DEPARTMENT OF B.VOC., MARINE FOOD PROCESSING AND PRESERVATION TECHNOLOGY

Employability **Entrepreneurship** **Skill Development**

Name of the Programme	Course Code	Title of the Course	Employability	Entrepreneurship	Skill development
B.Voc., Marine Food Processing and Preservation Technology	ZVGA	Fundamentals of Marine Edible Animals	✓		
	ZVSF	Biochemical and Microbial changes in Fishes	✓		
	ZVGI	Food Safety in Seafood Industry	✓		
	ZVGM	Packing and Labelling of Fish and Fishery Products		✓	
	ZVGO	Entrepreneurship Development		✓	
	ZVGR	Fisheries Economics			✓
	ZVGS	Quality control of fish and Fishery products	✓		
	ZVGW	Fisheries Administration and Legislation	✓		

EMPLOYABILITY

Semester-I / Core Course-I	Fundamentals of Marine Edible Animals-(Title of the Course)	Course Code:-ZVGA
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive Level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create	
Course Objectives	**The Course aims** ➢ To study planktons, the drifting life forms inhabiting water bodies that nourish the higher tropic levels in the ocean ecosystem and also act as indicator species. ➢ To gain knowledge of Fishery Science with regards to Population Dynamics. ➢ To consider the application of statistical tools to study fishery science. ➢ To learn about aquaculture of fin fish as well as crustaceans and molluscs. ➢ To attain a clear perception of the present status of sea farming in India	
Unit	**Content**	**No of Hours**
Unit I	History and definition of Taxonomy. Sea Weeds – Zooplanktons – PhytoPlanktons, Systematics. Binomial nomenclature. Classification of commercially important fishes, crustaceans and molluscs.	15

Unit II	Morphology and Sexual dimorphism in fishes, crustaceans and molluscs. Maturation and spawning in fishes. Maturity stages, Gonado-somatic index, Fecundity, ova diameter studies, breeding cycles.	15
Unit III	Life history of economically important fish species. Age and growth in fish. Methods employed for age determination, direct and indirect methods, scales, otoliths, length frequency studies, Length-weight relationships and relative condition factor. Types of migration in fishes. Breeding migration in fishes and Crustaceans.	15
Unit IV	Structure of digestive system in fishes, molluscs and crustaceans. Digestive glands and enzymes. Modification of digestive tract in relation to feeding habits. Food and feeding habits of fishes, molluscs and crustaceans. Feeding in relation to age, sex, season and maturity. Food analysis indices.	15
Unit V	Respiration-Structure of gills, branchial glands, mechanism of ventilation, respiratory pigments, mechanism of gas exchange. Accessory respiratory organs in fishes and its significance. Endocrine system,-Pituitary gland in fishes. Pheromones in fishes. Endocrine control of reproduction in crustaceans and molluscs.	15

Text Book:

1. Moyle and Cech Fishes and Introduction of Ichthyology

2. Nikolsky G.V Ecology of fishes

Reference Books:

1.Purchol R.D. The Biology of Mollusca

2. Bliss D.E. Biology of Crustacean

3.Moyle,P.B. &Cech,J.J. Fishes – An Introduction to Ichthyology

e- Resources:

https://www.pdfdrive.com/aquaculture-farming

Course Outcomes:

On completion of the course the learner will be able

CO 1: Living and non-living things in the sea - Marine flora and fauna - Basic characteristics of different sea species - The ocean zones

CO 2: Memorise the names of some sea creatures - Distinguish between sea animals and plants - Understand the relationship between species.

CO 3: To build a strong foundation in marine edible products.

CO 4:Toprepeare Students for career options in aquaculture centres, marine products, etc.

CO 5: Students aquired knowledge in fishery science, as well as crustaceans and Molluscs.

