

**SCHEME OF EVALUATION**  
**M.Sc. – FOOD TECHNOLOGY**  
**2<sup>nd</sup>-YEAR, SEMESTER-III**  
**(w.e.f. academic session 2021-2022)**

S. No.	Category	Course Code	SUBJECT	PERIODS			CREDIT	MARKS		
				L	T	P		DISTRIBUTION		
								IAM	ESM	TOTAL
<b>THEORY</b>										
1	CC	MFT-301	Processing of Cereals, Pulses and Oilseeds	3	1	0	4	30	70	100
2	CC	MFT-302	Dairy Technology	3	1	0	4	30	70	100
3	CC	MFT-303	Food Packaging and Labelling	3	1	0	4	30	70	100
4	CC	MFT -304	Bakery and Confectionery Technology	3	1	0	4	30	70	100
5	DSE(2*)	MFT305	Fermentation and Microbial Technology	2	0	0	2	15	35	50
		MFT306	Specialty Foods							
6	GE(2*)	MFT-307	Beverage Technology	3	1	0	4	30	70	100
		MFT-308	Snack Food Technology							
<b>PRACTICAL / TRAINING / PROJECT / SEMINAR</b>										
7	Lab Courses	MFT-351	Dairy Technology Lab	0	0	4	2	15	35	50
8	Lab Courses	MFT-352	Beverage Technology Lab	0	0	4	2	15	35	50
9	Lab Courses	MFT-353	Snack Food Technology Lab	0	0	4	2	15	35	50
		<b>Total</b>		<b>17</b>	<b>5</b>	<b>12</b>	<b>28</b>	<b>210</b>	<b>490</b>	<b>700</b>
Abbreviations Used	L – Lecture; T – Tutorial; P – Practical; C – Credit; IAM – Internal Assessment Marks; ESM – End Semester Marks CC= Core Course, DSE=Discipline Specific Electives, GE-Generic Elective, AECC-Ability Enhancement Compulsory Core Courses, SEC=Skill Enhancement Course									

(\*)Only one elective course is to be chosen out of the given two.

The elective subject for theory and practical will be same.

**SCHEME OF  
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**M.Sc. – FOOD TECHNOLOGY**  
**2nd-YEAR, SEMESTER-IV**  
**(w.e.f. academic session 2021-2022)**

S. No.	Category	Course Code	SUBJECT	PERIODS			CREDIT	MARKS DISTRIBUTION		
				L	T	P		IAM	ESM	TOTAL
<b>THEORY</b>										
1	CC	MFT-401	Entrepreneurship and Project Management	3	1	0	4	30	70	100
<b>PRACTICAL / TRAINING / PROJECT / SEMINAR</b>										
2	SEC	MFT-451	Dissertation/Project and Viva	0	0	20	24	0	300	300
<b>Total</b>				<b>3</b>	<b>1</b>	<b>20</b>	<b>28</b>	<b>30</b>	<b>370</b>	<b>400</b>
L – Lecture; T – Tutorial; P – Practical; C – Credit; IAM – Internal Assessment Marks; ESM – End Semester Marks, CC= Core Course, SEC=Skill Enhancement Course										

## MFT 301 Processing of Cereals, Pulses & Oil Seeds

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week	Internal Assessment Marks[IAM]:30
Tutorials: 1 hr./week	[Class Test: 12, Teachers assessment: 6,Attendance: 12 ]
Credits: 4	End Semester Marks[ESM]: 70

