

*Placed at the meeting of
Academic Council
held on 30.03.2021*

APPENDIX – F
MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)

Syllabus for One year Diploma in
“Marketing of Value added Products of Seafood Products”
(Under Semester Pattern - NSQF Programme)
With effect from the academic year 2021-2022
Regulations, Scheme of Examination and Syllabus

Eligibility for the Award of Diploma

No candidate shall be eligible for the Diploma unless he/she has completed the +2 (Twelfth) Exam conducted by the State Board of Education, Tamil Nadu and has passed the prescribed examination.

Examinations

External Examination in all subjects of the semester under the scheme of examinations will be conducted at the end of year. The sessional marks in all the subjects will be awarded on the basis of continuous internal assessment earned during the year concerned. For each subject 25 marks are allotted for internal assessment and 75 marks are allotted for External Examination.

Continuous Internal Evaluation Theory (Internal Assessment Mark 25 Marks)

It has been decided to introduce Continuous Internal Assessment marks for a total of 25marks, which are to be distributed as follows:

Attendance: 5 Marks

(Award of marks for attendance will be as per the range given below)

80% - 83% 1 Mark

84% - 87% 2 Marks

88% - 91% 3 Marks

92% - 95% 4 Marks

96% - 100% 5 Marks

Test: 10 Marks

3 Tests each of 2 hours duration for a total of 30 marks is to be conducted out of which the best two will be taken and the marks to be reduced to 10.

Question Paper Pattern for Internal Exam:

5 Objective Questions x 1 Mark ... 05 Marks

5 Either or Questions x 3 Marks ... 15 Marks

2 (out of 3) Questions x 5 Marks ... 10 Marks

30 Marks

Assignment: 10 Marks

For each subject three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks.

All the mark entries for assignment, test and attendance should be entered in the personal logbook of the staff handling the subject. This is applicable to the theory subjects.

Criteria for Pass

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed courses of study successfully in an institution approved by UGC and MKU pass all the subjects prescribed in the syllabus.

2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than 40% in theory, subject out of the total prescribed maximum marks including both the sessional and the external Examination marks put together, subject to the condition that he/she has to secure atleast a minimum of 30 marks out of 75 marks in the Board's Theory Examinations.

Question Paper Pattern for External Exam:

10 Objective Questions x 1 Mark ... 10 Marks

5 Either or Questions x 7 Marks ... 35 Marks

3 (out of 5) Questions x 10 Marks ... 30 Marks

75 Marks

External Exam Duration 3 Hours.

| SEMESTER – I | | | | | | | |
|----------------------------|-------------|---|-----------|------------|----------------|----------------|-------------|
| Sl. No | Course code | Course Title | Credits | Hours | Internal Marks | External Marks | Total |
| General Education : | | | | | | | |
| 1. | -- | <u>Theory Paper - I</u> Introduction to seafood products | 3 | 45 | 25 | 75 | 100 |
| 2. | -- | <u>Theory Paper – II</u> Operation Management of Fish Processing Plants | 3 | 45 | 25 | 75 | 100 |
| 3. | -- | <u>Lab I :</u> Introduction to seafood products | 3 | 45 | 40 | 60 | 100 |
| 4. | -- | <u>Lab II :</u> Operation Management of Fish Processing Plants | 3 | 45 | 40 | 60 | 100 |
| Skill Education : | | | | | | | |
| 5. | -- | <u>Theory Paper – III</u> Traditional and modern techniques in seafood processing | 3 | 45 | 25 | 75 | 100 |
| 6. | -- | <u>Theory Paper – IV</u> Value addition techniques for marketing seafood products | 3 | 45 | 25 | 75 | 100 |
| 7. | -- | <u>Theory Paper - V</u> Quality Control, Inspection and Certification in Seafood | 3 | 45 | 25 | 75 | 100 |
| 8. | | <u>Lab III :</u> Traditional and modern techniques in seafood processing | 3 | 45 | 40 | 60 | 100 |
| 9. | | <u>Lab IV :</u> Value addition techniques for marketing seafood products | 3 | 45 | 40 | 60 | 100 |
| 10. | | <u>Lab V :</u> Quality Control, Inspection and Certification in Seafood | 3 | 45 | 40 | 60 | 100 |
| Total | | | 30 | 450 | 325 | 675 | 1000 |

