MANNAR THIRUMALAI NAICKER COLLEGE

PASUMALAI, MADURAI– 625 004

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)

B.Sc., Food and Dairy Technology

SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2017–2018 and after)

Qualification for Admission

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu CBSE Board with Science as one of the subjects in Higher Secondary Education.

Duration of the Course

The students shall undergo the prescribed Food and Dairy Technology course of study for a period of three academic years (six semesters).

Subject of Study

Part I: Tamil
Part II: English
Part III:
1. Core Subjects
2. Allied Subjects
3. Electives

Part IV :
1. Non Major Electives
2. Skill Based Subjects
3. Environmental Studies
4. Value Education

Part V :
Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average	--15 marks
Seminar /Group discussion	--5 marks
Assignment	--5 marks
Total	--25 marks

Pattern of the question paper (Summative Examinations)

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The question paper may have 3 parts.

Duration of the Summative Examinations is 3 hours

Part –A

Five questions (answer all) 5 x02 = 10 Marks

(One question from each Unit)

Part –B

Five questions (‘either …. or ‘type) 5 x 07 = 35 Marks

(One question from each Unit)

Part –C

Three questions out of five 3 x 10 =30 Marks

(One question from each Unit)

Total 75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).
No separate pass minimum for the Internal Examinations.
27 marks out of 75 is the pass minimum for the Summative Examinations

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COURS Table:1: Course pattern

Study Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Hours	Total Credit	No. of course	Total Marks
Part-I Tamil	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part-II English	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part-III Core subjects	4(3) 2(1)	4(3) 2(2)	6(5) 4(3)	6(5) 4(4)	5(4) 5(4) 4(4) 4(3) 4(4)	6(5) 6(5) 10(8) 8(8)	84	71	17	1700
Part-III Elective Elective (P)					4(4) 4(3)		8	7	2	200
Allied subject-I	4(4)	4(3)		4(4)			12	11	03	300
Allied subject-I(P)	2(1)	2(1)	4(4)				08	06	03	300
Part-IV Skilled Based subjects	2(2) 2(2)	2(2) 2(2)	2(2)	2(2)			12	12	06	600
Environmental studies/Value education	2(2)	2(2)					04	04	02	200
Non Major Elective			2(2)	2(2)			04	04	02	200
Part-V Extension Activities				0(1)				01	01	100
Total	**30 (21)**	**30 (21)**	**30 (22)**	**30 (24)**	**30 (26)**	**30 (26)**	**180**	**140**	**44**	**4400**

SEMESTER –I

Subject code	Subjects	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int.	Ext	Total
15UTAG11	**Part –I Tamil /Alternate Subject** Tamil –I: **இக்காலக் கவிதையும் சிறுகதையும்**	1	6	3	25	75	100
15UENG11	**Part –II English Subject** English-I: Language Through Literature-1	1	6	3	25	75	100
17UFDC11 17UFDCP1	**Part –III Core Subject** Fundamentals of Dairying Fundamentals of Dairying – Practical	1 1	4 2	3 1	25 40	75 60	100 100
17UFDA11 17UFDAP1	**Part –III Allied Subject** Introduction to Food Science Introduction to Food Science – Practical	1 1	4 2	4 1	25 40	75 60	100 100
17UFDS11	**Part –IV Skill Subject** Work Shop Practices on CIP	1	2	2	25	75	100
17UFDS12	Preservation Techniques of Fruits and Vegetables	1	2	2	25	75	100
15UEVG11	**Part –IV Mandatory Subject** Environmental Studies	1	2	2	25	75	100
	Total	**9**	**30**	**21**	**255**	**645**	**900**

SEMESTER – II

15UTAG21	**Part –I Tamil /Alternate Subject** Tamil –II: இடைக்கால இலக்கியமும் புதினமும்	1	6	3	25	75	100
15UENG21	**Part –II English Subject** English-II: Language Through Literature-II	1	6	3	25	75	100
17UFDC21	**Part –III Core Subject** Physio-chemical aspects of Milk	1	4	3	25	75	100
17UFDCP2	Physio-chemical aspects of Milk - Practical	1	2	2	40	60	100
17UFDA21	**Part –III Allied Subject** Food Chemistry	1	4	3	25	75	100
17UFDAP2	Food Chemistry- Practical	1	2	1	40	60	100
17UFDS21	**Part –IV Skill based Subject** Dairy Plant Design and Layout	1	2	2	25	75	100
17UFDS22	Office Automation (Computer Subject)	1	2	2	25	75	100
15UVLG21	**Part –IV Mandatory Subject** Value Education	1	2	2	25	75	100
	Total	**9**	**30**	**21**	**255**	**645**	**900**