### Course Objective:

1. To create knowledge about the processing and quality evaluation of cereal grains.

### Detailed Syllabus

Module 1
Wheat Technology: Composition of grain and environmental effects on its processing quality, enzymes of wheat and their role in the manufacture of wheat products; principles of wheat milling and its effect on composition of flour, aging of flour, byproducts, chemical improvers- bleaching and maturing agents, property of dough and its rheology, manufacture of wheat products bread, biscuits etc.; formulation of premixes for bakery products; pasta goods and processed cereal foods for infants.
Module 2
Rice Technology: Composition, type of proteins, starch content, amylose and amylopectin fractions; presence and effect of lipases; distribution of vitamins; minerals, and proteins in rice grain and its relation to milling; rice milling operations and its effect on nutritive value; cooking quality; byproducts of rice milling and their utilization; processed and prepared mixes based on rice.
Module 3
Legumes: Composition, anti-nutritional factors, processing methods, methods of cooking.
Module 4
Corn Technology: Composition, processing of corn for manufacture of corn grits, meal and flour; manufacture of corn flakes, corn syrup, cornstarch, corn steep liquor, corn oil and canned corn. Composition and Processing of millets like barley, sorghum. Oats etc.
Module 5

Oilseeds: Composition, processing of oilseeds as protein concentrations, properties and uses of oilseeds meals, technology vegetable protein isolates; Barrier compounds in the utilization of oil seed proteins. Low cost protein foods from oilseeds.

#### **Suggested Readings**

1. Hosene, R.S. (1994). Principles of Cereal Science and Technology. 2nd Ed. AACC.
2. Chakrabarty, M.M. (2003). Chemistry and Technology of Oils and Fats. Prentice Hall.
3. Dendy, D.A.V., & Dobraszczyk, B.J. (2001). Cereal and Cereal Products. Aspen.
4. Hamilton, R.J., & Bhati, A. (1980). Fats and Oils - Chemistry and Technology. App. Sci. Publ.
5. Kay, D.E. (1979). Food Legumes. Tropical Products Institute.

#### **COURSE OUTCOMES**

After completing the course, students will be able to:

1. Student will acquire the understanding of the technology for Wheat Milling & Wheat based Food Products.
2. Student will acquire the understanding of the technology for Rice Milling & Rice based other Food Products.
3. Student will acquire the understanding of working of equipments related to Legumes Processing along with equipments.
4. Student will be able to understand technology for Milling of Corn & Corn based other Food Products along with equipments.
5. Student will be able to understand technology for Oil Seed Processing & Oil Extraction from various sources along with equipments.

## MFT 302 Dairy Technology

<b>Teaching Scheme</b> Lectures: 3 hrs./ week Tutorials: 1 hr./week Credits: 4	<b>Examination Scheme</b> Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70
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### Course Objective:

1. To impart knowledge about processing of milk and its products and legislation for the quality control of milk and milk products.

### Detailed Syllabus

<b>Module 1</b>
Introduction: Physicochemical properties of milk, Platform tests, Chemical composition and nutritive value of milk, Factors affecting composition of milk. Importance of milk industry in India: Collection, chilling, transportation, cream separation, standardization, pasteurization, sterilization, homogenization, packaging, storage and distribution of fluid milk, Ultrahigh temperature processed milk. Preparation of various types of milks: Toned, homogenized, fortified, reconstituted and flavored milk. Technology of fermented milk products: Principles and practices of manufacture, packaging, storage and marketing of Dahi, cultured butter milk, acidophilus milk etc.
<b>Module 2</b>
Cheese: Manufacture of hard, semi hard, soft and processed cheeses. Storage, grading and marketing of cheese, cheese defects and their control. Butter: Manufacture, packaging, storage and marketing of butter; butter defects and their control, margarine.
<b>Module 3</b>
Technology of frozen milk products: Classification, manufacture, packaging, storage and marketing of ice cream, ices, sherbets etc. defects of frozen products and their control. Technology of evaporated and dried milk: Manufacture of evaporated milks and milk powders. Packaging storage defects and their control. Technology of condensed milk: Manufacture of condensed milks, Packaging storage defects and their control.
<b>Module 4</b>

Technology of dairy by products: Utilization of skim milk, buttermilk and whey for the manufacture of casein, lactose etc. Technology of indigenous milk products: Principles and practices of manufacture, packaging, storage and marketing of ghee, Khoa, Chenna, shrikhand, paneer, rasogulla, gulab jamun and Milk based foods Preparation of soft curd milk, vitaminized milk, standardized milk, filled milk and imitation milk.