| SEMESTER – II | | | | | | | |
|----------------------------|-------------|--|-----------|------------|----------------|----------------|-------------|
| Sl. No | Course code | Course Title | Credits | Hours | Internal Marks | External Marks | Total |
| General Education : | | | | | | | |
| 1. | | <u>Paper – VI :</u> Central and State level schemes for seafood industries | 3 | 45 | 25 | 75 | 100 |
| 2. | | <u>Paper – VII :</u> Economics and Marketing in seafood | 3 | 45 | 25 | 75 | 100 |
| 3. | | <u>Lab VI :</u> Central and State level schemes for seafood industries | 3 | 45 | 40 | 60 | 100 |
| 4. | | <u>Lab VII :</u> Economics and Marketing in seafood | 3 | 45 | 40 | 60 | 100 |
| Skill Education : | | | | | | | |
| 5. | | <u>Paper VIII :</u> Spoilage and self life extension of value added seafood products | 3 | 45 | 25 | 75 | 100 |
| 6. | | <u>Paper IX :</u> Packing and Labelling of fish and Fishery Products | 3 | 45 | 25 | 75 | 100 |
| 7. | | <u>Paper X :</u> Product Research and Entrepreneurship development | 3 | 45 | 25 | 75 | 100 |
| 8. | | <u>Lab VIII :</u> Spoilage and self life extension of value added seafood products | 3 | 45 | 40 | 60 | 100 |
| 9. | | <u>Lab IX :</u> Packing and Labelling of fish and Fishery Products | 3 | 45 | 40 | 60 | 100 |
| 10. | | <u>Lab X :</u> Product Research and Entrepreneurship development | 3 | 45 | 40 | 60 | 100 |
| Total | | | 30 | 450 | 325 | 675 | 1000 |

SEMESTER – I : GENERAL EDUCATION

Paper - I : INTRODUCTION TO SEAFOOD PRODUCTS

The Course aims

- To know the different types of seafood products.
- To study the characteristic of seafood products.

Unit-I : Definition of seafood products - Principle of seafood preservation and processing - Scope of seafood products - Food Security.

Unit-II : List of value added seafood items – Shrimp Products-Cephalopod products –Finfish products-Other items.

Unit-III : Nutritional biochemistry of seafood products: Classification, nutrient quality and evaluation of proteins, lipids and carbohydrates.

Unit-IV : Seafood proteins: Classification. Sarcoplasmic proteins: Heme proteins, Myoglobin, Hemocyanins, parvalbumins, antifreeze proteins, pigments, enzymes- hydrolases, oxidoreductases, and other enzymes.

Unit-V : Functional properties of seafood proteins: Solubility, emulsification, viscosity, water holding, stability, gelation, texture profile analysis.

References:

1. https://mpeda.gov.in/MPEDA/different_products.php#
2. <http://courseware.cutm.ac.in/courses/fish-products-and-value-addition/>

Practical – Lab I : Introduction of Seafood Products

Paper II :OPERATION MANAGEMENT OF FISH PROCESSING PLANTS

Course objectives

1. To obtain understanding about the importance, principle and process of fish processing plant management.
2. To be able to plan and manage raw material, production method, plant lay out, product qualities, stock and human resources of fish processing plant according to principle and process of fish processing plant management.

Unit I : Plant design: Fundamentals of processing plant design: Site selection, design and preparation of layout of processing plants - freezing plant, cold storage, canning plant, dryers etc. Site building, water supply, equipment's and clothing.

Unit-II : Functions and construction of refrigeration system: Tests and inspection, Operation and handling, P-H diagram and basic calculation - Application of P-H diagram, size and required power of compressor, maintenance of refrigerating machine, troubles and causes.

Unit- III : Preventive maintenance of machinery and equipment of fish processing plants, IQF, Canning plant, sausage plant, artificial dryers, smoking chambers etc., safety controls for freezing and canning plant.