SEMESTER -III							
Subject code	**Subjects**	**No. of Courses**	**Hours /Week**	**Credits**	**Maximum Marks**		
					Int	**Ext**	**Total**
15UTAG31	**Part-I Tamil/Alternate Subject** காப்பிய இலக்கியமும் நாடகமும்	1	6	3	25	75	100
15UENG31	**Part -II English Subject** English-III: Language through Literature-III	1	6	3	25	75	100
17UFDC31	**Part-III Core Subject** Food and Dairy Processing Techniques	1	6	5	25	75	100
17UFDCP3	Food and Dairy Processing Techniques-Practical	1	4	3	40	60	100
17UFDAP3	**Part-III Allied Subject** Skill Development in food preparation-Practical	1	4	4	40	60	100
17UFDS31	**Part-IV Skill based Subject** Food Product Development and Marketing	1	2	2	25	75	100
17UCHN31	**Part-IV Non Major Elective** Waste Water Treatment	1	2	2	25	75	100
	Total	**7**	**30**	**22**	**205**	**495**	**700**

SEMESTER -IV							
Subject code	**Subjects**	**No. of Courses**	**Hours/ Week**	**Credits**	**Maximum Marks**		
					Int	**Ext**	**Total**
15UTAG41	**Part-I Tamil/Alternate** சங்க இலக்கியமும் உரைநடையும்	1	6	3	25	75	100
15UENG41	**Part -II English Subject** Language through Literature-IV	1	6	3	25	75	100
17UFDC41	**Part-III Core Subjects** Food and Industrial Microbiology	1	6	5	25	75	100
17UFDCP4	Food and Industrial Microbiology – Practical	1	4	4	40	60	100
17UFDA41	**Part-III Allied Subject** Food Safety and Quality Control	1	4	4	25	75	100
17UFDS41	**Part -IV Skill based Subject** Fundamentals on milk chilling machineries	1	2	2	25	75	100
17UCHN41	Polymer Chemistry	1	2	2	25	75	100
15UEAG40 to 15UEAG49	**Part-V Extension Activities**	1	0	1	100	-	100
	Total	**8**	**30**	**24**	**290**	**510**	**800**

SEMESTER-V							
Subject code	**Subjects**	**No. of Courses**	**Hours /Week**	**Credits**	**Maximum Marks**		
					Int	**Ext**	**Total**
17UFDC51	**Part-III Core Subjects** Technology of Dairy Products	1	5	4	25	75	100
17UFDCP5	Technology of Dairy Products-Practical	1	4	4	40	60	100
17UFDC52	Effluent Treatment and Environmental Safety	1	5	4	25	75	100
17UFDCP6	Effluent Treatment and Environmental Safety -Practical	1	4	3	40	60	100
17UFDC53	Dairy By - Products Technology	1	4	4	25	75	100
17UFDE51 17UFDE52 17UFDE53	**Part –III Elective Subject Human Nutrition** Food Packaging Technology Processing of Marine Products	1	4	4	25	75	100
17UFDEP1 17UFDEP2 17UFDEP3	**Part –III Elective – Practical Human Nutrition- Practical** Food Packaging Technology - Practical Processing of Marine Products - Practical	1	4	3	40	60	100
	Total	**7**	**30**	**26**	**220**	**480**	**700**

SEMESTER–VI							
Subject code	**Subjects**	**No. of Courses**	**Hours /Week**	**Credits**	**Maximum Marks**		
					Int	**Ext**	**Total**
17UFDC61	**Part-III Core Subjects** Bakery and Confectionary	1	6	5	25	75	100
17UFDE61 17UFDE62 **17UFDE63**	**Part-III Elective Subjects** Entrepreneurial Development Programme Poultry and Meat Processing Technology **Functional Foods and Nutraceuticals**	1	6	5	25	75	100
17UFDPR1	Project	1	10	8	40	60	100
17UFDINP	In plant Training	1	8	8	40	60	100
	Total	**4**	**30**	**26**	**130**	**270**	**400**

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: V**	**Hours per week**	**: 05**
Subject Code	**: 17UFDC51**	**Credit**	**: 04**

TECHNOLOGY OF DAIRY PRODUCTS

Course Outcomes:

After completion of the course, the students will be able to

CO1: Acquire knowledge on Milk and Milk products processing.
CO2: Study the working of equipments used in milk and milk products processing.
CO3: Expand the knowledge for preparation of different milk products
CO4: Enlighten processing methods of market milk.

