

TEACHING-LEARNING PLAN

Programme: M.Tech. Food Processing and Technology

Academic Session: 2023-2024

Semester: II

Batch: 2023-2025

Course Code: FT-502

Credits (L-T-P): 3 (3-0-0)

Course Name

: Processing of Meat, Fish and Poultry Products

Faculty

: Dr. Vinita Sharma (VS)

Course Objective

: The course aims to augment the understanding of students in the area of animal products' processing and technology. This course will enable students to appreciate the application of scientific principles in the processing of these materials.

Course Outcome

: Students shall be well-versed in all aspects of meat, poultry, egg and fish industry, processing, preservation and quality control.

Assessment/Evaluation

Mid-Sem: 25 marks (1 hr. 30 mins.), End-Sem: 60 marks (3:00 hrs.), Internal Assessment – 15 marks, Total- 100 marks.

Teaching Schedule:

Sr. No.	Topic	Classes required (No.)	Faculty
1.	Introduction Session about Course	1	VS
2.	Meat and poultry industries in India – kinds of meat animals and poultry birds, Current levels of production, consumption and export of category products. Nutritional, safety, health and hygienic considerations.	3	VS
3.	Structure, composition and nutritive value of meat tissues, Postmortem changes, Pre-slaughter handling, Death of the Animal–stunning and bleeding, dressing and cutting, Post slaughter care and post mortem inspection – classification and quality of meat.	5	VS
4.	Aging, Curing, Smoking, Canning, Irradiation, Freezing and Dehydration of Meat and Meat Products, Formed and Sectioned Meat Production Method, Meat Sausages, Classification, Ingredients and Production Technology.	6	VS
5.	Recent trends in meat processing.	2	VS
6.	Chemical composition and nutritive value of poultry meat, Pre-slaughter handling, Transport and Dressing of poultry, Antemortem and postmortem examination of poultry.	7	VS
7.	Egg: Structure, composition, and nutritional aspects of eggs. Grading, Storage and transportation of whole eggs.	5	VS
8.	Microbial spoilage of eggs, Preservation and maintenance of eggs, Processing of eggs and egg products (liquid and solid products).	6	VS
9.	Fish: Types of fish, Composition and Nutritive Value, Post-mortem changes in fish.	5	VS
10.	Unit operations in fish processing. Canning, Smoking, Salting, Curing, Freezing and Drying/Dehydration of fishes. Fish spoilage, Fish sausages.	5	VS

Suggested Readings:

1. Manay, S. (2008). Foods Facts and Principles. NEW AGE Publisher ISBN-13: 978-8122422153.
2. Hui, Y.H. (2012). Handbook of Meat and Meat Processing, CRC Press; Second edition ISBN - 13: 978- 1-4398-3684-2.
3. Heinz, G, and Hautzinger, P. (2007). Meat Processing Technology. Woodhead Publishing. ISBN: 978- 974-7946-99-4.
4. George J.M. and Carmen R.P. (2017). Poultry Products Technology Third Edition, CRC Press, ISBN 1- 56022-856-3.
5. Hui, Y. H. (2010). Handbook of Poultry Science and Technology:
6. Fernandes, R. (2009). Fish and Seafood.

TEACHING-LEARNING PLAN

Programme: M.Tech. Food Processing and Technology	Academic Session : 2023-2024
Semester : II	Batch : 2023-2025
Course Code : FT-509	Credits (L-T-P): 3 (3-0-0)
Course Name : Food Supply Chain Management	
Faculty : Dr. Nitin Sonkar	
Course Objective : The course's objective is to give students a better understanding of the design, functionality, and management of a food supply chain in order to boost sustainability and competitiveness, logistics including packaging, transportation, inventory management, and warehousing	
Course Outcome : The key ideas and theoretical frameworks governing the structures, tactics, and dynamics of supply networks and value chains will be understood by the students; they will comprehend the function of the primary components impacting the food supply chain management.	
Assessment/Evaluation : Mid-Sem: 25 marks (1 hr. 30 mins.), End-Sem: 60 marks (3:00 hrs.), Internal Assessment – 15 marks, Total- 100 marks.	