#### **Module 5**

Sanitary aspects of dairy plant building, equipment and their maintenance. Disposal of dairy plant waste. Application of membrane technology in dairy industry.

#### **Suggested Reading**

1. Dey, Sukumar. 1994. Outlines of Dairy Technology. Oxford Univ. Press, New Delhi.
2. Considine, D.M. Ed. 1982. Foods and Food Production Encyclopaedia, VNR, New York.
3. Robinson, R.K. (2 vol. set). 1986. Modern Dairy Technology Elsevier Applied Science, UK.
4. Rosenthal, I. 1991. Milk and Milk Products. VCH, New York.
5. Warner, J.M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.

#### **COURSE OUTCOMES**

After completing the course, students will be able to:

1. Composition and types of milk and milk products.
2. Processing of cheese
3. Technology of various frozen milk products.
4. Technology of dairy by products utilization
5. To understand membrane technology and sanitary aspects of dairy plant building, equipment with disposal of dairy plant wastes

### MFT 303 Food Packaging and Labelling

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week Tutorials: 1 hr./week Credits: 4	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

#### Course Objective:

1.To acquaint the students with packaging methods, packaging materials, packaging machineries, modern packaging techniques, food labeling guidelines as well. etc.

#### Detailed Syllabus

<b>Module 1</b>
Introduction to packaging. Packaging operations, package-functions and design. Principles of protective packaging. Deteriorative changes in foodstuff. Shelf life of packaged foodstuff, packaging methods to extend shelf-life. Packaging materials: origin, types, chemistry, morphology and physical characteristics, advantages, defects and risks.
<b>Module 2</b>
Food containers: Rigid containers, corrosion of containers (tin plate). Flexible packaging materials and their properties. Food packages-bags, pouches, wrappers, carton and other traditional packages. Containers-wooden boxes, crates, plywood and wire bound boxes, corrugated and fibre board boxes, textile and paper sacks.
<b>Module 3</b>
Challenges in food packaging, considerations in the packaging of perishable and processed foods. Evaluation of packaging material and package performance, WVTR, GTR, bursting strength, tensile strength, tearing strength, drop test, puncture test, impact test. Packaging equipment, package standards and regulation.
<b>Module 4</b>
Shrink packaging. Bar coding, aseptic and retortable pouches. Flexible and laminated pouches, Aluminum as packaging material. Biodegradable packaging. Active packaging, smart packaging and intelligent packaging.
<b>Module 5</b>
FSSAI regulations of food labeling - CAC guidelines for food labeling. FOSHU Nutritional labeling and education act 1990- mandatory nutritional labeling, nutrient content claims, health claims, national uniformity for food act, 2005.

### **Suggested Readings**

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012
2. Coles R, McDowell D and Kirwan MJ, Food Packaging Technology, CRC Press, 2003
3. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992.

### **Course Outcomes**

After completing the course, students will be able to:

1. Will able to know basics of packaging, its functions and shelf life of various food stuffs.
2. To understand about packaging materials, methods and their applications in food industry.
3. Evaluation methods of packaging materials
4. To understand the shrink wrapping, bar coding and biodegradable packaging
5. To understand the regulations related to food labelling



## MFT 304 Bakery and Confectionery Technology

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week Tutorials: 1 hr./week Credits: 4	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

### Course Objective:

1. To acquaint students with production and processing technologies for product development and value addition of various bakery and confectionery products.

