SEMESTER S3

FOOD CHEMISTRY LAB

Course Code	**PCFTL308**	**CIE Marks**	50
Teaching Hours/Week (L: T:P: R)	0:0:3:0	**ESE Marks**	50
Credits	2	**Exam Hours**	2 Hrs 30 Mins
Prerequisites (if any)	None	**Course Type**	Lab

Course Objectives:

1. Provides an experimental experience with the basic scientific principles of food systems and practical applications to Food Chemistry.
2. Demonstrate the chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods with respect to food quality.
3. Helps to examine the reaction conditions and processes that affect the color, flavor, and texture of food

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Expt. No.	Experiments
1	Karl Fischer titration for determination of moisture content
2	Qualitative tests for carbohydrates a) Distinguishing reducing from non- reducing sugars b) Keto sugar from aldo sugar
3	Determination of rate/ extent of hydrolysis of sucrose/starch
4	Acid hydrolysis and action of salivary amylase on starch
5	Estimation of gluten in wheat
6	Study of gelling properties of starch- gelatinisation and retrogradation
7	Quantitative tests for proteins- Kjelhdal method
8	Effect of heat treatment on protein quality
9	Effect of pH on hydration of meat proteins
10	Water holding capacity and oil holding capacity of proteins

11	Detection and estimation of oxidative rancidity in fats/oils
12	Determination of enzymatic browning reactions
13	Determination of non enzymatic browning reactions
14	Determination of free fatty acid content in fats and oils
15	Determination of hardness of water
16	Determination of heat stability of vitamin C
17	Detection of adulteration in food products
18	Detection / Estimation of some additives in foods

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**

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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**

- ***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	Students will be able to estimate the moisture content in food	K3
CO2	Understand the biochemical reactions in food components	K3
CO3	Demonstrate the knowledge on chemical properties of food components	K3
CO4	Evaluate and interpret food analysis data and scientifically communicate this	K3

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

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

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

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

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	The chemical analysis of foods and food products	Morris B. Jacobs	CBS Publishers and distributors New Delhi.	III edition
2	Hand book of analysis and quality control for fruit and vegetable products	Ranganna S	Tata McGraw Hill Publishing Co. New Delhi	II edition
3	Methods in Food Analysis	Rui M. S. Cruz, Igor Khmelinskii, Margarida Vieira	CRC Publishers	2014 (1 Ed.)

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Modern Experimental Biochemistry,	Rodney and Boyer	Pearson education, India.	
2	Fundamental Laboratory Approaches forBiochemistry and Biotechnology	Alexander J. Ninfa and David P. Ballou	Fitzgerald Science Press Inc, USA.	
3	An introduction to Practical Biochemistry,	David T. Plummer	McGraw- Hill.	
4	Principles and Techniques of Practical Biochemistry,	Wilson K and Walker J	Cambridge University Press.	

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://youtu.be/-GR8Z3UerE0
2	
3	
4	

Continuous Assessment (25 Marks)

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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.

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.

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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