

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA

A College with Potential for Excellence

NAAC Accredited & ISO 9001: 2015 Certified



PROGRAMME REGISTER

2020-2023

DEPARTMENT OF MICROBIOLOGY

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UG PROGRAMMES OFFERED

S.No.	Programme	Combination offered	Programme Code
1	B.Sc.	Microbiology, Biotechnology, Chemistry (MBC)	310
2		Food Science and Technology, Microbiology, Chemistry, (FMC)	308
3		Food Science and Technology ,Microbiology, Biochemistry, (FMB)	311

PROGRAMME OUTCOMES

(POs) 2020-2023

At the end of the programme students will have:

PO1: Essential Knowledge:

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 and 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:

Be able to 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: Motivation and preparation in life-long learning:

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

PO5: Professionalism and leadership readiness:

Be able to engage in professional behavior 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:

Be sensitive to and demonstrate agency in matters of environment, gender and other social issues to promote an equitable society.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

2020-2023

At the end of the programme students will be able to:

PSO1: Interpret principles, classifications, concepts, theories and mechanisms.

PSO2: Analyze hypothesis, procedures, properties, experimental facts and draw conclusions.

PSO3: Apply techniques in solving problems, results, sample analysis and production.

PSO4: Develop communicative competence, creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

Course Outcomes (COs)

2020-2023

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
1	I	20MBCCIM13	Introduction to Microbiology & Microbial Diversity.	CO1: Illustrate the contributions made by prominent scientists.
				CO2: Analyze different characteristics of microbes and difference of cell wall components in bacteria and arch bacteria
				CO3 Summarize the techniques used to stain ,and observe the microorganism under microscope.
				CO4: Demonstrate different isolation ,preservation techniques
				CO5: Analyze various method used for sterilization and disinfection techniques.
2		20MBP1BT12	Basics techniques in Microbiology - Practical	CO1: Isolate different types of microbes from soil samples
				CO2: Handle microscope and identify various types of bacteria and fungi under Microscope
				CO3: Knowledge on gram positive and negative bacteria
3	II	20MBCCMP23	Microbial Physiology & Biochemistry	CO1: Summarize different of Biomolecules with their structure and functions..
				CO2: Explain various analytical techniques used to separate Bio molecules.
				CO3: Describe the properties ,structure and functions of enzymes.
				CO4: Discuss the role of nutrients in microbial growth.and reproduction ,methods used to estimate Bacterial growth.
				CO5: Discuss the concept of central dogma of molecular biology, types, ,biosynthesis and functions of RNA.and protein synthesis in prokaryotes and eukaryotes
4		20MBP2QA22	Qualitative & Quantitative Analysis - Practical	CO1: Knowledge on different biomolecules by analytical techniques.
				CO2: learn the isolation of genetic material from microbes.

				CO3: Understand the enzymatic activities bacteria
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5	III	20MBCCMI33	Medical Microbiology & Immunology	CO1:. Illustrate the basic concepts of different types of Immunity. And role of cells and organs related to Immune System
				CO2: Discuss the chemical nature,,types, properties and functions of immunoglobulins and process ,role of antigen antibody reactions in clinical diagnosis
				CO3: Summarize the concepts of hypersensitivity, principals of diagnostic microbiology. And role of normal flora, antibacterial substances, in Human body.
				CO4: Discuss the role of Vectors in genetic engineering, and Molecular Biology.
6		20MBP3MI32	Medical Microbiology & Immunology- Practical	CO1:. Perform Blood Grouping test
				CO2:. Perform different types of test like Hemoglobin test and leucocyte count.
				CO3: Learn the Widal and estimation of haemoglobin

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
7	IV	20MBCCIM43	Industrial Microbiology	CO1: Summarize the importance of microbes used in industries.
				CO2:. Demonstrate different types of fermenters and fermentation processes.
				CO3:. Understand the role of microbes in various industries like Pharmaceutical, Bioleaching and textile.
				CO4: Explain the role of vectors in Genetic Engineering and their applications in Agriculture and Medicine.
8		20MBP4IM42	Industrial Microbiology - Practical	CO1: Separate metabolites produced by microbes.
				CO2: Production of ethanol by invitro techniques from microbes.
				CO3: Understand the concept of wine and ethanol production
9	IV	20MBCCMG43	Microbial Genetics & Molecular Biology	CO1: Summarize different modes of transfer mechanisms in Bacteria, molecular techniques used in various types of mutations.