### Detailed Syllabus

Module I
Principles of Baking Raw Material and their Role – flour, leavening agents, sugars, fats, additives, spice,Types of Bakery Products and Technology for their Manufacture – dough and batters; cakes, pies, pastries, bread, biscuits Icings and Fillings.
Module 2
Quality Parameters of Bakery Products - chemistry of dough and batters; rheological testing and interpretation of data; sensory evaluation Staling and Nutrient Losses in Bakery Products ,Sanitation and Hygiene in a Bakery Unit Equipment used in the Bakery Industry .
Module 3
Principles of Confectionery Manufacture.Raw Material and their Role – interfering agents, inversion of sugars, etc. Types of Confectionery Products and Technology for their Manufacture.Quality Parameters of Confectionery Products.Nutrient and other Losses in Confectionery Products.Sanitation and Hygiene in a Confectionery Unit .Equipment used in the Confectionery Industry.
Module 4
Sugar- Manufacturing of sugar, types of sugar, byproducts, jaggery, honey.. Additional ingredients: colours, flavors, gums, pectin and gelatin, chocolate processing. Types: imitation chocolate, milk chocolate. Crystalline and non crystalline candies.
Module 5
Chocolate – raw material, types, and manufacture, Ingredients of chocolate-sucrose, invert sugars, corn syrup, non-nutritive sweeteners, sugar substitutes

Chewing Gum - raw material, types, and manufacture

Pan Coating – hard and soft panning; problems in coating; glazing, polishing, and tableting Nutritional Value, Quality Parameters.

### Suggested readings

1. Samuel, A.M.(1996) “ *The Chemistry and Technology of Cereals as Food and Feed* “, CBS Publisher & Distribution, New Delhi.
2. Pomeranz, Y.(1998) “ *Wheat : Chemistry and Technology*”, Vol 1,3” Am. Assoc. Cereal Chemists. St. Paul, MN, USA.
3. Hosney, R.C.(1986) “ *Principles of Cereal Science and Technology*”, Am. Assoc. Cereal Chemists, St. Paul, MN, USA.
4. Pomeranz, Y. (1993) “ *Advances in Cereal Science and Technology*”, Am. Assoc. Cereal Chemists St.Paul, MN, USA.
5. Dubey SC. 2002. Basic Baking. The Society of Indian Bakers, New Delhi.

### Course Outcomes

1. Ability to understand the basic concepts of baking and role of various raw materials involved.
2. Ability to understand chemistry of dough chemistry and rheological testing.
3. Acquire knowledge of Principles of Confectionery its manufacture. and their Role.
4. Understand the sugar ,its type and related processing.
5. Understand the chocolate manufacturing,chewing gumand pan coating basics.

## MFT 305 Fermentation and Microbial Technology

Teaching Scheme	Examination Scheme
Lectures: 2 hrs./ week Credits:2	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

### Course Objective:

1. To familiarize about the various microbial processes/systems/activities which have been used for the development of industrially important products/processes.

### Detailed Syllabus

<b>Module 1</b>
Fermentation: History, definition and types. Study of a Bio fermentor – its design and operation, Down Stream Processing and Product recovery. Its measurement and control in fermentation, Aeration and agitation in fermentation: Oxygen requirement, sterilization of air and media; scale up in fermentation.
<b>Module 2</b>
Recovery of particulate matter, product isolation, distillation, centrifugation, whole broth processing, filtration, aqueous two-phase separation, solvent extraction, chromatography and electrophoresis.
<b>Module 3</b>
Production of alcoholic beverages, organic acids, enzymes and immobilization of enzymes. Biological waste treatment.
<b>Module 4</b>
Dairy Fermentations-starter cultures and their types, concept of probiotics.
<b>Module 5</b>
Microbial enzymes, role in various industrial processes, Bio-transformations, Immobilized enzymes based bioreactors; production of antibiotics, vaccines, and biocides; Bioconversion of substrates, anti-nutritional factors present in feeds; Microbial detoxification of aflatoxins;

Bioinsecticides; Biofertilizers.

### Suggested Readings

1. Vogel, H.C. and C.L. Todaro, 2005 Fermentation and Biochemical Engineering Handbook: Principles, Process Design and Equipment , 2nd Edition, Standard Publishers.
2. El-Mansi, E.M.T, 2007, Fermentation Microbiology and Biotechnology 2nd Edition, CRC / Taylor & Francis.
3. Joshi, V.K. and Ashok Pandey, 1999, Biotechnology: Food Fermentation, Microbiology, Biochemistry and Technology, Vol. I & vol. II Educational Publisher.
4. Pepler, H.J. and D. Perlman, 2004, Microbial Technology: Fermentation Technology, 2<sup>nd</sup> Edition, Vol. II Academic Press / Elsevier.
5. Stanbury, P.F., A. Whitaker and S.J. Hall, 2005 Principles of Fermentation Technology, 2<sup>nd</sup> Edition Aditya Books (P) Ltd.

