



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
Department of Food Process Engineering
FS2003 Analytical Techniques in Food Processing
Lesson Plan

Course Code: FS 2002
Course Name: Analytical Techniques in Food Processing

Semester: I
Year: 2018

Class Time Table

Day order	Hours	Timing
I	5	11:35-12:25pm
III	5	11:35-12:25 pm
IV	6&7	12:30-2:15 pm

Faculty Details

Section	Name	Office	E-mail ID
M. Tech (Food and Nutritional Biotechnology)	Dr. R. Preetha	B609 School of Bioengineering,	preetha.r@ktr.srmuniv.ac.in

REFERENCE BOOKS

1. Analytical Chemistry, Gary D Christian, John Wiley & Son, USA.2004.
2. Skoog Douglas A., West, Donald M., Holler, F. James., and Crouch Stanley R. "Analytical Chemistry: An Introduction". Seventh Edition,; South-Western, Australia, 2000. 4. Rouessac, F., "Chemical Analysis:

3. Nielsen, S.S. Introduction to the chemical analysis of foods. Jones and Bartlett Publishers, Boston , London.2004.
4. Chatwal, Gurdeep R and Anand, Sham K, “Instrumentation Methods of Chemical Analysis”, Himalaya Publications, Bombay, 2003.
5. Willard, H.H., Merritt, L.L., Dean, J.A., and Settle, F.A., “Instrumental Methods of Analysis, Seventh Edition”: C B S Publishers & Distributors, Delhi, 1988.

Assessment Details:

- Cycle test I : 20 marks
- Cycle test II : 20 marks
- Surprise Test : 5marks
- Assignment/Quiz : 5 marks
- End Semester Exam : 50marks

Test Schedule

S. No	Test	Portion	Duration (min)
1	Cycle Test-I	1& 2 unit	100
2	Cycle Test-I	3, 4, & 5 unit	180

PURPOSE

This subject is introduced with the basic objective to impart knowledge and skills in **Analytical Techniques in Food Processing**

INSTRUCTIONAL OBJECTIVES

After successful completion of this course the students will be able to

- To demonstrate various instruments using in food analysis .
- To understand principles, instrumentation, and procedures to use different analytical instruments for food analysis
- To demonstrate various applications of different analytical instruments in Food analysis

Outcomes

Students who have successfully completed this course will have full understanding of the following concepts

INSTRUCTIONAL OBJECTIVES

Course objective	Course outcome
<ul style="list-style-type: none"> To be familiar with different methods of investigation used in the analysis of foods and biochemical test To gain knowledge about different instruments used in food analysis. To know the principles and applications of different techniques used in food and Nutrition research. To be familiar with different methods of investigation used in the analysis of foods and biochemical assay 	<ul style="list-style-type: none"> After completing this course students get knowledge about analysis of foods and biochemical assay Will get an idea about different instruments using in food analysis Would have gained knowledge about Technological aspects instruments At the end of the course, the students would have acquired confidence to get placement in any kind of food industries doing food quality analysis

Detailed Session plan for theory:

Session No	Topics to be covered	No. of Hours	Reference	Teaching method	Testing method
1	Spectroscopy-Introduction and theory	2	1,2	BB	GD
2	Visible spectrometry, Colorimetry – Theory,Ultra violet spectroscopy – Theory,	3	1,2,3	BB	QA
3	Deviations from Beer’s Law, Instrumentation (Line diagram alone) Single and Double beam spectrometers,and application.	2	1,2	PPT	QA
4	NMR spectroscopy – Theory and, Instrumentation,	3	1,2	PPT	QA
5	NMR- applications and limitations.	1	2,RA	PPT	Quiz
6	Infra red spectroscopy – Theory, Fundamental Vibrations, Overtones, Hook’s Law..	2	3	BB	QA
7	FTIR Instrumentation,	2	1,2	PPT	QA
8	Infra red spectroscopy Application and Limitations,	2	1,2	BB	Quiz
9	Difference between Raman spectra and IR spectra	1	1,2	BB	QA

10	Mass spectroscopy – Theory, Spectrometer Instrumentation	2	1	PPT	QA
11	Interpretation, some examples, applications and limitations	2	1,2,3	PPT	GD
12	X-ray diffraction – Mosely’s law, K and R bands, Principle, instrumentation, various types of detectors and applications in food products.	4	1	PPT	GD
13	Flame photometer,	2	1,2	BB	QA
14	Polarimetry	2	1&2	BB	QA
15	Refractometry	2	3	PPT	QA
16	Introduction on specific rotation, optical activity;	1	RA,e-resources	PPT	GD
17	Principle and instrumentation- Saccharimetry- Analysis of Sugar.	1	1, 2 & 3	BB	QA
18	Conductometric measurements – Important Laws, Definitions, conductance measurements, applications,	2	RA, 3	PPT	QA
19	Types, advantages and disadvantages of Conductometric titrations.	2	RA,2,3	BB	QA
20	Potential measurements, pH, pO ₂ , pCO ₂ , pHCO ₃ , pH determination, Ion selective electrodes, Application of pH measurements.	2	3	BB	QA
21	Types of potentiometric titration’s and advantages.	1	RA,e-resources	PPT	GD
22	Electrophoresis,	2	1,3	BB	QA
23	Thermal methods – Thermogravimetry, Differential Thermal Analysis,	2	3, e-resources	BB	GD
24	Differential Scanning Calorimetry applications	1	13,e-resources	BB	QA
25	Chromatographic techniques – Introduction and classification.	1	1,2	PPT	QA
25	Theory, Instrumentation and Chromatography-different types, their principles and applications in General	2	1,2	PPT	QA
27	TLC, HPTLC and Paper Chromatography	2	RA	PPT	Quiz

28	Components of an HPLC system. Pump, injector, column (column hardware and column packing materials in brief) detector and different types of detectors, recorder-Applications	2	3	BB	QA
29	Gas chromatography Introduction and Principle	2	1,2	BB	Quiz
30	Sample preparation, Instrumentation of GC, , Components gas supply system, injection port, oven, column and stationary phases, types of columns, detectors different types of detectors, recorder, types of carrier gases used	2	1,2	PPT	QA
31	Applications of Chromatography : Extraction, separation and identification, water and oil soluble dyes. Detection and estimation of additives in food materials net as, boric acid, benzoates, sulphites, formaldehyde, formic acid, lactic acid, saccharine, etc.	3	1,3,FSSAI manuel + Students seminar	BB	QA
32	Analysis of food stuffs: with reference to the standards of quality.	1	3, e-resources	PPT	QA

Note:

- **BB- Black Board**
- **PPT- Power point presentation**
- **RA – Research articles**
- **QA- Question and Answer**
- **GD- Group discussion**