

OPTION-1

CC31: Food Crops, Spices & Flavor Technology

Credit-6

Objective: To provide comprehensive knowledge on the processing, quality evaluation, and technologies for cereals, legumes, oilseeds, and sugar crops, while acquainting students with food additives, spices, and flavor components relevant to the processed food industry for shelf-life extension, sensory appeal, and safety.

UNIT-I: Wheat Processing and Bakery Applications

- 1. Wheat:** Types, structure, composition, and physicochemical characteristics.
- 2. Wheat milling:** Products and by-products; factors affecting quality parameters; physical, chemical, and rheological tests on wheat flour, manufacturing of wheat-based products,
- 3. Baking:** Principles of baking and several changes in baked products, formulation of premixes for bakery products, pasta goods, and processed cereal foods for infants.

UNIT-II: Rice Processing

- 1. Rice:** Classification, structure, composition, physicochemical characteristics, and quality.
- 2. Rice milling technology:** By-products of rice milling and their utilization; rice bran stabilization, oil extraction and refining; parboiling methods, criteria of quality, aging of rice (quality changes), and processed products based on rice.

UNIT-III: Corn, Barley and Oat Processing

- 1. Corn:** Types and nutritive value; dry and wet milling; corn products including corn flakes, corn starch, snacks, tortillas, production of glucose syrups, dextrose, high fructose corn syrups, and modified corn starches.
- 2. Barley:** Composition, milling, malting, changes during malting, uses of malt and its products.
- 3. Oats:** Composition, types, processing of oats, and by-products of oat milling.

UNIT-IV: Legumes and Oilseed Processing

- 1. Legumes and Oilseeds:** Composition, anti-nutritional factors, processing, hydrogenation, and storage; processing for production of edible oil, meal, flour, protein concentrates and isolates; development of low-cost protein foods.
- 2. Oil extraction process:** mechanism, oil refining, utilization of by-products of oil milling.

UNIT-V: Processing of Sugar Crops

- 1. Processing of sugar crops and tubers:** Sugar production and manufacturing
- 2. Products of sugars and by-products of sugar manufacturing,** types and grades of sugars (sugar cane, sugar beets, and their differences).

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UNIT-VI: Flavor Science

1. **Food flavor basics:** Olfactory perception of flavor and taste, relationship of taste-sweet, bitter, salt, sour; chemicals causing pungency, astringency, cooling effect, and properties.
2. **Flavors generated during processing:** Reaction flavors, flavor composites, stability of flavors during food processing.

UNIT- VII: Flavor Technology

1. **Flavor encapsulation-**need, methods and applications in food industry
2. **Flavor technology:** Types of flavors, classification of flavors (natural, nature identical, and synthetic).
3. **Analysis of flavors,** extraction techniques of flavors

UNIT- VIII: Spices Processing

1. **Major and minor spices:** Oleoresins and essential oils, method of manufacture, quality control, fumigation, and irradiation of spices.
2. **Techniques for flavor extraction:** Supercritical fluid extraction (continuous and semi-continuous methods), effects of types of solvents used, and its role in food industry.

Text Books and Reference:

1. Chakravarty, M.M. (2003). Chemistry and Technology of Oils and Fats. 1st Edition. Prentice Hall.
2. Dendy, D.A.V., & Braszczok, B.J. (2001). Cereal and Cereal Products. 1st Edition. Aspen.
3. Hamilton, R.J., & Bhati, A. (2000). Fats and Oils: Chemistry and Technology. 1st Edition. Aspen.
4. Hony, R.S. (2010). Principles of Cereal Science and Technology. 3rd Edition. App. Skippable.
5. Kay, D.E. (2017). Food Legumes. 5th Edition Tropical Products Institute.
6. Kent, N.L. (1983). Technology of Cereals. 4th Ed. Pergamon Press.
7. Food Flavors (2014). Morton, I.D. & Macleod, A.J. Part A. BC. Elsevier.
8. George, A.B. (2009). Fenaroli's Handbook of Flavor Ingredients. 6th Edition. CRC Press.
9. Fennema, O.R. (1976). Principles of Food Science Part-I Food Chemistry 5th Edition. Marcel Dekker, New York.
10. Andrew J. Taylor & Robert S.T (2010). Food flavor technology, 2nd Edition, Wiley-Blackwell.