Semester-II/ Core course-II	**Biochemical and Microbial changes in Fish**	Course Code:- **ZVSF**
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive Level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create
Course Objectives:	➢ The course will provide an introduction to the various food components nutritional impact on growth, development, reproduction, health and quality of farmed fish. . ➢ This involves learning about the fish's digestive system and the various nutrients, digestion, absorption, metabolism, and biochemical function. ➢ The course also covers relevant undesirable substances in feed that can be challenge for the health and for the seafood product produced. ➢ This involves learning about of biochemical changes in fishes. ➢ Understanding of fishes habits and habitats and their function of microbial anatomy.

UNIT	CONTENT	NO OF HOURS
Unit I	Biochemical composition of Raw fish: Protein, carbohydrate, Fat, Fish oil, Minerals, Vitamins – Nutritional value of raw fish – Nutritional value of preserved and Processed fish.	15
Unit II	Fish decomposition: Post-mortem changes and Rigor mortis – post-rigor decay and spoilage of fish: Enzymatic spoilage, Microbial spoilage, Bacterial flora of fish and bacterial spoilage, chemical spoilage (Rancidity, Autolysis), spoilage due to other factors.	15
Unit III	Fish preservation-principles of preservation: cleaning, lowering temperature, raising temperature, dehydration, use of salt, use of fish preservatives, Exposure to low radiation of gamma rays, Electrocuting by ion wind- Methods of preservation – special problems in fish preservation: denaturation due to freezing of fish, problems arising out of industrial processes in fish preservation industries.	15
Unit IV	Food poisoning, intoxications, Allergies from fish: Histamine poisoning from badly preserved fish, Food-poisoning from eating a poisonous fish species, Food-poisoning of bacterial origin(*Salmonella, Staphylococcus, Botulism*), "Pink" spoilage and "Dun" spoilage of salted fish.	15

Unit V	Utilization of fish as products: Fish liver oil, methods of extraction of fish liver oil from liver – standardization of Vitamin' A potency in the extracted oil (Biological estimation, colorimetric estimation with tintometer, photoelectric spectrophotometric estimation) - Prototype of fish liver oil manufacturing plant – simple model of fish – liver oil extractor for use in small scale cottage industry – Fish body oil – Fish meal – Others(Fish flour, fish silage, fish manure & guano, fish sausage and ham, fish glue, Isinglass, Fish leather, fish macroni, fish biscuits, fish insulin)-Cooking effect on nutritional value of fish –Health hazard from fish eating.	. 15

Text Book:

- Hui, Y.H. 2006.(Ed). Food Biochemistry & Food Processing. Blackwell publishing Ltd.,USA
- Brody, T. 2006. Nutritional Biochemistry 2nd Edition. Elsevier, India Pvt. Ltd. New Delhi.

Reference Books:

- Luck, Erich, Jager, Martin 1997. Antimicrobial food additives, characteristics uses, effects – 2nd Edition, Springer – Verlag Berlin, Heidel berg – New York
- PomeranzYeshajahu, 1985. Functional Properties of Food Components. Academic Press , INC, London.

e- Resources:

- fisheries –biotechnology-d164824899.html

Course Outcomes:

On completion of the course the learner will be able

CO 1: Keep track of food's quantitative importance in the production of farmed fish, which feed resources you use, and the ratios between the energizing nutrient (Protein, fat and carbohydarate) in commercial feeds.

CO 2: Possess detailed knowledge of the fish digestive system, including a deeper focus on the development of gastrointestinal tract of marine fish larvae.

CO 3: Show detailed knowledge of various energizing and micro (vitamins and nutrients digestion, absorption, metabolism and biochemical function.

CO 4: Explain the components of fish feed on fish product quality, both positive (nutrients) and negative (contaminents from food and environment).

CO 5: Have knowledge of fish reproduction and how diet affects egg and fry quality.