### Course Outcomes

1. Understanding the fermentation, bioreactor, downstream processing and various factors affecting fermentation process.
2. Understand the Recovery of particulate matter and its methods.
3. Understand principles of alcoholic beverage production and immobilization of enzymes.
4. Understand dairy fermentation and starter culture methods.
5. Knowledge about microbial enzymes, role in various industrial processes, Bio-transformations

### MFT 306 Specialty Foods

Teaching Scheme	Examination Scheme
Lectures: 2 hrs./ week Credits: 2	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

#### Course Objective:

1. To make students understand the need, importance and process of developing healthy and nutritious foods for special category of population groups.

#### Detailed Syllabus

<b>Module 1</b>
Need and scope of specialty foods: Specialty food based on ease in preparation cost health benefits; Functional foods, Convenience food, Health care and medical benefits, Nutritional status, Low cost foods.
<b>Module 2</b>
Specialty foods based on sources; Cereals and millets, Legumes and pulses, Fruits and vegetables, Animal food sources, By product based, Non conventional foods.
<b>Module 3</b>
Specialty foods based on process; Innovative process technology, Food additives basis, Bioactive components, Novel nutraceuticals products, Packaging techniques, Adaptable technology basis, Fast and PET foods.
<b>Module 4</b>
Specialty food based on genetics; Genetically modified foods, Transgenic foods Biotechnological aspects of detoxification. Proprietary foods. Supplementary foods.
<b>Module 5</b>
Therapeutic foods; Specific consumer oriented foods; Defence persons, Space / astronaut, High altitude mountain climbers, Disaster situation – crises, care, maintenance. Specialty foods based on growing condition -organic, inorganic farming.

### **Suggested Readings**

1. Gibson GR & William CM. 2000. Functional Foods - Concept to Product.
2. Robert EC. 2006. Handbook of Nutraceuticals and Functional Foods.Ed. Wildman.
3. Manson P.2001. Dietary Supplements. 2nd Ed. Pharmaceutical Press.
4. Bamji MS, Rao NP & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH.

### **Course Outcomes**

1. After completion of course the students would have an understanding of various specialty foods.
2. Understand basic of various specialty foods and their sources,non conventional foods.
3. Understand principles of process technologies behind specialty foods.
4. Understand Specialty food based on genetics; Genetically modified foods, Transgenic foods like GMOs, transgenics etc.
5. Will have knowledge of therapeutic foods and customized food for target groups.

### MFT 307 Beverage Technology

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week Tutorials: 1 hr./week Credits: 4	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

#### Course Objective:

1. To acquaint students with the particulars of manufacturing industrial beverages and to familiarize students with the quality requirements of bottled beverages.

#### Detailed Syllabus

Module 1
Water as an Industrial beverage, Status of Beverage Industry in India and globally,Types of Bottled Water – Mineral Water, Spring Water, Flavoured Water, Carbonated Water Packaged Drinking Water – Manufacturing Process, Raw and Processed Water, Water Treatment, Quality Standards of Bottled and Packaged Water
Module 2
Beverage Ingredients and their Functions – sweeteners, bulking agents,acidulants, flavourings, preservatives ,Concentrated Beverages – ingredients, processing techniques, and ,standards Carbonated Beverages - ingredients, processing techniques, and standards. Fruit- and Vegetable-based Beverages – ingredients, processing techniques, and standards Tea,"Coffee and Cocoa: Production and manufacturing'
Module 3
Synthetic Beverages - ingredients, processing techniques, and standards ,Beverages used in the Sports Industry – types, ingredients, processing techniques, and standards,Indigenous Beverages for Domestic and Commercial Use – sugarcane juice, cashew apple extract, coconut palm sap. Carbonated Alcohols – beer, champagne.
Module 4