Unit-I Cream

Cream- Classification- Composition- Nutritive value- Physico- chemical properties-Pasteurization of cream-Manufacture of different types of cream - Packaging and Storage-uses of cream- Possible defects and control measures.

Unit-II Butter

Butter-Classification-Composition- Nutritive value-Method of manufacture-butter churn method-continuous butter making-packaging and storage-over run-yield-uses- Defects and control measures.

Unit-III Ice Cream

Definition of ice cream - Classification- Composition- Nutritive value- Role of Constituents-Properties of mixture- Method of manufacture- Packaging-Hardening and storage- Defects and control measures.

Unit-IV Paneer

Paneer - composition- nutritive value- Manufacture of paneer- Tofu-composition- nutritive value- - Yield - Uses.

Unit-V Condensed milk

Condensed milk - Composition- nutritive value- Physico-chemical properties-method of manufacture–Sweetened Condensed milk- packaging and storage of condensed milk.

Text Book:

1. Sukumar De, Outlines of Dairy Technology, Oxford University Press, 1980, New Delhi.

Reference Books:

1. Aneja. R.P, B.N Mathur, R.C Chandra and A.K. Banerjee, Technology of Indian Milk and Milk Products, Dairy India Publication 2002, New Delhi.
2. H. Douglas Goff, "The Dairy Science and Technology eBook" Dairy Science and Technology Education Series, University of Guelph, Canada.
3. Robinson, R. Advances in Milk Processing-Springer publication

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDCP5**	**Credit**	**:04**

TECHNOLOGY OF DAIRY PRODUCTS-PRACTICAL

Course Outcomes:

After completion of the course, the students will gain expertise in the

CO1: Preparation of cream, butter and ice cream by using the appropriate machines
CO2: Analysis of various quality parameters of prepared dairy products.
CO3: Acquire the knowledge on platform and organoleptic test.
CO4: Enlighten the knowledge of fat rich products4

1. Preparation of cream
2. Acidity of cream
3. Estimation of fat in cream
4. Preparation of butter
5. Estimation of Free fatty acid
6. Estimation of butter fat
7. Preparation of ice cream
8. Estimation of ice cream fat
9. Preparation of Paneer
10. Preparation of condensed milk

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Programme : UG	**Part III : Core**
Semester : V	**Hours per week : 05**
Subject Code : 17UFDC52	**Credit : 04**

EFFLUENT TREATMENT AND ENVIRONMENTAL SAFETY

Course outcomes:

After completion of the course, the students will be able to

CO1: Disseminate the knowledge pertaining to waste water treatment in dairy plants.

CO2: Understand environmental issues and remedial measures in dairy industrial sector.

CO3: Get In-depth understanding of specialist bodies of knowledge within the environmental discipline.

CO4: Predict and characterize the likely impacts of pollutants on the environment

Unit I: **Water** - Quality of farm and plant water – Routine and special methods for water analysis, purification of water – Requirement of water for farm and plant.

Unit II: **Wastes discharged from dairy plants**-Economics of effluent discharge-Insight process.

Unit III: **General Characteristics of dairy waste** – Types of sewage – Disposal methods. Primary treatment - Secondary treatment – water conservation-recycling - Standards of different treatment effluents.

Unit IV: **Types of Membrane separation process**-Removal of fats and greases recovery of brine and cleaning solutions- Dairy products effluents

Unit V: **Types of pollution** –Solid waste management- Environment protection Act, 1986- Central acts-State acts- Standards of different types treated effects.