Semester-III/ Core Course-III	**FOOD SAFETY IN SEAFOOD INDUSTRY**	Course Code:-**ZVGI**
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive Level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create
Course Objectives:	**TheCourseaims** ➢ To provide an optimum environment for students to gain an understanding of the chemical bases of food component reactivity and functionality. ➢ To provide an opportunity for students to develop skills for experimenting with food systems and to test various approaches for manipulating the chemical and/or functional properties of foods. ➢ To understand the concept of safe food and types of hazards associated with food. ➢ To control the potential threats to safety of food. ➢ To familiarize with the Good Hygienic Practices, Food Safety Management Systems and Food Regulations.

UNIT	CONTENT	NO OF HOURS
Unit I	Microbiological standards in seafood industry. Source of microorganism to fish-Sanitary measures adopted to reduce microbial load in fish. Food borne nonbacterial infections and intoxications: Aflatoxins, patulin, ochratoxin and other fungal toxins found in food, toxin producer, source, nature of toxin, toxicity and significance in foods.	15
Unit II	Public health microbiology- Food borne pathogens: Emerging food-borne pathogens. Waterandborne diseases. Bacteria of public health significance in fish/fishery products/environments*Salmonella, Clostridia, Staphylococcus, E. coli, Streptococcus, Vibrio, Aeromonas, Listeria,Yersinia, Bacillus*. Methods for Detection: Rapid detection and indirect detection methods ofpathogens and parasites. Laboratory techniques for detection and identification of food poisoningbacteria.	15
Unit III	Total plate count Coliforms-concept- indicator organism-MPN estimation-isolation and identification-faecal coliforms. Salmonella-Isolation and identification. Vibrio- Isolation and identification. Streptococcus- Isolation and identification. *Listeriaspp* isolation and identification. *Pseudomonas aeroginosa*, General understanding about different microbiologicalmethods. (FDA, CFIA, FSIS, NACMSF, AOAC).	15

Unit IV	Quality control of Laboratories. Good Laboratory Practices (GLP), ISO/IEC 17025. Types of laboratories, General requirements for a food laboratory. (Lay out, Environmental requirements,Safety requirements etc) Food borne diseases-Food infection and food intoxication. Botulism.Typhoid and Paratyphoid, *Clostridium perfringens,* Listeriosis. Sources and transmission ofbacteria in foods: human, animal, environmental reservoirs; cross-contamination.	15
Unit V	Antimicrobial systems and food preservation: ecological concepts: Lactoperoxidase. Nisin,Lysozyme, Bacteriocins. Packaging and modified atmosphere on the microbiology and shelf lifeof fishery products. Norms for using antimicrobial systems in food processing and preservation.Food Safety, Risk analysis. Potential health hazards and risks associated with fish products.Predictive modeling in quality and safety assurance of fishery products.	15

Text Book:

- Balachandran K.K., 2001. Post Harvest Technology of Fish and Fish Products, Daya Publishing House, New Delhi.
- Chincheste, C.O and Graham, H.D. Microbial safety of Fishery products,
- Frasier, W.C and Westhoff,D.C Food Microbiology ,
- Jay, J.M. Van Nostrand.D. Modern Food Microbiology
- Amerine,M.A, pangborm,R.M Principles of sensory evaluation of food

- Connell.J.J Control of fish Quality

Reference Books:

1. Belitz. H. D., and Grosch, W. 1999. Food Chemistry. 2nd Edition, Springer ,Verlag Berlin, Heidelbery, New York.
2. Fennema Owen, R (Ed.). 1996. Food Chemistry, 3rd Edition, Marcel Dekker, Inc. New York.
3. Garard, Ira D. 1976. Introductory Food Chemistry. The Avi Publishing Company INC. Westport, Connecticut.
4. Berg J M, Tymoczko JL &Stryer L. 2002. Biochemistry. WH Freeman.
5. Voet D, Voet JG & Pratt CW. 2006. Fundamentals of Biochemistry. John Wiley & Sons.

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Course Outcomes:

On completion of the course the learner will be able

CO 1: Understand the concept of food safety, types of hazards and their control measures .

CO 2: Identify and prevent potential sources of food contamination Comprehend the need of hygiene and sanitation for ensuring food safety.