Teaching Schedule:

Sr. No.	Topic	Classes required (No.)	Faculty
1.	Introduction to FSCM, building blocks of FSCM, Significance and objectives of FSCM; Indian scenario and challenges Human resource development in supply chain.	3	NS
2.	Human resource development in supply chain; understanding the changing customer needs, food disaster and hunger relief.	2	NS
3.	Supply chain as a source of competitive advantage, inbound and outbound logistics, buyer-vendor, vendor development and evaluation.	3	NS
	Buyer-vendor co-ordination, procurement, vendor development and evaluation.	2	NS
4.	Reduced sourcing and supplier partnership-benefits, risks and critical success factors.	2	NS
5.	Logistics/supply chain products: nature and classification, product life cycle, product characteristics- weight-bulk ratio, sustainability, risk characteristics, product packaging, product pricing, geographic pricing methods, legal concerns.	3	NS

6.	Coordination and management of transportation, inter model transportation and third-party transportation services; facility location.	3	NS
7.	Multi-level supply control, inventory control systems of stock replenishment, cost elements, EOQ and derivative models.	3	NS
8.	Order processing and information systems- definition, order status reporting- industrial order processing, retail order processing, customer order processing, web-based channel order planning.	4	NS
9.	Porter's industry analysis and value chain models; concept of total cost ownership.	3	NS
10.	Use of stochastic models and combinatorial optimization in supply chain planning, layout, capacity planning, inventory optimization.	3	NS
11.	Operation research models for operational and strategic issues in SCM.	2	NS
12.	Bullwhip effect and SCM game; Internet technologies and electronic commerce in SCM related to ERP, Q procurement, e-logistics and internet auctions.	3	NS
13.	Specific SC practices (buy local vs commodity supply chain)- pre- and post-harvest management of fresh produce.	3	NS
14.	Food manufacturing restaurant and hospitality industry, controlling food safety and insuring quality.	2	NS
15.	Sustainable and organic FSC and certification programs.	2	NS
16.	Benefits and risks associated with FDI in retail sector in India.	2	NS

Suggested Readings:

1. Dani, S. (2015). Food supply chain management and logistics. From farm to fork. Kogan Page Limited.
2. Pullman, M. and Wu, Z. (2011). Food supply chain management economic, social and environmental perspectives. Routledge.
3. Chopra, S., Meindl, P. and Kalra, D.V. (2016). Supply chain management. Pearson Education India.

TEACHING-LEARNING PLAN

Programme: M.Tech. Food Processing & Technology

Academic Session: 2023-2024

Semester: II

Batch: 2023-2025

Course Code: FT-504

Credits (L-T-P) (3+0+0)

Course Name : **Nutraceuticals and Functional Foods**

Faculty : Ms. Rachna Mishra (RM)

Course Objective : To study the fundamentals of functional foods and nutraceuticals, their significance, regulatory issues and role in disease prevention.

Course Outcome : The student will understand the role of functional food and nutraceutical in health promotion and disease prevention.

Assessment/ Evaluation : Mid-Sem: 25 marks (1 hr. 30 mins.), End-Sem: 60 marks (3:00 hrs.), Internal Assessment – 15 marks, Total- 100 marks.

Teaching Schedule:

Sr. No.	Topic	Class required (No.)	Faculty
1.	Nutraceuticals and Functional Food: An Introduction, Definition of Nutraceuticals and Functional Food, Growth Opportunities, current status, Key challenges and Future aspects in Nutraceuticals and Functional Foods.	2	RM
2.	Nutrient Components of Food and Effect of processing on Nutrients.	2	RM
3.	Sources of Nutraceuticals, link between nutrition and medicine	1	RM
4.	Classification: Classification of nutraceuticals based on the sources and chemical nature, Traditional Nutraceutical and Non-Traditional Nutraceutical	3	RM
5.	Phytochemical as Nutraceuticals: Occurrence and characteristic features (chemical nature medicinal benefits)	2	RM
6.	Nutraceuticals for diseases Prevention: Cancer, Heart disease, Stress, osteoarthritis, Hypertension, etc.	3	RM
7.	Antioxidant Mechanism, Free radical and Oxidative stress	2	RM
8.	Antioxidants and other Phytochemicals :(Isoflavones, beta carotene, Lycopene) their role as nutraceutical and functional food.	3	RM
9.	Dietary fibers as functional food ingredient: Source and role of Dietary fibers in disease prevention.	3	RM
10.	Probiotics and prebiotics: Probiotic food, Health Effects of Probiotic Microorganisms, Prebiotics: Resistant Starch, Gums.	2	RM

11.	Protein: Soya protein as a Functional food ingredient.	2	RM
12.	Herbs as a Functional Food: Common herb and their health promoting activities.	3	RM
13.	Cereal as a functional food: Product from Oat, wheat bran, rice bran <i>etc.</i>	3	RM
14.	Nutraceuticals from Fruits and Vegetables: Sources and health benefits.	2	RM
15.	Oilseed and Sea food: Functional ingredients and health benefits	2	RM
16.	Beverages as Functional Food: (Tea, Coffee, fermented beverages) Wine and Tea Polyphenols and its nutraceutical health benefits	3	RM
17.	Factors affecting potential of Nutraceuticals: Effect of processing, storage and interactions of various environmental factors.	3	RM
18.	Nutraceutical and functional food Industry and Market Information: Marketing and Regulatory Issues for Functional Foods and Nutraceuticals, Growth Opportunities, current status, Key challenges and Future aspects in nutraceuticals and functional Foods.	2	RM
19.	Recent development: Recent trend and advances in the areas of nutraceutical and functional foods.	2	RM

Suggested Readings:

1. Bao and Fenwick, (2004) "Phytochemicals in Health and Diseases". Marcel Decker, Inc. NY.
2. Ho, C.T. and Q.Y. Zheng. (2001). Quality Management of Nutraceuticals. ACS Symposium Series 803, ACS, Washington DC. eISBN: 9780841218840
3. Kramer, Hoppe and Packer, (2001) "Nutraceuticals in Health and Disease Prevention" Marcel Dekker. Inc., NY.
4. M.A.Eskin, S. Tamir S. (2006) Dictionary of Nutraceuticals and Functional Foods. CRC Press. ISBN 0849315727
5. Schmidl, M.K. and T.P. Labuza. (2000). Essentials of Functional Foods. Aspen Publishers, inc., Gaithersburg, MD. ISBN 978-0-8342-1261-9
6. Stanley T. Omaye . (2004). Food and Nutritional Toxicology CRC Press, Boca Raton, London. eBook ISBN: 978-0-203-48530-9
7. Tomris Altug. (2003). Introduction to Toxicology and Food. CRC Press, Boca Raton, FL. ISBN 9780849314568
8. Wildman, R.E.C. (2001) "Handbook of Nutraceuticals and Functional Foods", CRC Press LLC. ISBN- 0849387345.

TEACHING - LEARNING PLAN

Programme: M.Tech. Food Processing & Technology

Academic Session: 2023-24

Semester: II

Batch: 2023-2025

Course Code: FT 512

Credits (L-T-P): 03 (3-0-0)

Course Name

: Food Additives, Contamination and Toxicology

Faculty

: Dr. Vyakhaya (V)

Course Objective

: This course aim is to impart knowledge concerning food additives- their classification, uses, toxicity, and safety. Students will get knowledge about the idea of agricultural and industrial pollutants in food as well as toxicants in food materials.

Course Outcome

: Students will learn the usage of food additives, different toxicants present in food materials and toxicological risks of additives and contaminants in food.

Assessment/Evaluation

: Mid-Sem: 25 marks (1 hr. 30 mins.), End-Sem: 60 marks (3:00 hrs.), Internal Assessment – 15 marks, Total- 100 marks.

