Contents

PREFACE

The success of an organization, to a great extend, depends upon the quality of its management. Creating the best managers is the challenge of the present day, particularly in the light of the highly competitive global market. International business is an area that offers the world of growth for business organizations.

Thus, there is heavy demand for the skilled and highly efficient managerial personnel in the international business sector. It is in this background, a Masters' Degree Programme in International Business is proposed to be started in the College of Fisheries, Panangad. The college has all the supporting facilities and well qualified faculty members to offer the programme efficiently. Moreover, in the business centre of the state of Kerala, the college can also arrange campus recruitment for the students undergoing the MBA in International Business offered by the college.

The mission of the proposed MBA programme is to provide an applied business education and thereby imparting and improving the planning, decision making, analytical and managerial skills and knowledge of the students. On completion of the course, the graduates will be able to analyse the global business environment, laws, business ethics and values, strategic planning and decision making.

1. **Name of the Programme: M B A (International Business)**

2. **Objectives:** The basic objective of the programme is to provide sufficient number of competent young personnel with the necessary knowledge and skill to man the executive positions in organizations engaged in international business.

3. **Scope of the Programme:** The prime objective of the Master of Business Administration in International Business (MBA) programme is to prepare students to work in a management position in an ever changing international environment where advanced technology and multicultural situations occupy an increasingly important place in the daily lives of companies. This programme exposes the students to key issues in international business management, provides insight into relevant social, political, legal, and macroeconomic conditions affecting international business.

   The degree is suited to a wide range of interests but is particularly relevant to those who plan a career in organizations that conduct business beyond the boundaries of a country. For example, the MBA in International Business is relevant for those planning careers in multi- national companies, export oriented firms and public sector bodies involved in international business.

4. **Eligibility for Admission :** All professional graduates of State Agricultural Universities/Deemed Universities under the ICAR system with a minimum OGPA of 7.0/10.0 (6.5/10.0 for SC /ST Candidates).

   All graduates, including professional graduates from Indian/Foreign Universities recognized by AICTE/UGC with minimum 55% marks in traditional system (5% concession to SC /ST Candidates)

   Candidates awaiting their final results of the qualifying degree can also apply for the MBA course, but they should have secured their qualifying degree on or before the date prescribed for the GD and interview.

5. **Structure of the Course:** It is a two year programme under the credit and semester system. The total credit for the programme is 80. One practical credit is equivalent to 2 hours. Of the total, 70 credits will be for compulsory papers including project work and viva voce and 10 credit is for elective courses. Elective courses will be offered in the 3rd (7 credits) and 4th (3 credits) Semesters.

   In the second semester, students will be placed in selected organizations for a short period and based on their studies and observations, they have to prepare reports and also should present the same before the audience.

   In the Fourth semester, the students should prepare a detailed project report based on field studies and also should appear before the viva voce board. Besides, they should also present a seminar on a topic assigned.

6. **Assessment and Standards of Passing:** The evaluation of the students in a course shall be based on his/her performance in various examinations, term papers/assignments/ student seminars/ records/ case study and project reports. Assessment will be based on both internal and external evaluation.

7. **Attendance:** As per regulation

8. **Pedagogy** : The classroom teaching and learning will be supported by a range of capacity building programmes like ;

Role Play
Case Study Discussion
Management Cases
Assignments
Simulated Exercises
Group Discussions (GD)
Panel Discussion
Focused Group Discussions (FGD)
Rapid Rural Appraisal (RRA)
Participatory Rural Appraisal (PRA)

9. **Courses offered (Compulsory):**

Semester I.

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 511	Principles of Management	3+0
2	MIBC 512	Managerial Economics	3+1
3	MIBC 513	Accounting for Managers	3+1
4	MIBC 514	Marketing Management	3+0
5	MIBC 515	Quantitative Techniques for Managers	3+1
6	MIBC 516	Research Methodology	3+1
		Total	**18+4**

Semester II.

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 521	Financial Management	3+1
2	MIBC 522	International Marketing	3+0
3	MIBC 523	International Economics and Trade	3+1
4	MIBC 524	Organisational Behaviour	2+1
5	MIBC 525	Export Import Management and Documentation	3+0
6	MIBC 526	Business Ethics	2+0
7	MIBC 527	Summer Placement, Training and Report	0+2
		Total	**16+5**

Semester III

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 531	International Business Environment	3+0
2	MIBC 532	Foreign Exchange Management	3+0
3	MIBC 533	Logistics Management	3+0
4	MIBC 534	E -Commerce	3+0
5	MIBE	Elective Course	7
6	MIBE	Elective Course	
7.	MIBE	Elective Course	
		Total	**19**

Semester IV

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 541	Operations Research and Quality Control	2+1
2	MIBC 542	Student Seminar	0+0
3	MIBE	Elective Course	3
4	MIBC 543	Research Project/Dissertation	0+12
		Total	**18**

Elective Courses:

Sl.No.	Course No.	Name of the Course	Credit
1	MIBE 501	Indian and Global Global Fisheries Industry	2+0
2	MIBE 502	New Venture Management in Fisheries Business	2+1
3	MIBE 503	Fisheries Business Project Management	1+1
4	MIBE 504	Fisheries/Agriculture Pricing Policy and Price Behaviour	2+0
5	MIBE 505	Packing, handling, storage and transport of fish and fish products	2+0
6	MIBE 506	Quality Assurances, Management and Certification	2+1
7	MIBE 507	Supply Chain Management in Fisheries Business	3+0
8	MIBE 508	Entrepreneurship Development	3+1
9	MIBE 509	Human Resources Management	3+0
10	MIBE 510	International Project Management	2+1

Detailed Syllabus:

MIBC 511. Principles of Management (3+0)

UNIT I

The development of management thought – pre- scientific era, scientific management era, human relations era, social sciences era. Administration and management – meaning and definition – principles and process of management – management and society – social responsibility and ethics – functions of management. Planning – purpose, principles and steps in planning –components of planning – Decision making- MBO.

UNIT II

Organising – organization structure – departmentation – centralization, decentralization – delegation of authority – forms of organization – line, line of staff, functional and committee organizations – principles of organization-Staffing – components – steps in staffing – training – promotion.

UNIT III

Directing – motivating – theories of motivation – leadership – leadership theories, styles.

UNIT IV

Communication – process and forms of communication – communication barriers co-ordinating – controlling – control techniques.

Suggested Readings :

1. Koontz, Harold, Cyril O'Donnell and Heinz Weirich : Essentials of management, 1984. Tata Mc Graw Hill publishing Company, New Delhi.
2. Terry, George R and Franklin, Stephen G : Principles of Management, All India Traveller Book Seller, New Delhi 1988
3. Drucker, Peter F : The Practice of Management, Harper and Row, New York, 1984.
4. Fred Luthans : Organisational Behaviour, Mc Graw Hill International Edition.
5. Sherlekar, S.A & Sherlekar, V.S: Principles of business management, Himalaya Publishing House, Mumbai,2002.
6. Bhushan, Y.K: Fundamentals of Business Organisation and management, Sultan chand & Sons, New Delhi, 2006.

MIBC 512. Managerial Economics (3+1)

UNIT I

Managerial Economics - meaning, nature and scope - Managerial Economics and business decision making - Role of Managerial Economist – Fundamental concepts of Managerial Economics- Demand - meaning, determinants and types of demand - Elasticity of demand- Demand analysis and forecasting.

UNIT II

Theory of production - production function, Laws of production, Law of returns, Isoquants, expansion path - Cobb-Douglas function. Supply curve of Firm and Industry under perfect Competition, Role of Time Element in the Theory of Value.

UNIT III

Cost concepts - cost - output relationship- cost functions. Economies and diseconomies of scale.

UNIT IV

Market structure – Perfect and Imperfect competition, Monopoly, Monopolistic and Oligopoly - characteristics - Pricing and output decisions - methods of pricing - differential pricing - Government intervention and pricing.

UNIT V

Profit - Meaning and nature - Profit policies - Profit planning and forecasting - Cost volume profit analysis – Break Even Point. Capital Budgeting- Investment feasibility analysis.

UNIT VI

Economic forecasting for business-Input-output Analysis. Linear Programming

UNIT V

National Income - Business cycle - inflation and deflation - balance of payments- balance of trade- Monetary and Fiscal Policies. Economic Policy & Analysis - Objective, Social and Economic Justice Growth and equitable Distribution.

Practical:

Measurement of elasticity of demand, production trends, pricing of products, profit planning, BEP Analysis, Calculation of pay back period, NPV, ARR and IRR.

Suggested Readings :

1. Joel Dean: Managerial Economics, Prentice Hall/Pearson.
2. Rangarajan: Principles of Macro Economics, Tata McGraw Hill, New Delhi.
3. Athmanand.R: Managerial Economics, Excel, New Delhi, 2002.
4. Mehta, P.L: Managerial Economics, S.Chand and Sons Company Ltd., New Delhi. 2004.
5. Lewis, Peterson: Managerial Economics, Prentice Hall of India, New Delhi, 2002.
6. Thomas, C.R and Maurice, S.Charles: Managerial Economics , Tata McGraw Hill, New Delhi.
7. Dwivedi, D.N: Managerial Economics, Vikas Publishing House, New Delhi.
8. Dewett.K.K: Modern Economic Theory, S.Chand and Sons Company Ltd., New Delhi.
9. Mote, Paul, Gupta Managerial Economics - Tata McGraw Hill
10. Varshney.R.L. and Maheswary, K.L.: Managerial Economics, Sultan Chand & Sons, New Delhi.

MIBC 513 Accounting for Managers (3+1)

UNIT I

Accounting – Branches of accounting – Financial Accounting – Importance and Functions – Double Entry Book Keeping – Journal – Ledger – Cash Book – Bank Reconciliation Statement- Trial Balance- subsidiary books. Accounting concepts and conventions. Capital and Revenue – Depreciation – methods of charging depreciation – Final Accounts- Trading and Profit and Loss account- Balance sheet.

UNIT II
Analysis of Financial Statements – Accounting Ratios – Du pont analysis.
UNIT III
Funds Flow Analysis – Schedule of Changes in Working Capital – Funds Flow Statement-Cash Flow Analysis – Cash Flow Statement.
UNIT IV
Cost Accounting – Concepts – Cost Centre. Cost Unit – Cost Elements – Cost Sheet – Budgets – Budgetary Control – Marginal Costing – Break Even Analysis.
UNIT V
Responsibility Accounting – International Accounting Standards.

Practical:
Preparation of Journal – Ledger – Cash Book- Bank Reconciliation Statement – Trial Balance- Subsidiary Books. Methods of Charging Depreciation – Final Accounts- Trading and Profit and Loss Account- Balance Sheet.
Ratio Analysis, Funds Flow Analysis – Schedule of Changes in Working Capital – Funds Flow Statement ,Cash Flow Analysis – Cash Flow Statement, Cost Sheet, BEP, Cash Budget.

Suggested Readings :

1. Shukla, M.C. : Advanced Accountancy. S. Chand & Co., New Delhi, 1995
2. Jain, S.P. and Narang K.L. : Advanced Accountancy. Kalyani Publishers, Lacknow, 1998
3. Anthony, R.L. : Acounting Principles, Richard D. Irwin. Ine Home road. Illinois
4. Pandey I.M. : Financial Management, Vikas Publishing House, New Delhi
5. Maheswari, S.N. : Financial Management. Sultan Chand & Sons, New Delhi.
6. Gupta. R.L & Gupta, V.K: Principles and Practice of Accountancy, Sultan Chand & Sons. New Delhi, 2006.
7. Iyenkar, S.P: Cost accounting, Sultan Chand & Sons, New Delhi, 2007.

MIBC 514. Marketing Management (3+0)

UNIT I
Marketing Concepts and Tasks, Defining and delivering customer value and satisfaction - Value chain - Delivery network, Marketing environment, Adapting marketing to new liberalised economy - digitalisation, customisation, changing marketing practices, e-business - setting up websites: Marketing Information System, Strategic marketing planning and organization.
UNIT II
Buyer Behaviour. Market Segmentation and Targeting, Positioning and differentiation strategies. Product life cycle strategies, New product development, Product Mix and Product line decisions. Branding and Packaging, Price setting -objectives. factors and methods, Price adapting policies, Initiating and responding to price changes.
UNIT III
Marketing channel system - Functions and flows; Channel design, Channel management - Selection, Training, Motivation and evaluation of channel members; Channel dynamics - VMS, HMS, MMS: Market logistics decisions.

UNIT IV

Integrated marketing communication process and Mix; Advertising, Sales promotion and Public relation decisions. Direct marketing - Growth, Benefits and Channels; Telemarketing; Sales force objectives, structure, size and compensation.

UNIT V

Identifying and analysing competitors, Designing competitive strategies for leaders, challengers, followers and nichers : Customer Relationship marketing - Customer database, Data warehousing and mining. Attracting and retaining customers, Customerism in India. Controlling of marketing efforts.

Global Target market selection, standardization Vs adoptation, Product, Pricing, Distribution and Promotional Policy.

Suggested Readings :

1.Kotler, Philip: Marketing Management, Pearson Education/PHI, 2003.
2. Saxena, Rajan: Marketing Management, Tata McGraw Hill, 2002.
3. Ramasamy & Namakumari :Marketing Management, Macmilan India, 2002.
4. Ramphal and Gupta: Case and Simulations in Marketing - Golgatia, Delhi.
5. Jayachandran, S: Marketing Management , Mc Graw Hill, New Delhi, 2003.

MIBC 515 Quantitative Techniques for Managers (3+1)

UNIT I

Basic Statistical Concepts – Correlation and Regression - simple, partial and multiple-Spearman's rank correlation- Probability – definitions – addition and multiplication Rules-Bayes' theorem and its application, mathematical expectation.