CO 3: Students will be able to provide a theoretical explanation for observed extents and rates of reactions that are common to foods

CO 4: Students will be able to predict how changes in overall composition are likely to change the reactivity of individual food components.

CO 5: Knowledge of Food Safety Management tools.

Semester-V/ Core Course-VII	**Quality Control of fish and fishery products**	Course Code:-**ZVGS**
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create	
Course Objectives:	**The course aims** After reading this lesson, you should be able to ➢ To enable the knowledge can get students about the experiment , fresh fish quality, fish spoilage process. ➢ the microbiological quality methods in determination of spoilage. ➢ The course will provide cured fish quality crystal formation process and methodology.. ➢ This involves learning about sea food production methods HACCP in biological methods. ➢ Understand the meaning of Evaluates the Marine fish landings in India(QTY).	
UNIT	**CONTENT**	**NO OF HOURS**
Unit I	Fresh fish quality: Maintenance of quality-intrinsic quality- fish spoilage-sanitation-assessment of quality-HACCP in processing raw shrimp. Frozen fish quality: crystal	

	formation- freezing rate-deterioration-rancidity-processing specification and checking-inspection of raw material and product- recording, reporting and action	15
Unit II	Cured fish quality: schedule of quality control in the production of sun dried fish- salted fish-type of salt-quality of salt- schedule of quality control in the production of salted fishes- schedule of quality control in the production of hot smoked fish.	15
Unit III	Canned fish quality: schedule of quality control in the production of fishery products-defects and rejection of canned fish product-quality defect in canned fish products-cut out test for canned fishery products.	15
Unit IV	Microbiological quality: method for determination of the content of bacteria in fish- determination of spoilage.	15
Unit V	Sanitation: Hygenic practices- cleaning procedures- hygienic practices check list-phases of good cleaning procedures Hazard Analysis Critical Control Point (HACCP)-introduction- definition-hazard analysis of food-critical control point- rules in applying HACCP- reason for applying HACCP-Developing HACCP plan- Biological hazards-chemical hazards. **Hygenic practices:**	15

	Employee health-employee appearance-finger nailpolish- jewellery-smoking/spitting/gum or tobacco chewing-handwashing-head gear- Beared employee-outer garments- protective hand covering-toilet areas- personnel permitted in processing area- foot dips.	

Text Book:

- Bartlett C &Piramal G. 2000. World Class in India: A Case Book of Companies in Transformation. Penguin India.
- Quality control of fish and fishery products. 1999. CBT rajagopalan and P Velayutham. Fisheries college and research institute, TANVASU, Thoothukkudi.
- Krueger NF. 2002. Fisheries Economics – Critical Perspectives on Business Management. Taylor & Francis.
- Ojha SN &Slaim SS.2000. Entrepreneurship Development and Project Formulation. CIFE, Mumbai,.
- Brody J. Fishery By product Technology
- Chicheste C.O. and Graham H.D. Microbial Safety of fishery Products
- Amerien M.A. *et.al.* Principles of sensory evaluation of Food

Reference Books:

- Fish Preservation and Processing Technique. Author: UgochukwuNwaigwe, Department of Food science and Technology, Michael Okpara University of Agriculture, Umudike : https://www.researchgate.net/publication/316918904 (All content following this page was uploaded by UgochukwuNwaigwe on 14 May 2017.)
- Aitken, A., *et al.* Fish handling and processing.
- Balachandran, K. K. Post harvest technology of fish and fish products.

- Connell, J. J. Advances in fish sciences and technology.
- George, M. Hall. Fish processing technology.
- Gopakumar K. Text Book of Fish Processing Technology.

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- aquatic –animals-and-plants-d164824899.html

Course Outcomes:

On completion of the course the learner will be able

CO 1:Possess knowledge of the fish quality and intrinsic quality.

CO 2: Fish preservation methods.

CO 3: Modified Atmospheric packaging(MAP)

CO 4: Traditional method of fish preservation

CO 5: Methods of fish drying: Natural, Solar, Artificial, Mechanical dryer.