Teaching Schedule:

Sr. No.	Topic	Classes required	Faculty
1.	Introduction to Food Additives: General classification, types, uses, legal aspects, risks and benefits.	2	V
2.	Antimicrobial agents, antioxidants, anti-browning agents, chelating agents and sequestrants.	4	V
3.	Acidulants and pH control, coloring agents: types, uses and mode of action.	4	V
4.	Sweeteners: Natural and artificial sweeteners, emulsifiers and stabilizers: types, uses and functions.	4	V
5.	Introduction to food toxicology: Classification, dose, determinants of toxins in foods, naturally occurring toxins from animals, bacterial and fungal and seafood sources.	4	V
6.	Laws and regulations of food safety assessment of foods including food additives, environmental contaminants, pesticides and antibiotics residues.	5	V
7.	Allergens, toxic constituents and anti-nutritional factors of plant foods. Agricultural and industrial contaminants in foods: pesticides residues in fruits and vegetables, metal contaminants in foods and their toxicity in human body.	5	V
8.	Food additives as toxicants: Food color. Pigments their importance and utilization as food color.	4	V
9.	Food preservatives and their chemical action. Role mode of action salt, chelating agents' stabilizers and thickeners, polyhydric alcohol, flour bleaching agents and sweeteners.	5	V
10.	Toxicants formed during food processing such as nitrosamines, Maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons and irradiation.	5	V
11.	Risk of genetically modified food, food supplements, persistent organic pollutants, toxicity implications of nanotechnology in food.	3	V

Suggested Readings:

1. Metcalfe, D.D., Sampson, H. A., & Simon, R. A. (Eds.). (2011). *Food allergy: adverse reactions to foods and food additives*. John Wiley & Sons.
2. Medhi, M., Gupta, A.K., Dhua, S., & Mishra, P. (2022). Food Additives. In *Advances in Food Chemistry: Food Components, Processing and Preservation* (pp. 255-292). Singapore: Springer Nature Singapore.
3. Furia, T. E. (1973). *CRC handbook of food additives* (Vol. 1). CRC press.
4. Jain, A., & Mathur, P. (2015). Estimation of Food Additive Intake—Overview of the Methodology. *Food Reviews International*, 31(4), 355-384.
5. Shikha, P., Arvind, K., & Gupta, A. (2021). Technological Advancement in Food Additives and Preservatives. *Food Chemistry: The Role of Additives, Preservatives and Adulteration*, 375-396.
6. Khatkar, B.S. (Ed.). (2007). *Food Science and Technology*. Daya Books.
7. Manay, N.S.O. (2001). *Food: facts and principles*. New Age International.
8. Food Additives: An Overview of Food Additives and Their Effect on Health-by BrianCook
9. Nabavi, S. M., Nabavi, S. F., Loizzo, M. R., Tundis, R., Devi, K. P., & Silva, A. S. (Eds.). (2020). *Food Additives and Human Health*. Bentham Science Publishers.
10. Smith, J. (Ed.). (1991). *Food additive user's handbook*. Glasgow: Blackie.

TEACHING-LEARNING PLAN

Programme: M.Tech. Food Processing & Technology

Academic Session: 2023-24

Semester: II

Batch: 2023-2025

Course Code: FT-508

Credits (L-T-P): 3 (3-0-0)

Course Name

: Advances in Cereal and Pulse Processing

Faculty

: Dr. Vyakhaya (V)

Course Objective

: Aims to develop the knowledge of students in area of cereals, pulses and oilseeds processing. This is necessary for the understanding of specific aspects of food processing related to these foods

Course Outcome

: Students will learn processing and milling technologies of cereals and pulses along with the uses of their byproducts. They will also learn the storage and techniques of these commodities.

Assessment/Evaluation

: Mid-Sem: 25 marks (1 hr. 30 mins.), End-Sem: 60 marks (3:00 hrs.), Internal Assessment – 15 marks, Total- 100 marks.