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Objective: This course offers in-depth knowledge of processing, preservation, and quality control of dairy, meat, fish, and poultry products, covering composition, technology, legislation, and hygiene practices. Students will learn to apply sanitation measures, evaluate quality, implement storage, packaging, and marketing strategies, and utilize by-products effectively.

UNIT I -Composition, Collection & Processing of Raw Materials

1. Milk composition and characteristics; collection, chilling, transportation, cream separation.
2. Composition and classification of edible fish; average composition of fish; freshness evaluation.
3. Meat composition; carcass components, postmortem changes, glycolysis.

UNIT II -Processing Technologies for Milk & Liquid Products

1. Standardization, pasteurization (LTLT, HTST, UHT), homogenization.
2. Packaging, storage, and distribution of fluid milk.
3. Sanitary design of dairy plant; waste disposal.

UNIT III -Fish Processing & Preservation

1. Handling, storage, and transport of fish.
2. Preservation methods: canning, freezing, drying, salting, smoking, curing.
3. Fish products: fish meal, oil, and by-products.
4. Spoilage of fish and quality assessment.

UNIT IV -Meat Processing & Preservation

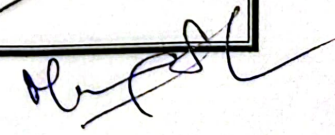
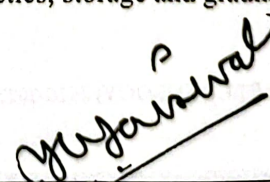
1. Slaughtering methods, meat preservation, and packaging, Pre and post-slaughter factors affecting meat quality.
2. PSE and DFD conditions.
3. Chilling, freezing, curing, and smoking of meat.
4. Meat industry in India: importance, application, growth rate.

UNIT V -Poultry Processing & Products

1. Pre-slaughter care, ante mortem examination, slaughtering, Preservation, chilling, freezing, and packaging of poultry meat.
2. Processed poultry products: smoked, canned, barbecued, curried poultry.
3. Tenderness factors and by-product utilization.

UNIT VI - Dairy Technology

1. Fermented milk products: curd, yoghurt, shrikhand.
2. Butter: manufacture, storage, packaging, and defects.
3. Cheese: manufacture of hard, semi-hard, soft, and processed varieties; storage and grading.



UNIT VII -Frozen, Indigenous, Evaporated & Dried Milk Products

1. Frozen milk products: ice cream, sherbets – classification, manufacture, defects.
2. Indigenous products: ghee, khoa, paneer, chhana.
3. Evaporated and dried milk: SMP, WMP, condensed milk – manufacture, storage, defects.

UNIT VIII - Eggs, By-products & Quality Evaluation

1. Egg structure, composition, nutritive value, functional properties.
2. Factors affecting egg quality and its measurement.
3. Industrial use of eggs; collection, grading, cleaning, storage.
4. Dairy by-products: skim milk, buttermilk, whey – utilization.
5. Quality parameters: appearance, texture, viscosity, flavour defects, contamination.

Textbooks & References

1. Robinson, R.K. (1996). Modern Dairy Technology, Vol. 1 & 2, 2nd Ed. Elsevier Applied Science.
2. Herington, B.L. (2009). Milk & Milk Processing. McGraw-Hill.
3. Lampert, L.H. (1998). Modern Dairy Products. Chemical Publishing Co.
4. Fox, P.F. (2016). Developments in Dairy Chemistry, Vol. 1 & 2, 2nd Ed. Springer.
5. De Sukumar. (2024). Outlines of Dairy Technology. Oxford Univ. Press.
6. Pearson, A.M., & Gillett, T.A. (1996). Processed Meats, 3rd Ed. CBS.
7. Toldra, F. (2022). Lawries Meat Science, 9th Ed. Woodhead Publishing.
8. Stadelman, W.J., et al. (1988). Egg and Poultry Meat Processing. Wiley-VCH.
9. Lawrie, R. (1991). Developments in Meat Science, Vol. 5. Applied Science Pub.
10. Stadelman, W.J., & Cotterill, O.J. (1995). Egg Science & Technology, 4th Ed. AVI Publ.
11. Borgstrom, G. (2012). Fish as Food, Vol. 1 & 2. CRC Press.

Objective:

Imparting knowledge about the general methods of quality evaluation, testing and processing cereals and preparation of different type of cereal-based products.

Outcome:

The students shall be able to assess the quality of wheat, rice and different type cereals. Preparation of different type of cereal-based products.