Distillation and Distilled Liquors – whisky, rum, gin, vodka, brandy  
Fermentation and Fermented Alcohols – wine, ciders, sake

### **Module 5**

Indigenous Alcohol Production – urak, feni, toddy  
Liqueurs and Aperitifs

### **Suggested Readings**

1. Hui YH et al 2004. Handbook of Food and Beverage Fermentation Technology. Marcel Dekker.
2. Priest FG & Stewart GG. 2006. Handbook of Brewing. Second Edition. CRC.
3. Richard P Vine. 1981. Commercial Wine Making - Processing and Controls. AVI Publ.
4. Varnam AH and Sutherland JP. 1994. Beverages: Technology, Chemistry and Microbiology. Chapman & Hall.
5. Woodroof JG and Phillips GF. 1974. Beverages: Carbonated and NonCarbonated. AVI Publ.

### **Course Outcomes**

1. The student will gain an understanding of processing techniques used for water as an industrial beverage and its various standards .
2. The student will gain an understanding of processing ingredients and its functions used in the beverage industry.
3. The student will comprehend synthetic beverages and its types used for specific target groups.
4. Understand both distilled and undistilled beverage production.
5. Gain knowledge related to indigenous alcohol production and have concept of Liqueurs and Aperitifs.



### MFT 308 Snack Food Technology

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week Tutorials: 1 hr./week Credits: 4	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

#### Course Objective:

1. To impart knowledge related to various snack foods and their manufacturing techniques.

#### Detailed Syllabus

Module 1
Extrusion: Introduction to extruders and their principles, types of extruders. Extruders in the food industry: History and uses. Single screw extruder: principle of working, factors affecting extrusion process, co-kneaders. Twin screw extruder: Feeding, screw design, screw speed, screw configurations. Pre-conditioning of raw materials used in extrusion process: operations and benefits and devolatilization. Chemical and nutritional changes in food during extrusion. Addition and subtraction of materials, shaping and forming at the die. Post-extrusion processes- colouring, flavouring and packaging of extruded snack foods.
Module 2
Breakfast cereals: Introduction and classification (flaked cereals, oven puffed cereals, gun puffed cereals, shredded products). Breakfast cereal-manufacturing processes (traditional and modern methods), High shear cooking process and steam cookers.
Module 3
Texturized vegetable protein: definition, processing techniques. Direct expanded (DX) and third generation (3G) snacks: types. Concept of junk & fried foods and their impact on human health.
Module 4
Technology for grain-based snacks: Whole grains- roasted, toasted, puffed, popped, flaked. Coated grains- salted, spiced and sweetened. Formulation, processing and quality assessment of chips and wafers, papads, instant premixes of traditional Indian snack foods.
Module 5

Technology for fruit and vegetable-based snacks- chips, wafers; Technology for coated nuts- salted, spiced and sweetened chikkies. Equipments for frying, baking, drying, toasting, roasting, flaking, popping, blending, coating and chipping.

### **Suggested readings**

1. Booth, R. G. (1997). Snack Food: CBS, New Delhi.
2. Raymond, W. L. & Rooney, L. W. (2001). Snack Foods Processing: CRC. London.
3. Lusas, E. W. & Rooney, L. W. (2015). Snack Foods Processing: CRC. London.
4. Guy, R. (2001). Extrusion Cooking: Technologies and Applications: Woodhead, USA.
5. Riaz, M. N. (2000). Extruders in Food Applications: Technomic, Lanchester.

### **Course Outcomes**

1. Students shall be able to understand Basics of Preparing Extruded Snack Foods Items along with working of equipments related to extrusion of Food Products.
2. Students shall be able to understand preparation of Breakfast Snacks in particular cereal based Snacks Food Items.
3. Students shall be able to understand preparation of Texturised vegetable protein, concept of junk food and fried foods.
4. Students shall be able to understand preparation of Grain based Snacks Food Item.
5. Students shall be able to understand preparation of Fruits & Vegetables based Snack Item along with introduction of related equipments.