Unit-III : Effluent treatment: Legislation and standards of effluent discharge, water pollution control measures in the food industry, waste water treatment process;

Unit-IV : Measurement techniques; Sensors, active and passive sensors, characteristic of sensors for the measurement of temperature, relative humidity, aw value, gel strength, moisture, freshness, pH, conductivity,

UNIT-V : Production system management; quality control management; stock and human resources management according to GMP, HACCP, ISO 9000, ISO 14000 and ISO 18000; labor and plant establishment law.

References

1. Chupakhim and Dormenko. Fish processing equipments. MIR Publishers.
2. Heid & Joslyn. Food processing operations.
3. Slade. Food processing plants.
4. Wheaton & Lawson. Processing Aquatic Food Products.

PRACTICALS – Lab-II : Lab Operation Management of Fish Processing Plants

1. Visit to fish processing plants to know about Filleting of fish, treatments, glazing, packaging, freezing, Processing of Prawns, Lobster, Squid, Cattle Fish, Crab etc. in different styles, Packaging and Freezing, Freezing curve, determination of freezing point.
2. Studies on physical, chemical and sensory changes. Evaluation of pasteurisation and sterilisation, determination of TDT and F value Examination of canned foods.

SKILL EDUCATION

Paper-III : TRADITIONAL AND MODERN TECHNIQUES IN SEAFOOD PROCESSING

The Course aims

- To define the latest methods in manufacturing.
- To develop different products from fish and shellfish

Unit-I: Traditional methods in processing of fish – sun drying, salting, smoking, marinading and fermentation.

Unit-II : Theory of salting, methods of salting–wet salting and dry salting. Different types of spoilage in salt cured fish. Quality standard for salted and dry fish. Drying and dehydration-theory, importance of water activity in relation to microbial growth. Methods of Drying-Sun drying and artificial drying- solar dryer. Packaging and storage of salted and dried fish.

Unit-III : Fish preservation by smoking- chemical composition of wood smoke and their role in preservation. Methods of smoking and equipments used for smoking. Carcinogenic compound in wood and methods to remove them.

Unit-IV : Hurdle technology in fish preservation and processing. Marinaded fish products – role of acids in marinades, types of marinades.

Unit-V : Fish and prawn pickles-Fermented fish products traditional Indian fermented products. Fermented fish products of Southeast Asia. Fish sauce and Fish paste. Principles and methods of preparation of various fish paste products ;Fish Mince. Value addition. Battered and braided products-fish finger, fish cutlet. By products and value added products : Fish meal manufacturing process – fish silage, fish oil (Body oil and liver oil) production – fish maws, fins and leather production – chitin, chitosan and glucosamine production from shrimp waste – FPC, fish soup powder – fish balls – fish curry – fish pickle – fish enzyme – surumi products – fermented fishery products.

Practical - Lab-III : Traditional and Modern Techniques in seafood Processing

1. Preparation of salted-dried fish by dry salting, wet salting and mixed salting
2. Preparation of smoked fish
3. Preparation of fish pickle
4. Preparation of prawn pickle
5. Preparation of fermented fish
6. Demonstration of icing methods in fish preservation.
7. Demonstration of cleaning and disinfection of processing materials.
8. Fish meal production.
9. Chitin and chitosan production from shrimp shell waste.
10. Fish soup, fish curry and fish pickle production.
11. Collection and identification of fish parasites.
12. Morphological, biochemical and biological tests of bacteria and virus.
13. Methods of seaweed cultivation and harvesting technology.
14. Extraction of agar agar from seaweeds.

Paper -IV : VALUE ADDITION TECHNIQUES FOR MARKETING SEAFOOD PRODUCTS.

Unit-I : Principles of fish processing : Processing by traditional methods – salting, sun drying, smoking, marinating and fermentation and their methods. Package and storage of processed products, quality and standard's of processed products.

Unit-II : Traditional fishing products : Marinated, dried and fermented fish products, fish and prawn pickles, fish sauce, fish paste, traditional Indian and south east Asian fermented products, Principles and methods of preparation of various fish paste products. Eg. Fish sausage, fish ham, surimi, fish cake, kmabako etc.

Unit-III : Extruded and diversified products : Theory of extrusion equipments used for extrusion, advantages and disadvantages of extruded products, method of preparation of extruded products. Value addition : Diversified fish products, battered and braided products, fish fingers, fish cutlet, fish wafers, fish soup powder etc. and imitation product.