UNIT II

Random variables and probability distributions – expected value - theoretical probability distributions – Binomial, Poisson and Normal Distributions

UNIT II

Concept of sampling distribution - Sampling distribution for mean and proportion, standard error, confidence interval - Test of hypothesis- Type I and Type II errors, level of significance, tests based on Z, t, Chi-square and F distributions

UNIT III

Basic concepts of sampling - simple random, stratified, systematic, cluster and two stage sampling and their applications in Business.

UNIT IV

Analysis of variance: one way and two way classification; Non-parametric tests, advantages and disadvantages over parametric tests; Run test and Sign test - Wilcoxon test, Mann-Whitney U-test, Kruskal Wallis test and Friedman's test

Practical:

Exercises on Measures of central tendency, measures of dispersion , Correlation and Regression, Probability and theoretical probability distributions. Tests of hypothesis based on Z, t, chi-square and F distributions .ANOVA – one-way and two-way classifications. Selection of samples using Random number table, estimation of mean and variance in simple

random sampling and stratified sampling. Non-parametric tests – sign test. Run test. Wilcoxon test, Mann-Whitney test, Krushkal Wallis test and Friedman's test.

Suggested Readings :

1. Keller G.: Applied Statistics with Microsoft Excel. Duxbury, 2001.
2. Kothari C.R: Research Methodology. 2nd Ed. Wishwa Prahashan. 1998.
3. Levin. R.L & Rubin D.S: Statistics for Management. Prentice-Hall of India, New Delhi, 1983.
4. Levin. Richard L & Rubin. Daid .S: Statistics for Management. Timothy C.Krehbiel and Mark L.Berenson Chains, 7th Edition. PHI, 2007.
5. Srivastava.U.K. Shenoy.G.V & Sharma. S.C: Quantitative Techniques for Managerial Decision. 2nd edn., Prentice Hall of India, New Delhi.
6. Siegel S & Castellan NJ. Jr. 1988. Non Parametric Statistical Methods. John Wiley & Sons,Inc.

MIBC 516 Research Methodology (3+1)

UNIT I

Research - meaning - scope and significance - types of research – research process - characteristics of good research - problems in research - identifying and defining research problem – formulation of research objectives - concepts, constructs and theoretical framework.

UNIT II

Hypothesis:- meaning - sources - types – development of hypothesis - formulation of research design - features of good design – nature and types of variables -measurement - types and levels of measurement - errors in measurement - tests of sound measurement - scaling techniques - types of scales - scale construction techniques.

UNIT III

Sampling design - meaning - concepts - steps in sampling - criteria for good sampling design - types of sampling designs - probability and non-probability sampling. Data collection:- types of data - sources of data - tools for data collection - methods of data collection - constructing questionnaire - pilot study – case study - Data processing:- coding , editing and tabulation of data – Data analysis.

UNIT IV

Interpretation - meaning and significance- techniques of interpretation - report writing- steps in report writing - layout of report – types of reports - precautions for writing report - summary and conclusion - norms for using tables, charts and diagrams - Appendix:- norms for using Index and Bibliography.

Practical:

Exercises on identification of a research problem and formulation of hypothesis, preparing a mock synopsis, sampling , questionnaire preparation, data collection, editing, coding, tabulation, analysis and report writing. Review and evaluation of research articles, writing thesis and research articles.

Suggested Readings :

1. Rao, K.V: Research methods for management and commerce - Sterling

2. Zikmund. William G: Business Research Methods
3. Kothari C.R: Research methodology, 2nd edn., Wishwa Prahashan, 1998.
4. Donald R.Cooper and Pamela S.Schindler: Business Research Methods - Tata McGraw Hill,NewYork.
5.Uma Sekaran: Research Methods for Business, Wiley Publications.

MIBC 521 Financial Management (3+1)

UNIT I
Financial Management – Meaning, Importance and Scope – Functions – Financial Forecasting – Risk and Return – Liquidity Vs Profitability.
UNIT II
Analysis and Interpretation of Financial Statements – Types of Financial Analysis – Accounting Ratios – Merits and Limitations – Funds Flow Analysis – Cash Flow Analysis – Capital Budgeting – Ranking Methods.
UNIT III
Financial Planning – Meaning, Scope and Importance – Fixed Capital – Working Capital – Capitalization –Over Capitalization and Under Capitalization- Capital Structure – Theories of Capital Structure – Optimum Capital Structure – Factors Determining Capital Structure.
Working Capital Management – Management of Cash – Management of Inventories – Management of Receivables – Management of Accounts Payable – Over Trading and Under Trading.
UNIT IV
Sources of Finance – Internal Financing – External Financing – Security Financing – Bridge Finance – Lease Financing.
UNIT V
Cost of Capital – Meaning and Importance – Theories of Cost of Capital – Dividend Policies.

Practical:
Problems on Ratio Analysis, Funds Flow Analysis, Cash Flow Analysis, Estimation of Working Capital, Cash Management, Inventory Management, Receivables Management, Capital Structure, Cost of Capital.

Suggested Readings :
1. Chandra, Prasanna: Financial Management – Theory and Practice, Tata McGraw Hill, New Delhi.1994.
2. Pandey, I.M : "Financial Management, Vikas Publishing, New Delhi.
3. Maheswari, S.N : Financial Management, Sultan Chand & Sons, New Delhi.
4. Van Horne, James C: Financial Management and Policy, Printice Hall, 2002.

MIBC 522 International Marketing (3+0)

UNIT- I
Introduction to International Marketing, Process of International Marketing – scope, concepts and drivers of internationalmarketing – Domestic marketing versus international marketing – International dimensions of marketing- Characteristics of MNC's - Benefit of International Marketing– International trade theories.

UNIT- II

International Marketing Environment- Dynamics of International marketing environment- International trade distortions and marketing Barriers – Political environment- Legal and Regulatory environment –Social and Cultural environment- economic environment.

UNIT- III

International Marketing strategy decisions. International marketing research : practices and Challenges – International market segmentation, targeting and positioning - International marketing plan and entry mode selection – international consumer buying behavior.

UNIT- IV

Developing global marketing strategies. International product and service strategies- Branding decisions for international marketing – Managing International Distributions and logistics - Global Advertising and promotion –Pricing for international markets – Personal selling and sales management.

UNIT- V

International marketing strategy implementation. Organizing and Controlling International Marketing operations. – Negotiating with international customers. partners and regulators. Conferences. Trade shares. using Internet as medium.

Suggested Readings :

1. Mitchell, Charls : International Business Culture, World trade Press, California, 2000.
2. Keegan, Warren, J: Global Marketing Management, Prentice Hall of India, New Delhi, 1995.
3. Terpstra, Vern and Sarathy, Ravi : International Marketing, The Dryden Press, Chicago, 1991.
4. P.K. Vasudeva: International Marketing,

MIBC 523 International Economics and Trade (3+1)

UNIT I

International trade : nature of international trade, difference between domestic and foreign trade ; Theories of international trade : absolute and comparative advantage, modern theories of international trade – Hecksher Ohlin theorem :

UNIT II

Concepts of terms of trade, free trade, protection, tariffs, quantitative restrictions and other non-tariff measures.

UNIT III

Exchange rate, devaluation and depreciation, balance of payments, international capital movements, state trading.

UNIT IV

International gold standard : International Monetary Fund and World Bank : Multi National Corporations and international trade : India's foreign trade and balance of payment. SWOT analysis of WTO: Case studies on disputes in TRIPS.

Practical:

Comparison of exchange rates, depreciation of money, balance of payment calculations, SWOT Analysis, Case studies on international Trade & balance of Payments.

Suggested Readings :

1. Dennis Appleyard: Trade Theory and Practice Irwin Publishers.
2. Mithani. J.P: International Economics Tata Mcgraw. Hill. New Delhi.
3. Cherunilam. Francis: Internatikonal Economics Tata Mcgraw. Hill. New Delhi.
4. Samuelson and Nordnaus: Economics. Tata Mcgraw Hill, New Delhi.
5. Indian Journal of Forein Trade.
6. Economic and Political Weekly

MIBC 524 Organisational Behaviour (2+1)

UNIT I

Organisational Behaviour : History - evolution. Challenges & opportunities. contributing disciplines. management functions and relevance to Organisational Behaviour. Organizational Behaviour responses to Global and Cultural diversity.

UNIT II

Personality - Determinents. structure. behaviour. assessment. psychoanalytical social learning. job-fit. theories of personality. Emotions and Emotional Intelligence as a managerial tool. Attitudes -relationship with behaviour. sources. types. consistancy. work attitudes. values- importance. sources. types. ethics and types of management ethics.

UNIT III

Perception - Process. Selection. Organisation Errors. Managerial implications of perception. Learning - classicial. operant and social cognitive approaches. Implications of learning on managerial performance. Motivation- theories of motivation.

UNIT IV

Stress - Nature. sources. Effects. influence of personality. managing stress- Conflict - Management. Levels. Sources. bases. conflict resolution strategies. negotiation. Foundations of group behaviour- team decision making . groups and group dynamics Issues in Managing teams.

UNIT V

Organisational change - Managing planned change. Resistance to change -Approaches to managing organisational change - Organisational Development - values - interventions. change management- Organisational culture - Dynamics. role and types of culture and corporate culture.

UNIT VI

Organizational Environment. Contingency Theory. Resource Dependence Theory and Transaction Cost Theory–Strategy. Functional Level Strategies. Business Level Strategies. Corporate Level Strategies–Technology, Technical Complexity. Routine Tasks and Complex Tasks. task Interdependence. Structure Choices–Bureaucracy. Autocracy. Functional Structure. Divisional Structure. Matrix Structure. Organizational Birth. Growth. Decline and Death. Organizational Conflict–Conflict Resolution Strategies. Organizational Power–Sources of Organizational Power. Organizational Policies.

Practical:

Management cases on group decisions making. employee attitudes. employee ethics. management of stress. group dynamics and employee motivation.

Suggested Readings :

1. Koontz & Weirich: Essentials of Management. Tata McGraw Hill Publishing Company. New Delhi.

2. Stoner, Freeman & Gilbert: Management. PHI, 6th Edition.
3. Robbins,S.P: Fundamentals of Management. Pearson, 2003.
4. Robbins.S: Organisational Behaviour, X edn., Prentice-Hall India, New Delhi.
5. Umasekaran: Organisational Behaviour.
6. Rao.VSP and Krishna. V. Hari , Management: Text and Cases. Excel Books. I[st] edn. 2004
7. Fred Lufthans: Organisational Behaviour. Mc Graw Hill International Edition.
8. Robbins. Stephen R : Organizational Behaviour, Prentice Hall of India, New Delhi. 1990.
9. Prasad. L.M. : Organisational Behaviour, Sultan Chand and Co , New Delhi, 2002.

MIBC 525 Export Import Management and Documentation (3+0)

UNIT - I

Introduction- Customs Act – other acts relating to export/import – Formalities for commencing – obtaining export/import licenses – processing of export order - customs formalities – Export documentation – role of ECGC in export promotion – terms of shipment – Export Promotion council, commodity boards – Role and functions of Export Promotion council, Commodity boards, Directorates of commercial intelligence and statistics, Indian trade promotion organization, IIFT.

UNIT - II

Export: Types of exporters-Registration of exporters. Major Export from India Licensing. Facilities available to EOUs, SEZs, and Status holders duty drawback procedures other incentives .

UNIT III

Import Procedure and measures – EPCG scheme – Duty Exemption/Remission scheme – central excise and sales tax exemption; OGL, negative list, canalization and counter trade. Present export/import policy.

UNIT- III

Documentation - Performa invoice, commercial invoice and its attestation, packing list. Inspection, certificate, certificate of origin, GSP certification, shipping bills, A.R, A.R(4) forms, Mate receipts, GR-Forms or SDF, Marine insurance policy, ECGC policy, bill of exchange, bank certificate for Export B/L, AWB, Special Consular Invoice- bill of entry and airway bill.

UNIT - IV

Preshipment inspection formalities – inspection agencies- compulsory inspection control Act 1963 – customs clearance of export cargo – post shipment formalities and procedures excise duty and customs clearance.

UNIT - V

Foreign trade policies-EXIM Policy-Foreign trade policy 2004-09-provisions- Negative list-Restricted list. Shipment of Export cargo: By sea, air, ICD, courier, land customs station and by Post - Procedure and Documents required for shipment of cargo - Multimodal transport - Procedure and documentation - Central Excise and Customs clearance of export cargo - Procedure and documents.

Suggested Readings :

1. Jain. R.K: Export and import Policy and hand Book of Procedures..CENTAX Pvt. Ltd., New Delhi, 2007.

2. Nabhi: New Export Import Policy and Handbook of Procedures - Nabhi's publications, New Delhi.
3. Cherunilam, Francis: International Trade and Export Management, Himalaya publishing House, Mumbai
4. Balagopal, T.A.S : Export Management, Himalaya publishing House, Mumbai.
5. Ramagopal, C: Export Import Procedure - Documentation and Logistics, New Age International.
6. Khushpat S, Jain: S: Export Import Procedures and Documentation, Himalaya Publishing House, Mumbai.

MIBC 526 Business Ethics (2+0)

UNIT I

Introduction- Ethics and Organisations- Employee Duties and Rights- Discriminatory and Prejudicial Employee Practices- Downsizing the Workforce.Handling Ethical Dilemmas at Work.

UNIT II

Ethics in Marketing - Ethical Practices in Market Place- Ethics and Finance- Business and the Environment. Corporate Social Responsibility, Social Audit and Ethical Investing.

UNIT III

Ethics in Management- Management By Values – Science and Technology versus Ethics and Morals. Ethics and Morals: Intellect or Emotions.