Teaching Schedule:

Sr. No.	Topic	Classes required	Faculty
1.	Paddy Processing: Curing Of paddy, parboiling processes, cold water soaking and hot water soaking processes, paddy dryer-LSU dryer	4	V
2.	By products of paddy processing- paddy husk and its uses – as boiler fuel, husk ash, activated carbon, furfural and other by products. Production of flattened rice and puffed rice from paddy	5	V
3.	Rice milling: components of modern rice mill, pre cleaner, shellers, under runner, shellers and centrifugal shellers, paddy separators - Satake and Schule designs.	5	V
4.	Polishers- cone polishers and other types, bran and broken separators, rice mill yields and loss due to broken at different stage of milling, rice milling machinery handling. Methods of rice bran oil extension	5	V
5.	Milling Of Pulses: Need for modernization, traditional milling process, merits and demerits, De-husking in pulse pearler, water conditioning, splitting of pulses in pulse splitter, process flow chart, merits and demerits	6	V
6.	Mini dal mill, working principle, advantages and disadvantages, grinding of split pulses, pulse flour products, their applications and equipment used.	4	V

7.	Milling and processing of maize: dry and wet milling of maize and corn.	4	V
8.	Modern methods of processing, cleaning, steeping, degemination, bran and fiber separation, gluten and starch separation and extraction process. Equipment needed for degemination, de-branning and starch separation.	5	V
9	Starch conversion into other value- added products, acid hydrolysis, enzyme hydrolysis, isomerization processes, processing for dextrose maltodextrin and other products	4	V
10	Extraction and refining of corn oil in brief.	3	V

Suggested Readings:

1. Mahapatra, A.K., & Lan, Y. (2007). Postharvest handling of grains and pulses. In *Handbook of Food Preservation* (pp. 91-154). CRC Press.
2. Manay, N.S.O. (2001). *Food: facts and principles*. New Age International.
3. Tiwari, B.K., & Singh, N. (2012). *Pulse chemistry and technology*. Royal Society of Chemistry.
4. Barr, S. (2019). *Technology of cereals, pulses and oilseeds*. Scientific e-Resources.
5. Arendt, E.K., & Zannini, E. (2013). *Cereal grains for the food and beverage industries*. Elsevier.
6. Liangli, L.Y., Tsao, R., & Shahidi, F. (Eds.). (2012). *Cereals and pulses: nutraceutical properties and health benefits*. John Wiley & Sons.
7. Ganjyal, G.M. (Ed.). (2020). *Extrusion cooking: cereal grains processing*. Elsevier.
8. Raghavan, A.S.M.G.V., & Ramaswamy, H.S. (2003). *Handbook of Postharvest Technology Cereals, Fruits, Vegetables, Tea, and Spices*.
9. Brink, M. (2006). *Cereals and pulses* (Vol. 1). PROTA.
10. Roy, D., Joshi, P. K., & Chandra, R. (Eds.). (2017). *Pulses for nutrition in India: Changing patterns from farm to fork*. Intl Food Policy Res Inst.
11. Bala, B.K. (2016). *Drying and storage of cereal grains*. John Wiley & Sons.
12. El Boushy, A. R., Van der Poel, A. F., & Poel, A. F. B. (2000). *Handbook of poultry feed from waste: processing and use*. Springer Science & Business Media.
13. Goel, A.K., Kumar, R., & Mann, S. S. (2007). *Postharvest management and value addition*. Daya Books.

TEACHING –LEARNING PLAN

Programme: M.Tech. Food Processing and Technology

Academic Session: 2023-2024

Semester: II

Batch: 2022-2024

Course Code: FT-506

Credits (L-T-P): 3 (3-0-0)

Course Name : Food Texture and Rheology

Faculty Name : Dr. Ruchi Verma (RV)

Course Objective It is designed to provide an extensive understanding of the fundamentals of food texture and rheology measurement and theory, as well as applications to food processing and the development of innovative and modified food textures.