Unit-IV : Fish by-products and fish waste utilization : Preparation and product of fish meal, fish oil (body & liver oils) shrimps waste products like chitin and chitosan, FPC, fish hydrolysae, hydrolysed and deodorized fish meat, fish silage (acid and fermented silage), fish maws, shark leather, fish glue, fish gelatin, isinglass, pearl essence, shark fin rays and Beach-de-mer.

Unit-V : Quality assurance of fishery products : Quality dimension of seafood products, sensory quality, intrinsic, extrinsic, quantitative parameters. Assessment of quality changes in processed products. Application of HACCP concept in quality of the product. Principles of hygienic and sanitation, food laws and standards. Role of Export Inspection Council, MPEDA in fishery products, Certification System of Fishery Products in India.

References

1. Gopakumar, K., 2002. Post harvest technology of fish and fish products, Daya Publication.
2. Hall, G. M., 1992. Text book of Fish Processing Technology, ICAR Publication.
3. Fish Processing Technology, Blackie, Hui, Y. M., Marle, D. P. and Richard, J. G., 2001.
4. Sen, D. P., 2005. Technology of Fishery Products, Fishing Chimes.
5. Wheaton, F. W. and Lawson, T. B., 1985. Processing Aquatic Products.

PRACTICALS –Lab IV : Value addition techniques for marketing seafood products

- 1.Preparation of fish oil (body & liver oils).
- 2.Preparation of fish meal.
- 3.Preparation of isinglass
4. Preparation of silage (Acid)
- 5.Preparation of silage (Alkali)
- 6.Preparation of chitin and chitosan
- 7.Preparation of FPC
- 8.Assessment of quality of products by sensory evaluation method.

Paper-V : QUALITY CONTROL, INSPECTION AND CERTIFICATION IN SEAFOOD.

Course objectives

1. To obtain understanding about the importance, principles and process of Quality control and assurance.
2. To be able to analyse, plan and conduct the quality control and assurance work.

Unit-I : Introduction to quality control in food processing. Necessity of quality control. Food laws in India, integrated food law.

Unit-II : Quality management, total quality concept and application in fish trade. Quality assessment of fish and fishery products - physical, chemical, organoleptic and microbiological quality standards. - sensory evaluation of quality, general testing conditions, different sensory tests.

Unit-III : HACCP and Good manufacturing practices. HACCP principles, practical aspects of planning and implementation, verification, validation and audit. HACCP based quality control systems in India. Hazard analysis, preparation of HACCP plan, implementation of HACCP based quality control systems.

Unit-IV : Quality evaluation techniques for seafood: Physical, chemical. Bacteriological and Instrumental methods of quality evaluation. National and International standards: ISO 9000: 2000 series of quality assurance system,

Unit-V : Quality assurance method; the use of statistic in quality assurance; the use of control chart - Sampling plan; the use of mathematics model in the quality control assurance system.

References

Gopakumar K. Text Book of Fish Processing Technology.
Huss, H. H. *et al.* Quality assurance in the fish industry.
Krenzer, R. Fish inspection and quality control.
Vincent K. O. & Joel E. Ross. Principles of Total Quality.

Practicals - Lab - IV : Quality Control, Inspection and Certification in Seafood

1. Visit the quality control lab to know about the factors to check the quality and measures for quality Assurance.
2. Prepare the students to get to know about the various methods used to measure the standards.
3. Estimation of Iron in Water, Estimation of Total Dissolved Solids in Water, Chlorides, hardness in water, sulphates and nitrates in water (used in Fish Handling and Processing)

SEMESTER – II : GENERAL EDUCATION

Paper-VI : CENTRAL AND STATE LEVEL SCHEMES FOR SEAFOOD INDUSTRIES.

Unit-I : Fisheries Extension & Employment: Fisheries extension and education in India. Fishery as a tool for rural development and employment potentiality. Fisheries Development Activities: Different fisheries development plant in India. Role of Government, NGOs and other agencies in fisheries sector. Different fishery related laws in India.

Unit-II : Concept of entrepreneurship : Entrepreneurial and managerial characteristics; managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up; managing competition.