Preparation of extruded products using single screw and twin screw extruder.

Semester-VI/ Core Course-VIII	**Fisheries Administrations and Legislation**	Course Code:-**ZVGW**
Instruction Hours: 6	Credits: 6	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create	
Course Objectives:	**The course aims** After reading this lesson, you should be able to ➢ To study the research on this field is vital to tap the vast potential of the marine environment to improve human life in any way possible. ➢ .To gain knowledge of Fishery Science with regards to Population Dynamics. ➢ To consider the application of statistical tools to study fishery science. . ➢ To learn about definition and scope of public administration , principles of management of public enterprises. ➢ Understand the meaning of Evaluates the Marine fish landings in India(QTY).	
UNIT	**CONTENT**	**NO OF HOURS**
Unit I	Public administration: Principles of organization- Public sector enterprises- Current scenario- Public	

	sector enterprises- Forms of organization of enterprises- Importance of public sector enterprises- Producer companies & Trusts. Legal and organizational framework: Fisheries administration in India- Work allocation-Key State Government Organizations- Fisheries administration in Tamilnadu.	18
Unit II	Fisheries development over five year plans: Sectoral Growth- Marine fisheries: Contributions to state economy- Development of marine fisheries during Five Year Plans- Investment in fisheries sector- An analysis of growth in production and fishing capacity- The 2002 Tenth Five Year Plan and the 2004 India Marine Fishing Policy.	18
Unit III	General background on law: Introduction- M.C. Mehta v. Kamal Nath- 'Span Motel Case'- Legislations covering IPRs in India- Indian constitution. Marine fisheries legislations: The Indian Fisheries Act, No. 4 of 1897- The Maritime Zones of India (Regulation of fishing by foreign vessels) Rules, 1982.	18
Unit IV	Laws and policies related to the environment: The Environment Protection Act, 1986- The Water (Prevention and Control of Pollution) Act,1974- The Air (Prevention and Control of Pollution) act, 1981- National Environment Policy 2006- Protected area Management- Integrated coastal and ocean management (ICM)- Legislations Related to	18

	Protected Area Management- CITES- Biological Diversity Act 2002 (No. 18 of 2003).	
Unit V	Laws relating to fish products and fish marketing: Introduction- Some important acts regulating fish products- Trade and other matters- Consumer Protection and Regulations. International law of the sea: Introduction- Shared fish Stocks- Prohibition of Driftnet Fishing- Sustainable Fishing- European Union Fish Labeling Requirements- Shrimp-turtle case-WTO- Code of conduct for responsible fisheries- SEZ Law(s) and India's Coastal Areas.	18

Text Book:

1. Anon. 1998. Maritime Law of India in the International Context.Bhadarkar Publ.
2. Brahtz JFP. 1972. Coastal Zone Management. U.N. International Economicand Social Affairs, New York
3. Churchill RR & Lowe AV. 1988. Law of the Sea. Manchester University Press.
4. Henkin L, Pugh RC &Smit H. 1993. International Law: Cases and Materials. West Publ. Co.
5. Sinha RK. (Ed.). 1996. Marine Resources and Applicable Laws (World Environmental Series - 009). Commonwealth Publ.
6. Verghese CP. 1989. Fishing Regulation in India's Territorial Waters.World Fishing.
7. Cairns J Jr. 1994. Implementing Integrated Environmental Management. Virginia Tech. University.

eference Books:

- Fish Preservation and Processing Technique. Author: UgochukwuNwaigwe, Department of Food science and Technology, Michael Okpara University of Agriculture, Umudike : https://www.researchgate.net/publication/316918904 (All content following this page was uploaded by UgochukwuNwaigwe on 14 May 2017.)
- Aitken, A., *et al.* Fish handling and processing.
- Balachandran, K. K. Post harvest technology of fish and fish products.
- Connell, J. J. Advances in fish sciences and technology.
- George, M. Hall. Fish processing technology.
- Gopakumar K. Text Book of Fish Processing Technology.

