



S.No.	Topic	No. of Practicals
12.	To determine the Rheological properties: firmness and hardness of grain, fruits, stalk and vegetables.	1
13.	To study the electrical properties (dielectric constant, dielectric loss factor) of various food materials.	1
14.	To study the electrical properties (loss tangent and A.C. conductivity) of various food materials.	1
	Total	15

X. Suggested Reading

- Ludger F and Teixeira AA. 2007. *Food Physics Physical Properties - Measurement and Application*. Springer.
- Mohesenin NN. 1980. *Thermal Properties of Foods and Agricultural Materials*. Gordon and Breach Science Publisher.
- Mohesenin NN. 1980. *Physical Properties of Plant and Animal Materials*. Gordon & Breach Science Publisher.
- Peleg M and Bagelay EB. 1983. *Physical Properties of Foods*. AVI Publisher.
- Peter B. 2007. *The Chemical Physics of Food*. Wiley-Blackwell.
- Rao MA and Rizvi SSH. 1986. *Engineering Properties of Foods*. Marcel Dekker.
- Singhal OP and Samuel DVK. 2003. *Engineering Properties of Biological Materials*. Saroj Prakasan.
- Sitkei. 1986. *Mechanics of Agricultural Materials*. Elsevier.

I. Course Title : Food Quality and Safety

II. Course Code : PFE 509

III. Credit Hours : 2+1

IV. Aim of the course

To acquaint and equip the students with the latest standards to maintain food quality and safety.

V. Theory

Unit I

Food safety: Need for quality control and safety, strategy and criteria, microbiological criteria for safety and quality, scope of food toxicology, toxic potential and food toxicants, biological and chemical contaminants.

Unit II

Food additives and derived substances, factors affecting toxicity, designing safety in products and processes, intrinsic factors, establishing a safe raw material supply, safe and achievable shelf life.

Unit III

Process equipment and machinery auditing, consideration of risk, environmental consideration, mechanical quality control.

Unit IV

Personnel hygienic standards, preventative pest control, cleaning and disinfesting system, biological factors underlying food safety.



Unit V

Preservation and stability, contaminants of processed foods, adulteration, prevention and control, FSSAI, ISO, Codex, GMP, BIS and HACCP. Practices, principles, standards, specifications, application establishment and implementation, HACCP and quality management system. Food Safety Management Systems (FSMS), Traceability.

VI. Practical

Microbiological examination of food, hazard analysis, premises design, HACCP project plan, CCP, CCP Decision tree, HACCP control chart. HACCP case studies: Survey, BIS, FPO, Codex standards and specifications. Visits to food industries to study the various quality and safety aspects adopted.

VII. Learning outcome:

Student's capability to measure food quality as well as ensure food safety in food supply chain.

VIII. Lecture Schedule

S.No.	Topic	No. of Lectures
1.	Food safety: Need for quality control and safety, strategy and criteria.	2
2.	Microbiological criteria for safety and quality.	1
3.	Scope of food toxicology, toxic potential and food toxicants.	2
4.	Biological and chemical contaminants.	1
5.	Food additives and derived substances, factors affecting toxicity.	2
6.	Designing safety in products and processes, intrinsic factors.	2
7.	Establishing a safe raw material supply, safe and achievable shelf life.	2
8.	Process equipment and machinery auditing.	1
9.	Consideration of risk, environmental consideration. Biological factors underlying food safety.	2
10.	Personnel hygienic standards, preventative pest control. Cleaning and disinfecting system.	2
11.	Preservation and stability, contaminants of processed foods, adulteration, prevention and control	3
12.	FSSAI-Practices, principles, standards, specifications, application establishment and implementation	2
13.	ISO-Practices, principles, standards, specifications, application establishment and implementation.	2
14.	Codex, GMP and BIS - Practices, principles, standards, specifications, application establishment and implementation.	3
15.	HACCP and quality management system.	1
16.	Food Safety Management Systems (FSMS), Traceability.	2
	Total	30

IX. List of Practicals

S.No.	Topic	No. of Practicals
1.	To test microbiological contamination of food.	1
2.	To conduct hazard analysis.	2
3.	To study the premises design for food safety and quality.	2
4.	To study the HACCP project plan.	1
5.	To prepare CCP and CCP Decision tree.	2



S.No.	Topic	No. of Lectures
6.	To prepare HACCP control chart.	2
7.	To conduct the Survey and study BIS- standards and specifications.	2
8.	To study the FPO standards and specifications.	1
9.	To study the codex standards and specifications.	1
10.	Visits to food industries to study the various quality and safety aspects adopted.	2
	Total	15

X. Suggested Reading

- Herschdoerfer, SM. 1984. *Quality Control in the Food Industry*. Vol. 1 Academic Press.
- Herschdoerfer SM. 2012. *Quality Control in the Food Industry*. Vol. 2 Elsevier Science.
- Hubbard MR. 2003. *Statistical Quality Control for the Food Industry*. Springer.
- Mahadeviah M and Gowramma R V. 1996. *Food Packaging Materials*. Tata McGraw Hill.
- Mehmet M. 2011. *Biosensors in Food Processing, Safety, and Quality Control*. CRC Press.
- Palling SJ. 1980. *Developments in Food Packaging*. Applied Science Publisher.
- Sacharow S and Grittin RC. 1980. *Principles of Food Packaging*. AVI Publisher.
- Yanbo H, Whittaker AD and Lacey RE. 2001. *Automation for Food Engineering*. Food Quality Quantization and Process Control-CRC Press.

I. Course Title : Food Processing Technologies

II. Course Code : PFE 510

III. Credit Hours : 2+1

IV. Aim of the course

To acquaint and equip the students with different unit operations to be performed in food industries and related equipment.

V. Theory

Unit I

Mixing and homogenization; Principles of solid and liquid mixing, types of mixers for solids, liquid and pastes homogenization. Emulsification: Principles and equipments.

Unit II

Novel dehydration technologies; Osmotic dehydration, foam mat drying, puff drying, freeze drying, microwave drying, dehumidified air drying. Extrusion: Theory, equipment, applications.

Unit III

Non-thermal processing; Principles and equipment involved in ohmic heating, pulsed electric field preservation, hydrostatic pressure technique (vacuum processing, high pressure processing of Foods), ultrasonic technology, irradiation, quality changes and effects on microorganisms, nanotechnology in food processing.

Unit IV

Distillation, leaching and extraction: Principles and equipment for distillation, crystallization, phase equilibria, multistage calculations, leaching principles and equipment, solvent extraction, super-critical fluid extraction, near critical fluid extraction: Equipment and experimental techniques used in NCF extraction and