Text Book:

1. Velazhagan.D, Pollution control operation calculation, Velava publishers – Chennai - 117

Reference Books:

1. Anantha Krishnan, C.P., **Technology of milk processing**, Sri Lakshmi Publications, (1991), Chennai -10.
2. Subhasish Biswas, Subhash Kumar Battacharyya, **Milk and milk products technology**, Jaypee Brothers medical publishers (P) Ltd, (2006), New Delhi.
3. **Dalzall**, J. M. **Food Industry and the Environment-** Springer publication

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDCP6**	**Credit**	**: 03**

EFFLUENT TREATMENT AND ENVIRONMENTAL SAFETY- PRACTICAL

Course outcomes:

After completion of the course, the students will be able to

CO1: Learn different methods of hazard analysis and control of hazards

CO2: Know about types of pollution, its sources, effects and control methodology and thereby environmental protection

CO3: Manage pollutants within environmental guidelines

CO4: Acquire pollution boards duties and responsibilities

List of Practicals:

1. Estimation of Hardness of water.
2. Sample collection of effluent.
3. Estimation of BOD.
4. Estimation of COD.
5. Visit to Dairy effluent treatment plant.
6. Visit to sewage effluent treatment plant.
7. Visit to Tamilnadu pollution control board.
8. Basic Concepts of Safety Measures.
9. TDS – Total Dissolved solids

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Programme	**: F&D Tech**	**Part III**	**: Core**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDC53**	**Credit**	**: 04**

DAIRY BY-PRODUCTS TECHNOLOGY

Course Outcomes:

After completion of the course, the students will be able to

CO1: Identify different milk by products
CO2: Describe different method of storage
CO3: Learn the efficient utilization of milk in Dairy industries.
CO4: Adopt different dairy product processing methods

Unit-I

Status of Dairy industry - Introduction- Definition –Global status availability and utilization of dairy byproducts- Indian status availability and utilization of dairy byproducts.

Unit-II

Skim milk - Definition - composition- Physico-chemical properties of skim milk- Manufacture of skim milk powder- other uses of skim milk

Unit-III

Casein - Types of casein – Industrial casein - Processing methods - uses of caseins- rennet casein – manufacturing process - Edible casein definition.

Unit-IV

Whey-Definition & Standards of whey- types of whey-composition –manufacture of whey beverages - whevit - Yeast-whey -Whey protein concentrate –Lactose – definition – standards - Grades of lactose-method of manufacture - uses.

Unit-V

Butter milk – Definition, composition - types of butter milk - Lassi- Ghee residue and its characteristic s - utilization of ghee residues.

Text Book:

1. Sukumar De, Outlines of Dairy Technology, Oxford University Press, 1980, New Delhi.

Reference Books:

1. Aneja.R.P, Mathur.B.N, R.C Chandra and A.K. Banerjee, Technology of Indian Milk and Milk Products, Dairy India Publication 2002, New Delhi.
2. Douglas Goff.H, "The Dairy Science and Technology eBook" Dairy Science and Technology Education Series, University of Guelph, Canada.
3. Robinson, R. Advances in Milk Processing-Springer publication

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Programme	**: UG**	**Part III**	**: Elective**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDE51**	**Credit**	**: 04**

HUMAN NUTRITION

Course outcomes:

After completion of the course, the students will be able to

CO1: Learn the basic information about human nutrition.

CO2: Understand the factors that affect the human nutrition.

CO3: Know the nutritional and energy requirements of human beings at different stages of life, in the physiological situations associated with nutrition.

CO4: Learn how to carry out and interpret the nutritional assessment of an individual

UNIT I - Introduction - Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition. Minimum Nutritional Requirement and RDA. Dietary Guidelines for Reference Man and Reference Woman.

UNIT II- Nutrition During Pregnancy - Factors affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, Deficiency of nutrients, specially energy, iron, folic acid, protein, calcium, iodine.

UNIT III -Nutrition during Lactation: Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Hormonal control of lactation.

UNIT IV- Nutrition **during Infancy:** Infant physiology relevant to feeding and care, Breast feeding- colostrum, its composition and importance in feeding. Advantages of exclusive breast feeding. Basic principles of breast feeding. Weaning - Introduction of supplementary foods.

Unit-V- Growth monitoring and promotion: Use of growth charts and standards,

Preventions of growth faltering. Nutritional needs of toddlers, preschool, school going children- and adolescents - Dietary management.

Text book:

1. B. Srilakshmi: Dietetics, New Age International Publishers.2006

Reference books:

1. Robinson, C. H. Lawler, M. R.; CheiToweth, W. L. and Garwick, A. E.: Normal and Therapeutic Nutrition. 17th Ed. Mac Millan Publishing Co.

