SEMESTER S3

FOOD MICROBIOLOGY LAB

Course Code	**PCFTL307**	**CIE Marks**	50
Teaching Hours/Week (L: T:P: R)	0-0-3-0	**ESE Marks**	50
Credits	2	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Lab

Course Objectives:

1. Goal of this course is to develop the knowledge of students in the basic area of Food Microbiology. This is essential for the better understanding of various basic microbiological technologies and acquires knowledge about different types microorganisms related to food and techniques of microbial analysis

Expt. No.	Experiments
1	Introduction to Basic Microbiological Practices and Equipment
2	Sterilization techniques and disinfection
3	Preparation of culture media – solid and liquid
4	Cultivation and Subculturing of microbes
5	Isolation techniques for microorganisms – spread, pour & streak plate
6	Simple staining techniques
7	Gram staining method for differentiation of bacteria
8	Motility of microorganism – hanging drop method
9	Enumeration of microorganisms in air
10	Evaluation of microbiological quality of potable water
11	Evaluation of microbiological quality of milk (MBRT)
12	Quantitative analysis of milk by Standard plate count (SPC) method
13	Evaluation of microbiological quality of food products
14	Microbial Examination of Fruit sample-surface washing and internal tissue

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15	Methods for identification of Escherichia coli
16	Methods for identification of Staphylococcus aureus
17	Counting for yeasts and moulds
18	Demonstration of microbial production of curd

Course Assessment Method
(CIE: 50 marks, ESE: 50 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Preparation/Pre-Lab Work experiments, Viva and Timely completion of Lab Reports / Record (Continuous Assessment)	Internal Examination	Total
5	**25**	**20**	**50**

End Semester Examination Marks (ESE):

Procedure/ Preparatory work/Design/ Algorithm	Conduct of experiment/ Execution of work/ troubleshooting/ Programming	Result with valid inference/ Quality of Output	Viva voce	Record	Total
10	**15**	**10**	**10**	**5**	**50**

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- ***Submission of Record: Students shall be allowed for the end semester examination only upon submitting the duly certified record.***
- ***Endorsement by External Examiner:*** *The external examiner shall endorse the record*

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Demonstrate safety practices inside a microbiology laboratory and familiarise with different equipments	**K2**
CO2	Preparation and sterilisation of common culture media for subculturing microbes	**K3**
CO3	Identify suitable methods for qualitative and quantitative evaluation of food	**K3**
CO4	Evaluate the total microbial load in the food or in the environment	**K3**
CO5	Demonstrate the procedure for identification of specific microorganism in food and usage of beneficial microbes for food production	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Creat*

CO- PO Mapping (Mapping of Course Outcomes with Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3								3			
CO2	3					1			3			
CO3	3		2			2			3			
CO4	3		2			2			3			
CO5	3		2			2			3			

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Practical Microbiology	R C Dubey and D K Maheshwary	S. Chand & Co. Ltd.	2006
2	Microbiology: A Laboratory Manual	James Cappuccino		10th edition
3	Fundamental Food Microbiology	Bibek Ray	CRC press	

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Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://www.classcentral.com/course/youtube-how-to-pass-your-microbiology-lab-practical-skills-97364
2	https://onlinecourses.swayam2.ac.in/cec24_ag01/preview
3	https://www.classcentral.com/course/youtube-how-to-pass-your-microbiology-lab-practical-skills-97364
4	https://www.classcentral.com/course/youtube-food-microbiology-97376

Continuous Assessment (25 Marks)

1. Preparation and Pre-Lab Work (7 Marks)

- Pre-Lab Assignments: Assessment of pre-lab assignments or quizzes that test understanding of the upcoming experiment.
- Understanding of Theory: Evaluation based on students' preparation and understanding of the theoretical background related to the experiments.

2. **Conduct of Experiments (7 Marks)**

- Procedure and Execution: Adherence to correct procedures, accurate execution of experiments, and following safety protocols.
- Skill Proficiency: Proficiency in handling equipment, accuracy in observations, and troubleshooting skills during the experiments.
- Teamwork: Collaboration and participation in group experiments.

3. **Lab Reports and Record Keeping (6 Marks)**

- Quality of Reports: Clarity, completeness and accuracy of lab reports. Proper documentation of experiments, data analysis and conclusions.
- Timely Submission: Adhering to deadlines for submitting lab reports/rough record and maintaining a well-organized fair record.

4. **Viva Voce (5 Marks)**

- Oral Examination: Ability to explain the experiment, results and underlying principles during a viva voce session.

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Final Marks Averaging: The final marks for preparation, conduct of experiments, viva, and record are the average of all the specified experiments in the syllabus.

Evaluation Pattern for End Semester Examination (50 Marks)

1. **Procedure/Preliminary Work/Design/Algorithm (10 Marks)**

- Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
- Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
- Algorithm Development: Correctness and efficiency of the algorithm related to the experiment.
- Creativity and logic in algorithm or experimental design.

2. **Conduct of Experiment/Execution of Work/Programming (15 Marks)**

- Setup and Execution: Proper setup and accurate execution of the experiment or programming task.

3. **Result with Valid Inference/Quality of Output (10 Marks)**

    - Accuracy of Results: Precision and correctness of the obtained results.
    - Analysis and Interpretation: Validity of inferences drawn from the experiment or quality of program output.

4. **Viva Voce (10 Marks)**

- Ability to explain the experiment, procedure results and answer related questions
- Proficiency in answering questions related to theoretical and practical aspects of the subject.

5. **Record (5 Marks)**

- Completeness, clarity, and accuracy of the lab record submitted

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