

<b>INSTITUTE</b>	<b>FACULTY OF SCIENCE</b>
<b>PROGRAM</b>	<b>MASTER OF SCIENCE (MICROBIOLOGY)</b>
<b>SEMESTER</b>	<b>1</b>
<b>COURSE TITLE</b>	<b>EXPERIMENTAL LABORATORY-I</b>
<b>COURSE CODE</b>	<b>02MB0411</b>
<b>COURSE CREDITS</b>	<b>6</b>

**Objective:**

- 1 To enable students with practical skills of Biochemistry, Bioanalytical techniques, Enzymology and Microbial diversity.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Students will become aware of the Lifescience related instruments.
- 2 Students will learn to prepared basic solutions for experiments.
- 3 Students will be able to plan and execute experiments in Biochemistry, Bioanalytical techniques, Enzymology and Microbial diversity.
- 4 Students will be able to analyze, interpret and record the experimental results.

**Pre-requisite of course:**Basic understanding of Biology Laboratory.

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
0	0	12	0	0	0	50	50
<b>Contents : Unit</b>	<b>Topics</b>						<b>Contact Hours</b>
<b>Total Hours</b>							

**Suggested List of Experiments:**

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Biochemistry</b> Preparation of solutions, Qualitative Determination of Carbohydrates, Quantitative Estimation of Carbohydrates (DNSA), Qualitative Determination of Amino Acids, Quantitative Estimation of Proteins (Biuret), Quantitative Estimation of Proteins (Folin Lowry method), Quantitative Estimation of Nucleic Acids (Orcinol and DPA METHOD), Quantitative Estimation of Nucleic Acids (UV METHOD), Isolation of Proteolytic Organisms, Isolation of Lipolytic Organisms	30

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	<b>Microbial Evolution and Phylogenetics</b> Analyzing the diversity of the microbes from soil sample, Analyzing the diversity of the microbes from water sample, Colony characterization of the microbes , Cultural characterization of the microbes on selective and differential media, Biochemical characterization of the microbes, To perform different staining methods, Isolation of Halophiles, Isolation of Acidophiles, Isolation of fungi from natural samples and its morphological observation, Isolation of algae from natural samples and its morphological observation	30
3	<b>Bioanalytical Techniques</b> To perform density gradient centrifugation of given sample., To determination of absorption maxima of different solutions., To perform solvent-solvent chromatography with the given sample., To perform thin layer chromatography with the given sample., To perform paper chromatography with the given sample., To perform column chromatography with the given sample, To perform partial purification of enzyme using dialysis.	30
4	<b>Enzymology</b> To determine the effect of substrate concentration on enzyme activity., To determine the effect of enzyme concentration on enzyme activity., To investigate the effect of pH and temperature of the enzyme activity., To determine the effect of activators and inhibitors/activators/metal ions in enzyme activity., To perform immobilization of enzymes using calcium alginate method., To determine the total activity, specific activity and turn over number of enzyme from given source., To determine the blood glucose level by GOD POD method..	30
<b>Total Hours</b>		<b>120</b>

### Textbook :

- 1 Practical Microbiology, D.K.Maheshwari, S. Chand Limited, 2002
- 2 Microbiology Practical Manual, 1st Edition-E-book, Amita Jain, Jyotsna Agarwal, Vimala Venkatesh , Elsevier Health Sciences, 2018

### References:

- 1 Essentials of Practical Microbiology , Essentials of Practical Microbiology , Apurba Sankar Sastry, Bhat Sandhya K, Jaypee Brothers Medical Publishers Pvt. Limited, 2017

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

<b>Remember / Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Higher order Thinking / Creative</b>
10.00	20.00	25.00	25.00	10.00	10.00

**Instructional Method:**

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, virtual labs, role play, Quiz, brainstorming, etc.
- 2 The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, presentations, verbal interactions etc
- 3 Students will use supplementary resources such as online videos, ebooks, ppts etc.

**Supplementary Resources:**

- 1 <https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf>
- 2 <https://nptel.ac.in/courses/104105102>