### MFT-351 Dairy Technology Laboratory

Teaching Scheme	Examination Scheme
Practicals:4 hrs./week Credits: 2	Internal Assessment Marks[IAM]:15 [Record: 06, Teachers assessment: 03,Attendance: 06 ] End Semester Marks[ESM]: 35 [Practical: 20 marks Viva:10, Record: 05 Marks]

#### Course Objective:

1. To give practical knowledge of various test for milk.
2. Provides practical knowledge of adulteration testing.
3. Gives knowledge about preparation of toned, homogenized, fortified, reconstituted,fermentedand flavored milks, ice cream,butter,khoa,ghee,casein and chenna.

#### Detailed Syllabus

1. Platform test for raw milk.
2. Determination of moisture content in milk.
3. Dye reduction test.
4. Determination of fat content in Milk powders and ice-cream products.
5. Determination of Milk adulterants: Starch, Urea, Formaldehyde and Sugar, Hydrogen peroxide, salt and detergent.
6. Operation, cleaning and sterilization of dairy plant machinery involved in fluid milk processing
7. Preparation of toned, homogenized, fortified, reconstituted and flavored milks
8. Manufacture of fermented milks.
9. To study the kinetics of enzymes and manufacture of cheeses.
10. Manufacture of butter
11. Manufacture of ice- cream, ices, sherbats.

#### Course Outcomes:

After completing the course, students will be able to:

- 1.Understand the various platform and adulteration tests for milk.
2. Preparation of toned, homogenized, fortified, reconstituted,fermented and flavored milks, ice cream,butter,khoa,ghee,casein and chenna.
3. Students will know about operation, cleaning and sterilizaiton of dairy plant machinery involved in fluid milk processing.

### MFT-352 Beverage Technology Laboratory

Teaching Scheme	Examination Scheme
Practicals:4 hrs./week Credits: 2	Internal Assessment Marks[IAM]:15 [Record: 06, Teachers assessment: 03,Attendance: 06 ] End Semester Marks[ESM]: 35 [Practical: 20 marks Viva:10, Record: 05 Marks]

#### Course Objective:

1. To give practical knowledge of various sensory tests for food products.
2. Provides practical knowledge about parameters of analysis of water.

#### Detailed Syllabus

1. Preparation of Non-Carbonated Beverages
2. Estimation of Sulphur Dioxide in Beverages
3. Estimation of Ascorbic Acid Content of Commercial Juices
4. Estimation of Phenolic Content in Beverages
5. Analysis of Mineral Content of Bottled Water
6. Analysis of Nutrient Content in Sports Drinks

#### Course Outcomes:

After completing the course, students will be able to:

1. Understand the various sensory tests used in food industry.
2. Understand the testing methods for alkalinity, acidity, hardness, pH , total plate count and coliformcount

### MFT-353 Snack Food Technology Laboratory

Teaching Scheme	Examination Scheme
Practicals:4 hrs./week Credits: 2	Internal Assessment Marks[IAM]:15 [Record: 06, Teachers assessment: 03,Attendance: End Semester Marks[ESM]: 35 [Practical: 20 marks Viva:10, Record: 05 Marks]

#### Course Objective:

1. To give practical knowledge of various development of snack food products.
2. Provides practical knowledge about shelf life and quality characteristics of snack food products.

#### Detailed Syllabus

1. Preparation of Snack Foods based on Cereals
2. Preparation of Snack Foods based on Pulses
3. Preparation of Snack Foods based on Nuts
4. Preparation of Snack Foods based on Fruits
5. Preparation of Snack Foods based on Vegetables
6. Development of Instant Food Pre-Mixes
7. Determination of Shelf-Life and Quality Characteristics of Snack Foods

#### Course Outcomes:

After completing the course, students will be able to:

- 1.The student will be able to practically prepare snack foods from a variety of raw material .
- 2.The student will be competent in analysing the shelf life and quality of snack foods.