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Course Outcomes:

On completion of the course the learner will be able

CO 1: After Successful completion of this course work students will able to Fisheries Administration's tasks have shifted from general authority in fisheries to technical support to decentralized institutions, but this is not generally reflected in the actual functioning of the administration.

CO 2: The fisheries administration and decentralized authorities suffer from financial constraints and a lackof specialized personnal at community level.

CO 3: Views of fisheries staff on fisheries management differ between the national and the local level.

CO 4: Continuous reorganization and decentralization processes have reduced transparency and complicated communnication line (both horizontal and vertical)

CO 5: A multitude of non fisheriesinstitutues increasingly have key roles to play in fisheries management fisheries legislation, with as one result that procedures are becoming long and complicated and the outcomes unsure.

ENTREPRENEURSHIP

Semester-IV/ Core Course-IV	**Packing and Labelling of Fish and Fishery Products**	Course Code:-**ZVGM**
Instruction Hours: 4	Credits: 4	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive Level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create
Course Objectives	**The course aims** ➢ Packaging may be defined as the means of ensuring the safe delivery of a product to the end consumer in sound condition at the minimum overall cost. ➢ Foodpackaging is an external means of preservation of food during storage transportationand distribution. ➢ They should facilitate storage, effective chilling, internal and long distance transport, easy determination of quantities and display in whole sale and retail markets. ➢ Packaging materials protect the product from contamination or loss. The printing on the exterior of the package helps to identify the brand and attract the buyer's attention. ➢ To familiarize with the Good Hygienic Practices, Fish Safety Management Systems and Fish Regulations.

UNIT	CONTENT	NO OF HOURS
Unit I	Food packaging, its purposes and procedures; technological aspects of packaging fisheryproducts; packing of fresh and frozen fish for consumers; packaging for transport, shipping and Institutional supplies; packaging standards for domestic AND International Trade.	15
Unit II	Packaging materials; basic films and laminates, their manufacture and identification; resistance of packaging materials; development of protective packaging for fishery products.	15
Unit III	Methods of testing for packaging materials for their physical properties; containers and theirtesting and evaluation; package designs; resistance of packages to hazards in handling; transport and storage.	15
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.	15
Unit V	Labelling and printing of packaging materials. Labeling requirements - national andinternational, legislation on labeling. Labeling for product traceability. Type of labeling fororganic foods, specific foods like organic foods, GM foods, irradiated foods, vegetarian and nonvegetarianfoods. Label design specification –size, colour.	15

Text Book:

- Balachandran K.K., 2001. Post Harvest Technology of Fish and Fish Products, Daya Publishing House, New Delhi.
- Desrosier N.W. and Treasler D.K Fundamentals of Food Freezing
- Govindan T.K. Fish Processing Technology
- Moorjani M.N. Fish Processing in India
- Brody J. Fishery Byproduct Technology
- Chicheste C.O. and Graham H.D. Microbial Safety of fishery Products
- Amerien M.A. *et.al.* Principles of sensory evaluation of Food

Reference Books:

- Bremmer, H.A. 2002. Safety and Quality Issues in Fish Processing .Woodhead Publ. Ltd., England, 507 pp.
- Curting, C.L. 1999. Processing and Preservation. Agro Botanical Publ., Bikaner, India, 372 pp.
- Gopakumar, K. 2002. Textbook of Fish Processing Technology. Indian Council of Agricultural Research, New Delhi, 491 pp.
- Hall, G.M.1992 Fish Processing Technology. Chapman & Hall India, Madras, India, 309 pp.
- ICAR 2006. Handbook of Fisheries and Aquaculture. Directorate of Information and Publication of Agriculture, ICAR, New Delhi, 755 pp.
- Long, A.C. 2008. Fish Processing Technology. Cybertech Publ., New Delhi, 312 pp. 8. Moorjani, M.N. 1984. Fish Processing in India. Publ. Infor. Div., ICAR, New Delhi, 82 pp.