2. Indian Council of Medical Research : Nutrient Requirements and Recommended-Dietary Allowance for Indians, New Delhi.

3. Thangam.E.Philip(1965): Modern Cookery, Orient Longman, II edition. Vol II, Bombay.

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Programme	**: F&D Tech**	**Part III**	**: Elective**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDE52**	**Credit**	**: 04**

FOOD PACKAGING TECHNOLOGY

Course outcomes:

After completion of the course, the students will be able to

CO1: Understand packaging materials and its importance in food Industry

CO2: Adapt and utilize packaging materials for right application in Food Industry

CO3: Standardize testing methods for packaging material to assure quality

CO4: Consumer packaging: Important functionally, but not attitudinally

Unit-1 Introduction to Food packaging: Packaging terminology –definition, Functions of Food Package, Packaging environment. Characteristics of food stuff that influences packaging selection. Nitrogen purging - Aseptic Packaging.

Unit-II Packaging systems and methods: Cellulosie and Polymeric packaging materials and forms: Food grade polymeric packaging materials, Rigid plastic packages- Regenerated cellulose film- plastic films- Aluminum foils and laminations- Special packaging methods- vacuum and gas packaging, shrink package, retort pouches- Bio degradable packages.

Unit-III Packaging material and their properties: Glass and Metal containers: Glass: Composition, Properties, Bottle making and Closures for glass containers - Metal: Bulk containers; Tin-plate containers, Tin free steel containers, Aluminum containers-Latest development in metal cans and protective lacquers.

Unit-IV Packaging of fresh and processed foods: Packaging of Fruits and vegetables,- Fats and Oils, Spices, meat, Poultry and sea foods, Dairy Products, Bakery, beverages, Dehydrated and frozen foods. Liquid and powder filling machines – like aseptic system, form and fill (volumetric and

gravimetric), bottling machines. Form Fill Seal (FFS) and multilayer aseptic packaging machines.

Unit-V Packaging designs and environmental issues in packaging : Food marketing and role of packaging-Packaging aesthetic and graphic design; Packaging Laws and Regulations, Safety aspects of packaging materials; sources of toxic materials and migration of toxins into food materials; Packaging material residues in food products; Environmental & Economic issues, recycling and water disposal.

Text Books

1.Robertson,G.L. "Food Packaging: Principles and Practice (2nd Edn). Taylor & Francis.2006.

Reference Books

1. Han,J.H. " Innovations in Food Packaging". Elsevier Academic Press, 2005.

2. Ahvenainen.R. " Novel Food Packaging Techniques". CRC Press. 2003.

3. Coles.R., McDowell,D. and Kirwan,M.J. " Food Packaging Technology". CRC Press.2003.

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Programme	**:UG**	**Part III**	**: Elective**
Semester	**:V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDE53**	**Credit**	**: 04**

PROCESSING OF MARINE PRODUCTS

Course outcomes:

CO1: After the completion of course, the students will be able to understand about the composition of marine products

CO2: Gain knowledge on the processing of marine and their by products

CO3: Examine the quality of marine products and quality issues in post production

CO4: Learn the different processing methods

Unit-I: Chemistry of sea food components - Proteins, Lipids. Protein hydrolysis in sea foods, oxidation of lipids in sea foods. Flavor of fish- Taste active component

Unit-II: Quality of sea foods - Freshness quality of sea foods- Appearance, Color, Texture, Odor and Flavor, Destructive slow analyses, Alternative methods. Factors affecting the loss of quality in sea foods.

Unit-III: Preservation of sea foods - Chilling of fresh fish, Freezing and frozen storage, Drying of sea foods, Smoking and other methods of preservation.

Unit-IV: Canning of sea foods - Introduction, Unit operations in the Canning process- primary processing, heat treatment, packing and sealing, cooling. Production of canned sea foods – Mackerel, Salmon, Tuna, Shrimp and clams.

Unit-V: Processing of by – products - Fish By-products : Protein, Peptides, Collagen and Gelatin, Fish oil. Crustaceans By-products: Chitin and Chitosan, Seaweed by-products and their applications

Text books:

1. Shahidi and J.R. Botta, “Sea foods: Chemistry, Processing, Technology and Quality”, Springer Science Business media, 1996.

