



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-5

Subject: Food Analysis Techniques–BETFT15318

Type of course: Skill Enhancement Course

Prerequisite: Basic knowledge of chemistry, biochemistry, microbiology, and food processing.

Rational : Food Analysis Techniques equip students with essential skills to evaluate food quality, safety, and composition using classical and modern instrumental methods. Amid rising demands for food safety, nutritional labeling, and regulatory compliance, this course bridges theoretical principles with hands-on laboratory proficiency. It promotes accurate detection of contaminants, adulterants, and nutritional profiles, enabling innovation in food product development and quality assurance.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
0	0	4	2	-	-	10	40	50	100

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities



Course Content:

Unit No.	Course content
1	Introduction to Food Analysis Objectives and scope; Sampling techniques and errors; Proximate analysis (moisture, ash, protein, fat, carbohydrates); Basic statistics in analysis (accuracy, precision); Regulations (FSSAI, Codex).
2	Classical and Wet Chemistry Methods Gravimetric and volumetric analysis; Kjeldahl nitrogen method; Soxhlet fat extraction; Fiber determination; Detection of adulterants and preservatives.
3	Physico-Chemical Analysis pH, titratable acidity, viscosity, refractive index, specific gravity; Color measurement (Hunter Lab); Texture profile analysis; Water activity (aw).
4	Instrumental Techniques Spectrophotometry (UV-Vis), chromatography (TLC, HPLC basics); Thermal analysis (DSC); Sensors and biosensors; Automation in food labs.

Continuous Assessment:

Sr. No.	Active Learn	Marks
1.	Proximate Analysis Report: Perform moisture/protein tests on samples and submit on GMIU portal.	10
2.	Adulterant Detection Demo: Test common foods for adulterants make a video and submit on GMIU portal.	10
3.	Instrument Calibration Workshop: Calibrate pH meter/spectrophotometer make a group report on it and submit on GMIU portal.	10
4.	Food Quality Audit: Analyze market samples and propose improvements of it. Make a report and submit on GMIU portal.	10
5.	Case Study Presentation: Case Study on Recent food scandals and analysis Make a Presentation and submit on GMIU portal.	10
Total		50



Suggested Specification table with Marks(Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

List of Practical

Sr. No	Title	Unit	Hours
1	Moisture content by hot air oven drying method	1	2
2	Total ash content determination	1	2
3	Acid insoluble ash in food samples	1	4
4	Crude protein estimation by Kjeldahl method	2	4
5	Crude fat extraction by Soxhlet apparatus	2	4
6	Total dietary fiber determination	2	4
7	Detection of argemone oil in mustard oil	2	2
8	Detection of metanil yellow in turmeric	2	2
9	Qualitative test for preservatives (benzoic acid)	2	2
10	Carbohydrate estimation by anthrone method	1	4
11	Reducing sugars by DNS method	1	2
12	pH and titratable acidity measurement	3	4
13	Refractive index, °Brix, and specific gravity	3	4
14	Color measurement using colorimeter	3	2
15	Water activity (aw) and viscosity measurement	3	4
16	Texture profile analysis basics	3	2
17	UV-Vis spectrophotometry for food colorants/vitamins	4	4
18	Vitamin C estimation by spectrophotometry	4	4
19	Thin Layer Chromatography (TLC) for additives	4	2
20	Sampling techniques and calibration of instruments	1	2
Total			60



Course Outcome:

After learning the course, the students should be able to:	
CO1	Identify sampling needs and perform proximate analysis for food composition.
CO2	Apply classical wet methods for macronutrient quantification.
CO3	Measure Physico-chemical properties influencing food quality.
CO4	Utilize basic instrumental techniques for accurate food testing.

Instructional Method:

- The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by blackboard, may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- From the content, 10% of topics are suggested for flipped mode instruction.
- Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory
- The internal evaluation will be done based on the Active Learning Assignment

Reference Books:

- [1] Food Analysis by S. Suzanne Nielsen
- [2] Instrumental Methods in Food Analysis by J.R.J. Pare and J.M. Gentile
- [3] Handbook of Food Analytical Chemistry by Ronald E. Wrolstad et al.
- [4] Food Analysis: Principles and Techniques edited by Dieter W. Gruenwedel and John R. Whitaker
- [5] Introduction to Food Analysis by S. Suzanne Nielsen

