SEMESTER S4

FOOD ANALYSIS

Course Code	PBFTT404	CIE Marks	60
Teaching Hours/Week (L: T:P: R)	4	ESE Marks	40
Credits	3:0:0:1	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	4	Course Type	Theory

Course Objectives:

1. Introduce the basic concepts of Food Analysis, and explain the principles behind sampling and proximate analysis.
2. Familiarize the regulations by Government agencies based on the analysis of food.
3. Strengthen the knowledge about the different equipment and techniques employed in food analysis.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Introduction to food analysis, significance, FSSAI regulations for food analysis, Sampling and sampling plan in relation to food analysis, AOAC, NABL Accreditation, Export Inspect Council Proximate Analysis – Moisture, Ash, Fiber	9
2	Proximate Analysis –Carbohydrates, Protein,Protein Quality Fat analysis – method of analysis, oxidation test for fat methods, modern analytical techniques for proximate analysis Protein separation techniques – Electrophoresis – principle. Types of electrophoresis – capillary electrophoresis, Gel electrophoresis – PAGE and SDS PAGE, 1Dimensional and 2-Dimensional electrophoresis	9
3	Spectroscopy – principles, Beer Lambert's law- deviation from Beer lambert's law, construction of calibration curve, UV Visible spectroscopy. Fluorescence spectroscopy. Atomic Absorption and emission spectroscopy,	9
4	Chromatography – Principles of chromatography column chromatography, Gel filtration chromatography, GLC, HPLC, Supercritical fluid chromatography	9

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Suggestion on Project Topics

1. Identify any one of the food products from market and check for its label for nutritional value and health claim if any
2. Identify the official method of analysis protocol – AOAC, FSSAI Method
3. Conduct the proximate analysis of selected food – moisture, ash, protein, fat, carbohydrate, fiber
4. Evaluate the rancidity study – peroxide value, acid number of oil, saponification value
5. Conduct the shelf-life analysis and sensory analysis of food product
6. Identify the methods available for spectroscopy and chromatography for the specific analysis of food
7. Refer FSSAI standard for the food product from FSSAI regulations
8. Compare the result of your analysis with FSSAI standards and infer the result
9. Prepare a project report and present the results.

Course Assessment Method
(CIE: 60 marks, ESE: 40 marks)

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Continuous Internal Evaluation Marks (CIE):

Attendance	Project	Internal Ex-1	Internal Ex-2	Total
5	30	12.5	12.5	60

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 2 marks **(8x2 =16 marks)**	2 questions will be given from each module, out of which 1 question should be answered. Each question can have a maximum of 2 sub divisions. Each question carries 6 marks. **(4x6 = 24 marks)**	**40**

Course Outcomes (COs)

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

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	To be familiar with the Government Regulations pertaining to Food Analysis	**K1**
CO2	Identify the different methodologies employed in proper sampling of food	**K2**
CO3	Review the principles behind the analysis of various food components	**K2**
CO4	To recognise the different techniques employed for analysis of components in food	**K3**
CO5	To gain knowledge of the instrumentation and working of equipment used for Food Analysis	**K3**

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

CO-PO Mapping Table:

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

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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	Food Analysis	Nielsen, Suzanne (Ed.),	Springer US	2010
2	Handbook of Food Analysis Vol I and II,	Leo M. L. Nollet	CRC Press	2004
3	Methods of Analysis of Food Components and Additives	Semih Otles	CRC Press	2016

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Spectroscopic Methods in Food Analysis	Adriana S. Franca and Leo M.L. Nollet,	CRC Press	2018
2	Handbook of Food Analysis Instruments	Semih Otles	CRC Press	2016
3	Methods in Food Analysis	Rui M. S. Cruz, Igor Khmelinskii, Margarida Vieira,	CRC Press	2014
4	Modern Methods of Food Analysis	Kent K. Stewart and John R. Whitaker	AVI PUBLISHING COMPANY	1984

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://nptel.ac.in/courses/104105084
2	https://nptel.ac.in/courses/104105102
3	https://nptel.ac.in/courses/104106122

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PBL Course Elements

L: Lecture (3 Hrs.)	**R: Project (1 Hr.), 2 Faculty Members**		
	Tutorial	**Practical**	**Presentation**
Lecture delivery	Project identification	Simulation/ Laboratory Work/ Workshops	Presentation (Progress and Final Presentations)
Group discussion	Project Analysis	Data Collection	Evaluation
Question answer Sessions/ Brainstorming Sessions	Analytical thinking and self-learning	Testing	Project Milestone Reviews, Feedback, Project reformation (If required)
Guest Speakers (Industry Experts)	Case Study/ Field Survey Report	Prototyping	Poster Presentation/ Video Presentation: Students present their results in a 2 to 5 minutes video

Assessment and Evaluation for Project Activity

Sl. No	Evaluation for	Allotted Marks
1	Project Planning and Proposal	5
2	Contribution in Progress Presentations and Question Answer Sessions	4
3	Involvement in the project work and Team Work	3
4	Execution and Implementation	10
5	Final Presentations	5
6	Project Quality, Innovation and Creativity	3
Total		**30**

1. **Project Planning and Proposal (5 Marks)**
    - Clarity and feasibility of the project plan
    - Research and background understanding
    - Defined objectives and methodology

2. **Contribution in Progress Presentation and Question Answer Sessions (4 Marks)**
    - Individual contribution to the presentation
    - Effectiveness in answering questions and handling feedback

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3. **Involvement in the Project Work and Team Work (3 Marks)**
    - Active participation and individual contribution
    - Teamwork and collaboration

4. **Execution and Implementation (10 Marks)**
    - Adherence to the project timeline and milestones
    - Application of theoretical knowledge and problem-solving
    - Final Result

5. **Final Presentation (5 Marks)**
    - Quality and clarity of the overall presentation
    - Individual contribution to the presentation
    - Effectiveness in answering questions

6. **Project Quality, Innovation, and Creativity (3 Marks)**

- Overall quality and technical excellence of the project
- Innovation and originality in the project

Creativity in solutions and approaches

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