Reference books:

1. Zdzislaw E. Sikorshi, “Sea foods: Resources, Nutritional Composition, and Preservation”, CRC Press, 2004.
2. Indian Fishery Hand Book by MPEDA publications
3. Marine Products Export Review by MPEDA publications

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Programme	**: UG**	**Part III**	**: Elective**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDEP1**	**Credit**	**: 03**

HUMAN NUTRITION – PRACTICAL

Course Outcomes:

After completion of the course, the students will be able to

CO1: Understand the physiology of pregnancy and lactation and how these influence on nutritional requirements.

CO2: Understand the process of growth and development form birth until old age.

CO3: Get familiar with the nutritional needs at different stages of growth

CO4: Adequate knowledge on nutritional importants

1. Planning, preparing and serving a meal for low income family, middle income family and high income family.
2. Planning, preparing and serving a meal for a pregnant woman.
3. Planning, preparing and serving a meal for a lactating woman.
4. Planning, preparing and serving a meal for an infant.
5. Planning, preparing and serving a meal for a preschooler.
6. Planning, preparing and serving a meal for a school going child.
7. Planning, preparing and serving a meal for an adolescent.
8. Planning and preparation of any five packed lunches.
9. Planning, preparing and serving a meal for an adult (sedentary, moderate & heavy worker).
10. Planning, preparing and serving a meal for an old age person.

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Programme	**: UG**	**Part III**	**: Elective**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDEP2**	**Credit**	**: 03**

FOOD PACKAGING TECHNOLOGY – PRACTICAL

Course outcomes:

After completion of the course, the students will be able to

CO1: Check Barrier properties of Packaging materials to avoid cross contamination with air, water and printing ink

CO2: Apply and examine the knowledge of properties for selection of packaging materials for foods & food products

CO3: Select between different techniques of food packaging

CO4: Adopt business applications in mind.

1. Determination of bacterial counts of polymer – packed foods during storage
2. Determination of coli forms and fungal counts of polymer – packed foods during storage.
3. Determination of water vapour transmission rate of the given packaging material – polythene.
4. Estimation of water vapour transmission rate of the given packaging material polypropylene.
5. Determination of grease resistance of papers used in food industry – butter paper & toffee wraps.
6. Determination of adhesive test of tapes
7. Determination of drop test using food packets
8. Estimation of water absorption test in paper based materials
9. Experiment on sealing of plastic cups
10. Experiment on ceiling of pouches.

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: V**	**Hours per week**	**: 04**
Subject Code	**: 17UFDEP3**	**Credit**	**: 03**

PROCESSING OF MARINE PRODUCTS - PRACTICAL

Course outcomes:

After completion of the course, the students will be able to

CO1: Learn the sampling procedures

CO2: Adopt and handle testing methods.

CO3: Learn personal hygiene

CO4: Gain the knowledge of EIA-technology

List of Practicals:

1. Sampling procedure
2. Media preparation
3. Fumigation method
4. Discarding methods
5. Standard plate count methods
6. Identification of E.coli
7. Other faecal coli forms
8. Vibrio cholerae
9. Salmonella
10. Visit to sea food processing industries.

MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY
(For those who joined in 2017 and after)

Programme	**:UG**	**Part III**	**: Core**
Semester	**: VI**	**Hours per week**	**: 06**
Subject Code	**: 17UFDC61**	**Credits**	**: 05**

BAKERY AND CONFECTIONERY

Course outcomes:

The students will be able to

CO1: Adapt the standards and regulations followed in bakery and confectionary industry
CO2: Grasp basic knowledge about food ingredients and its used in bakery products
CO3: Utilize bakery unit processing machinery effectively
CO4: Adapt various process flow line in confectionary and bakery products

Unit - I: Baking Industry - Baking industry and its scope in the Indian economy. History of Bakery- present trends, Bakery terms. Nutrition facts of bakery products.

Unit - II: Cake Technology - Preparation of cakes - Ingredients and processes, Equipments used, product quality characteristics faults and corrective measures. Different types of icings.

Unit - III: Bread, Buns and pizza base-Ingredients - Ingredients for process for breads, buns, pizza base, Equipments used, Product quality characteristics. Faults and remedies.

