

CURRICULUM & SYLLABUS



CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

MASTER OF SCIENCE (M.Sc.)

(2 Year Postgraduate Degree Programme)

IN

MICROBIOLOGY

[w. e. f. 2023-24]

FACULTY OF SCIENCE & HUMANATIES
SRM UNIVERSITY DELHI-NCR, SONEPAT
No.39, Rajiv Gandhi Education City, Sonapat
Haryana-131029

SCHEME OF STUDIES & SYLLABUS

MASTER OF SCIENCE

(2 Years Degree Programme)

MICROBIOLOGY

(w.e.f. Session 2023-24 onwards)



DEPARTMENT OF MICROBIOLOGY

FACULTY OF SCIENCE & HUMANATIES

SRM UNIVERSITY DELHI-NCR, SONEPAT

SONEPAT, HARYANA -131029

Course Structure
Details of Course M.Sc. (Microbiology)
Course Credits:Theory& Practical

I. Course Theory (14 Papers)	14X3+1=43
II. Course Electives (3 Papers)	3X3=9
III. Course Practical (8 Papers)	8×2=16
IV. Project Work and Dissertation	1X14=14
V. Seminar/Research Paper Presentation	1X2=2
V. Live Project	1X2=2

Total 86 Credits

M.Sc. Microbiology Graduates Employability Attributes

- Sound knowledge and understanding of the domain areas: Graduates have a thorough knowledge and understanding of their subject area, as well as the capacity to apply what they've learned in the classroom, even in multidisciplinary courses.
- Creative , Critical thinking and Problem solving: Effective problems-solvers, able to apply critical, creative and evidence-based thinking to conceive innovative responses to future challenges.
- Communication Skills and Team work: Successfully communicate ideas and information to all members and audiences in a collaborative way in order to achieve common goals.
- Dependability, reliability, responsibility, and independent leadership abilities: Graduates have the capacity to be entrepreneurial and take leadership roles in their chosen industries or careers, as well as in their communities.

M.Sc. MICROBIOLOGY PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- To impart knowledge about the importance of microorganisms with respect to disease, therapy, industry and research.
- To handle microbes and basic instrumentation used in microbiological laboratory. Various basic techniques to isolate, characterize the microbes morphologically will be known to them.
- To know the use of various advanced techniques for application in the field of microbiology.
- To apply statistics to the experiments being carried out by them, besides this they will be acquainted with the basics of bioinformatics, a science that is of utmost use in fast changing world of research.
- To undertake research on their area of interest. This training acquaints students with identification of a research topic, research planning and its execution.

M.Sc. MICROBIOLOGY PROGRAM LEARNING OUTCOMES (PLOs)

- The students will be able to understand the biochemical pathways of synthesis and degradation of the molecules and the transport of different metabolites generated with application in industrial processes.
- Students will be able to demonstrate a knowledge and understanding of: Genetic engineering principle in the development of novel microbial strains with an application in agriculture, bioremediation, vaccine development, gene therapy and disease detections.
- Students will be able to work both independently or in groups on complex problems to apply the scientific knowledge to develop entrepreneurship abilities. They will be able to identify a research topic, planning and execution and are capable to present the results/findings in the scientific manner.
- Confidence level is enhanced by arranging seminars where students give seminars on current research topics of the subject. Students are encouraged to think independently, plan research separately during dissertations, subject based quiz competition, instructions to address a research problem.
- Students are encouraged to undergo summer training during vacations in their related fields. Students are also encouraged to participate in seminars, visit to research institutions is arranged where they get a chance to interact with the researchers.

MAPPING MATRIX OF PEOs & PLOs

Programing Educational Objectives (PEO's)	Program Learning Outcomes (PLO's)				
	PLO1	PLO2	PLO3	PLO4	PLO5
PEO1	✓	✓			
PEO2	✓	✓	✓		
PEO3		✓	✓	✓	
PEO4			✓	✓	
PEO5				✓	✓

SEMESTER-I

Course Code	Course Name	Lectures (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credit (C)
21MBM101	Microbiology	3	-	-	3
21MBM102	Cell Biology	3	-	-	3
21MSM103	Microbial Biochemistry	3	-	-	3
21MBM104	Biophysics & Instrumentation Technology	3	-	-	3
21MSM105	Molecular Biology	3	-	-	3
21MPEXXX	Department Elective- 1	3	-	-	3
21MBM151	Lab 1 -Microbiology	-	2	2	2
21MBM153	Lab2 -Biochemistry	-	2	2	2
21MBM155	Lab 3 -Molecular Biology	-	2	2	2
	Total	18	6	6	24
	Total Contact Hours	30			

Department Elective-1	Subjects
21MPE101	Animal Biotechnology
21MPE102	Plant Biotechnology
21MPE103	Environmental Biotechnology

SEMESTER-II

Course Code	Course Name	Lectures (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credit (C)
21MBM201	Genomics & Proteomics	3	-	-	3
21MSM202	Microbial Technology	3	-	-	3
21MBM203	Bioinformatics & Computational Biology	3	-	-	3
21MSM204	Environmental Microbiology	3	-	-	3
21MBM205	Immunology and Immunotherapy	3	-	-	3
21MPEXXX	Department Elective-2	3	-	-	3
21MSM252	Lab4 -Microbial Technology Lab		2	2	2
21MBM255	Lab 5 -Immunology Lab	-	2	2	2
21MBM253	Lab6 -Computational Biology Lab	-	2	2	2
	Total	18	6	6	24
	Total Contact Hours	30			

Department Elective-2	Subjects
21MPE201	Drug Designing & Pharmacogenomics
21MPE202	Enzymology
21MPE203	Virology
21MPM204	Pharmaceutical Microbiology

SEMESTER-III

Course Code	Course Name	Lectures (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credit (C)
21MBM301	Downstream Processing & Fermentation Technology	3	-	-	3
21MBM302	Biostatistics	3	-	-	3
21MSM303	Bioethics, IPR & Biosafety	3	-	-	3
21MSM304	Microbial Genetics	3	-	-	3
21MPEXXX	Department Elective-3	3	-	-	3
21MBM351	Lab 7 -Downstream Processing Lab	-	2	2	2
21MSM354	Lab8 - Applied Microbiology Lab	-	2	2	2
21MBM355	Seminar/Research Paper & Technical Writing	1	1	-	2
21MBM356	Minor Project/Live Project	-	-	4	2
21MBM357	Research Methodology	1	-	-	1
	Total	17	5	8	24
	Total Contact Hours	30			

Department Elective-3	Subjects
21MPM301	Food and Nutrition Biology
21MPM302	Industrial Microbiology
21MPE303	AI & ML in Biological Sciences
22MPE304	Nutritional Immunology

SEMESTER-IV

Course Code	Course Name	Lectures (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credit (C)
21MSM451	Project Work (22-24 Weeks)	-	-	18	9
21MSM452	Dissertation Presentation and Viva Voice	-	-	10	5
	Total Credits				14