1. Detection of adulteration in different types of foods.
2. Determination of moisture content in food product by hot air oven drying method.
3. Determination of yeast quality by its dough rising capacity.
4. Determination of thousand kernel weight of different grains sample.
5. Determination of cooking time in different rice sample.
6. Determination of elongation ratio in different rice sample.
7. Determination of Gluten content in different flour sample.
8. Determination of ash content in flour samples.
9. Determination of Acid insoluble Ash
10. Estimation of fat acidity
11. Determination of Alcoholic acidity
12. Preparation of Bread, Biscuits, Pizza base, Dinner roll, Cookies, Muffins, Nankhatai, Cakes.
13. Preparation of fermented products.
14. Quality evaluation of different biscuit sample—physical and chemical analysis.
15. To determine the foaming capacity of given flour sample.
16. Determination of protein content of flour by Kjeldahl Method
17. Estimation of curcumin in turmeric.
18. Determination of capsaicin in content in chilli.

Textbooks/References:

1. MIIR (2022). Handbook on spices. 6th Edition. National Institute of Industrial Research Board, Asia Pacific Business Press Inc.
2. Peeler EJ. (2000) Bakery Science & Technology. 3rd Edition. Vols. I, II Sosst and Publication.
3. Lorenz KL. Hand Book of cereals Science and Technology. Marcel Dekker.
4. Manual of Methods of Analysis of Cereal and Cereal Products. (2023) 2nd Edition, FSSAI.

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Manoj Sharma

Objective: Imparting knowledge about the general methods of quality evaluation, testing and processing fresh milk and preparation of different type milk products.

Outcome: The students shall be able to assess the quality of milk and milk products and to develop various milk products. Preparation of different milk products and fat estimation and analysis of fat for milk and milk products,

1. Platform Test of Milk.
2. Fat estimation in milk by Gerber Method.
3. Preparation of curd, lassi, shrikhand, ghee, khoa, chenna and paneer.
4. Determination of total solids in milk, skim milk, butter milk and whey by drying method.
5. Viscosity determination of Milk by Pipette method.
6. Test for fats: Bromothymol blue test.
7. Alcohol test for determining coagulability of milk.
8. Determination of salt content in butter.
9. Casein estimation in milk sample.
10. Preparation of fortified, reconstituted and flavoured milks.
11. Sensory analysis of food products: Paired comparison test, Duo-trio test, Hedonic test, Triangle test; Ranking test, Single sample test, Composite scoring test.

Textbooks/References: -

1. Herrington BL. (1948) Milk and Milk processing, 1st Edition. Mc Craw Hill Book Company.
2. De S. (2001). Outlines of Dairy Technology. 1st Edition. Oxford University Press.
3. Manual of Methods of Analysis of foods- Dairy and Dairy Products. (2022), 2nd Edition FSSAI.

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Internship/Apprenticeship or Seminar

Credits-2

- Every student shall deliver at least one seminar on topic of the curriculum/ advances in food technology, which will individually be assessed by every available teacher on the basis criteria laid down by the Staff council. Students in audience will also be encouraged to assess the seminar on the given criteria and their evaluation will also be given due consideration. The average marking will be taken into consideration.
- The internship provides students with practical exposure to real-world industrial environments, bridging the gap between classroom learning and professional practice. It enables hands-on experience, skill development, and industry-oriented learning for career readiness.

Practical

Manish

Objective: To understand the importance of various technologies used in food processing. Imparting knowledge about principles and application of computer in food technology.

UNIT I – Foundations of Modern Food Processing

1. Historical development and eras of modern food processing.
2. Overview of current challenges and future prospects.

UNIT II – Extrusion & Non-Thermal Processing

1. Extrusion – thermoplastic extrusion cooking, preparation of meat analogues, advantages over natural meat
2. Advances in non-thermal processing: bio-preservation, high-hydrostatic pressure processing, pulsed electric field processing

UNIT III – Ultrasound & Hurdle Technology

1. Ultrasound processing – preservation & enhancement of mass transfer
2. Hurdle Technology – principles and applications

UNIT IV – Food Biotechnology & Food Fortification

1. **Food Biotechnology:** introduction, history, and applications in the food industry
2. **Genetically Modified (GM) Foods:** Process of genetic modification, Transgenesis methods, Safety concerns: potential toxicity and allergenicity
3. **Food Fortification:** Advanced technologies for fortification, Types of fortified products, Challenges: nutrient interaction and bioavailability