Unit - IV: Cookies and Biscuits - Ingredients of cookies and their functions, Principles involved in cookies preparation, Methods for mixing cookies, Types of cookies, Faults and their cause in making cookies

Unit – V: Confectionery products - Hard-boiled candies, toffees fruit drops, chocolates and other confectionaries - ingredients, equipments & processes, product quality parameters, faults and corrective measures.

Text Book:

1. Yogambal Ashokkumar., Textbook of Bakery and Confectionery, London 2014
2. Beckette, Industrial Chocolate Manufacture, Wiley-blackwell publisher, 3rd edition, 2009

Reference Books:

1. Arora.S.M., **Hand Book of Bakery Products**, Small Industry Research Institute: (1994), New Delhi.
2. Hamlyn, **The Best of Baking**, (1984), London.
3. Indira Kakati, **Egg Less Baking**, Sahibabad: Vikas Publishing House (1984).

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Programme : UG **Part III : Elective**
Semester : VI **Hours per week : 06**
Subject Code : 17UFDE61 **Credit : 05**

ENTREPRENEURIAL DEVELOPMENT PROGRAMME

Course outcomes:

The student will be able to

CO1: Understand the process and procedures for taking up entrepreneurial programmes.

CO2: Develop an attitude for Entrepreneurship development.

CO3: Understand different methods that can be used to minimize uncertainties at different stages of the entrepreneurial process

CO4: Understand different innovation and entrepreneurship theories and their implications

CO5: Understand the various scientific research methods commonly used to study innovation, entrepreneurship and new technology

Unit I: Concept of Entrepreneurship and Managerial Characteristics- Managing an Enterprise- Motivation and Entrepreneurship Development- Generation, Women Entrepreneurship

Unit-II: Incubation and Commercialization of Ideas and Innovations- Importance of Planning, Monitoring, Evaluation and Follow Up- Managing Competition and Entrepreneurship Development Programmes.

Unit III: Agencies supporting Entrepreneurial Development Programme – SIDCO, DIC,TIIC, NSIC, MSME- Objectives, Programmers', Financial Assistance

Unit IV: Dairy entrepreneurship development scheme (DEDS). Dairy processing and infrastructure development fund (DIDF), National rural livelihoods mission (NRLM)

Unit V: Project proposal – Proposal format and content - Steps in its preparation, Feasibility testing, SWOT analysis.

Text book:

1.Vasant Desai., **Project Management and entrepreneurship**, Himalaya Publishing House, New Delhi (2000).

Reference Books:

1.Chunawalla S.A., **Sales Management**, Himalayan publishing House (1999), New Delhi.

2.Dr.N.Rajan Nair., Sajith R. **Nair Marketing**, Sutan chand and Sons, (2002), New Delhi.

3.David H. Moll., **Entrepreneurship**, prentice Hall of India, (1999), New Delhi.

4.Frank Jerkins., **Advertising**, prentice Hall of India, (2000), New Delhi.

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Programme	**: UG**	**Part III**	**: Elective**
Semester	**: VI**	**Hours per week**	**: 06**
Subject Code	**: 17UFDE62**	**Credit**	**: 05**

POULTRY AND MEAT PROCESSING TECHNOLOGY

Course Outcomes:

The student will be able to

CO1: Gain Knowledge regarding processing methods and its importance in meat based Products

CO2: Gain Optimize Technology for processing of meat and its byproducts.

CO3: Knowledge regarding handling and transportation of meat and Fish.

CO4: Adopt preservation techniques and Packaging for poultry products.

Unit-1: Meat composition from different sources; muscle structure and compositions; post- mortem muscle chemistry; Factors influencing the quality of meat. Meat Microbiology and safety.

Unit-II: Slaughtering- Ante mortem inspection and handling, Stunning types, Slaughtering types. Steps in slaughtering (Pig,Cattle,Sheep/Goat)and dressing .Slaughter house operations-Hoisting rail and traveling pulley system; Modern abattoirs, typically out and features, Offal handling and inspection. Grading of meat-retail and whole sale cuts. Operational factors affecting meat quality. By product utilization .Meat plant hygiene– GMP and HACCP.

Unit-III: Processing and preservation of meat: Chilling and freezing of meat, Canning, cooking, drying, pickling, curing and smoking; prepared meat products like sausages, kebabs,etc.. Intermediate moisture and dried meat products, Packaging of meat products.