UNIT IV

The tryst with self for team work – work ethic versus Ethics –in- work work commitment - self actualization. The sacro-secular Role Model: Archetypal leaders. Management of will. The Law of Service and Sacrifice.

Suggested Readings :

1. Sekhar, R.C: Ethical Choices in Business, Response Books, New Delhi. 1997.
2. Shaw, William , Business Ethics, Wordsworth Publishing Company , 1999.
3. Valasquez, Manuel G: Business Ethics – Concepts and Caes, Pearson Education. 2002.
4. Donaldson, Thomas: Ethics of International Business, Oxford University Press. 1989.
5. De George, Richard T: Business Ethics, MacMillan Publishing Corporation. 1990.
6. Richardson, John E : Business Ethics, Annual Edition – 1999 / 2000.
7. Suoeyenlas, Milton, Almeder, Robert & Humber, James :Business Ethics, Promethens Books 1992.
8. Harman, Laura P, Perspectives on Business Ethics, Tata McGraw Hill. 2004.
9. Shaw William H, Business Ethics, Thomson Asia, 2002.

MIBC 527 Summer Placement, Training and Report (0+2)

MIBC 531 International Business Environment (3+0)

UNIT-I

International Business - Meaning – Definition - Difference between domestic and

international business - Concepts of environmental analysis – Importance – Techniques – Process - Limitation.

UNIT II

Demographic and Geographic environment – Population growth – causes and consequences – urbanization – impact on business – Geographic factors – topography – climate – Role of infrastructure on international business – Transportation – Energy – Communication - Need for proficiency in foreign language.

UNIT III

Cultural Environment – Elements – religion and religious groups – language and linguistic groups – Types of social organization (social structure) - Impact of foreign culture on business.

UNIT IV

Political and Legal environment – Functions - Economic roles of government – Need for government intervention in business – Legal systems – Bases – Dispute settlement – Jurisdiction and forms of settlement. Government and regulatory environment – Environmental Pollution – Causes and consequences and legislative measures.

UNIT V

Technological and Financial Environment- Meaning of technological environment – governing factors – Importance – Indicators of technological progress – Financial environment – Role of financial institution – International financial institutions – World Bank – IMF – Structure and Functions.

Suggested Readings :

1. Cateora, Philip R: International Marketing .
2. Gupta. C.B: Business Environment.
3. Cherunillam. Francis: Global Business Environment.
4. Kenichi Ohmae: The borderless world. Fontana. London. 1991.
5. World Bank: Global: Economic Prospects and Developing Countries. World Bank. Washington DC. 1995.
6. Kenichi Ohmae: End of the Nations state: the Rise of Regional Economies. harper Collins publications. London. 1995.

MIBC 532 Foreign Exchange Management (3+0)

Unit I

Nature significance & scope of forex management- foreign exchange rate-foreign exchange market-types of foreign exchange –determinants of foreign exchange-exchange rate quotations-BOT-BOP-Funding of vostra account-multinational banking.

Unit II

Foreign exchange market-Spot and forward transactions –TT selling and buying rate-Forward exchange contract-features of forward exchange contract- foreign exchange control.

Unit III

Risk management- Basis of risk management-concepts and objectives-Risks in foreign exchange-Spot and forward-Basic issues in interest rate risks-risk management process-techniques-measurement-monitoring exchange control.

Unit IV

Inter bank deals-cover deals trading-swap deals-arbitrage operations-managing foreign exchange reserves-devaluation-pros and cons

Unit-V

Sources of forex funds –Export finance and credit in India- debt short term, supplier's credit, buyers credit, medium and long term, ECB; s-Present status of foreign exchange markets in India.

Suggested Readings :

1. Maurice.D.levi : International Financial Management.
2. Apte. P.G: International financial management.
3. Jeevanantham, Dr:Foreign exchange and Risk Management,–

MIBC 533 Logistics Management (3+0)

Unit I:

Introduction to logistics management- Definition, scope, functions, objectives - Integrated logistics management, role of logistics in the Supply chain - Logistics & customer service. Role of logistics in competitive strategy. Logistics organization & performance measurement. ERP – SAP - ORACLE

Unit II:

Inventory planning, inventory costs, classifying inventory, Nature & importance of warehousing, types of warehouses, warehousing functions, warehouse layout & design. Material handling- objectives, guidelines & principles, selection of material handling equipments. Packaging-role of packaging, packaging materials, consumer & industrial packaging, material handling efficiency

Unit III:

Transportation- role of transportation in logistics, transportation selection decision, basic modes of transportation- Rail, Road, Water, Air, Pipeline- characteristics of different modes-transport economics - Inter modal operations

Unit IV:

Containerization-concept, types, benefits. Types of carriers- indirect & special carriers. Role of intermediaries- shipping agents, brokers- freight management- route planning. Role of ports, ICDs, CONCOR - Global shipping options

Unit V:

Reverse logistics- scope, design, e-logistics- logistics information system-application of IT in logistics- automatic identification technologies- bar coding, RFID, Logistics outsourcing-3PL & 4PL. Global logistics- operational & strategic issues.

Suggested Readings :

1. Ailawadi C Sathish & Rakesh Singh: Logistics Management, Prentice Hall India, 2005.
2. Agrawal D K: Textbook of Logistics & Supply Chain Management, Macmillan India Limited, 2003.
3. Coyle et al.:The Management of Business Logistics, Thomson Learning, (7th edn), 2004.
4. Bowersox Donald J: Logistical Management- The Integrated Supply Chain Process, Tata McGraw Hill, 2000.

MIBC 536 E-Commerce (3+0)

UNIT I

Introduction to E-Commerce. Benefits, Impact of E-Commerce.Classification of E-Commerce. Application of E-Commerce Technology, Business Models, Framework of E-Commerce.. Business to Business.Business to Customer. Customer to Customer.

UNIT II

Network Infrastructure – LAN, Ethernet (IEEE 802.3), WAN, Internet, TCP/IP reference model, Domain names, Internet Industry Structure, FTP applications, Electronic Mail, WWW.

UNIT III

HTTP, Web Browsers, HTML, Simple exercises in HTML, Common Gateway Interface, Multimedia objects.

UNIT IV

Securing Business on Network: Security Policy, Procedures and Practices,Site Security, Firewalls, Securing Web Service, Transaction Security, Cryptology, Cryptological Algorithms, Public Key algorithms,Authentication Protocols, Digital Signatures, Security protocols for Web Commerce.

UNIT V

Electronic Payment Systems: Online Electronic Payment Systems, Prepaid and Post Paid Electronic Payment Systems Information Directories and Search Engines.

UNIT VI

Internet Advertising, Models of Internet advertising, Sponsoring Content, Corporate Website, Weaknesses in Internet advertising, Web Auctions.

UNIT VII

Launching Your E business- Marketing an E-Business, Search Engines and Directories, Public Relations, Consumer Communication, News Groups & Forums, Exchanging Links, Web Rings, E-Business Back end systems, Business Record Maintenance, Back up procedures and disaster Recovery plans.

UNIT VIII

Building a Corporate Website: Practical issues on servers and Application Software, Management issues related to Web Server Setup. Case Study discussion on a Corporate Web Site. E-Commerce legal issues and Cyber laws.

Suggested Readings :

1. C Xavier: World Wide Web Design with HTML

2. Napier, Judd, Rivers, Wagner:Creating a winning E-Business: Course Technology-Thomson Learning, 2001.

3. Bhasker, Bharat: Electronic Commerce -Framework, technologies and Applications, Tata McGraw Hill Publications, New Delhi.

4.Bajaj, Kamlesh K: E-Commerce – Cutting Edge of Business, Tata McGraw Hill, New Delhi.

5. Westland, J Christopher & Clark, Theodre ,H K: Global Electronic Commerce - Theory and Case Studies, University Press

6. Joseph, P.T: E-Commerce – an Indian perspective,Prentice Hall, New Delhi, 2005.

7. Moorthy, C S V: E-Commerce concepts, Models, Strategies,Himalaya Publications, Mumbai.

MIBC 541 Operations Research and Quality Control (2+1)

Unit I
Historical development of operations Research – optimization – inequality constraints – formulation of Linear programming – General statement of linear programming- Assumptions underlying linear programming solution to LP problems using Graphic method – Simplex Method – Conditions for application of Simplex Method.
Unit II
Transportation and Assignment problem – Sequencing and Inventory Management – Applications in Business Management.
Unit III
Basic concepts of SQC – process control – control charts – variable and attribute control charts.
Unit IV
Acceptance sampling – Single, Double, multiple and sequential sampling plans – Producer's Risk and Consumer's Risk – OC curve.
Unit V
Total quality Management – Quality circles – International standards organization- ISO certification – Bureau of Indian Standards – Good Manufacturing practices.

Practical :
Exercises on optimization – formulation of Linear programming problem – solution to LP problem using Graphical and simplex methods - Transportation and Assignment problem. Control charts for variables – mean,range and standard deviation charts – control charts for attributes – P,nP and c charts – plotting control charts using SPSS.

Suggested Readings :
1. Agarwal B.L: Programmed statistics, New Age International Publishers, 2007.
2. Brinston. R. and Naadimuthu. G: Schaum's Outline of Operational Research. McGraw Hill. 1997.
3. Grant E.L: Statistical Quality Control. International Student Edition. McGraw Hill. 1975
4. Gupta. S.C. and Kapoor. V.K.. Fundamentals of Applied Statistics. Sultan Chand & Sons. 1978.
5. Haley. K.B: Operational Research. Elsevier. 1978.
6. Liberman. H: Introduction to operational Research. Tata McGraw Hill. 2001.
7. Nigel. S.. Stuart. C. & Rober. J: Operators Management. 4th Ed. Prentice Hall. 2007.
8. Taha. H.A: Operational Research- An Introduction. Prentice Hall. 2003.

MIBC 542 Student Seminar (0+0)

MIBC 543 Research Project/Dissertation
Elective Courses:

MIBE 501 Indian and Global Global Fisheries Industry (2+0)

Unit I

Growth and Evolution of Indian Fisheries Industry; size, organisation, structure and ownership in fishing, hatchery, feed, health management, cold storage, processing and allied sectors.

Manufacturers and merchant traders- wholesale and retail sectors. Investments, innovations, production and productivity in Indian fisheries industry.

Unit II

Introduction to International Marketing-Scope and Size of International Markets-Conceptual Framework-Institutional Framework. Environment of International Fisheries Business-Cultural and Social Environment-Legal and Political Environment-Trade, Monetary and Financial Environment. Policy Framework and Procedure Aspects-Import and Export Policy of India-Import Export Documentation.

Unit III

Global Fisheries industry- Evolution and growth ; major features- size , organisation structure and ownership in global fisheries industry. World fishing industry; fresh, frozen, processed meat and other products. Fisheries industry of major fishing nations.

Unit IV

Regulation of Fishing Industry in major fishing nations. Support measures- subsidies and protectionism in global fisheries industry. Globalisation and changing facets of global and India fisheries industry. Emerging sectors- coastal Zone management, eco tourism and aquatourism.

Unit IV

International Trade Agreements-Bilateral Agreements- GATT, WTO, TRIPS. European Economic Union , and European Free Trade Association- Other Agreements. International Marketing Institutions-Zonal Import Export Advisory Committee-Commodity Boards-export Promotion Council-Service Institutions.

Practical:

Case studies on world fish production – major species- trend analysis of fisheries production and productivity of major producers. SWOT Analysis of fisheries industry of major producers.

Suggested Readings:

1. FAO: Fisheries Statistics, FAO, Rome.
2. Government of India: Handbook of Fisheries Statistics, Ministry of Agriculture, New Delhi.
3. FAO: Globe fish Commodity updates, Rome.
4. Gareth Porter: Fisheries Subsidies- Overfishing and Trade, Geneva, 1998.
5. Oscar J Barros: Export Competitiveness in South East Asia- Policy initiatives and Corporate actions in marine products industry, Wheeler publishing, New Delhi.

Journals:

Aquaculture International

Journal if Seafood Export Association.

Journal of Fisheries Technology.

Fishing Chimes.

FAO publications.

MIBE 502 New Venture Management in Fisheries Business (2+1)

Unit I

The Concept of New Venture, Characteristics of small and Medium Enterprises (SME), Role of SME in India. Entrepreneurship and Intrapreneurship, Developing enterprise. Start-up Strategies: New Venture Management- Managing Issues on Different Fronts Simultaneously, Strategic and Operational Implications.

Unit II

Project Reassessment on Implementation-Project Management – Key Issues- Problems in Implementation-Cost and Time Overruns Recasting Assumptions-New Environmental Framework – Strategic and Operational implications- project viability.

Unit III

Raising of Working Capital- Sources of Funds and Mobilization of Funds, Management of Working Capital, Implication for Policy Changes. Technology Absorption- Product and Process Technologies, Indigenous vs Foreign Technology, Technology Collaboration.

Unit IV

Marketing by New Venture –Marketing Problems of New Venture and Services, New Products and Existing Products- Constrains-Successful Strategies Practiced.

Unit V

Recruitment and Retention of Human Resources- Recruitment, Selection, Placement and Training, Compensation Planning, Terms of Employment, Retention of Personnel Unit VI

Networking in New Ventures- Net-working with Industries, Input Sources and Markets, Networking with Institutions, Survival and Growth Networking, Operational and Strategic Networking. Managing the Environment-Complying with Formalities and Procedures, Liasoning with Regulatory Bodies. Developing Appropriate Structures and Systems, Survival Strategies. Turn-around Strategies-Sickness. Alternative Strategies for Survival. Managing Family Business and partners, Inter-personal Dynamics. Strategic Planning in New Ventures-Concepts of Strategic Planning.