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- aquatic –animals-and-plants-d164824899.html

Course Outcomes:

On completion of the course the learner will be able

CO 1: Identifies packing materials like Glass containers, Metal cans, Types of paper packages, Cellophane, LDPE, HDPE, Aluminium foil and Retort pouch

CO 2: Practises packing of Frozen Material like IQF products, Block frozen Products.

CO 3: Practises packing methods like, packing on stand pouch, packing in polythene covers.

CO 4: Categorises the packing of various value added fishery products and by products.

CO 5: Classifies the packaging of canned fish and fish pickle

Semester-V/ Core Course-V	**Entrepreneurship Development**	Course Code:-**ZVGO**
Instruction Hours: 3	Credits: 3	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create	
Course Objectives:	**The course aims** After reading this lesson, you should be able to ➢ Understand the meaning of entrepreneur and entrepreneurship. ➢ Explain the characteristics of entrepreneur and entrepreneurship. ➢ Discuss the different types of entrepreneurs. ➢ Highlight the entrepreneurial traits. ➢ Understand the meaning of Evaluates the Marine fish landings in India(QTY).	
UNIT	**CONTENT**	**NO OF HOURS**
Unit I	Entrepreneurial development: Environmental factors influencing entrepreneurship- Social Factors- Psychological environment- Governmental Influence- Factors Influencing entrepreneurship	12

Unit II	Entrepreneurship: Concept of Entrepreneur- characteristics, profile and importance of Entrepreneurship - Kinds of entrepreneurs- Role and Functions of an Entrepreneur- Qualities of a Successful Entrepreneur- Circumstances Favouring Entrepreneurship.	12
Unit III	Managing an enterprise – Motivation and entrepreneurship development: Motivation concepts - Categories of Motivation- Types of motivation- Motivation is important to an individual as.	12
Unit IV	Entrepreneurs Development Programmes (EDPs) and SWOT Analysis- Government Schemes and Incentives for Promotion of Entrepreneurship.	12
Unit V	Government policy on Small and Medium Enterprises- Export and Import policies of Fisheries Sector- Joint ventures, sub contracting, venture capital and public and private partnerships	12

Text Book:

- Bartlett C &Piramal G. 2000. World Class in India: A Case Book of Companies in Transformation. Penguin India.
- FICCI. 2000. A Pictorial History of Indian Business. Oxford University Press
- Krueger NF. 2002. Entrepreneurship – Critical Perspectives on Business Management. Taylor & Francis.
- Ojha SN &Slaim SS.2000. Entrepreneurship Development and Project Formulation. CIFE, Mumbai,.
- Brody J. Fishery Byproduct Technology

- Chicheste C.O. and Graham H.D. Microbial Safety of fishery Products
- Amerien M.A. *et.al.* Principles of sensory evaluation of Food

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- Fish Preservation and Processing Technique. Author: UgochukwuNwaigwe, Department of Food science and Technology, Michael Okpara University of Agriculture, Umudike : https://www.researchgate.net/publication/316918904 (All content following this page was uploaded by UgochukwuNwaigwe on 14 May 2017.)
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- Connell, J. J. Advances in fish sciences and technology.
- George, M. Hall. Fish processing technology.
- Gopakumar K. Text Book of Fish Processing Technology.
- Sen D. P. Advances in Fish Processing Technology.

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- aquatic –animals-and-plants-d164824899.html

Course Outcomes:

On completion of the course the learner will be able

CO 1: The amount of subsidies provided is much less with less than 8 per cent of the total value even though challenged internationally.

CO 2: The marine fisheries sector in India is subsistence fishing and much different from the factory / commercial fishing of developed countries.

CO 3: In addition the fuel subsidy provided contributes to less than 5 per cent of the total value of landings.

CO 4: But on the other side the welfare measures, saving cum relief, housing and other transfer payment adds to the subsidy component in the Indian context. Evaluates the Marine fish landings in India (Qty)

CO 5: Records in Value of marine landings at landing centre.Value of marine landings at retail level of the delivery system should be maintained.Total subsidy of Entrepreneurs.