Unit-IV: Poultry: methods of slaughtering, Slaughtering equipment and operations, dressing, handling, storage and preservation of poultry meat. Spoilage and its control. Freezing and chilling of poultry. Whole sale and retail cuts. Eggs: Composition, handling, candeling, washing, coating, packaging and storage.

U n i t – V : **Commercially important marine products from India**- Proximate composition, Postmortem changes in fish muscle. Handling, Preservation and transportation of fish. Indices of fish quality, Microbiology of fish and shellfish, Freezing of fish and shellfish.

Text books:

1. Legarreta,I.G. " Handbook of Poultry Science and Technology"(Volume I and Volume II), John Wiley & Sons,Inc., Hoboken, 2010

Reference books

1. Mead M. "Poultry Meat Processing and Quality". Wood head Publ. 2004.
2. Pearson, A.M.&Gillett, T.A. " Processed Meat". 3rdEd. Chapman & Hall, 2006.
3. Marine Products Export Review by MPEDA publications

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Programme	**:UG**	**Part III**	**: Elective**
Semester	**:VI**	**Hours per week**	**: 06**
Subject Code	**: 17UFDE63**	**Credit**	**: 05**

FUNCTIONAL FOODS AND NUTRACEUTICALS

Course Outcomes:

The students will be able to

CO1: Understand about functional foods and its properties

CO2: Understand regarding Metabolic disorders and its relation with functional foods.

CO3: Learn the benefits of fortification in Food supplements

CO4: Understand the importance of Prebiotic and probiotic foods

Unit-I: Introduction to Nutraceuticals –Historical Reviews-Teleology of nutraceuticals-Organization models for nutraceuticals – Classification of Nutraceuticals based on the sources– Animal, Plant and Microbial – Nutraceuticals in specific foods.

Unit-II: Food recommended for metabolic disorder - Food recommended and restricted in metabolic disorders and disturbances, gastrointestinal disorders; fever and infection; liver, gall, bladder and pancreatic disturbances; blood, circulatory and cardiac diseases; urinary and musculo skeletal diseases; allergies.

Unit-III: Nutritional deficiencies - Nutritional deficiencies and its correction trough fortification and supplementation of foods. Beneficial effect of spices, honey, spirulina etc.

Unit-IV: Health benefits of Micronutrients - Health benefits/ mode of action of PUFA/gamma linolenic acids, antioxidants, dietary fiber, oligosaccharides, sugar alcohols, peptides and proteins, glycosides, alcohols, iso- prenoides and vitamins, choline, LAB, phenolics, flavonols, minerals

Unit-V: Herbs as Functional foods - Herbal medicine–Herbsas ingredients in functional foods–actions of herbal and evidence of efficacy, Cruciferous vegetables and cancer prevention, Evolution of marketing environment for Functional foods and Nutraceuticals.

Text Book

1. Robert E.C Wildman. Handbook of Nutraceuticals and Functional Foods, Ed., CRC Press LLC.ISBN– 0849387345, 2001.

Reference books:

1. Nutraceuticals Designer foods III- Paul. a. Lachance-Food and Nutrition press. INC,USA.
2. Developing New Functional Food and Nutraceutical Products –Cookbook- USA
3. Essential of functional foods –Marry scheward-Springer publication

MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
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Programme :UG | **Part III : Core subject**
Semester : VI | **Hours per week : 10**
Days: 60 (working days)
Subject Code : 17UFDPR1 | **Credit : 08**

PROJECT AND VIVA – VOCE

Individual – 1 member

Record submission – A hard bound report to be submitted to the Department.

Evaluation – Project (oral) presentation followed by a brief Viva

Internal 40 Marks (Course teacher)

External 60 Marks (Course teacher and External members from other departments)

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Programme : UG | **Part III : Core Project**
Semester : VI | **Hours : 08**
Days: 60 (working days)
Subject Code: 17UFDINP | **Credits : 08**

INPLANT TRAINING

Each Group – 4 members

Area of learning – Raw material procurement, quality checking, processing & packaging methods.

Record submission – A hard bound report to be submitted to the Department.

Evaluation – Project (oral) presentation followed by a brief Viva

Internal 40 Marks (Course teacher)

External 60 Marks (Course teacher and an industrial person)

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