MIBE 503 Fisheries Business Project Management (1+1)

UNIT I

Need, Definition and Characteristics of Projects, Peculiarities of Fisheries and Fisheries Business Projects, Advantages and limitations of Project Format. Fisheries Planning and Fisheries Projects. System Approach to Fishery-industrial Projects-Production Chain Linkages. Procurement and Processing Factors

UNITII

Project Cycle- Concept and Components. Project Identification- Factors Influencing selection of Fisheries Business Projects, Sources of Information. Pre-feasibility Studies-Opportunity Studies and Functional Studies. Feasibility Study-Components.

UNIT III

Demand Forecasts, Input Survey, Location, Financing, Technical Parameters, Identification of Costs and Benefits, Cash flow Analysis –Principles and Components. Technical, Institutional, Financial and Economic Appraisal of Projects: Techniques of Financial Appraisal – Non-discounting and Discounting Techniques–Payback Period, Return On Investment, Discounted Cash Flow Analysis – NPV, BCR and IRR.

UNIT III

Project Implementation- Functions of Project Manager, Constraints in Project Implementation, Project Execution Plan –Work-breakdown Project Scheduling, Project Procedure Manual.

UNIT IV

Project Control System, Scheduling and Monitoring, Advantages of Scheduling and Monitoring, Monitoring Techniques-Gantt chart, Activity Bar Chart– Activity Slack Bar Chart, Resource Histogram and Resource Smoothing Techniques, Network Techniques-Rules for Network Formation; PERT and CPM. Derivation of Critical Path Crashing and Time-cost Trade Off. Comparison between PERT and CPM.

UNIT V

Economic Analysis of Fisheries Projects- Distinction between Financial and Economic Analysis. Need for Economic Analysis. Determination of Economic Values. Identification. Quantification and Valuation of Cost and Benefits. Externalities and Spillovers. principles of Accounting Prices for Tradable and Non-tradable Goods- UNIDO and Little Mirlees Approach and SCB Analysis in India.

Practical:

Model pre- feasibility studies, problems on demand forecasting, cost banefit analysis, Investment evaluation methods, PERT CPM.

Suggested Readings:

1. Prassana Chandra :Project Appraisal and Management –Tata McGraw Hill, New Delhi.
2. Gopalakrishnan & Rama Moorthy :Text book of Project Management, Macmillan
3. David I.Cleland : Project Management: Strategic Design & Implementation, McGraw Hill International Edition.
4. Owen J. Murphy: International Project Management, South Western Educational Publication.
5. Bennet P. Lientz & Kathyrn P.Rea International Project Management, Academic Press.

MIBE 504 Fisheries/Agriculture Pricing Policy and Price Behaviour (2+0)

Unit I

Fisheries/Agricultural Prices-Terms and Concepts-Scope of Price Analysis-Characteristics of Agricultural/Fish Product Prices –Price Statistics in India-Fish/Agricultural Price Indices.

Unit II

Inter-temporal Behavior of important Price-Input Prices and output Prices –Causes, Nature, Instability, Price Efficiency-DD&SS Price Analysis.

Unit III

Terms of Trade.-Price Competitiveness of Indian Fisheries Products. Trends in Fish Prices-Food Policy.

Unit IV

Food Problem- Causes. Food Security Under Post-liberalization Regime. Government Strategies- Minimum support prices-Subsidy-Commission for Fisheries Cause and Prices-Liberalization-Policy Changes – Fish Price Movement.

MIBE 505 Handling, Storage And Transport Of Fish And Fish Products (2+0)

Theory:

Unit I
Structure of fish myosystems, Postmortem changes - Structural and chemical.
Unit II
Fish as raw material for processing: Body structure, physical properties, shape, specific eight, bulk weight, angle of slip, weight composition.
Unit III
Factors affecting quality of fresh fish: intrinsic and extrinsic factors.
Unit IV
Handling of fish onboard fishing vessels, Unit operations.

Unit V
Unloading fish, Fish pumps.
Unit VI
Post-harvest Fishery losses, Methods to reduce losses.
Unit VII
Handling of fish in landing centres, defects and modifications needed.
Unit VIII
Chill storage of fish: Heat load calculation, storage methods, insulated boxes and insulation thickness, different types of ice, physical, chemical, microbiological and sensory changes during chill storage, iced storage shelf life, cold shock, physical, chemical and sensory methods of analysis.
Unit IX
Different types of ice and their advantages.
Unit X
Sous-vide technology,
Unit XI
Melanosis and its prevention, discolouration in aquatic products, non-enzymatic browning.
Unit XII
Depuration of bivalves
Unit XIII
Transportation: Live fish/shell fish, Transportation of raw fish to local markets and processing centres, Improvements needed in transportation, Refrigerated transport systems, Classification of transport vehicles, Cold chain.

Practical:
Chill storage studies: Chemical, physical and sensory analysis, determination of shelf life. Handling of fish, bivalves, prawns, mollusks, Depuration, treatment with chemicals, evaluation of freshness of fish.

Suggested Readings:
1. Aitken, A., Mackie, M., Merritt S. H. and Windsor, M. L. 1982. Fish handling and processing, Ministry of Agriculture, Fisheries and Food, Torry Research Station, Edinburgh.
2. Anon., 1965. Fish Handling & Preservation, Proceedings at meeting on fish technology, Scheveningen, Organisation for Economic co-operation & Development, Paris.

3. Balachandran, K. K., 2001. Post harvest technology of fish and fish products. Daya Publishing,New Delhi.
4. Connell, J. J., 1980. Advances in fish sciences and technology. Farnhan Survey England.
5. George, M. Hall, 1992. Fish processing technology, VCH Publications, Inc., New York.
6. Gopakumar K. (editor), 2002. Text Book of Fish Processing Technology. ICAR, New Delhi.
7. Sen D. P., 2005. Advances in Fish Processing Technology. Allied Publishers Pvt. Ltd. New Delhi.
Journals:
International Journal of Food Science and Technology
Journal of Food Science and Technology
Fishery Technology
Journal of Food Processing and Preservation

MIBE 506 QUALITY ASSURANCES, MANAGEMENT AND CERTIFICATION (2+1)

Unit I Quality management, total quality concept and application in fish trade. Quality assessment of fish and fishery products - physical, chemical, organoleptic and microbiological quality standards.
Unit II
Inspection and quality assurance: Fish inspection in India, process water quality in fishery industry, product quality. Water quality and standards.
Unit III
Sensory evaluation of fish and fish products, basic aspects, different methods of evaluation, taste panel selection and constitution, statistical analysis.
Unit IV
HACCP and Good manufacturing practices. HACCP principles, practical aspects of planning and implementation, verification, validation and audit. National and International standards: ISO 9000: 2000 series of quality assurance system, Codex alimentarius, USFDA and EU regulations for fish export trade, IDP and SAT formations in certification of export worthiness of fish processing units, regulations for fishing vessels, pre-processing and processing plants, EU regulations. ISO
22000:2006.
Unit VI
Factory sanitation and hygiene: National and international requirements, SSOP, Sanitary and Phytosanitary measures.
Unit VII
Food laws in India, integrated food law.

Practical:
Evaluation of fish / fishery products for organoleptic, chemical and microbial quality. Methods for analysis for bacterial quality parameters, chemical parameters and filth. Evaluation of sanitary conditions in fish processing units. Analysis of typical hazards. Study of correction and corrective action. SQC: Introduction, statistical principles involved, process control, control charts, variable and attribute control charts, Acceptance sampling, basic ideas, sampling by attributes single and double sampling plants, Basic concepts of decision making. Familiarization with water quality analysis.
MFSc & PhD Syllabus : Fish Processing Technology.

Suggested Readings:

1. Anthony T. Tu., 1988 .Handbook of Natural toxins. Marine Toxins and Venom. Vol.3. Marcel Dekker Inc. New York
2. Balachandran. K.K.. 2001. Post Harvest Technology of fish and fish products. Daya Publishing House. Delhi.
3. Connell. J. J., 1995. Control of fish quality. Fishing news books.
4. Fennema,K., Powrie. W.D and Marth, E.H. 1973. Low Temperature Preservation of Foods and Living Matter." Marcel Dekker , New York .
5. Gopakumar K. (editor). 2002. Text Book of Fish Processing Technology. ICAR. New Delhi .
6. Hall. G.M., 1992. Fish Processing Technology (Ed), Blackie Academic and Professional. London.
7. Hui,Y.H., Merle D. Pierson, J Richard Gorham. (eds).2001. Food borne Disease Handbook. Seafood and Environmental Toxins, Vol.4, Marcel Dekker Inc New York
8. Huss. H. H., Jakobsen, M. and Liston, J., 1991. Quality assurance in the fish industry.Elsevier Publishing, London, New York.
9. John. D. E. V., 1985. Food safety and toxicity - CRC Press. New York. London. Tokyo. Seafood science and technology - BLISH.
10. Krenzer. R., 1971. Fish inspection and quality control. Fishing News Ltd., London.
11. Sen D. P., 2005. Advances in Fish Processing Technology. Allied Publishers Pvt. Ltd. New Delhi.
12. Vincent K. Omachonu. Joel E. Ross. 2004.Principles of Total Quality. CRC Press. Baca Raton. USA.

Journals
1. Journal of Food Science and Technology
2. Fishery Technology

MIBE 507 Supply Chain Management in Fisheries Business (3+0)

UNIT I

Supply Chain. Supply Chain Orientation. Supply Chain Management-Definition and Scope. SCM - a Management Philosophy, a Set of Management Process. Consequences of SEM-Customer. Customer Satisfaction and Differential Advantage.

UNIT II

Role of Marketing in SCM –Influence of Market Concept. Market Orientation and Relationship Marketing on SCM. Sales Force Activities and Behaviors in SCM –Co operative Behaviors. Information Sharing. Nurturing Supply Chain Relationship –Sales Person Logistics Expertise.

UNIT III

R&D in SCM. intra-firm R&D. Inter-firm R&D. Supply Chain R&D. Supply Chain Sales Forecasting. Role of Production in SCM-Intra-firm Production. Inter-firm Production. Supply Chain Production. Role of Purchasing in SCM-Changing Role of Purchasing. Organization. Communication and IT.

UNIT IV

Role of Logistics in SCM-Order Processing. Inventory. Transportation. Warehousing and Networks Logistic Strategy-Capabilities and Advantages. IT&SCM-Fisheries Business

Environment. Intra-firm IT. Inter-firm IT. supply Chain IT. Financial Issues in SCM-Trends in Logistic Cost Dupont Model.

UNIT V

Supply Chain Costing. Customer Service in SCM- Definitions of Customer Services. Customer Service as a Performance Outcome. Customer Responses. Inter-functional co-ordination in SCM. concurrent management. nature of inter-functional Co-ordination. Inter-corporate Co-operation in SCM-Changing Markets and SCM. Nature of Co-operation. Outcome of Co-operation. Measuring Performance in SCM-Conceptual Model of Measurement. Problems with Measures.

MIBE 508 Entrepreneurship Development (3+1)

UNIT I

Concepts of- Entrepreneurship Development- Evolution of the concept of Entrepreneur Entrepreneur Vs. Intrapreneur, Entrepreneur Vs. Entrepreneurship. Entrepreneur Vs. Manager.

UNIT II

Attributes and Characteristics of a successful Entrepreneur- Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development-Entrepreneurial Culture.

UNIT III

Entrepreneurship Development: 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 IV

Globalization and the emerging business/ entrepreneurial environment. Managing an enterprise: motivation and entrepreneurship development:. importance of planning. Monitoring. evaluation and follow up; managing competition; entrepreneurship development programs; SWOT analysis. Generation, incubation and commercialization of ideas and innovations.

UNIT V

Government schemes and incentives for promotion of entrepreneurship. Government policy on Small. Medium and Large Enterprises.

Practical:

SWOT Analysis of enterprises. Case studies on successful enterprises. preparation of projects for new ventures- small and medium.

Suggested Readings :

1. Campleman. G: Manual on the Identification and Preparation of Fishery Investment Projects. Fisheries Technical paper . 149. FAO. Rome. 1976.
2. Maheswari. S.N: Financial Management – Sultan Chand & Sons. New Delhi. 2005.
3. Pandy. I.M: Financial Management. Vikas Publishing Home Pvt. Ltd. 1997.
4. Cherunilam. Francis: International Business. Prentice Hallof India.
5. David H. Holt:Entrepreneurship: New Venture Creation.
6. Vasant Desai: Dynamics of Entrepreneurship Development.
7. Dr. P.C.Shejwalkar; Entrepreneurship Development.
8. Steven Brandt: Entrepreneurship. 3rd Ed.
9. S.N.Chary: Business Gurus Speak.

MIBE 509 Human Resource Management (3+0)

UNIT-I

Introduction to Human Resource Management: Context and Concept of People Management in a Systems Perspective - Organisation and Functions of the HR and Personnel Department - HR Structure and Strategy- Role of Government and Personnel Environment – HR structure and strategies of MNCs.

UNIT-II

HR Planning and Selection: Human Resource Information System [HRIS], Manpower Planning - Selection System including Induction - Performance and Potential Appraisal: Coaching and Mentoring: HRM issues and practices in the context of Outsourcing as a strategy and MNCs.

UNIT-III

Personnel Development and Retirement: Training and Development ¬Methods, Design & Evaluation of T & D Programmes: Career Development - Promotions and Transfers - Personnel Empowerment including Delegation - Retirement and Other Separation Processes.

UNIT-IV

Financial Compensation, Productivity and Morale:Principal Compensation Issues & Management - Job Evaluation - Productivity, Employee Morale and Motivation: Stress Management and Quality of Work Life.