UNIT V – Nanotechnology in Food

1. New ways of food production
2. Efficient fractionation of product
3. Optimizing nutritional values
4. Applications in sensing, packaging, encapsulation
5. Super-critical fluid extraction

UNIT VI – 3D Food Printing

1. Principles of food printing technologies
2. Printing methods and advancements
3. Potential culinary applications

UNIT VII – AI in Food Processing

1. **Role of AI:** Food production enhancement, Precision agriculture, Food safety and quality control, Food packaging, Personalized food products, Supply chain management, Consumer experience
2. Benefits & limitations of AI in food technology

UNIT VIII – Biostatistics for Food Technology

1. Introduction of Biostatistics and its applications
2. Population and sample – types of statistical data – collection and classification of data
3. Frequency tables – diagrammatic representation of data
4. Measures of central tendency – mean, median, mode
5. Measures of dispersion – range, quartile deviation, standard deviation, skewness, kurtosis
6. Sampling techniques – simple random sampling, stratified random sampling

Textbooks and Reference:

1. Lopez, G.F.G., & Canovas, G.V.B. (2003). Food Science and Food Biotechnology, 1st Ed., CRC Press, Florida, USA.
2. Cupp, J., & Tracy, T.S. (2003). Dietary Supplements, 1st Ed., Humana Press.
3. Lewin, B. (2004). Genes VIII, 8th Ed., Pearson Education International.
4. Bains, W. (2022). Biotechnology 6th Edition: from A to Z, Oxford Univ. Press.
5. Khalid Barkat, Kulsum Jan, Valibhay Kumar Maurya, Amita Shakya. (2024). Food Fortification, 1st Ed., CRC Press.
6. Insha Zahoor, Sajad Ahmad Wani, & Tariq Ahmad Ganaie. (2025). Artificial Intelligence in the Food Industry, CRC Press.
7. Eila Hassanein, Mona Soliman. (2023). Artificial Intelligence: A Real Opportunity in the Food Industry, 1st Ed., Springer.
8. Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research, Himalaya Publishing House, Mumbai.
9. Mukherjee, R (1989): The Quality of Life: Valuation in School Research, Sage Publications.

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Objective: To understand the importance of various nutrients, bioactive compounds, and toxicants in foods, their role in human health, and effects of their imbalance. To study utilization, deficiency diseases, metabolic disorders, safety, and regulatory issues. To explore probiotic, prebiotic, and functional foods, and learn about toxicology and contaminants in foods.

UNIT I — Fundamentals of Nutraceuticals, Functional Foods & Food Toxicology

1. Definitions, concepts, scope, history, and market trends.
2. Significance in disease prevention and health promotion.
3. General principles of food toxicology: manifestation of toxic effects, classification of food toxicants, factors affecting toxicity.

UNIT II — Classification & Occurrence

1. Classification of nutraceuticals and functional foods.
2. Natural occurrence of phytochemicals (antioxidants, flavonoids, omega-3 fatty acids, carotenoids, dietary fiber).
3. Agricultural & industrial contaminants in foods: pesticide residues in fruits/vegetables, metal contaminants.

UNIT III— Phytochemicals, Bio-actives & Safety

1. Phytoestrogens, glucosinolates, organosulfur compounds: dosage for disease control/health benefits, safety, acute/chronic studies.
2. Regulatory aspects of nutraceuticals and bio-actives.
3. Natural toxins in foods: plant and animal origin, microbial toxins (algal, bacterial, fungal) and their significance.

UNIT IV — Probiotics

1. Probiotics: definition, types, relevance.
2. Role in gastrointestinal health and other benefits.
3. Development of probiotic products, recent advances, challenges, and regulatory issues.
4. Mycotoxicosis: significance, determination, and management.

UNIT V — Prebiotics

1. Definition, chemistry, sources, metabolism, and effects of processing.
2. Prebiotics in foods: types, effects on gut microbiota, health benefits, and recent developments.
3. Food poisoning: causes, microbial toxins, and prevention strategies.

UNIT VI — Functional Food Development

1. Development process, use of bio-actives in appropriate forms with protective substances and activators.
2. Effect of environmental conditions and food matrix.
3. Food allergies and sensitivities: sources, chemistry, true/false allergies, food intolerances.

UNIT VII — Food Contaminants, Adulterants & Processing-Generated Toxicants

1. Environmental contaminants and drug residues: pesticide/fungicide residues, heavy metals, veterinary drug residues, radioactive contamination.
2. Processing-generated toxicants: nitroso compounds, heterocyclic amines.
3. Safety of genetically modified foods: potential toxicity and allergenicity.
4. Food adulteration, definition, types, reasons and methods of detection.