				<p>CO2: Explain the structures ,regulation of Lac Operon with gene expression in bacteria</p> <p>CO3: Articulate different types of RNAs involved in protein synthesis and their role.</p> <p>CO4: Explain the role of vectors in Genetic Engineering and their applications in Agriculture and Medicine.</p>
10		20MBP5MG42	Microbial Genetics & Molecular Biology- Practical	<p>CO1: Separate, identify DNA by Agarose gel electrophoresis.</p> <p>CO2: Isolate genomic DNA from Bacteria, Onion.</p> <p>CO3: Visualization of DNA by Agarose Gel Electrophoresis</p>
11	V/VI set -1	20MBSEC11FA3	Food, Agriculture & Environmental Microbiology	<p>CO1: Understand different parameters for food spoilage and preservation</p> <p>CO2: Develop various food products</p> <p>CO3: Importance of microbes in agriculture for crop production</p> <p>CO4: learn the role of sewage treatment methods</p> <p>CO5: Summarize the role of microbes in Environment</p>
12	V/VI set - 1	20MBP611FA2	Food, Agriculture & Environmental Microbiology -Practical	<p>CO1: List out different types of microflora</p> <p>CO2: Identify the bacterial and fungal diseases</p> <p>CO3: Develop skill on quality of milk sample by MBRT</p>

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
13	V/VI set - 1	20MBSEC12MD3	.Management of Human Microbial Diseases & Diagnosis.	<p>CO1: Distinguish the diseases caused by Bacteria, Fungi, Viruses</p> <p>CO2: Develop the skills of sample collection.</p> <p>CO3: Learn different serological techniques for diagnosis of infectious diseases</p> <p>CO4: Identify the sensitivity and resistance of various antibiotics</p> <p>CO5: Determine the sensitivity and resistance of various antibiotics.</p>

14	V/VI set - 1	20MBP712MD2	.Management of Human Microbial Diseases & Diagnosis – Practical	CO1: Learn the process of specimen collection
				CO2: Acquire skills on microscopic examination of clinical samples
				CO3: Study different types of parasites
15	V/VI set - 2	20MBSEC21MB3	Microbial Biotechnology & r –DNA Technology	CO1: Enhance the skills on Electrophoresis and Blotting techniques
				CO2: Develop skill on methods of gene sequence
				CO3: Schematize the process of Construction of genomic and cDNA libraries
				CO4: List out different Screening methods
				CO5: Discuss the advantages and disadvantages of genetically modified strains.
16	V/VI set - 2	20MBP621MB2	Microbial Biotechnology & r –DNA Technology- Practical	CO1: Acquire skills on PCR techniques
				CO2: Learn the Isolation of RNA from yeast
				CO3: Develop the skills on blotting techniques
17	V/VI set - 2	20MBSEC22BB3	Biostatistics & Bioinformatics	CO1: Summarize nature and scope of bioinformatics
				CO2: Understand various biological data bases
				CO3: Discuss measures of central tendency and distribution.
				CO4: Construction of phylogenetic tree
				CO5: Discussion of Protein 3D Structure.
18	V/VI set - 2	20MBP722BB2	Biostatistics & Bioinformatics- Practical	CO1: Learn the Isolation of plasmid DNA
				CO2: Acquire skills on analysis of proteins
				CO3: Summarize the process of Southern hybridization.
19	V/VI set – 3	20MBSEC31MI3	Microbial Quality Control Instrumentation & Techniques	CO1: Understand different methods involved in assessment of microbial quality control.
				CO2: Discuss different types of media used for identification of Disease.
				CO3: Perform important techniques for enumeration of microbes in different samples.
				CO4: Understand and handle different types of Microscopes.
				CO5: Perform preparative and analytical techniques for separation of components.
	V/VI	20MBP631M12	Microbial Quality	CO1: Develop the skills on staining techniques

