introduction to Classical Biology	✔	✔	✔	✔
Introduction to Applied Biology	✔	✔	✔	✔
Biomolecules	✔	✔	✔	✔
Biomolecules – Practical	✔	✔	✔	✔
Cell Biology	✔	✔	✔	✔
Cell Biology -Practical	✔	✔	✔	✔
Analytical Techniques	✔	✔	✔	✔
Analytical techniques practical	✔	✔	✔	✔
Basic Microbiology	✔	✔	✔	✔
Basic Microbiology - Practical	✔	✔	✔	✔
General Physiology	✔	✔	✔	✔
General Physiology – Practical	✔	✔	✔	✔
Genetics	✔	✔	✔	✔
Genetics – Practical	✔	✔	✔	✔
Bioenergetics & Metabolism of Carbohydrates & Lipids	✔	✔	✔	✔
Bioenergetics & Metabolism of Carbohydrates & Lipids – Practical	✔	✔	✔	✔
Clinical Biochemistry	✔	✔	✔	✔
Clinical Biochemistry-Practical	✔	✔	✔	✔
Immunology	✔	✔	✔	✔
Immunology Practical	✔	✔	✔	✔

Mapping of Courses with POs

Course	PO1 Essential Knowledge	PO2 Creative, Critical thinking and Problem-solving abilities	PO3 Teamwork and Communication skills	PO4 Motivated, Self-directed and Life-long Learning	PO5 Professionalism and Leadership Readiness	PO6 Intercultural and Ethical Competency	PO7 Self-awareness and Emotional Intelligence	PO8 Social Responsibility and Effective Citizenship
Introduction to Classical Biology	✔	✔	✔	✔				
Introduction to Applied Biology	✔	✔	✔	✔				
Biomolecules	✔	✔	✔	✔				
Biomolecules – Practical	✔	✔	✔	✔				
Cell Biology	✔	✔	✔	✔				
Cell Biology-Practical	✔	✔	✔	✔				
Analytical Techniques	✔	✔	✔	✔	✔	✔	✔	
Analytical techniques practical	✔	✔	✔	✔	✔	✔	✔	
Basic Microbiology	✔	✔	✔	✔				
Basic Microbiology - Practical	✔	✔	✔	✔				
General Physiology	✔	✔	✔	✔				
General Physiology - Practical	✔	✔	✔	✔				
Genetics	✔	✔	✔	✔	✔	✔	✔	
Genetics - Practical	✔	✔	✔	✔	✔	✔	✔	

Bioenergetics & Metabolism of Carbohydrates & Lipids	✔	✔	✔	✔				
Bioenergetics & Metabolism of Carbohydrates & Lipids - Practical	✔	✔	✔	✔				
Clinical Biochemistry	✔	✔	✔	✔	✔	✔	✔	
Clinical Biochemistry-Practical	✔	✔	✔	✔	✔	✔	✔	
Immunology	✔	✔	✔	✔	✔	✔	✔	
Immunology Practical	✔	✔	✔	✔	✔	✔	✔	