UNIT VIII — Food Additives, Supplements & Nutritional Genomics

1. Food additives: Need, safety, toxicological evaluation.
2. Dietary supplements: toxicity related to dose, possible toxic effects, relevance.
3. Research frontiers in functional foods, nutrigenomics, personalized nutrition, and their application in the food industry.

Textbooks & References:

1. Wildman, R.E.C. (2019). Handbook of Nutraceuticals and Functional Foods (3rd ed.). CRC Press.
2. Gibson, G.R., & Williams, C.M. (2000). Functional Foods: Concept to Product (1st ed.). CRC Press.
3. Goldberg, I. (2012). Functional Foods: Designer Foods, Pharma Foods. Springer-Verlag.
4. Brigelius-Flohé, R., & Joost, H.G. (2006). Nutritional Genomics (1st ed.). Wiley VCH.
5. Helferich, W., & Winter, C.K. (2000). Food Toxicology (1st ed.). CRC Press.
6. Duffus, J.H., & Worth, H.G.J. (2015). Fundamental Toxicology. Royal Society of Chemistry.
7. Stine, K.E., & Brown, T.M. (2015). Principles of Toxicology (3rd ed.). CRC Press
8. Tonu, P. (2014). Principles of Food Toxicology (2nd ed.). CRC Press.
9. Branen, A.L., Davidson, P.M. & Salminen, S. (2001). Food Additives, 2nd Edition. Marcel Dekker.
10. George, A.B. (1997). Encyclopedia of Food and Color Additives, 1st Edition Vol. III. CRC Press.
11. Furia, T.E. (1980). Handbook of Food Additives, Vol I and Vol II. CRC Press.

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Objectives: Provide hands-on exposure to modern food technology, train students in applied biostatistics for food research without high-end software dependency and develop skills in product development, shelf-life testing, and data interpretation.

Outcomes: Conduct advanced food technology concepts, design small-scale experiments, apply statistical tools to food data and interpret results for product optimization and quality control.

Advanced Techniques

1. Small-scale Vacuum Packaging & Shelf-life Study
2. Low-cost Freeze drying Simulation
3. Fortified Product Development
4. Texture Analysis (Manual Method)
5. Solar/Tray Drying vs. Oven Drying
6. Spectrophotometry Using Colorimeter
7. pH & Acidity Measurement
8. Color Analysis (DIY method)
9. Total Soluble Solids (TSS)
10. Water Activity (Aw) Approximation

Applied Biostatistics

1. Experimental Design Basics – CRD & RBD using sensory data from food samples.
2. Descriptive Statistics – Mean, median, SD calculation using Excel.
3. t-test & ANOVA in Food Data Comparing moisture content of two drying methods.
4. Correlation & Regression – Shelf-life days vs. sensory scores.
5. Chi-square Test – Sensory panel preference data analysis.
6. Graph Making & Data Interpretation

Textbook/References:

1. Ranganna, S. Handbook of Analysis and Quality Control for Fruit and Vegetable Products.
2. Montgomery, D.C. Design and Analysis of Experiments.

Dr. Yashpal

Harsh

Objective: Train students to detect common food toxins using simple tests, developing functional foods and nutraceuticals using locally available resources.

Outcomes: Detect natural toxins, develop functional foods and nutraceutical products.

Food Toxicology

1. Detection of Argemone Oil in Mustard Oil
2. Detection of Aflatoxins in Nuts/Grains
3. Pesticide Residue Screening
4. Detection of Heavy Metals
5. Cyanogenic Glycosides

Functional Foods

1. Preparation of Probiotic products.
2. Preparation of Fortified food.
3. Preparation of Antioxidant
4. Detection of Dietary Fiber Content
5. Shelf-life Study of Functional Food

Nutraceuticals

1. Extraction of Herbal Powders, Preparation of Herbal Capsules/Tablets
2. Detection of Total Phenolic and Total Flavonoids content
3. In-vitro Antioxidant Activity detection

References:

1. Ranganna, S. Handbook of Analysis and Quality Control for Fruit and Vegetable Products (adapted methods).
2. AOAC Official Methods (low-cost adaptations).
3. Arora, S. Food Toxicology.
4. Wildman, R.E.C. Handbook of Nutraceuticals and Functional

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OPTION-2

CC31: Food Crops, Spices & Flavor Technology

Credit-6

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1. **Rice:** Classification, structure, composition, physicochemical characteristics, and quality.
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4. Meat industry in India: importance, application, growth rate.