## MFT 401 Entrepreneurship and Project Management

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./ week Tutorials: 1 hr./ week Credits: 4	Internal Assessment Marks[IAM]:30 [Class Test: 12, Teachers assessment: 6,Attendance: 12 ] End Semester Marks[ESM]: 70

### Course Objective:

1. To enable students to have firm grounding in entrepreneurship as they will get prepare competitive job market.

### Detailed Syllabus

Module 1
Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth. Types of entrepreneurs - Entrepreneurship, Women entrepreneurship, significance, problems, solutions to the problems.
Module 2
Objectives, Steps, Need for training- target group- Contents of the training programme-Special Agencies for Entrepreneurial Development and Training-DIC.
Module 3
Meaning, Features, Classification, Project identification, Stages in project identification, Project Life Cycle, Project formulation Elements, Feasibility Analysis-Network Analysis-Project Planning.
Module 4
Government schemes and incentives for promotion of entrepreneurship; Government policy on small and medium enterprises (SMEs)/SSIs; Setting up of micro small and medium 10 10% enterprises, location significance, Green channel, Bridge capital, Seed capital assistance, Margin

money scheme, Sickness, Causes-Remedies.

#### Module 5

Export and import policies relevant to food processing sector; Venture capital; Contract farming and joint ventures, publicprivate partnerships; Overview of food industry inputs; Characteristics of Indian food processing industries and export; Social responsibility of business. SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, RozgarYojana Schemes.

#### Suggested readings

1. Drucker, Peter (2014), "Innovation and Entrepreneurship", Routledge Publishers
2. Abraham M.M, (2010), "Entrepreneurship Development and Project Management", Prakash Publications and Printers.
3. 3. Desai, Vasant (2001), "Dynamics of entrepreneurial development and management". Himalaya Publishing House.

#### Course Outcomes

1. Understand the definition and concept of entrepreneurship.
2. Understand objectives and need for training.
3. Understand meaning and features of project.
4. Understand government schemes and incentives for promotion of entrepreneurship
5. Understand export and import policies relevant to food processing sector;

## MFT-451 Dissertation

Teaching Scheme	Examination Scheme
Credits: 20*	End Semester Exam: 300 Marks [Dissertation-100,Ppt-100,Viva-voce-100]

(\*)Every student will be required to undertake a research project (**maximum tenure five months**) based on any of the areas related to food technology. The project report will be submitted in the form of dissertation duly certified by the supervisor of the dissertation by any research organization, industry, national institutes and/or Universities in India, by seeking the placement. The student then shall have to appear for the viva voce examination.

### GUIDELINES FOR DISSERTATIONS REPORT LAYOUT

The report should contain the following components:

- **Title or Cover Page:** The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.
- **Acknowledgements** (optional): Acknowledgment to any advisory or financial assistance received in the course of work may be given.
- **Abstract:** It should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to objectives. The abstract have to be concise summary of the scope and results of the project.
- **Table of Contents:** Titles and subtitles are to correspond exactly with those in the text.
- **Introduction:** A brief introduction to the problem that is central to the project and it should aim to catch the imagination of the reader, so excessive details should be avoided.
- **Materials and Methods:** This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.
- **Results and Discussion:** Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.
- **Note** during writing, all figures & tables should as far as possible be next to the associated text, in same orientation as main text, numbered, & given appropriate titles.
- **Conclusion:** This is the final section in which outcome of the work is mentioned briefly.
- **Future prospects** (if applicable)
- **References / Bibliography:** This should include papers and books referred to in the body of thereport. These should be ordered alphabetically on the author's surname.
- **Appendices:** This contains material which is of interest to reader but not an integral part of the thesis and may be useful to document for future reference.



## Course Outcomes

1. The student will be able to plan and execute experiments or undertake literature surveys independently.
2. The student will develop the skills to design experiments for solving problems in food research.