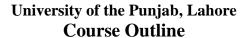
# **Department of Food Sciences**





Program	B.Sc. (Hons.) Food Science & Technology	Course Code	FST-206	Credit Hours	3(1-2)
Course Title Instrumental Techniques in Food Analysis					

#### **Course Introduction**

In this course foods will analyze for purposes of trade, compliance, quality assurance, authentication, complaint investigation, nutritional attributes and scientific research. The students will undertake and compare various food analysis techniques, followed by analysis, interpretation and presentation of the results. The basic knowledge of different analysis concerning to food and food products will be provided. It will include the fundamental concepts of different techniques to analyze food samples of different nature. The core purpose of the course is based on laboratory skills to perform proximate analysis and sensory evaluation of different foods.

### **Learning Outcomes**

After completing this course students should be able to:

- 1. Understand sampling techniques regarding analysis.
- 2. Apply modern instrumental methods to analyze chemical and physical properties of foods.
- **3.** Analyze data produced from proximate analysis and sensory evaluation of different foods.

THEORY			
Course Content Assignments Readings			
***	Unit-I		
Week 1	1.1 Food Analysis: Significance		
Week 2	Unit-II		
	2.1 Sampling Techniques,		
	2.2 Preparation, preservation.		
	Unit-III		
Week 3	3.1 Physical properties and analysis of foods and food products		
	3.2 Appearance, texture, specific gravity, refractive index,		
	rheology.		

	Unit-IV
Week 4	4.1 Chemical analysis:
	4.2 Proximate analysis: moisture, ash, protein
***	Unit-V
Week 5	5.1 Lipids, carbohydrates, fiber, NFE analysis
XX1- (	Unit-VI
Week 6	6.1 Acidity, pH, sugars analysis
Week 7	Unit-VII
vveek /	7.1 Mineral elements, vitamins analysis
	Unit-VIII
Week 8	8.1 Microbial analysis
vveek o	8.2 Importance, media preparation, sterilization, dilution of
	samples, pouring of media
	Unit-IX
Week 9	9.1 Instrumental techniques:
	9.2 Principles, instrumentation, applications.
	Unit-X
*** 1.40	10.1 Sample preparation.
Week 10	10.2 Supercritical fluid extraction, Chromatography:
	TLC, ion chromatography,
	Unit-XI
XX71 - 11	11.1 Gas Chromatography,
Week 11	11.2 High Performance Liquid Chromatography,
	11.3 LCMS
Week 12	Unit-XII
Week 12	12.1 Spectroscopy: UV-VIS, atomic emission and absorption,
	Unit-XIII
Week 13	13.1 Infrared - FTIR,
	13.2 NIR, NMR
	Unit-XIV
Week 14	14.1 Electrophoresis:
	14.2 Types, principles, applications

	Unit-XV	
Week 15	15.1 Sensory evaluation of foods	
	15.2 Attributes, difference and preference tests, consumer	
	acceptance	
	Unit-XVI	
	16.1 Analytical data:	
Week 16	10.1 Analytical data.	
	16.2 Evaluation, interpretation, statistical applications.	
	PRACTICAL	
	Course Content	Assignments/ Readings
	Lab safety requirements.	
***	Preparation and standardization of laboratory solutions.	
Week 1	·	
	Sampling: preparation of sample for analysis.	
	Physicochemical analysis	
Week 2	Determination of specific gravity, refractive index, moisture, ash.	
Week 3	Determination of crude protein, crude fat, crude fiber, NFE	
	Determination of pH and acidity.	
Week 4	Paper and thin layer chromatography. Identification of toxins by	
	TLC.	
Week 5	Estimation of food components	
WEEK 5	UV-VIS spectrophotometer	
Week 6	Microbiological analysis	
	Measurement of total plate count, coliform and salmonella	
Week 7		
VVCCK /	Mineral analysis by flame photometer and atomic absorption	
	spectrophotometer.	
Week 8	Determination of organic acids by chromatography.	
Week 9		
WCCR 7	Determination of volatile compounds by gas chromatography	

Week 10	Identification of food components by FTIR		
Week 11	Protein characterization by electrophoresis.		
Week 12	Estimation of Amino Acids profile by amino analyzer		
Week 13	Estimation of fatty acids profile by GC-MS		
Week 14	Measurement of minerals by flame photometer		
Week 15	Sensory evaluation of foods.		
Week 16	High tech laboratory/food industry visit		

### **Textbooks and Reading Material**

- **1.** AOAC. (2019). Official Methods of Analysis of AOAC, 21<sup>st</sup> Edition. Association of Official Analytical Chemists, Arlington, USA.
- **2.** Otles, S. (2009). Handbook of Food Analysis Instruments. CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA.Winton, A. & Winton, K.B. (2006). Techniques of Food Analysis. Agrobios Publishing Co., Jodhpur, India.
- **3.** Awan, J.A. & Rehman, S.U. (2003). Food Analysis Manual. Unitech Communications, Faisalabad, Pakistan.
- **4.** Nielson, S.S. (2003). Food analysis, Kluwer Academic/Plenum Pub., New York, USA Pomeranz, Y. & Meloan, C.E. (2000). Food Analysis: Theory and Practice. CBS Publishers, New Delhi.

Lawless, H.T. & Haymann, H. (1998). Sensory Evaluation of Food: Principles and Practices. Chapman and Hall, New York, USA

# **Teaching Learning Strategies**

- 1. Lectures
- 2. Class discussions
- 3. Ouizzes
- 4. Assignments
- 5. Practical performance
- 6. Presentations

## **Assignments: Types and Number with Calendar**

- **1.** The main evaluation will be done for sessional mark by the practical performance of the students in the laboratory.
- 2. The sessional work will also be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessment			
Sr. No.	Elements	Weightage	Details

1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.