Unit-III : Government schemes and incentives for promotion of entrepreneurship : Preparation of enterprise budget for integrated fish farming. Fiscal and monetary policies and its impact on entrepreneurship. Infrastructural and other financial requirement for fishery entrepreneurship Government policy on Small and Medium Enterprises (SMEs) / SSIs.

Unit-IV : Accounting procedures of fish business entity. Emerging trends in fish production, processing, marketing and exports. Assessing overall business environment in the Indian economy.

Unit-V : Overview of Indian social, political and economic systems and their decision making by individual entrepreneurs. Globalisation and the emerging business /entrepreneurial environment. Social Responsibility of Business.

References :

1. Shyam S Salim, Biradar, R.S. and Pandey, S.K., Economic Analysis of Fisheries Projects, CIFE, Mumbai.
2. Ojha, S.N. and Shyam S Salim, Entrepreneurship Development and Project Formulation, CIFE, Mumbai.
FAO Technical Paper No.334, Fisheries Project Formulation, FAO, Rome.
3. Shang, Y.C., Aquaculture Economic Analysis – An Introduction, The World of Aquaculture Society Ltd.
Twiner and Simister (ed.), Project Management, Infinity Books, New Delhi.
4. Chodhury, Project Management Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Gittinger, J. Price, Economic analysis of Agricultural projects, EDI Series in Economic Development, John Hopkins University Press, Baltimore and London.

Practical – Lab - V : Central and State Level Schemes for Seafood Industries.

Paper VII : ECONOMICS AND MARKETING IN SEAFOOD.

Course Objectives

1. To know the economic impact of fishery Markets.
2. To study the different marketing strategies to explore the market for fish products.

Unit-I : Fishery economics: Definition, scope and role. Production economics catch and effort studies – methodological issues in the estimation of fish catch and fishing effort – dimensions of fishing effort – costs of and returns from fishing – cost components

Unit-II : Economic theories and growth models of fish resource development and exploitation; Fishery resource management; An overview of the socio economic status of the fisherfolk in India.

Unit-III : Fisheries Marketing definition and scope, functions of fish marketing, Markets and market structure, Marketing cost and price spread, Marketing planning, marketing strategy, marketing research, Marketing infrastructure, Marketing regulations, constraints and approaches to fish marketing development.

Unit-IV : Developing marketing strategies. Advanced studies of marketing information system and E-marketing ,fish-business. Dynamics and innovations in fisheries marketing system.

Unit-V : Principles of price determination. Price difference and variability, price analysis, price elasticities, Price determination of fish and fishery products, characteristics of demand and supply of fish and fishery product,.

References

1. Phillip Kotler Marketing Management.
2. Jolson, M. A., Marketing Management,
3. Amarchand & Varadharajan, B. An introduction to marketing,
4. Phillip Kotler & Gary Armstrong Principles of Marketing.
5. G. E. Shephard. Agricultural Price Analysis.

Practicals – Lab - VII : Economics and marketing in seafood

1. Students undergone a training to know the ways for value addition products.
2. Students are involve to take up market research and survey.

SKILL EDUCATION

Paper VIII : SPOILAGE AND SELF LIFE EXTENSION OF VALUE ADDED SEAFOOD PRODUCTS.

Unit-I : Introduction to freezing technology; characteristics of fish and shellfish; changes in fish after death, spoilage of fish, spoilage and pathogenic microorganisms; Composition and nutritional value of fish as food – moisture, lipid, protein, carbohydrates; changes in fish after death as spoilage of fish – biochemistry of fish spoilage. Different types of spoilage in salt cured fish. Quality standard for salted and dry fish.

Unit-II : Handling and sanitation of fresh and harvested fish – Bacteriology of fish, water and occurrence of bacteria on fish and its load – microbial spoilage of fish and methods of preservation. Characteristics of psychrophiles, halophile and thermophiles, their role in spoilage, food poisoning. Types of spoilage of fish, semi processed and processed fishery products, Indices of fish sanitary quality, Concept of Quality Management.

Unit-III : Handling of fish in on board & off shores – sorting – evisceration and removal of gills, ice and icing methods, fish holds, containers, cleaning and disinfection personal hygiene and HACCP.