Course Outcome : Students will comprehend how processing factors affect the food's rheological qualities texture. They will comprehend the scientific basis of liquid and solid material rheology and structure.

Assessment/Evaluation : Mid-Sem:25 marks (1 hr. 30 mins.), End-Sem:60 marks (3:00 hrs.), Internal Assessment-15 marks, Total:100 Marks.

Teaching Schedule:

Sr. No.	Topic	Classes Required (No.)	Faculty
1.	Fundamentals of Structuring: Food Polymers, Polymer Solutions.	3	RV
2.	Colloids and Surface Chemistry, Phase Transitions.	4	RV
3.	Rheology: Introduction to food rheology and its classification, Mechanical and Rheological Properties.	4	RV
4.	Mechanical Properties of Food Solids, Food Structure in the Mouth and Beyond.	4	RV
5.	Food Structuring: Traditional Food Structuring and Texture Improvement, Approaches to Food Structuring.	4	RV
6.	Extrusion and Spinning, Structuring Fat Products, Structure and Stability.	3	RV
7.	Gels, Gelation Mechanisms, Mixed Gels, The Microstructure of Gels, Structure-Property Relations in Gels.	4	RV
8.	Microstructural Components and Food Assemblies: Water and Ice, Proteins, Lipids, Carbohydrates.	4	RV
9.	Cells and Cell Membranes, Structural Aspects of Animal Tissue, Structural Aspects of Plant Tissue.	3	RV

10.	Food Microstructure and Quality: Measurement of Texture, Structural Aspects of Food Texture, Quality and Structure.	4	RV
11.	Microstructure and Mass Transfer: Solid-Liquid Extraction: Fundamental Aspects of Extraction.	4	RV
12.	Extraction process: Introduction, Extraction of Food Materials, Modifying Microstructure, Modeling the Extraction Process.	4	RV

Suggested Readings:

1. Day, L., and Golding, M. (2016). Reference Module in Food Sciences in Food Structure, Rheology, and Texture.
2. Cossa, K.N (2019). Basic concepts on rheology and application of shear-thickening fluids in protective gear: Research Article. *SN Applied Sciences*. 1:1284
3. Food Texture and Viscosity: Concept and Measurement by Malcolm C. Bourne. (2002). Publisher: Elsevier Science & Technology Books. · ISBN: 0121190625
4. Hiemenz, P.C., and Rajagopalan, R. Principles of colloid and surface chemistry. - 3rd ed., rev.
5. Rahman and Mohammad Shafiur. FOOD ENGINEERING – Vol. I - Mechanical Properties of Foods.
6. Van der Sman, R. G. M. and van der Goot, A. J (2008). The science of food structuring. The Royal Society of Chemistry. 5, 501–510
7. Suzana Caetano da Silva Lannes and Rene Maria Ignacio. Food industry book (2013 ISBN978-953-51-0911-2
8. Narender Raju Panjagari. Principles of the Food Processing & Preservation published by Inlibnet centre edited by Prof. Vijaya Khader.
9. Shakuntala Manay (2008). N. Foods Facts and Principles. NEW AGE Publisher ISBN-13: 978-8122422153
10. Food Texture and Viscosity: Concept and Measurement by Malcolm C. Bourne. (2002). Publisher: Elsevier Science & Technology Books. · ISBN: 0121190625
11. Lloyd, P and Wyk, J (2011). Introduction to extraction in food processing Lebovka N, Vorobiev E, Chemat F (eds): Enhancing Extraction Processes in the Food Industry Boca Raton, FL: CRC Press (Taylor and Francis Group). ISBN 978-1-4398-4593.

TEACHING –LEARNING PLAN

Programme: M.Tech. Food Processing and Technology **Academic Session:** 2023-2024

Semester: II

Course Code: FT-552

Credits (L-T-P): 2 (0-0-2)

Course Name : **Advances in Food Processing Lab**

Faculty : Dr. Nitin Sonkar

Course Objective : It will help students to understand the fundamentals of instrumentation, advantages and disadvantages of different techniques, to perform data acquisition, interpret measurements, perform qualitative and quantitative analysis of selected foods.