UNIT - V

Building Relationships & Facilitating-Legislative Framework: Trade Unions - Managing Conflicts - Disciplinary Process - Collective Bargaining - Workers and Managerial Decision Making - Concept, Mechanics and Experience.

Suggested Readings :

1. Pramod Verma: Personnel Management In Indian Organisations, (Oxford & IBM Publishing Co. Ltd).
2. Venkata Ratnam C. S. & Srivatsava B. K.: Personnel Management and Human Resources (Tata Mc-Graw Hill).
3. Bohlander, Snell, Sherman: Managing Human Resources,Thomson - South Western.

MIBE 510 International Project Management (2+1)

Unit I

Projects – Introduction – Project Management – Process – Project Life Cycle – International Projects – Nature and Characteristics – Difference between traditional and International Projects – Generation and screening of project ideas – Project Organizations.

Unit II

Defining a Project – Objectives and Scope of Projects – Project Planning – Plan development – Tasks, Milestones, Estimates and Contingencies – Online Techniques for Project Management – PERT – CPM - Project Schedule – Resource Usage – Critical Success Factors for International Projects.

Unit III

Financial Planning and Control for International Projects – Project Appraisal - Process and criteria – NPV, IRR, Pay Back Period - International practice of investment appraisal– Risk Analysis – Assessment and Management of Risks in global projects – Project Portfolio Management – Methods of sourcing International Finance.

Unit IV

Organizing for International Projects – Dealing with diversities – Competency Management of Project managers – International Project Leader – Qualities and Duties –Setting up multinational project teams – Establishing roles and responsibilities of team members – HR issues in International Project Management.

Unit V

Project implementation and control – Global Outsourcing – Subcontracting – Vendor Management – Global Tenders and Bid Evaluation Criteria – Project Review – Project Communication – Measuring results of project stages – Project Audit – International Project issues – Cross cultural, social, political, infrastructure, technological and legal – Future of International Project Management.

Practical:

Problems on project appraisal techniques, control techniques, preparation of projects.

Suggested Readings :

1. Prassana Chandra :Project Appraisal and Management –Tata McGraw Hill, New Delhi.
2. Gopalakrishnan & Rama Moorthy :Text book of Project Management, Macmillan
3. David I.Cleland : Project Management: Strategic Design & Implementation, McGraw Hill International Edition.
4. Owen J. Murphy: International Project Management, South Western Educational Publication.
5. Bennet P. Lientz & Kathyrn P.Rea International Project Management, Academic Press.

Regulations governing MBA Programme in International Business

1.0 Title of the Programmed : The Degree shall be called Master of Business Administraton (MBA) in International Business (IB)

2.0 Scope : The Regulation provided herein shall be effective from 2010-11 batch of MBA admission.

3.0 Eligibility for admission:

- All professional graduates of State Agricultural Universities/Deemed Universities under the ICAR system with a minimum OGPA of 7.0/10.0 (6.5/10.0 for SC /ST Candidates).
- All graduates. including professional graduates from Indian/Foreign Universities recognized by AICTE/UGC with minimum 55% marks in traditional system (5% concession to SC /ST Candidates)
- Candidates awaiting their final results of the qualifying degree can also apply for the MBA course, but they should have secured their qualifying degree on or before the date prescribed for the GD and interview.

4.0 Intake Capacity:

The annual intake of the course is 30 of which:

- 05 seats are reserved for sponsored candidates from Government departments/ public sector organization/agencies & institutions including Kerala Agricultural University. (minimum 3 years of service while applying)

(The unfilled vacancies in the reserved category will be reverted to open merit)

Reservation: As per Government of Kerala and KAU norms

5.0. Selection Process:

On the basis of Management Admission Test(MAT) to be conducted by KAU followed by Group Discussion. Interview and previous Academic Performance. The departmental/sponsored candidates shall also apply to the University completing all formalities and shall have the same eligibility criteria with respect to academic qualification. They should have at least 3 years experience while applying. KAUMAT is applicable for sponsored candidates also.

The candidates will be ranked as follows:

	Particulars	Max .Marks	Remarks
a.	KAU Management Admission Test (KAUMAT)	120	Candidates will be considered for GD and interview only if they secure a minimum of 40% marks in the entrance examination. The minimum is 35% for SC /ST candidates.
b.	Qualifying Degree	30	
c.	Group Discussion	25	
d.	Interview	25	

Total 200

.0 **The semester fee** of the programme will be Rs.50,000/- (Rs. Fifty Thousand only)

- Admission fee will be Rs.10,000/- (Rupees Ten thousand only)

- The external exam fee per semester will be Rs.2000/- (Rupees One Thousand and Five Hundred only) during the first three semester and Rs.3000/- (Rupees Two Thousand only) during the last semester.

.0 **The fee structure for MBA in Agri-Business Management is as follows:**

(a) Course Fees

Sl. No	Head	Amount (Rs)
1	Admission fee (at the time of admission)	10000
2.	College Caution Deposit (refundable)	5000
3.	Tuition Fee (per semester)	50000
4.	Library Fee (Per semester)	1000
5.	Medical Fee (per semester)	100
6.	Stationery Fee (per semester)	1000
7.	Syllabus & Calendar Fee (per semester)	500
8.	Athletic Fee (per semester)	500
9.	Association Fee (per semester)	100
10	Magazine Fee (per semester)	500
11.	University Union Fee (per semester)	500
	Total	69200

(b) Hostel Fees

Sl. No	Head	Amount (Rs.)
1.	Hostel admission fee (one time)	500
2	Mess advance (one time)	3000
3	Rent (per Semester)	1000
4	Electricity and water charges (per month)	200
5	Hostel caution deposit (one time) (refundable)	3000
6	Establishment fund (per month)	500
7	Other miscellaneous charges (per semester)	500
Total		8.700

(c) *Contribution to PTA*

A one time contribution of Rs.5000/- (Rupees Five Thousand only) may be paid in lump sum at the time of admission. (This will be used as seed capital for the formation of Student Management Association, student welfare and personality development programmes.)

8.0 Procedure for registration:

(a) Each candidate shall fill up a Course Registration-cum-Grade Card (two copies) in the prescribed form in consultation with his/her advisor and submit to the Professor (Academics). MBA the same may be countersigned by the Head of the Institution.

(b) In the Course Registration-cum-Grade Card (CRCGC), the symbol "r" should be noted along with credit hours in respect of courses which are repeated.

(c) The credit equivalent for field segment and project work should be shown in the CRCGC of 2nd and final semesters respectively.

(d) On approval of the CRCGC, the Head of the Institution shall return all the four copies to the Director, MBA who will return one copy to the student and retain three copies till the end of the semester.

9.0 List of students registered for the course:

The Head of the Institution should see that a list of students registered for each course is maintained at his office.

10.0 Withdrawal of courses : No provision for withdrawal of courses.

11.0 Addition of courses:

In unavoidable situation, the Head o the Institution may permit a student to add a course(s) during a semester within a period of ten working days from the commencement of the semester, without exceeding the maximum credit load prescribed.

12.0 Discontinuance and re-admission:

(a) A student may be permitted by the Head of the Institution on recommendation of the Director, MBA to discontinue his/her MBA programme temporarily under unavoidable circumstances, under intimation to the Registrar. The student may rejoin after the specified period of discontinuance on payment of the re-registration fee as prescribed subject to the maximum time limit of one semester.

(b) On no account shall a student, who discontinued his studies without the orders of the Head of the Institution, be re-admitted or the fees remitted will be reimbursed.

13.0 Pedagogy:

A range of capacity building programmes like

- Case methods
- Simulated Exercises
- Participatory Rural Appraisal (PRA)
- Assignments
- Group Discussions (GD)
- Role Play
- Focused Group Discussions (FGD) &
- Rapid Rural Appraisal (RRA)

Will complement the classroom teaching and learning

14.0 Faculty:

A mix of PG teachers from various faculties of KAU and panel of experts drawn from various institutes/industries of repute. For this purpose a panel of Core Faculty for the areas/disciplines like Marketing Management, Banking and Finance Management, Human Resources and Behavioral Sciences, Agri-business Management, Quantitative Methods, Operation Research and Information Technology, Development Economics and Business Policy, Strategy and Environment may be prepared. The willingness of KAU Faculties to serve in one or more of the above disciplines may be obtained. Based on their willingness and suitability a panel of Core Faculty in the above identified disciplines may be maintained and it may be revised in every 3 years. In each area/discipline one Chairman/person may be selected and he/she will be incharge of the discipline for 3 years and the chairman/person may prepare and maintain a panel of Guest Faculty to serve in their respective area/discipline. This panel of experts can also be used for guiding the students for their minor and major project works.

15.0 Duration and Structure of the programme:

It is a full-time residential programme with duration of 2 years, split into 4 semesters. Each semester will be of 90 working days (excluding study leave, examination days, and days for co-curricular and extra curricular activities)

Semester – I

The first semester is devoted for foundation courses, which are compulsory. After the first semester there shall be a break of 15 days.

Semester – II

The second semester has got two segments viz., the Class Room Segment and Field Segment. The Class Room Segment covers six General Management Courses, which are compulsory.

There shall be a break of 45 days after the second semester. The field segment is intended to impart hands on experience to the students in international business management practices during the semester break. In this segment the students will be placed for project work for a minimum period of 1 month in an institution belonging to the industries identified under Sectoral Electives and they have to submit a project report after thorough study under the guidance of a faculty. A board, to be constituted by the Director, will evaluate the project report. The Board will be consisting of the project guide, one examiner and the Director, MBA (IB).

Semester- III

The third semester will have two segments, viz., Core segment and Elective Segment. The Core Segment contains four compulsory courses for a total credit load of 12 (twelve). The Elective Segment has ten courses in two major groups namely International trade in fisheries & food products and Human resourses manageemnt. From these segments the students have to select three courses from one area with a maximum of 7 credits. At the end of the third semester the students will be given a break of 25 days.

Semester IV

The fourth and final semester is also divided into two segments – the Class Room Segment and the Field Segment. In the Class Room Segment consists of core courses (3 credits), student seminar (0+0) and elective courses (3 credits). In the Field Segment, which is called Management Experience Programmed (MEP), the students will be placed in an institution belonging to the industries identified under Sectoral Electives for a period of 2 months at the end of the semester for project work and they have to submit a project report after thorough study under the guidance of an approved faculty. The institution for project work should be identified in the beginning of the third semester so that the student will get enough time to secure placement and acquaint with the structure and functioning of the organization.

16.0 Medium of instruction:

The medium of instruction and examination shall be in English.

17.0 Course curriculum:

The subjects of study leading to the award of MBA in Agri-business Management shall comprise the following courses :

Semester I.

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 511	Principles of Management	3+0
2	MIBC 512	Managerial Economics	3+1
3	MIBC 513	Accounting for Managers	3+1
4	MIBC 514	Marketing Management	3+0
5	MIBC 515	Quantitative Techniques for Managers	3+1
6	MIBC 516	Research Methodology	3+1
		Total	**18+4**

Semester II.

Sl. No.	Course No.	Name of the Course	Credit
1	MIBC 521	Financial Management	3+1
2	MIBC 522	International Marketing	3+0
3	MIBC 523	International Economics and Trade	3+1
4	MIBC 524	Organizational Behaviour	2+1
5	MIBC 525	Export Import Management and Documentation	3+0

Sl. No.	Course No.	Name of the Course	Credit
6	MIBC 526	Business Ethics	2+0
7	MIBC 527	Summer Placement, Training and Report	0+2
		Total	**16+5**

Semester III

Sl. No.	Course No.	Name of the Course	Credit
1	MIBC 531	International Business Environment	3+0
2	MIBC 532	Foreign Exchange Management	3+0
3	MIBC 533	Logistics Management	2+1
4	MIBC 534	E -Commerce	3+0
5	MIBE	Elective Course	7
6	MIBE	Elective Course	
7.	MIBE	Elective Course	
		Total	**19**

Semester IV

Sl.No.	Course No.	Name of the Course	Credit
1	MIBC 541	Operations Research and Quality Control	2+1
2	MIBC 542	Student Seminar	0+0
3	MIBE	Elective Course	3
4	MIBC 543	Research Project/Dissertation	0+12
		Total	**18**

Elective Courses:

Sl. No.	Course No.	Name of the Course	Credit
1	MIBE 501	Indian and Global Fisheries Industry	2+0
2	MIBE 502	New Venture Management in Fisheries Business	2+1
3	MIBE 503	Fisheries Business Project Management	1+1
4	MIBE 504	Fisheries/Agriculture Pricing Policy and Price Behaviour	2+0

Sl. No.	Course No.	Name of the Course	Credit
5	MIBE 505	Packing, handling, storage and transport of fish and fish products	2+0
6	MIBE 506	Quality Assurances, Management and Certification	2+1
7	MIBE 507	Supply Chain Management in Fisheries Business	3+0
8	MIBE 508	Entrepreneurship Development	3+1
9	MIBE 509	Human Resources Management	3+0
10	MIBE 510	International Project Management	2+1

Field Segment Summer Placement, Training and Report (0+2)

'Focus : To impart a deep understanding of the real life-situations in International business Management

The field segment is intended to give hands-on-experience in Agri-business 'management practices. In this segment, the students will be placed for a minimum period of one month at the end of the second semester (during semester breadk) for project work in an institution belonging to the industries identified under Sectoral Electives and they have to submit a project report after thorough study under the guidance of a faculty.

