

**UNIVERSITY OF KERALA**  
THIRUVANANTHAPURAM

**MASTER OF SCIENCE IN MICROBIOLOGY**

**(M.Sc. Microbiology)**

**SCHEME & SYLLABUS**

**(Semester System)**

**(w.e.f. 2022 Admissions)**

## M.Sc. Degree in Microbiology

### Course structure

Seme ster	Paper Code	Title of the Paper	Hours/week		Maximum Marks		
			L	P	CA	ESA	Total
SEM I	MB 511	General Microbiology	6	0	25	75	100
	MB 512	Microbial Physiology, Biochemistry and Biostatistics	5	0	25	75	100
	MB 513	Biophysics, Instrumentation and Bioinformatics	5	0	25	75	100
	MB 514	Lab -1. General Microbiology	0	5	*	*	Δ
	MB 515	Lab -2. Microbial Biochemistry and Bioinformatics	0	4	*	*	Δ
	MB 516	Industrial Visit	0	0	0	*	Δ
	Total for Semester I		16	9	75	225	300
SEM II	MB 521	Molecular Biology and rDNA Technology	5	0	25	75	100
	MB 522	Immunology, Immunotechniques and Cancer Biology	5	0	25	75	100
	MB 523	Food and Industrial Microbiology	5	0	25	75	100
	MB 524	Biosafety, Quality Assurance and IPR (Elective)	3	0	25	75	100
	MB 514	Lab -1. General Microbiology (Practical for Sem I)	0	0	15*	55*	70
	MB 515	Lab -2. Microbial Biochemistry and Bioinformatics(Practical for Sem I)	0	0	15*	55*	70
	MB 525	Lab-3. rDNA Technology and Immunology	0	3	15	55	70
	MB 526	Lab-4. Food and Industrial Microbiology	0	4	15	55	70
	MB 516	Industrial Visit	0	0	-	15*	15
	Total for Semester II		18	7	160	535	695
SEM III	MB 531	Environmental, Agricultural and Exo Microbiology	5	0	25	75	100
	MB 532	Medical Bacteriology and Diagnostic Microbiology	5	0	25	75	100
	MB 533	Medical Virology, Mycology and Protozoology	5	0	25	75	100
	MB 534	Lab –5. Environmental and Agricultural Microbiology	0	5	**	**	ΔΔ
	MB 535	Lab-6. Medical Bacteriology, Virology, Mycology and Protozoology.	0	5	**	**	ΔΔ
	MB 536	Medical/Diagnostic Lab Visit	0	0	0	**	ΔΔ
	Total for Semester III		15	10	75	225	300
SEM IV	MB 541	Marine Microbiology	5	0	25	75	100
	MB 542	Pharmaceutical Microbiology (Elective)	5	0	25	75	100
	MB 534	Lab –5. Environmental and Agricultural Microbiology (Practical for Sem 3)	0	0	15**	55**	70
	MB 535	Lab-6. Medical Bacteriology, Virology, Mycology and Protozoology (Practical for Sem 3)	0	0	15**	55**	70
	MB 536	Medical/Diagnostic Lab Visit	0	0	-	15**	15
	MB 543	Dissertation	0	15	-	100	100
	MB 544	Comprehensive Viva-Voce	0	0	-	50	50
	Total for Semester IV		10	15	80	425	505
		Grand Total			390	1410	1800
L-Lecture, P-practical, ESA-End Semester Assessment, CA-Continuous Assessment (Internal)							

Δ The S1 practical examinations are to be conducted along with the S2 practical examinations. Assessment of Industrial visit is to be done at the end of semester 2. \*The S1 practical examination & Industrial visit marks will be awarded only in semester 2.

ΔΔ The S3 practical examinations are to be conducted along with the comprehensive viva voce and assessment of dissertation in semester 4. Assessment of Medical/Diagnostic lab visit is to be done at the end of semester 4. \*\*The S3 practical examination & Medical/Diagnostic Lab visit marks will be awarded only in Semester 4.

## **Preamble**

The postgraduate course in Microbiology aims to professionally train students with an undergraduate degree in life science to provide services in teaching institutions, research institutions, hospitals, quality control divisions of industries, food processing units and other related settings. These postgraduates are expected to be equipped to pursue research and to contribute to the knowledge building process in the same field.