Course Outcome : Students will be able to perform physical and chemical analyses of food and select the appropriate instrumental procedure food analysis problem.

Assessment/Evaluation : Lab record- 20 marks, Viva- 20 marks, End-Sem: 60 marks, Total: 100 marks

Laboratory Schedule:

Sr. No.	List of Experiments
1.	Experiment on osmotic dehydration of food
2.	Determination of Total Soluble Solids
3.	Drying and dehydration of fruits and vegetables
4.	Determination of colour value by using hunter lab colorimeter
5.	Experiment on detection of adulteration
6.	To study the different functional properties of given food sample
7.	Estimation of protein content in food sample
8.	Application of various preservation techniques for food preservation
10.	To retard enzymatic browning by using natural ingredients
11.	Preparation of jam, jelly and marmalades
12.	Estimation of total sugars
13.	Estimation of reducing and non-reducing sugars

Suggested Readings:

1. Ranganna, S. (2005). Handbook of analysis and quality control for fruit and vegetable products. Tata Mc Graw-Hill Publishing Company Limited, New Delhi.
2. Zavastin, D.E., Gherman, S.P and Florin Şpac, A (2021). Physical chemistry. A laboratory manual. Published by Gr. T. Popa. U.M.F. Lasi.
3. Girdharilal., Siddappaa, G.S and Tandon, G.L. (1998). Preservation of fruits & vegetables. ICAR, New Delhi.

TEACHING –LEARNING PLAN

Programme: M.Tech. Food Processing and Technology **Academic Session:** 2023-2024

Semester: II

Course Code: FT-556

Credits (L-T-P): 2 (0-0-2)

Course Name : **Advances in Cereals and Pulses Processing Lab**

Faculty Name : Ms. Reshma Saroj

Course Objective : To provide in-depth understanding of fundamentals of cereals and pulses, their processing and the different physio-chemical analysis.

Course Outcome : The learners would understand to analyze data, develop skills to control the quality of food, to monitor various food processing operations in cereal industries, and generate familiarity with process equipment via hands on learning.

Assessment/Evaluation : Lab record-20 marks, Viva-20 marks, End-Sem: 60 marks, Total-100 marks.

Laboratory Schedule:

Sr. No.	List of Experiments
1.	To determine the quality of various food grains commonly used and grade them accordingly
2.	Determination of TKW (Thousand Kernel Weight) of cereal grains
3.	Estimation of moisture content of grains and flours by vacuum drying method
4.	Determination of ash content of flours
5.	Determination of ash insoluble in dilute HCL
6.	Determination of gluten content in wheat flour and refined flour
7.	Estimation of alcoholic acidity of flours
8.	Determination of crude fiber of flours
9.	Determination of average size of cereals and pulses flour by sieve analyses
10.	To estimate the water/oil holding capacity of flours
11.	To estimate the bulk density of flours
12.	To estimate the crude fat by Soxhlet extraction method in given food sample

Suggested Readings:

1. Rangana, S. (2002). Handbook of Analyzer and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata Megraw Hill pub. Co. Ltd. New Delhi.
2. Verem, T. B., Dooshima, I. B., Ojoutu, E. M., Owolabi, O. O., & Onigbajumo, A. (2021). Proximate, chemical and functional properties of wheat, soy and moringa leaf composite flours.
3. Chandra, S., Singh, S., & Kumari, D. (2015). Evaluation of functional properties of composite flours and sensorial attributes of composite flour biscuits. *Journal of food science and technology*, 52, 3681-3688.
4. Daboul, A. K., Awady, M. N., Hamada, M. A., & EL-Attar, M. Z. (2011). Physical and mechanical characteristics of corn kernels. *Misr Journal of Agricultural Engineering*, 28(4), 961-974.