Unit-IV : Chilling of fish – methods and equipment for chilling; icing – quality of ice, ice – making; refrigerated or chilled sea water, chilling rate; spoilage of fish during chilled storage; use of antibiotics and chemicals

Unit-V : Changes that occur during frozen storage – microbiological, physical and chemical changes; protein denaturation, fat oxidation, dehydration, drip; protective treatments – polyphosphate, glazing, antioxidants, packaging ; thawing of frozen fish – methods of thawing. Transportation of frozen fish, cold chain, quality control, HACCP in freezing industry.

Practical – Lab - VIII : Spoilage and Self Life Extension of Value Added Seafood Products

1. Handling and sanitation of fresh and harvested fish.
2. Visit to landing centres and fish markets.
3. Observation of microbial spoilage in fishery products.

Paper IX : PACKING AND LABELLING OF FISH AND FISHERY PRODUCTS.

Course Objectives

1. To study the various packaging methods for fishery Products.
2. To know methods of testing the packaging materials.
3. To study the labelling Mechanism.

Unit-I : Food packaging, its purposes and procedures; technological aspects of packaging fishery products; packing of fresh and frozen fish for consumers; packaging for transport, shipping and institutional supplies; packaging standards for domestic and international trade.

Unit-II : Packaging materials; basic films and laminates, their manufacture and identification; resistance of packaging materials; development of protective packaging for fishery products.

Unit-III : Methods of testing for packaging materials for their physical properties; containers and their testing and evaluation; package designs; resistance of packages to hazards in handling; transport and storage.

Unit-IV : Modified atmosphere packaging, controlled packaging and aseptic packaging. Flexible packing, retort pouch processing of fish and fishery products principles and techniques. Combination and synergistic effects.

Unit-V : Labelling and printing of packaging materials. Labelling requirements - national and international, legislation on labelling. Labelling for product traceability. Type of labelling for organic foods, specific foods like organic foods, GM foods, irradiated foods, vegetarian and non-vegetarian foods. Label design specification – size, colour.

References

1. Balachandran K.K., Post Harvest Technology of Fish and Fishery Products.
2. Desrosier N.W. and Treasler D.K, Fundamentals of Food Freezing.
3. Govindan T.K., Fish Processing Technology.
4. Moorjani M.N., Fish Processing in India.

Practicals – Lab - IX : Packing and Labelling of Fish and Fishery Products.

1. Preparations of assignments and discussion with experts to know more about labelling and packaging.

Paper X : Product Research and Entrepreneurship Development

Course Objectives

1. To obtain knowledge and understanding about the process and development of the fish processing career.
2. To be able to plan, conduct, solve problem and practice fish processing according to the principles and process.
3. To be able to apply this knowledge, skills and experiences into practice in a Career.

Unit-I : The importance and advantages of product research and development; analysis of necessarily data, marketing and consumer behavior data; product management methodology and value added products; data collection, analysis, summarization and reporting.

Unit-II : Assessing overall business environment in the Indian economy. Overview of Indian social, political and economic systems and their implications for decision making by individual entrepreneurs.

Unit-III : Globalisation and the emerging business / entrepreneurial environment. Concept of entrepreneurship; entrepreneurial and managerial characteristics; managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up;

Unit-IV : managing competition; entrepreneurship development programs; Generation, incubation and commercialization of ideas and innovations.

Unit-V : Government schemes and incentives for promotion of entrepreneurship. Government policy on Small and Medium Enterprises (SMEs) / SSIs. Export and Import Policies relevant to fisheries sector. Venture capital. Contract farming and joint ventures, public-private partnerships. Overview of aqua inputs industry. Characteristics of Indian fish processing and export industry. Social Responsibility of Business.

References

1. “Entrepreneurial Development” by Khanka S S.,
2. “Dynamics of Entrepreneurial development and Management” by Desai.
3. “Product Design and Development” by K T Ulrich and S D Eppinger.

Practicals – Lab - X : Product Research and Entrepreneurship Development

Spotting business opportunities and exploring entrepreneurial possibilities in different sectors of fisheries industry; developing a pilot project based on identified business; case studies of successful and failed entrepreneurs.

PROJECT WORK

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