18.0. The total credit requirements for the MBA programme in Agri Business shall be as follows :

Particulars	Total credit
I[st] Semester	22
II[nd] Semester	21
Field Segment	02
III[rd] semester	19
IV[th] Semester (excluding project work)	06
Project work	12
Total Credit	**80**
Credit Load in a-semester	The maximum credit load per semester shall not exceed 22 (excluding repeat and re-examination)

19.0 Attendance:

A student shall attend a minimum of 80% of the number of classes actually held for each of the courses in a semester to be eligible for appearing for examination in that course. If the candidate has shortage of attendance in any course in any semester, he or she shall not be allowed to appear for any examination in that semester. However, the University may condone up to 10% of shortage if the candidate applies for it as laid down in University procedures and if the Vice-Chancellor is satisfied with the reasons cited by the candidate for his absence in classes.

20.0 Scheme of evaluation:

The performance of the students will be evaluated through internal and external assessment. The ratio of internal and external assessment will be 60:40. Internal assessment will be through quiz, mid-term, assignments, student seminars, etc. by the course teacher concerned. The University will conduct the external assessment.

Breakup of internal and external marks for theory and practical will be as follow :

A Theory paper (Distribution of internal and external marks)

Distribution of internal marks				External Marks	Total marks
Assignment (5)	Quiz (10)	Mid-term Exam (40)	Viva-voce (5)	Total internal marks (60)	External written exam (40)	100

B. Practical examination (100% internal evaluation)

Assignments	Class participation and presentation	Viva-voce	Final practical examination	Total marks
20	20	10	50	100

A separate minimum of 40% marks is required for theory and practical and a minimum of 50% mark per paper is required for a pass.

The evaluation of a course shall be indicated by grade points ranging from 0-10. The total marks in per cent divided by 10 will give the grade point which has to be rounded off to the first decimal place. For example, a grade point of 8.35 will be rounded off as 8.4. The following symbols are also used in the grade report.

I	-	Incomplete	F	-	Failed
W	-	Withdrawal	R	-	Repeat
S	-	Satisfactory	RE	-	Re-examination
US	-	Unsatisfactory			

To arrive at the Overall Grade Point Average (OGPA) at the end of a semester, the grade point of each course is multiplies by the credit hours of the course to obtain the credit points. Then the sum of the credit points secured by the student in all the courses taken till the end of that semester is divided by the total number of credit hours of the above courses, provided that the credit hours and credit points of courses which are repeated are not counted more than once for this purpose. The student is also required to maintain an OGPA of 6 at the end of each semester.

Note : While calculating OGPA, the figures obtained is corrected to the first decimal. For example, 7.97 is rounded off to 8.0

21.0 Classification and grading of results (Paper wise):

Less than 50%	Fail – (Grade point 5)
50% to 60%	Second class (Grade point between 5 and 6)
60% to 80%	First class (Grade point between 6 and 8)

80% and above	First class with distinction (Grade point above 8)

Rank, medals etc. will be awarded only for those candidates who successfully completed the course within the stipulated period as per regulation.

22.0 Absence from examination/quiz/mid-term, etc.

a) A student who is absent from any of the internal examinations on valid and bonafide grounds or on account of being deputed at the time of examination for activities of the institution/university by written orders of the Head of the Institution may be given a supplementary examination. A supplementary examination may also be conducted if the candidate's absence was on account of bonafide reasons for which leave has been sanctioned by the Director, MBA.

b) Supplementary examination shall be conducted only once and within five working days of the previous examination/quiz/test. A candidate who is unable to take the supplementary examination, even if the leave had been sanctioned on valid grounds shall be deemed to have scored zero in that test.

23.0 Grade reports:

a) The course teachers are required to maintain the attendance and academic records of the students registered for the respective courses.

b) It shall be the responsibility of the advisor to consolidate the grade reports of students under him and to calculate the OGPA within 12 days from the end of each semester in order to facilitate registration of the students in the succeeding semester.

24.0 Repetition of courses:

a) A student who has failed in a course may repeat that course in a subsequent semester or register as a re-examination course in any of the subsequent semesters, the grade point is higher than zero and less than five for the course.

b) A student getting less that 60% in a course may if he/she so desires, repeat that course to improve his/her OGPA and the symbol "R" shall be in relevant records for repeated course.

25.0 Transparency about Internal Assessment:

Each faculty member shall maintain a record of performance of each student in the courses he or she teaches. Each faculty member shall submit the internal assessment of the students through the Head of the Department/functional area chairman to Director, MBA (IB) on completion of the course in each semester. In case of complaint by a student or students, the Director (MBA in IB shall follow the following procedure.

a) The Complaint shall be referred to the concerned faculty member (whose assessment is under dispute or cause of the complaint) for redress.

b) If the faculty member fails in resolving it, then the complaint shall be referred to a committee of three teachers in the Department/Functional Area: Head of the Department/Chairman, Functional Area (Chairperson), one senior faculty member of the Department and the concerned faculty member.

c) If the complaint is not resolved at the Department level, it shall be referred to a third tier committee consisting of Associate Dean, Director (MBA) and one senior Faculty Member nominated by the Vice-Chancellor.

At any level, the views of the aggrieved student(s) and the faculty member or member's party to it shall be heard before arriving at a solution.

26.0 Honorarium for Examination work:

a. Question paper setting @ Rs.1000/- per paper (2 sets)

b. Invigilation for final external examination

i. Supervising Teacher @ Rs.100/- examination
ii. Supporting Staff @ Rs.40/- per examination.

c. Paper valuation @ Rs.20/- per paper with eligible TA/DA for centralized valuation.

27.0 Discontinuance:

The fees once remitted shall not be refunded if the student discontinues before the completion of the course.

28.0 Guidelines for Minor Project Work:

- During the end of the second semester the student shall do a minor project in an organization dealing in international business under an approved faculty guide.
- Any on the faculty from the list of Core Faculty (Both KAU and Guest Faculty) can be the supervising guide. The qualified professionals working in the industry where the student is undergoing the Minor/Major project work can also be the supervising guide for the project.
- The duration for Minor project work is one month of which three weeks are for data collection and one week for report writing.
- The project can be done individually or in groups of two students. One report is enough for two students if they are doing the project as a team.
- But, if more than two students are doing project work for an organization, their project reports should be different for each of the students or each of the teams. That is, one team may study a problem in the Financial Management area and another team may study a problem in the Marketing Management area etc. of the same firm.
- The student shall prepare and submit the project report to the Department
- The report shall be printed and bound (preferably spiral bound) with not less than 35 A4 size pages.
- The student shall prepare four copies of the report: one copy for submission to the Department, one copy for the student, one to the guide and one copy to the Organization.
- If the student fails in submitting the project report on or before the stipulated date, an application for late submission along with

Rs.100/- for late submission fee may be forwarded to the Director. MBA along with the project report.

- However, such submission shall not be considered after one month from the date of registration of the third semester MBA in the case of Minor Project Work.
- A certificate showing the duration of the project work shall be obtained from the organization for which the project work was done and it shall form part of the project report.

29.0	**Organization of the Project Report (Applicable to both Mini and Major Projects):**
	The format for the presentation of the Project Report is given below in the following sequences :
i)	Title Page: The title page shall bear the title of the project report, name of the student, name of the programme and address of the college.
ii)	Declaration by the student:A declaration from the student in the proforma appended (Annexure II (a) is to be furnished after the title page.
iii)	Certificate of bonafide work by Guide: A certificate from the Guide of the student in the proforma prescribed (Annexure II (b) is to be furnished immediately after the declaration by the student.
iv)	A certificate showing the duration of the project work shall be obtained from the organization for which he project work was done
v)	Acknowledgment Proper acknowledgement of the support given by the Guide. Associate Dean. Placement Officer, other teachers and those including the officials of the institution in which the student had conducted the project work.
vi)	Table contents Table of contents should include the major headings (with minor headings and page numbers)
vii)	List of Tables
viii)	List of Illustration / Statements
ix)	Text (body) of the Project Report

30.0 This should contain:

(a) Introduction

Introduction must cover;

i. Statement of the problem

ii. Need and significance of the study

iii. Objectives

iv. Methodology

v. Limitations of the study : and

vi. Chapter plan of the project report

(b) Review of Literature:

It must contend a critical review of past work relating to the problem with a view to identify the research gap. Only studies relevant to the topic are to be cited.

(c) Analysis:

Analysis may be divided into one or two chapters depending upon the volume of work and the objectives of the study. The data collected may be analyzed to establish casual relationships between variables and generalizations may be derived with the help of accepted statistical /quantitative techniques. The findings of the study may correspond to the objectives and to the extent possible must be related to the findings of earlier studies in area.

(d) Summary and conclusions: A brief self contained account of the work covering major findings and conclusions may be given in not more than six typed pages.

(f) Reference:

All the references cited in the text of the project report shall be arranged alphabetically according to their authors. Articles listed shall follow the pattern prescribed below

g) Names(s) of the auhor (s) – Surname first followed by first name and middle name or initials

h) Year of publication within brackets

i) Title of the article

j) Name of the journal in which the article is published

k) Volume No.

l) Pages

(g) Reference to books shall be made as follows:

h) Name(s) of the author(s) – Surname first followed by first name and middle name or initials

i) Year of publication within brackets

j) Title of the book

k) Publisher

l) Place of Publication

m) Edition

j) Page

Appendix. if any

31.0 Evaluation of Minor Project Report:

A committee. consisting of the guide and a member of faculty, shall evaluate the Minor project based on the report and its presentation by the student. This shall be a nongraded course. The committee shall evaluate the project and award S/US (Successful/unsuccessful)

32.0 Major Project Work:

- The students shall do a major project work during their final semester of MBA under a faculty guide, preferably in their area of specialization.
- Any of the faculty from the list of Core Faculty (Both KAU and Guest Faculty) can be the supervising guide. The qualified professionals working in the organization where the student is undergoing the Major project work can also serve as the supervising guide
- The duration of the fieldwork for major project is six weeks and two weeks for report writing
- This project work is to be done individually by the students
- The student shall prepare and submit a project report, printed and bound (preferably spiral bound) with a minimum of 80 A4 pages of text, to the Director MBA.
- For the evaluation of the Project Report, a board will be constituted by the Director. The Board shall consists of the Project Guide, External Examiner and the Director. The project report shall carry 60 marks and the viva-voce 40 marks. The minimum marks required for a pass in the project work will be 50% separately for project report and viva-voce.
- In unavoidable circumstances, the student can submit the project as late submission with a late fee of Rs.250/-
- However, the maximum permission time for late submission shall not exceed one month.

33.0 Evaluation of Major Project Report:

The Board of examiners appointed for the evaluation of the major project shall evaluate the project report and award maximum 60 marks based on the content, style, research methodology, originality of the problem and solutions recommended, etc. The remaining 40 marks may be awarded for the performance in the viva-voce.

34.0 Viva-Voce:

- The Project Viva-Voce Board shall have two members: one external and one internal (other than the Head of Institution, Director of MBA and Project Guide) University shall appoint the external examiner.
- The student should get 50% marks for a pass in viva voce

35.0 All Guest Faculty/Professionals of the organizations who are declared as guides

shall be given a honorarium @ Rs.500/- per student and for KAU Faculty, the honorarium will be @ Rs.300/- per student. The maximum number of students that may be allotted to a Guide shall be two at a time.

36.0 Honorarium for Project Evaluation and Viva-voce:

External Examiner shall be paid an honorarium @ Rs.100/- per student along with eligible TA/DA. Sitting fee for other board members excluding project guide shall be @ Rs.500/- per day.

37.0 Governing Body:

A high level governing body under the chairmanship of the honourable vice chancellor may be constituted for the effect conduct of the course and to sort out various issues in connection with construction of separate Building, Hostel, Library, Computer and other infrastructure facilities for the prestigious programme. The possibility of getting grants from ICAR, NABARD, Govt. of India, Govt. of Kerala, M.P.'s, and MLA's Fund etc. may be explored. The committee should have the following members.

1. Honourable Vice-chancellor, KAU (Chairman)
2. Dean, Faculty of Fisheries, KAU
3. Director, Academic and PG Studies, KAU
4. Head, Department of Management Studies, CoF, Panangad, & Director MBA (Convener) and
5. Two professionals from the industry

38.0 Advisory Board:

- Vice-chancellor of KAU (will be the Honorary chairman)
- Leading Management Experts
- Leading Business Entrepreneurs
- Deans and Directors of KAU
- Academicians
- Policy Makers
- Media Professionals
- Head, Department of Management Studies, CoF, Panangad, KAU
- Director-MBA in International Business (Convener)

39.0 Placement Cell: There will be a full time Placement Cell to co-ordinate the placement of the MBA programme under a senior KAU Faculty.

40.0 Dress Code:

There shall be a common dress code for the students and it will be intimated at the time of interview.

41.0	**Research requirements**	: Not applicable to MBA students
42.0	**Comprehensive examination**	: Not required for the MBA students.

ANNEXURE I (a)

(Model of Declaration)

DECLARATION

I hereby declare that this project report entitles .....

..... is a bonafide record of work done by me during the course of project work and that it ha not previously formed the basis for the award to me for any degree/diploma, associate ship, fellowship or other similar title of any other university or society.

Signature of the Candidate

Place :

Date: Name of the Candidate

ANNEXURE I (b)

(Model of Certificate to be attached to Project Report)

C E R T I F I C A T E

Certified that this project report entitled .....

..... is a record of project work done independently by Sri./Smt.Kumari..... under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associate ship to him/her.

Signature of the Guide

Place :

Date : Name & Designation of the Guide

MASTER OF TECHNOLOGY

M.Tech (Fishing & Fisheries Engineering)

INTRODUCTION

The ICAR has recently introduced a new PG programme in M.FSc(Fisheries Engineering &Technology) with the objective to produce a new generation of experts who could be able to take up the new challenges in the fields of Aquaculture engineering, fishing, equipment & machinery and management aspects; of the rapidly developing diversified fisheries industry of India and abroad. Also this programme is intended to cater to the teaching programmes of Engineering Curriculum in Fisheries Colleges of the Country.