20	set - 3		Control Instrumentation & Techniques - Practical	CO2: Learn to estimate the nucleic acids
				CO3: Understand the techniques for separation of cell components
21	V/VI set - 3	20MBSEC32DI3	Drug Design, Discovery & Intellectual Property Rights	CO1: Discuss molecular mechanism of disease and drug mode of action on organ.
				CO2: Understand drug development process.
				CO3: Acquire knowledge on preparation of vaccine and genetic disorders.
				CO4: Explain the importance of biotechnology in research and various industries.
				CO5: Discuss the importance of IPR in research.
22	V/VI set - 3	20MBP732D12	Drug Design, Discovery & Intellectual Property Rights - Practical.	CO1: Learn to isolate the chemical compounds from microbes
				CO2: Develop the skill to identify antibacterial activity
				CO3: Identify the antagonistic activity of fungi

Mapping of COs with PSOs & POs

S.No.	Sem	Course Code	Course Title	COs	PSOs	POs
1	I	20MBCCIM13	Introduction to Microbiology & Microbial Diversity	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3	PO1, PO2, PO3
				CO3	PSO1, PSO2, PSO3	PO1, PO2, PO3
				CO4	PSO1, PSO2, PO3	PO1, PO2, PO3
				CO5	PSO1, PSO2, PSO3	PO1, PO2, PO3
2		20MBP1TM12	Basic Techniques in Microbiology- Practical	CO1	PSO1, PSO2, PSO3	PO1, PO2, PO3
				CO2	PSO2, PSO4	PO1, PO2, PO3
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
3	II	20MBCCMP23	Microbial Physiology & Biochemistry	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO4	PO1, PO2, PO3
				CO3	PSO1, PSO2,	PO1, PO2, PO3
				CO4	PSO1, PSO2, PSO4	PO1, PO2, PO3
				CO5	PSO1, PSO2, PSO4, PSO4	PO1, PO2, PO3
4		20MBP2QA22	Qualitative & Quantitative Analysis - Practical	CO1	PSO3, PSO4	PO1, PO2, PSO4, PO8
				CO2	PSO2, PSO4, PSO3	PO1, PO2, PO4, PO8
				CO3	PSO2, PSO4, PSO3	PO1, PO2, PO4, PO8
5	III	20MBCCMI33	Medical Microbiology & Immunology	CO1	PSO2, PSO3	PO1, PO4, PO7
				CO2	PSO1, PSO2, PSO3	PO1, PO4, PO7
				CO3	PSO1, PSO2, PSO4	PO1, PO4, PO7
				CO4	PSO1, PSO2, PSO3	PO1, PO4, PO7
6		20MBP3MI32	Medical Microbiology & Immunology –	CO1	PSO2, PSO3, PSO4,	PO1, PO2, PO4, PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO4, PO8

			Practical			
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
7	IV	20MBCCMG43	Microbial Genetics & Molecular Biology.	CO1	PSO1, PSO2, PSO3, PSO4	PO1,PO7,PO8
				CO2	PSO1, PSO2, PSO3,	PO1,PO7,PO8
				CO3	PSO1, PSO2, PSO3	PO1,PO7,PO8
				CO4	PSO1, PSO2, PSO4	PO1,PO7,PO8
8		20MBP4MG42	Microbial Genetics & Molecular Biology - Practical	CO1	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO2	PSO2, PSO4	PO1, PO2, PO3,PO4
				CO3	PSO2, PSO4	PO1, PO2, PO3,PO4
9	IV	20MBCCIM43	Industrial Microbiology	CO1	PSO1, PSO2,	PO1.PO2,PO6,PO8
				CO2	PSO1, PSO2, PSO3	PO1.PO2,PO6,PO8
				CO3	PSO1, PSO2, PSO3, PSO4	PO1.PO2,PO6,PO8
				CO4	PSO1, PSO2, PSO4	PO1.PO2,PO6,PO8
10		20MBP5IM42	Industrial Microbiology-Practical	CO1	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
11	V/VI	20MBSEC11FA3	Food, Agriculture & Environmental Microbiology	CO1	PSO1, PSO2, PSO3,PSO4.	PO1, PO2, PO4,PO8
				CO2	PSO1, PSO2, PSO3,PSO4	PO1, PO2, PO4,PO8

	set- 1			CO3	PSO1, PSO2, PSO3,PSO4	PO1, PO2, PO6,PO7
				CO4	PSO1, PSO2, PSO3,PSO4	PO1, PO2, PO6,PO8
				CO5	PSO1, PSO2, PSO3,PSO4	PO1, PO2, PO6,PO7

