

DEPARTMENT OF MICROBIOLOGY				CLASS: I PG				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
I	NME 1	21P1RNM1	Microbial World	2	2	25	75	100

Nature of Course			
Knowledge and skill	✓		Employability oriented
Skill oriented			Entrepreneurship oriented

Course Objectives

1. To know the structure and nomenclature of microorganisms
2. To impart basic knowledge on history of microbiology.
3. To identify the uses of environmentally friendly microorganisms
4. To know the beneficial aspects of microbes
5. To study harmful aspects of microbes

Course Learning Outcome

On successful completion of the programme, the students will be able to

1. Explain the morphological and cultural characteristics of microorganisms
2. Understand the contributions of scientists in the field of microbiology
3. Summarize the application of microorganisms in bioremediation
4. Understand the beneficial aspects of microbes
5. Classify the harmful microbial characteristics

Unit	Description	Hours	K Level	CLO
I	Unit I - Basic structure and properties of microorganisms Introduction – types, structure and properties of microorganisms- bacteria, fungi, microscopic algae, protozoan and viruses.	6 hrs	Up to K2	1
II	Unit II - Contribution of scientists in the field of microbiology History of Microbiology – Anton van Leeuwenhock – spontaneous generation of organisms, contributions by Redi, Spallanzani, Louis Pasteur, Robert Koch, Edward Jenner and Alexander Fleming in the field of Microbiology.	6 hrs	Up to K2	2

III	Unit III – Interaction of microbes with environment Role and significance of microbes in the environment – superbugs, Biogeochemical cycle, Biogas, Bio-fertilizer, Biological control, Bio-remediation.	6 hrs	Up to K2	3
IV	Unit IV – Significant aspects of microbes Beneficial aspects of microbes- any four important uses and its economical importance with specific examples from Algae, Fungi and Bacteria.	6 hrs	Up to K2	4
V	Unit V – Adverse effects of microbes Harmful aspects of microbes – any four harmful effects of Fungi, Bacteria and viruses with specific examples.	6 hrs	Up to K2	5

Total 30hrs

Books for study:

1. Pelczar, Jr. M.J., Chan, E.C.S. and Kreig, N.R. (2006). Microbiology. 5th Edition. McGraw Hill Inc., New York.
2. Dubey, R.C. (2004). Basic Microbiology, S.Chand Publications, New Delhi.

Reference Books:

1. Hurst, C.J., Crawford, R.L., Garland, J.L., Lipson, D.A. and Mills, A.L. (2002). Manual of Environmental Microbiology, 2nd Edition. ASM Press, New Delhi.
2. Atlas, R.A. (1995). Principles of Microbiology. Mosby Publications, USA.
3. Madigan, M.T. and Martinko, J.M. (2014). Brock Biology of Microorganisms. 14th Edition. Prentice Hall International Inc., USA.

Web resources

1. <https://microbiologyinfo.com/category/basic-microbiology/>
2. <https://microbiologyinfo.com/category/basic-microbiology/>
3. <https://www.britannica.com/science/microbiology>

Rationale for nature of the course

Microorganisms play a vital role in nutrient cycling, biodegradation, climate changes and in making life-saving drugs and manufacture of biofuels. Bio-treatment of waste has become environmentally friendly alternative to other options. Microbes are also known to cause deadly disease and cause an adverse impact on other living organisms.

Activities having direct bearing on skill development/ employability/entrepreneurship

Determination of the morphological characteristic of microorganisms.

Categories environmental friendly microbes

Microbial adverse effects on other life

Pedagogy

Chalk and talk, PPT, Group discussion, Seminar, Screening of educational videos and quiz

Course Learning Outcomes (CLO)

On completion of this course the students will be able to

CLOs	Course Learning Outcome	Knowledge Level
CLO-1	Explain the morphological and cultural characteristics of microorganisms	Up to K2
CLO-2	Understand the contributions of scientists in the field of microbiology	Up to K2
CLO-3	Summarize application of microorganisms in bioremediation	Up to K2
CLO-4	Understand the beneficial aspects of microbes	Up to K2
CLO-5	Classify the harmful microbial characteristics of microbes	Up to K2

K1 –Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 – Examining, analyzing, presentation and make interferences with evidences

Mapping of Course Learning Outcome with Programme Specific Outcome

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	2	2	2	1	1
CLO2	2	3	3	2	2
CLO3	1	1	2	1	1
CLO4	1	2	1	1	2
CLO5	1	1	1	2	1

Advance application – 3,

Intermediate level – 2,

Basic level – 1.