2. ELIGIBILITY FOR ADMISSION

Candidates holding Bachelor of Fisheries Science (B.F.Sc.) degree of ICAR or State Agricultural University shall be eligible for admission to the M.F.Sc. course in 'Fisheries Engineering'The Programme may also be open to Engineering Graduates (B.Tech) in Fish Processing Technology, Food Engineering, Food Technology, Civil. Naval Architecture, Chemical, Agricultural and other relevant specializations.

3. TOPICS

Engineering Topics in Fisheries Sector are normally categorized into the following broad areas.

- Aquaculture Engineering and related fields.
- Site selection, Surveying, Farm Machinery, Constructions etc.
- Marine Engineering
- Harbour Engineering.
- Fish Processing Engineering.
- Naval Architecture.

4. COURSES

A post graduate in Fishery Engineering is expected to deal with the Engineering problems in the field. Hence elementary engineering topics like engineering graphics, workshop technology, thermodynamics and Heat Engines,Applied Mechanics and Hydraulics which are taught in UG engineering curriculum shall be made compulsory subjects for a Fisheries Graduate. Mathematics, statistics, economics, fisheries subjects are normally covered in their UG programmes. If an engineering graduate is admitted he may be taught Fisheries subjects as compulsory subjects as being practiced at IIT Kharagpur for the Aquacultural Engineering programme.

5.JUSTIFICATION FOR M.TECH. (FISHING AND FISHERIES ENGINEERING)

Currently the country is facing acute shortage of qualified M.Tech degree holders for handling engineering courses. At present only IIT Kharagpur is offering an M.Tech programme in Aquacultural Engineering for which seats are limited.. The Research and teaching activities of Fisheries Engineering and Technology can be strengthened only if well qualified candidates are available for handling the topics. Hence the ICAR introduced the new course covering all aspects of Fisheries Engineering and Fishing technology . Normally Engineering graduates may be reluctanct to join for the programme, if the PG degree awarded is M.FSc. Hence if the name of the degree is changed to M.Tech(Fishing and Fisheries Engineering), engineering graduates can also be admitted to this programme and thus advanced research activities can be taken up in the fields of Fisheries Engineering and Technology. Hence the Board of Studies recommended the ICAR syllabus of M.FSc (Fisheries Engineering &Technology) for the M.Tech .(Fishing and Fisheries Engineering), with compulsory remedial courses for B.FSc graduates and Engineering graduates. Engineering subjects such as Graphics, Workshop Technology, Basic engineering topics of civil, mechanical ,electrical and electronics will be compulsory for B.FSc graduates. Fisheries subjects such as Aquaculture, Fish processing Technology, Capture Fisheries &Environment courses will be compulsory remedial courses for Engineering graduates.The board of studies recommended six seats for the course. Eligiblity for admission further broadened by the Board of studies by including Marine engineering, Mechanical engineering, Dairy science & technology and B.FSc(NS) of Cusat.

MASTER OF TECHNOLOGY
M.Tech (Fishing & Fisheries Engineering)

1. OBJECTIVE

This PG program should produce a new generation of experts who could be able to take up the new challenges in the fields of Aquaculture engineering, fishing, equipment & machinery and management aspects; of the rapidly developing diversified fisheries industry of India and abroad. Also this programme is intended to cater to the teaching programmes of Engineering Curriculum in Fisheries Colleges of the Country. This programme will be offered jointly by the Departments of Fishing Technology and Fisheries Engineering of the Faculty of Fisheries.

2. ELIGIBILITY FOR ADMISSION

Candidates holding Bachelor of Fisheries Science (B.F.Sc.) degree of ICAR or State Agricultural University and B.F.Sc (Nautical Science) of Cochin University of Science and Technology shall be eligible for admission.
The Programme also be open to Engineering Graduates (B.Tech) in Fish Processing Technology, Food Engineering, Food Technology, Mechanical, Civil, Naval Architecture, Marine Engineering, Chemical, Agricultural, Dairy Engineering and other relevant specializations.

CREDIT REQUIREMENTS

Subject	Credit
Major	20
Minor	09
Supporting	05
Seminar	01
Research	20
Total credits	55
Compulsory Non – credit remedial courses	06
Compulsory Non-credit courses	As approved in general MFSc Programme

Course Structure - at a Glance

Courses offered by Department of Fishing Technology

CODE	COURSE TITLE	CREDITS
FT 501*	ADVANCED FISHING GEAR TECHNOLOGY	2+1
FT 502*	RESPONSIBLE FISHING	2+1
FT 503	SEA SAFETY AND DISASTER MANAGEMENT	1+0
FT 504	ACOUSTICS, NAVIGATION AND SEAMANSHIP	1+1
FT 505	DISASTER MANAGEMENT (e-course)	1+0

Courses offered by Department of Fishery Engineering

CODE	COURSE TITLE	CREDITS
FE 501	AQUACULTURE ENGINEERING	2+1
FE 502	ENVIRONMENTAL ENGINEERING AND POLLUTION	1+1
FE 503	FISH PROCESSING MACHINERY	1+1
FE 504*	REFRIGERATION AND ELECTRICAL ENGINEERING	2+1
FE 505	MARINE ENGINEERING	1+1
FE 506	FISHING HARBOUR AND FLEET MANAGEMENT	1+1
FE 507*	ADVANCED FISHING CRAFT TECHNOLOGY	2+1
FE 508	ENGINEERING GRAPHICS	0+1

OTHER CREDIT REQUIREMENTS

CODE	COURSE TITLE	CREDITS
FT 591/FE 591	MASTER'S SEMINAR	1+0
FT 599/FE 599	MASTER'S RESEARCH	0+20

COMPULSORY NON CREDIT REMEDIAL COURSES FOR BTech GRADUATES

CODE	COURSE TITLE	CREDITS
FT 506	BASIC AQUACULTURE	(1+1)
FT 507	BASICS OF FISH PROCESSING TECHNOLOGY	(1+1)
FT 508	CAPTURE FISHERIES AND HYDROGRAPHY	(1+1)

COMPULSORY NON CREDIT REMEDIAL COURSES FOR OTHER GRADUATES

CODE	COURSE TITLE	CREDITS
FE 509	BASIC ENGINEERING PRINCIPLES –I	(1+1)
FE 510	BASIC ENGINEERING PRINCIPLES –II	(1+1)
FE 511	ENGINEERING WORK SHOP PRACTICE	(0+2)

Course Contents

FT 501* ADVANCED FISHING GEAR TECHNOLOGY 2+1

Objective

To learn advanced fishing gear technology, design modification of existing fishing gears and selectivity studies of various fishing gears.

Theory

UNIT I

Fishing gear design – Conventional and current practice for the representation of fishing gear by scale drawing; The use of computers in the scale drawing of fishing gear to determine the defects in gear, design to develop new gears.

UNIT II

Selection of fishing gear, analysis of the parameters of specific fishing gears and the derivation of empirical relationships for use in the design process.

UNIT III

Design of bottom, mid-water and surface trawl; gill nets and tangle nets; types of gill nets-single-walled gill nets, framed gill nets tangle nets and their technical characteristics, two and three walled trammel nets, combined gill nets; traps – their classification and general principles of construction.

UNIT IV

Design of stake nets; fyke nets; purse seine, hooks and lines, long lines and trolling gear.

UNIT V

Attraction of fish – fishing with electricity; Light fishing, fish pumps; operation and mechanization of long lining.

UNIT VI

Factors to be considered in gill netting in selection of meshes for the different fishes. Aimed fishing using the modern electronic devices like echo sounder, Sonar and trawl eye.

UNIT VII

The selectivity of trawl fishing gears, design of otter boards for various types of trawl fishing.

UNIT VIII

Case studies relating towed, surrounding and static fishing gear and their energy consumption.

UNIT IX

Fishing gear testing – full scale and model testing in flume tanks, methods of testing a fishing gear.

UNIT X

The influence of design features on the overall economic performance of fishing gears.

Practical

Exercises on scale drawing of different types of fishing gears. Use of cadnet programme in the design of trawl gears. Model net calculations, Calculations of energy requirements of different gears. Onboard experience of different fishing methods. Use of net monitoring instruments. Study of fishing gears through models of nets and field study. Making sketches. Reading of gear designs. – Trawl nets, Purse seines, Gill net and Long line. Familiarization with design drawing soft ware. Design of otter boards and other accessories. Survey of gears and preparation of designs according to scale by taking measurements from a net.

Suggested Readings

Baranov FI. 1969. *Selected Works on Fishing Gear.* Vol. I. *Commercial Fishing Techniques.* Israel Programme for Scientific Translations, Jerusalem.

Baranov FI. 1977. *Selected Works on Fishing Gear*. Keterpress Enterprises. Israel.
Ben-Yami M. 1994. *Purse Seining Manual*. FAO Fishing Manual.
Biswas KP. 1996. *Harvesting Aquatic Resources*. Daya Publ. House.
Bjordal A & Lokkeborg S. 1998. *Long Lining*. Fishing News Books.
Brandt AV. 1984. *Fish Catching Methods of the World*. Fishing News Books.
FAO. 1987. *Small Scale Fishing Gear*.
Fridman AL. 1986. *Calculations for Fishing Gear Designs*. FAO Fishing Manual. Fishing News Books.
Garner J. 1988. *Modern Deep Sea Trawling Gear*. Fishing News Books.
Hameed SM & Boopendranath MR. 2000. *Modern Fishing Gear Technology*. Daya Publ. House.
Kristionsson H. 1975. *Modern Fishing Gear of the World*. The White Friars Press.
Sreekrishna Y & Shenoy L. 2001. *Fishing Gear and Craft Technology*. ICAR.

FT 502* RESPONSIBLE FISHING 2+1

Objective

To learn various responsible fishing techniques which cause less damage to the environment and biodiversity and to understand methods for reducing bycatch in trawl net.

Theory

UNIT I

Scope and objectives of FAO Code of conduct for Responsible Fisheries. Articles of CCRF-Description of the code.

UNIT II

Elaboration of Article 8-Fishing operations; By-catch and discards – Definitions, bycatch reduction devices, Turtle excluder devices, finfish and shrimp excluder devices.

UNIT III

Selective fishing gear and practices – Selectivity of trawls, gill nets and lines-Environmental friendly fishing – Energy conservation and resource enhancement.

UNIT IV

Fish Aggregation devices (FADs) – Objectives and types of FADs. Design and construction of FADs.

UNIT V

Energy optimization in fisheries – methods of energy conservation in fish harvesting.

UNIT VI

Application of Remote sensing and PFZ and GIS in fisheries.

UNIT VII

Illegal, Unregulated and Unreported fishing methods (IUU); Destructive and prohibited fishing systems and practices.

UNIT VIII

Eco friendly fishing methods and fishing gears.

UNIT IX

Effect of fishing on nontarget species – Effect of bottom trawl on benthic fauna and habitats. Conservation methods issues and implications for biodiversity.

Practical

Study of design and operation of BRDs and TEDs; Preparation of document listing and prohibited fishing practices; compilation of package of practices for energy conservation;

iInterpretation of SST and Ocean colour charts, study of Potential Fishing Zone (PFZ) maps; problems on fishing gear selectivity; studies on impact of various fishing gears on environment and biodiversity.

Suggested Readings

Bergstrom M. 1983. *Review of Experiences with and Present Knowledge about Fish Aggregating Devices*. BOBP/WP/23 Bay of Bengal Programme. Madras.
CIFNET MODULE III & IV. Code of Conduct for Responsible Fisheries.
FAO. 1995. *Code of Conduct for Responsible Fisheries*. Rome. 228
FAO. 1996. *Fishing Operations. FAO Training Guidelines for Responsible Fisheries*. No. 1. Rome.
FAO. 2003. *Fisheries Management. The Ecosystem Approach to Fisheries*.
FAO Technical Guidelines for Responsible Fisheries. No.4, Suppl.2. Rome.
Kaiser MJ & de Groot SJ. 2000. *Effect of Fishing on Non-Target Species and Habitats*. Blackwell.

FT 503 SEA SAFETY AND DISASTER MANAGEMENT 1+0

Objective

To learn theoretical aspects of sea safety and disaster management, water warning signal and bad weather preparations.

Theory

UNIT I

Introduction to sea safety – Safe navigation procedures for fishing vessels: Distress signals: Distress signals.

UNIT II

Accidents associated with marine environment-crossing surf, bad weather, poor visibility storms, loss of power at sea, loss of way, grounding, collisions. Injuries from fish, animals and machinery. Man overboard and capsizing.

UNIT III

Signals for fishing vessel safety; agencies involved in fishing vessel rescue operations. Keeping watch at sea – Preventing collusions – Heavy weather preparations crew management.

UNIT IV

Fire onboard and Fire fighting equipments. First aid at sea; Weather warning signals and weather reporting system for fishing vessels; Bad weather preparations for fishing vessels.

UNIT V

Stranding and beaching of fishing vessels and refloatation procedures: Measures to enhance sea safety; International conventions related to sea safety.

UNIT VI

Types of natural and man made hazards in fisheries – Cyclone, tsunami etc. Characteristics and impact of various disasters. Preparedness for disasters at sea. Mass evacuation, storm shelters and survival platforms.

Suggested Readings

Bist DS. 2000. *Safety and Security at Sea - A Guide to Safer Voyages*.
Butterworth-Heinemann.
FAO. 1975. *Code of Safety for Fisherman and Fishing Vessels*. International Maritime Organization, London.
International Convention for the Safety of Life at Sea. 1974. Universal Publ. Corp. Mumbai.
Larkin FJ. 1998. *Basic Coastal Navigation*. 2nd Ed. Sheridan.
Prakasan U. 1997. *Rule of the Road Signal and Voyage*. CIFNET, Cochin.