## **Eligibility criteria for admission**

B.Sc. degree in Life Sciences (Microbiology, Biochemistry & Industrial Microbiology, Biotechnology (double main & triple main), Biochemistry, Zoology & Botany) from University of Kerala or recognized as equivalent there to by University of Kerala securing not less than 55% marks.

## **Course Structure**

The post Graduate course leading to the award of the Master of Science Degree in Microbiology by the University of Kerala is spread over four semesters of 18 weeks duration. The academic work is a package of twelve theory papers which includes one elective paper to be chosen from four options, six practical papers, one dissertation, one industrial visit, one Medical lab visit and a comprehensive viva voce. Each semester will include didactic lectures, practical training, assignment writings, seminars, group discussions, tutorials, presentations etc.

In semester I there are three theory papers and two practical papers along with an industrial visit. In semester II, there are three common theory papers, one elective theory paper and two practical papers. In semester III, there are three theory papers, two practical papers along with a medical/diagnostic lab visit. Semester IV comprises of one common theory paper, one elective theory paper and one dissertation. There will be a comprehensive viva voce at the end of semester IV to evaluate enbloc semesters I, II, III & IV. The practical papers in all the semesters contain units related to the theory papers in that semester.

The scheme of papers and the distribution of marks for continuous evaluation (CA) and End Semester Examination (ESA) are given below:

## Examinations and Requirements for Passing

Evaluation of each paper shall be done in parts viz., Continuous Assessment (CA) and End Semester Assessment (ESA). The distribution of marks shall be 25% for CA and 75% for ESA for all theory papers. In the case of practical papers, the distribution of marks shall be 15 for CA and 55 for ESA in a total of 70.

There shall be no continuous assessment for dissertation work.

The allocation of marks for Continuous Assessment (CA) for theory papers shall be in the following proportion:

CA mark allocation for theory papers	
Assignment	10
Tests	10
Seminar	5
<b>Total</b>	<b>25</b>

The allocation of marks for Continuous Assessment (CA) for practical papers shall be in the following proportion:

CA mark allocation for practical		
Attendance	5	>90 % - 5 marks >86-90 % - 4 marks >81-85 % - 3 marks >76-80 % - 2 marks 75% - 1 mark
Performance	5	
Punctuality	5	
<b>Total</b>	<b>15</b>	

Only those who secure a minimum of 75% attendance in the aggregate for all the papers of a semester taken together alone will be allowed to register for the End Semester Examination of the semester.

Each student shall be required to do two assignments for each paper; a maximum 10 marks shall be awarded for two assignments.

There shall be two class tests during a semester. Marks of tests shall be awarded on the basis of the marks secured for the best of two tests. Maximum ten marks shall be awarded for the test.

Students shall be required to present a seminar on a selected topic in each paper. The evaluation of the

seminar will be done on the basis of presentation, content of the seminar paper and participation in discussion. The maximum marks shall be five.

Pass requirement shall be 40% marks for ESA for each paper and an aggregate minimum of 50% marks including CA for all the papers put together of a semester

### **Dissertation**

Aim: (a) Application of knowledge to real life situation (b) To introduce research methodology.

Topic of the dissertation may be chosen from any area of Microbiology and should be laboratory based with emphasis on originality of approach. It may be started during second or third semester and shall be completed by the end of the IV semester. The dissertation submitted should include (a) background information in the form of introduction (b) objectives of the study (c) materials and methods employed for the study (d) results and discussion thereon (e) summary and conclusions and (f) bibliography. Apart from these sections, importance of the results, originality and general presentation also may be taken into consideration for evaluation.

Two copies of the dissertation duly certified by the supervising teacher and countersigned by the principal, where the course is held, shall be submitted to the University before the commencement of the End Semester Examination (ESA) at the end of the fourth semester. The maximum marks for the dissertation shall be 100 of which 20% shall be allotted to viva-voce examination, which shall be conducted along with the comprehensive viva.

### **Pattern of Question papers for the End Semester Examination**

Each question paper must have three parts drawing questions from all the units in the syllabus. Part I of the paper shall consist of long essays, Part-II short essays and Part-III brief notes and concepts.

In Part-I, two out of three questions each carrying 10 marks, in Part-II, five out of eight questions each carrying 5 marks and in Part-III ten out of fourteen questions each carrying 3 marks shall be answered. Thus the total marks shall be 75.