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2. Herington, B.L. (2009). Milk & Milk Processing. McGraw-Hill.
3. Lampert, L.H. (1998). Modern Dairy Products. Chemical Publishing Co.
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5. De Sukumar. (2024). Outlines of Dairy Technology. Oxford Univ. Press.
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3. Determination of yeast quality by its dough rising capacity.
4. Determination of thousand kernel weight of different grains sample.
5. Determination of cooking time in different rice sample.
6. Determination of elongation ratio in different rice sample.
7. Determination of Gluten content in different flour sample.
8. Determination of ash content in flour samples.
9. Determination of Acid insoluble Ash
10. Estimation of fat acidity
11. Determination of Alcoholic acidity
12. Preparation of Bread, Biscuits, Pizza base, Dinner roll, Cookies, Muffins, Nankhatai, Cakes.
13. Preparation of fermented products.
14. Quality evaluation of different biscuit sample—physical and chemical analysis.
15. To determine the foaming capacity of given flour sample.
16. Determination of protein content of flour by Kjeldahl Method
17. Estimation of curcumin in turmeric.
18. Determination of capsaicin in content in chilli.

Textbooks/References:

1. MIIR (2022). Handbook on spices. 6th Edition. National Institute of Industrial Research Board, Asia Pacific Business Press Inc.
2. Peeler EJ. (2000) Bakery Science & Technology. 3rd Edition. Vols. I, II Sosst and Publication.
3. Lorenz KL. Hand Book of cereals Science and Technology. Marcel Dekker.
4. Manual of Methods of Analysis of Cereal and Cereal Products. (2023) 2nd Edition, FSSAI.

Meghna
Harsh

Objective: Imparting knowledge about the general methods of quality evaluation, testing and processing fresh milk and preparation of different type milk products.

Outcome: The students shall be able to assess the quality of milk and milk products and to develop various milk products. Preparation of different milk products and fat estimation and analysis of fat for milk and milk products,

1. Platform Test of Milk.
2. Fat estimation in milk by Gerber Method.
3. Preparation of curd, lassi, shrikhand, ghee, khoa, chenna and paneer.
4. Determination of total solids in milk, skim milk, butter milk and whey by drying method.
5. Viscosity determination of Milk by Pipette method.
6. Test for fats: Bromothymol blue test.
7. Alcohol test for determining coagulability of milk.
8. Determination of salt content in butter.
9. Casein estimation in milk sample.
10. Preparation of fortified, reconstituted and flavoured milks.
11. Sensory analysis of food products: Paired comparison test, Duo-trio test, Hedonic test, Triangle test, Ranking test, Single sample test, Composite scoring test.

Textbooks/References: -

1. Herrington BL. (1948) Milk and Milk processing, 1st Edition. Mc Craw Hill Book Company.
2. De S. (2001). Outlines of Dairy Technology. 1st Edition. Oxford University Press.
3. Manual of Methods of Analysis of foods- Dairy and Dairy Products. (2022), 2nd Edition FSSAI.

Cyranne

Margaret

Seminar

Credits-2

Every student shall deliver at least one seminar on topic of the curriculum/ advances in food technology, which will individually be assessed by every available teacher on the basis criteria laid down by the Staff council. Students in audience will also be encouraged to assess the seminar on the given criteria and their evaluation will also be given due consideration. The average marking will be taken into consideration.

IV Semester

Research Thesis/ Research Project/ Patent

Credits-22

The research/thesis/patent/project component fosters independent inquiry, critical analysis, and innovative thinking. It enables students to apply scientific methods and technical knowledge to address real-world challenges and contribute original solutions.

myanmar

Harip

OPTION-3

III Semester

Research Thesis/ Research Project/ Patent

Credits-22

The research/thesis/patent/project component fosters independent inquiry, critical analysis, and innovative thinking. It enables students to apply scientific methods and technical knowledge to address real-world challenges and contribute original solutions.

IV Semester

Research Thesis/ Research Project/ Patent**Credits-22**

The research/thesis/patent/project component fosters independent inquiry, critical analysis, and innovative thinking. It enables students to apply scientific methods and technical knowledge to address real-world challenges and contribute original solutions.

M. J. J. J. Harrell