12	set - 1	20MBP611FA2	Food, Agriculture & Environmental Microbiology – Practical			
				CO1	PSO2, PSO3, PSO4	PO1, PO2, PO6,PO7,PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO6,PO7,PO8
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO6,PO7,PO8
13	set - 1 V/VI	20MBSEC12MD3	Management of Microbial Human Diseases & Diagnosis.	CO1	PSO1, PSO2, PSO3	PSO1, PSO2, PSO6,PSO7,PO8
				CO2	PSO1, PSO2, PSO3	PO1, PO2, PO6,PO7,PO8
				CO3	PSO1, PSO2, PSO3	PO1, PO2, PO6,PO7,PO8
				CO4	PSO1, PSO2, PSO3	PO1, PO2, PO6,PO7,PO8
				CO5	PSO1, PSO2, PSO3	PO1, PO2, PO6,PO7,PO8
14	set- 1	20MBP712MD2	Management of Microbial Human Diseases & Diagnosis.- practical	CO1	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO2	PSO2, PSO4	PO1, PO2, PO4,PO8
				CO3	PSO2, PSO4	PO1, PO2, PO4,PO8
15	set -2 V/VI	20MBSEC21MB3	Microbial Biotechnology & r –DNA Technology	CO1	PSO1, PS2, PSO3 PSO4	PO1, PO2, PO6,PO7
				CO2	PSO1, PS2, PSO3 PSO4	PO1, PO2, PO6,PO7
				CO3	PSO1, PS2, PSO3 PSO4	PO1, PO2, PO6,PO7
				CO4	PSO1, PS2, PSO3 PSO4 PSO1, PS2, PSO3 PSO4	PO1, PO2, PO3,,PO7
				CO5	PSO1, PS2, PSO3 PSO4	PO1, PO2, PO3,PO7
	set -2	20MBP621MB2	Microbial Biotechnology & r –DNA	CO1	PSO2, PSO3, PSO4	PSO1, PSO2, PSO4,PSO8

16	V/VI		Technology-Practical	CO2	PSO2, PSO3, PSO4	PO1, PO2, PO4, PO8
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO4, PO8
17	set -2 V/VI	20MBSEC22BB3	Biostatistics & Bioinformatics	CO1	PSO1, PS2, PSO3	PO1, PO2, PO6, PO8
				CO2	PSO1, PS2, PSO3, PSO4,	PO1, PO2, PO6, PO8
				CO3	PSO1, PS2, PSO3, PO4	PO1, PO2, PO6, PO8
				CO4	PSO1, PS2, PSO3, PO4	PO1, PO2, PO6, PO8
				CO5	PSO1, PS2, PSO3, PO4	PO1, PO2, PO6, PO8
18	set -2 V/VI	20MBP722BB2	Biostatistics & Bioinformatics-Practical	CO1	PSO2, PSO3, PSO4	PO1, PO2, PO4, PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO3, PO7
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO3, PO7
19	set -3 V/VI	20MBSEC31M13	Microbial Quality Control Instrumentation & Techniques	CO1	PSO1, PS2, PSO3	PO1, PO2, PO6, PO7.
				CO2	PSO1, PS2, PSO3	PO1, PO2, PO6, PO7
				CO3	PSO1, PS2, PSO3	PO1, PO2, PO6, PO7
				CO4	PSO1, PS2, PSO3	PO1, PO2, PO6, PO7
				CO5	PSO1, PS2, PSO3	PO1, PSO2, PO6, PSO7
				CO1	PSO2, PSO3, PSO4	PO1, PO2,
	set -3	20MBP631M12	Microbial Quality	CO1	PSO2, PSO3, PSO4	PO1, PO2,