Mapping of Course Outcome with Programme Outcome

	PO1	PO2	PO3	PO4	PO5
CLO1	1	2	1	2	1
CLO2	2	2	3	3	2
CLO3	1	2	1	2	1
CLO4	2	1	2	1	1
CLO5	1	1	1	2	1

Advance application – 3,

Intermediate level – 2,

Basic level – 1.

LESSON PLAN

Units	Description	Staff	Hours	Mode
I Basic structure and properties of microorganisms	a) Introduction – types, structure and properties of microorganisms		1	Chalk and Talk
	b) Types, structure and properties of bacteria, fungi		2	PPT
	c) Types, structure and properties of microscopic algae, protozoan and viruses.		3	PPT
II Contribution of scientists in the field of microbiology	a) History of Microbiology — spontaneous generation of organisms.		1	Chalk and talk
	b) Contributions by Anton van Leeuwenhock, Redi, in the field of Microbiology.		2	PPT
	c) Spallanzani, Louis Pasteur, Robert Koch in the field of Microbiology.		2	Chalk and Talk
	d) Edward Jenner and Alexander Fleming in the field of Microbiology.		2	Lecture
III Interaction of microbes with environment	a) Role and significance of microbes in the environment – superbugs.		1	PPT
	b) Role and significance of microbes in the environment –biogeochemical cycle.		1	Chalk and Talk
	c) Role and significance of microbes in the environment – biogas, bio-fertilizer.		2	Lecture
	d) Role and significance of microbes in the environment – biological control, bio-remediation.		2	PPT
IV Significant aspects of microbes	a) Beneficial aspects of microbes- any four important uses and its economical importance with specific examples from Algae.		2	Chalk and talk
	b) Beneficial aspects of microbes- any four important uses and its economical importance with specific examples from Fungi.		2	PPT
	c) Beneficial aspects of microbes- any four important uses and its economical importance with specific examples from Bacteria		1	Chalk and Talk
V Adverse effects of microbes	a) Harmful aspects of microbes – any four harmful effects of Fungi with specific examples.		2	PPT
	b) Harmful aspects of microbes – any four harmful effects of Bacteria with specific examples.		2	Lecture
	c) Harmful aspects of microbes – any four harmful effects of viruses with specific examples.		2	Chalk and Talk
Total			30	Hours

Learning Outcome Based Education & Assessment (LOBE)
Formative Exam – Blue Print (CIA I & II)
Articulation Mapping - K Levels with Courses Learning Outcomes (CLOs)

CLOs	K- Level	Section A		Section B		Section C	
		Short Answers		(Either/or Choice)		(Open Choice)	
		No. of Questions	K- Level	No. of Questions	K- Level	No. of Questions	K- Level
CLO x	Up to K2	1	K1	1	K2/K2	1	K1
CLO y	Up to K2	2	K1	1	K2/K2	2	K1
No. of Questions to be asked		3		2		3	
No. of Questions to be answered		3		2		2	
Marks for each question		2		7		10	
Total Marks for each section		6		14		20	

- CLO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Distribution of Section-wise Marks with K Levels (CIA I & II)

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated %
K1	6	-	30	-	36	56.25	100
K2	-	28	-	-	28	43.75	
K3	-	-	-	-	-	-	-
K4	-	-	-	-	-	-	-
Total Marks	6	14	30	-	64	100.00	100%

Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

Units	CLOs	K-Level	Section – A		Section – B		Section – C	
			Short Answers		(Either / or Choice)		(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level	No. of Questions	K-Level
1	CLO 1	Up to K2	1	K1	1	K2/K2	1	K1
2	CLO 2	Up to K2	1	K1	1	K2/K2	1	K1
3	CLO 3	Up to K2	1	K1	1	K2/K2	1	K1
4	CLO 4	Up to K2	1	K1	1	K2/K2	1	K1
5	CLO 5	Up to K2	1	K1	1	K2/K2	1	K1
No. of Questions to be asked			5		5		5	
No. of Questions to be answered			5		5		3	
Marks for each question			2		7		10	
Total Marks for each section			10		35		30	

Distribution of Section-Wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (No Choice)	Section D (No Choice)	Total Marks	% of Marks (without choice)	Consolidated
K1	10	-	50	-	60	46.15	100
K2	-	70	-	-	70	53.85	
K3	-	-	-	-	-	-	-
K4	-	-	-	-	-	-	-
Total Marks	10	35	50	-	130	100.00	100

Course designers:

1. Mrs. K. Rajeswari