SKILL DEVELOPMENT

Semester-V/ Core Course-VI	**Fisheries Economics**	Course Code:-**ZVGR**
Instruction Hours: 3	Credits: 3	Exam Hours: 3
Internal Marks -25	External Marks-75	Total Marks: 100

Cognitive level	K - 1 Acquire / Remember K - 2 Understand K - 3 Apply K - 4 Analyze K - 5 Evaluate K - 6 Create	
Course Objectives	**The course aims** After reading this lesson, you should be able to ➢ To understand the concept of safe food and types of hazards associated with food. ➢ To control the potential threats to Micro Economics . ➢ To familiarize with the Good Hygienic Practices, Food Safety Management Systems and Food Regulations. ➢ Highlight the General Agreement on Tariffs and Trade(GATT). ➢ Understand the meaning of Evaluates the Marine fish landings in India(QTY).	
UNIT	**CONTENT**	**NO OF HOURS**
Unit I	Introduction to economics- Micro economics- Demand, -Elasticity of demand –Supply & market Prices-law of diminishing marginal utility.	12

Unit II	Production- Production function- Costs & Returns of scale and Break-even analysis in fish production system.	12
Unit III	Profit maximization- Farm planning and budgeting- Preparation of Enterprise budget for Integrated fish farming. Macroeconomics: National Economy- Contribution of fisheries in GNP and employement- International trade and exchange.	12
Unit IV	Introduction to General Agreement on Tariffs and Trade (GATT) & World Trade Organization (WTO), WTO-Framework- Intellectual property rights (IPRs) and different forms- Agreement on Trade – Related Aspects of Intellectual Property Rights (TRIPS)- Biopiracy.	12
Unit V	Economic Growth Fisheries Trade and Environment- Patents in Indian Fisheries Sector- GMOs in fisheries- Concepts of externality and social cost.	12

Text Book:

- Bartlett C &Piramal G. 2000. World Class in India: A Case Book of Companies in Transformation. Penguin India.
- FICCI. 2000. A Pictorial History of Fisheries Economics. Oxford University Press
- Krueger NF. 2002. Fisheries Economics – Critical Perspectives on Business Management. Taylor & Francis.
- Ojha SN &Slaim SS.2000. Entrepreneurship Development and Project Formulation. CIFE, Mumbai,.
- Brody J. Fishery By product Technology
- Chicheste C.O. and Graham H.D. Microbial Safety of fishery Products
- Amerien M.A. *et.al.* Principles of sensory evaluation of Food

Reference Books:

- Fish Preservation and Processing Technique. Author: UgochukwuNwaigwe, Department of Food science and Technology, Michael Okpara University of Agriculture, Umudike : https://www.researchgate.net/publication/316918904 (All content following this page was uploaded by UgochukwuNwaigwe on 14 May 2017.)
- Aitken, A., *et al.* Fish handling and processing.
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- Connell, J. J. Advances in fish sciences and technology.
- George, M. Hall. Fish processing technology.
- Gopakumar K. Text Book of Fish Processing Technology.

e- Resources:

- https:/www.pdfdrive.com/handbook-of- Fisheries Economics -and-fisheries – volume-1-fish-biology-d183650412.html
- aquatic –animals-and-plants-d164824899.html

Course Outcomes:

On completion of the course the learner will be able

CO 1:To control the potential threats to Micro Economics .

CO 2: The marine fisheries sector in India is subsistence fishing and much different from the factory / commercial fishing of developed countries.

CO 3: In addition the fuel subsidy provided contributes to less than 5 per cent of the total value of landings.

CO 4:But on the other side the welfare measures, saving cum relief, housing and other transfer payment adds to the subsidy component in the Indian context. Evaluates the Marine fish landings in India (Qty)

CO 5: The delivery system should be able to accommodate the externality social cost.