20	V/VI		Control Instrumentation & Techniques - Practical			PO4,PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
21	set -3 V/VI	20MBSEC32D13	Drug Design, Discovery & Intellectual Property Rights	CO1	PSO1, PSO2, PSO3	PO1, PO2, PO4,PO6
				CO2	PSO1, PS2, PSO3	PO1, PO2, PO4,PO6
				CO3	PSO1, PS2, PSO3	PO1, PO2, PO4,PO6
				CO4	PSO1, PS2, PSO3	PO1, PO2, PO4,PO6
				CO5	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
22	set -3 V/VI	20MBP732D12	Drug Design, Discovery & Intellectual Property Rights - Practical	CO1	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO2	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8
				CO3	PSO2, PSO3, PSO4	PO1, PO2, PO4,PO8

Mapping of Courses with PSOs

S.No	Course Title	PSO 1	PSO 2	PSO 3	PSO 4
1	Introduction to Microbiology & Microbial Diversity	✓	✓	✓	✓
2	Basic Techniques in Microbiology - Practical	✓	✓	✓	✓
3	Microbial Physiology & Biochemistry	✓	✓	✓	✓
4	Qualitative & Quantitative Analysis- Practical	-	✓	✓	✓
5	Medical Microbiology & Immunology	✓	✓	✓	✓
6	Medical Microbiology & Immunology - Practical	-	✓	✓	✓
7	Microbial Genetics & Molecular Biology.	✓	✓	✓	✓
8	Microbial Genetics & Molecular Biology- Practical	-	✓	✓	✓
9	Industrial Microbiology	✓	✓	✓	✓
10	Industrial Microbiology- Practical	-	✓	✓	✓
11	Food, Agriculture & Environmental Microbiology	✓	✓	✓	✓
12	Food, Agriculture & Environmental Microbiology- Practical	-	✓	✓	✓
13	Management of Microbial Human Diseases & Diagnosis	✓	✓	✓	-
14	Management of Microbial Human Diseases & Diagnosis - Practical	-	✓	✓	✓
15	Microbial Biotechnology & r –DNA Technology	✓	✓	✓	✓

16	Microbial Biotechnology & r –DNA Technology- Practical	-	✓	✓	✓
17	Biostatistics & Bioinformatics	✓	✓	✓	✓
18	Biostatistics & Bioinformatics- Practical	-	✓	✓	✓
19	Microbial Quality Control Instrumentation & Techniques	✓	✓	✓	-
20	Microbial Quality Control Instrumentation & Techniques - Practical	-	✓	✓	✓
21	Drug Design, Discovery & Intellectual Property Rights	✓	✓	✓	✓
22	Drug Design, Discovery & Intellectual Property Rights - Practical.	-	✓	✓	✓

Mapping of Courses with POs

Course	PO1 Essential Knowle dge	PO2 Creati ve and critica l thinki ng and proble m solving abilitie	PO3 Teamwork and communic ation skills	PO4 Motivati on and preparat ion in life-long learning	PO5 Professiona lism and leadership readiness	PO6 Intercultu ral and ethical competen cy	PO7 Self- awarene ss and emotion al intelligenc e	PO8 Social Responsi bility
IM	✓	✓	✓	✓	-	-	-	-
TM	✓	✓	✓	✓	-	-	-	-
MP	✓	✓	✓	✓	-	-	-	
QA	✓	✓	-	✓	-	-	-	✓
MI	✓		-	✓	-	-	✓	-
MI	✓	✓	-	✓	-	-	-	✓
MG	✓	-	-	-	-	-	✓	✓
MG	✓	✓	✓	✓	-	-	-	✓
IM	✓	✓	-	-	-	✓	-	✓
IM	✓	✓	-	✓	-	-	-	✓
FA	✓	✓	✓	✓	-	✓	✓	✓
FA	✓	✓	-	-	-	✓	✓	✓
MD	✓	✓	-	-	-	✓	✓	✓

MD	✓	✓	-	✓	-	-	-	✓
MB	✓	✓	✓	-	-	✓	✓	-
MB	✓	✓	-	✓	-	-	-	✓
BB	✓	✓	-	-	-	✓		✓
BB	✓	✓	✓	✓	-		✓	✓
MI	✓	✓	-	-	-	✓	✓	-
MI	✓	✓	-	✓	-	-	-	✓
DI	✓	✓	-	✓	-	✓	-	✓
DI	✓	✓	-	✓	-		-	✓