ESA for the practicals at the end of semesters 2 & 4, Assessment of Industrial visit & medical/Diagnostic lab visit at the end of semesters 2 & 4, Assessment of dissertation at the end of semester 4 and the comprehensive viva –voce at the end of semester 4 shall be conducted by the board of examiners appointed by the controller of examinations.

Any other PG regulations decided by the University of Kerala shall be applicable to the students of M.Sc Microbiology of this university.

### MARKS AWARDED IN EACH SEMESTER

Semester I	300
Semester II	695
Semester III	300
Semester IV	505
<b>Total</b>	<b>1800</b>

### SCHEME FOR PRACTICALS

<b>Semester I</b>	<b>MB 514</b>	LAB -1. GENERAL MICROBIOLOGY	70 marks
	<b>MB 515</b>	LAB -2. MICROBIAL BIOCHEMISTRY AND BIOINFORMATICS	70 marks
<b>Semester II</b>	<b>MB 525</b>	LAB-3. rDNA TECHNOLOGY AND IMMUNOLOGY	70 marks
	<b>MB 526</b>	LAB-4. FOOD AND INDUSTRIAL MICROBIOLOGY	70 marks
<b>Semester III</b>	<b>MB 534</b>	LAB -5. ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY	70 marks
	<b>MB 535</b>	LAB-6. MEDICAL BACTERIOLOGY, VIROLOGY, MYCOLOGY AND PROTOZOOLOGY	70 marks

The practical examinations are conducted at the end of semester 2 & semester 4.

At the end of semester 2, examination for practical MB514, MB515, MB 525 & MB 526 and at the end of semester 4, examination for practical MB534 & MB535 will be conducted.

### SCHEME FOR INDUSTRIAL VISIT & MEDICAL/DIAGNOSTIC LAB VISIT

<b>Semester I</b>	<b>MB 516</b>	INDUSTRIAL VISIT	15 marks
<b>Semester III</b>	<b>MB 536</b>	MEDICAL/DIAGNOSTIC LAB VISIT	15 marks

**Assessment of industrial visit is to be done at the end of semester 2**

**Assessment of medical/diagnostic lab visit is to be done at the end of semester 4**

## Distribution of marks for Practical Examination

	Code		Duration	ESA	CA	Total marks
<b>Semester I</b>	<b>MB 514</b>	<b>Practical I</b>	6 hrs x 2 days*		15	70
		Minor		10		
		Major		40		
		Record		5		
	<b>MB 515</b>	<b>Practical II</b> Minor	6 hrs x 1 day*	10	15	70
		Major		40		
		Record		5		
<b>Semester II</b>	<b>MB 525</b>	<b>Practical III</b>	6 hrs x 2 days**		15	70
		Minor		10		
		Major		40		
		Record		5		
	<b>MB 526</b>	<b>Practical IV</b>	6 hrs x 2 days**		15	70
		Minor		10		
		Major		40		
		Record		5		
<b>Semester III</b>	<b>MB 534</b>	<b>Practical V</b>	6 hrs x 2 days***		15	70
		Minor		10		
		Major		40		
		Record		5		
	<b>MB 535</b>	<b>Practical VI</b>	6 hrs x 2 days***		15	70
		Minor		10		
		Major		40		
		Record		5		
<b>Semester IV</b>	<b>MB 543</b>	Assessment of Report	6 hrs x 2 days***	80		100
	<b>Dissertation</b>	Presentation & viva		20		
	<b>MB 544</b>	Comprehensive Viva-Voce		50		50

\*can be clubbed together ( Total 2 days)

\*\*can be clubbed together ( Total 2 days)

\*\*\* can be clubbed together ( Total 4 days)

The S1 practical examinations are to be conducted along with the S2 practical examinations.

The S3 practical examinations are to be conducted along with the Comprehensive viva voce and assessment of dissertation in Semester 4.

### Overall distribution of marks

Theory	100x12	=	1200
Practical	70x6	=	420
Industrial visit	15x1	=	15
Medical/ Diagnostic Lab visit	15x1	=	15
Dissertation	100x1	=	100
Comprehensive Viva-Voce	50x1	=	50
<b>Total</b>		<b>=</b>	<b>1800</b>