Sreekrishna Y & Shenoy L. 2001. *Fishing Gear and Craft Technology*. ICAR.

FT 504 ACOUSTICS, NAVIGATION AND SEAMANSHIP 1+1

Objective
To understand engineering aspects of fish acoustics equipment, navigation and seamanship for fishing vessel safety.

Theory
UNIT I
Basic principles of acoustic fish detection. Acoustic surveys, acoustic equipments used in fishing.
UNIT II
Echo sounder – major components, specifications and uses; Sonar – specifications, types; instruments used for evaluation of underwater gear performance.
UNIT III
Global positioning system (GPS); vessel monitoring systems (VMS); communication systems – VHF, SSB, Immarsat system; safety devices – SART, EPIRB, GMDSS.
UNIT IV
Navigation – types, navigational equipments, RADAR, Radio direction finder, Decca, LORAN, OMEGA, Autopilot, Fixing of vessel position, Navigational charts, Satellite: Navigator - Navigation and fishing lights, distress signals; Rules of the Road.
UNIT V
Ship and its main parts; ropes – their types, handling; strength and preservation; knots and splices; measurement of speed; maintenance of log sheet; anchoring mooring; steering; rolling and pitching; Morse code; accidents; marine compass and its uses; sextant; chart reading positions – simple position lines.

Practical
Chart work; operation of echo sounder, Sonar, GPS, Radar and communication systems like VHF, SSB; familiarization with safety devices like SART, EPIRB and GMDSS; identification and study of navigation and fishing lights, distress signals and navigational equipments like compass, chronometer, aneroid barometer, sextant and logs.

Suggested Readings
CIFNET. 2004. *Fishery Engineering*. Cochin.
FAO. 1998. *Fishing Operations. Vessel Monitoring Systems*. FAO
Technical Guidelines for Responsible Fisheries No. 1. Suppl. 1, Rome.
Joshy CD & Devadhason M. 2001. *Basic Electronics and Fish Finding Equipments*. CIFNET, Cochin.
Larkin FJ. 1998. *Basic Coastal Navigation*. 2nd Ed. Sheridan.
MacLennan DN & Simmonds EJ. 1992. *Fisheries Acoustics*. Fish and Fisheries Series 5. Chapman & Hall.
Mitson RB. 1983. *Fisheries Sonar*. Fishing News Books.
Sreekrishnan Y & Shenoy L. 2001. *Fishing Gear and Craft Technology*. ICAR.

FT 506 BASIC AQUACULTURE (1+1)

Objective To impart basic knowledge of aquaculture to the engineering graduates

'heory
JNIT1
\quaculture – definition and scope. History of Aquaculture- present global and national cenario.
)ifferent types of Aquaculture – pond culture, pen culture, cage culture, running water :ulture, zero exchange system etc.
JNIT2
Systems of Aquaculture – extensive, semi – intensive, intensive and super intensive iquaculture systems.
Monoculture, Polyculture and integrated aquaculture production programmes.
Major candidate species for aquaculture- characterisitics.
JNIT3
Lay out of a fish farm – various components.
JNIT4
Seed production techiniques for various – food fishes and ornamental fishes.
Seed production of various shell fishes.
)ifferent types of hatcheries- various parts.

Practical
dentification of commercially important freshwater, brackishwater and marine finfish and :hellfish species of India,
Practices of prestocking management.
Practices of Post –stocking management.
Analysis of water and soil samples.
Preparation and management of nursery, rearing and grow out ponds.
dentification of common ornamental fishes and plants.
Setting up of breeding tanks for various groups of ornamental fishes.
dentification of brood stock and maturity stages of important fishes and shell fishes.
nduced breeding of fishes.
Breeding and larval rearing of Macrobrachium and Penaeids.

Suggested Readings
Pillay and Kutty, 2005 Aquaculture – Principles and Practices II Edn, Blackwell Publications JK
'hingran, V.G. 1991 Fish and Fisheries of India, Hindustan Publishing Corporation, India III Edn

FT 507 BASICS OF FISH PROCESSING TECHNOLOGY (1+1)

Objective To impart basic knowledge of fish processing technology to the engineering graduates
Theory
JNIT1
Spoilage of fish – methods of prevention.
Post harvest handling of fish – chilling of fish – methods and equipments.
cing of fish – types of ice. Refrigerated or chilled seawater. Storage of iced fish.
JNIT2

Freezing of fish – methods of freezing- freezing and frozen storage of fish, shell fish and other food products.
Transportation of fresh and frozen fish, cold chain and quality control.
UNIT3
Introduction to canning princple. Steps in canning – raw materials, preparatory treatments, precooking, packing, exhausting, seaming, thermal processing, cooling and storage.
Introduction to food packaging – various types of packinging materials and containers.
UNIT4
Introduction to various products and by-products from fish and shell fish.
Drying- different types of driers – solar drier, mechanical drier. Freeze drying – accelerated freeze drying.
Salting – wet and dry salting.
Smoking – methods and equipments.
Pickling / marinating – various products and their preparation.
Fremented fish products – fish sauces.
Fish paste products- fish sausage, cake, ball, ham, kamaboke.
Surimi – battered and breaded products.
Other fish products – fish wafers, fish soup powder, fish noodles, meat analogues, extruded products etc,
UNIT5
Fish meal – manufacturing methods and equipments.
Fish silage, fish oil, chitin and chitosan
Seaweed products – agar, algin, carrageenan, iodine, edible algae.
Utilization of krill\
Other miscellaneous products – fish leather, shark fin rays etc.

Practical.
Methods of icing of fish.
Preparation of fish and shell fish for freezing.
Types of cans, canning equipments and lay out of cannery.
Canning of different varieties of fish and shell fish.
Preparation of salted fish.
Preparation of smoked fish, fish/prawn pickle.
Surimi preparation.
Preparation of various other products.

Suggested Readings
Gopakumar, K (Ed) 2002 Text book of Fish Processing Technology. ICAR New Delhi
Venugopal, V. 2006 Sea food Processing, Narendra Publishing Co, New Delhi

FT 508 CAPTURE FISHERIES AND HYDROGRAPHY (1+1)

Objective To impart basic knowledge of capture fisheries and hydrography to the engineering graduates

Theory
UNIT1
An Overview of the world fisheries, important fishery regions of the world, major fish and shell fish resources. Major fisheries of the world.
Indian marine fisheries – major fishing zones- area, potential and exploitation.\.

Pelagic fishery resources of India.
Midwater fishery resources of India.
Demersal fishery resources of India.
Crustacean and molluscan resources of India and their fishery.
UNIT2
Inland capture fishery resources of India.
Riverine fisheries of India.
Reservoir fishery resources of India.
Brackish water resources of India
Cold water fishery resources of India.
UNIT3
Different types of fishing gears and fishing methods used in India.
UNIT4
Introduction to limnology.
Inland water types- ponds and lakes, streams and rivers.
Physical, chemical and biological conditions of various lentic and lotic water bodies.
Estuaries- classification, physico – chemical factors: biota and productivity.
UNIT5
Introduction of Oceanography.
Major features of topography, major divisions - continental shelf, continental slope, ocean ridges, deep sea trenches, abyssal plain, submarine canyons, guyots and sea mounts.
Ocean waves, tides and currents- classification and properties.
Chemistry of sea water – composition of sea water, salinity and nutrients.

Practical.
Identification of commercially important fin fishes and shell fishes.
Study of various fishing gears .
Study of Oceanographic instruments – water samplers, thermometers, grabs, corers, current meters, tidal gauges etc.
Determination of various chemical components of fresh and sea water.

Suggested Readings
ICAR 2006. Hand Book of Fisheries and Aquaculture. Directorate of Information and publications of Agriculture, ICAR, New Delhi.
Jhingran, V.G. 1991 Fish and Fisheries of India, Hindustan Publishing Corporation, India III Edn
HutchinsonG.E..1957 .A treatise on Lomnology (I&II),John Wiley &Sons Inc. New York
Sverdrup H.U, Johnson,M.W and Fleming R.H. 1970. The Oceans, Prentice-Hall Inc.

FE 501 AQUACULTURAL ENGINEERING 1+1

Objective
To familiarize engineering aspects of fish farm and hatchery, farm machinery operation and maintenance.
Theory
UNIT I
Site selection for aquaculture; surveying and leveling, earthwork calculations. Design of dykes, sluice, channels.

UNIT II
Tide fed farms; studies on water supply; aquaculture in open systems design of cages, rafts, pens, rakes, ropes etc.
UNIT III
Fluid mechanics, pumps, flow estimation and measurement; aquaculture in ponds, raceways and tanks.
UNIT IV
Recirculating aquaculture system; aeration, sterilization and disinfection, ponds, tanks and other impounding structures; filtration. Aeration – Gases in water. Gas transfer – Theory of oxygenation – Types of aerations.
Efficiency of Aerators. Recirculation and water – Reuse systems – water exchange – water reuse methods – Recirculation – Advantage – Designs of re-use systems.
UNIT V
Fundamentals of concrete; building materials, cement, RCC. Engineering aspects of fish and shrimp hatchery. Farm machinery operation and maintenance. Pond sealing techniques. Shapes roof design – Load carrying system. Floors, walls, ventilation.
UNIT VI
Automatic feeding system – Feed dispensers – Demand feeders. Design and construction of aquaculture system pond construction – water transportation system – Pump houses – Inlet and outlet structures – Water treatment plants.

Practical
Visit to hatcheries and farms; Instruments used in aquaculture; Operations of aerators, filters, water supply systems. Calculations related to earth requirement aerated efficiency and pump selection. Pump installations .Design of pump house. Computation of water requirement, pump, and pumping rates.

Suggested Readings
Bose AN, Ghosh SN, Yang CT & Mitra A. 1991. *Coastal Aquaculture Engineering*. E. Arnold.231
Ivar LO. 2007. *Aquaculture Engineering*. Daya Publ. House.
Lawson TB. 1997. *Fundamentals of Aquaculture Engineering*. CBS.
Wheaton EW. 1970. *Aquaculture Engineering*. Wiley-Interscience.

FE 502 ENVIRONMENTAL ENGINEERING AND POLLUTION 1+1

Objective
To understand engineering aspects of environment to protect the environment from pollution.

Theory
UNIT I
Introduction – Quality of water – Quantity of water – conveyance of water – treatment of water – filtration of water – Disinfections of water – water softening.
UNIT II
Distribution system of water. Collection and conveyance of refuse – pumps – sewage disposal – primary and secondary treatment of sewage.

UNIT III

Environmental Pollution – Ecological Balances – Ozone layer – Green House effect – Fossil Fuels. Atmosphere pollution – water pollution.

Marine oil pollution – Cause – Oil filtering equipment. Oil record book and controlling monitoring of marine pollution. Bunkering. MORPOL regulations.

UNIT IV

Air pollution – Control of Air pollution. Air pollution causes, Setting chambers, Cyclone Filters. Solid waste disposal. Sources of Pollutants – Classification. Air- pollution – Emission of harmful touchils. Littering of the sea – Plastics – Foods – Papers – Metals – Garbage – Regulation.

UNIT V

Low cost waste treatment systems and their Design. Ballest water management in ships. Discharge of ballast water – Problems of ballast water – Log book maintenance – Managing ballast water. Waste water and treatment, Industrial waste water management – Solid waste disposal.

Environment and corrosion. Mathematical modeling for environment pollution control.

Practical

Visit to various pollution control stations. Familiarization of pollution control instrument. Pollution control in Fishing harbours. Pollution control in aquacultural farms.

Suggested Readings

Bist DS. 2000. *Safety and Security at Sea - A Guide to Safer Voyages.* Butterworth- Heinemann.

Salvato JA, Nemerow NL & Agardy FJ. 2004. *Environmental Engineering.* John Wiley & Sons.

Sciortino JA & Ravikumar R. 1999. *Fishery Harbour Manual on the Prevention of Pollution.* BOBP. Chennai.

FE 503 FISH PROCESSING MACHINERY 1+1

Objective

To familiarize with engineering aspects of various equipments related to fish processing and design and layout of factory vessels and processing factories.

Theory

UNIT I

Theory of machines; mechanisms; transmission of power; friction wheels; toothed gears; belt drive.

UNIT II

Processing equipments on board the fishing vessels. Belt drivers, graders, deskinners, freezers, and canning machineries.

UNIT III

Study of fish meal plant equipments; freeze drying and dehydrating equipments.

UNIT IV

Types of boilers and their auxiliary equipments used in fish processing industries.

UNIT V

Twin screw extruders, driers, grading two filtering machines, Packing machines–Equipment Maintenance and safety.

Practical

Study of various types fish processing machineries; calculation of power requirements. Study of boilers and its operation, canning equipments, Twin screw extruders.

Suggested Readings

EIRI. 2000. *Modern Packaging Technology*. Engineers India Research Institute, New Delhi.
Gopakumar K. 2002. *Text Book of Fish Processing Technology*. ICAR.
Heldman DR. 1975. *Food Process Engineering*. AVI Publ.
Kondrashova NG. 1986. *Shipboard Refrigeration and Fish Processing Equipment*. Balkema. Leiden.
Novikov VM. 1982. *Handbook of Fishery Technology*. Vol. I. Amerind Publ. 235
Slade FH. 1997. *Food Processing Plants*. Leonard Hill Books.
Stansby ME. 1963. *Industrial Fishery Technology*. Reinhold Publ.

FE 504 REFRIGERATION & ELECTRICAL ENGINEERING

2+1

Objective

To impart knowledge on engineering aspects of refrigerators, freezers and heat-load calculation etc and to teach electrical aspects of fishing vessel.

Theory

UNIT I

Principles of refrigeration – Vapour Compression system, Vapour adsorption system – Refrigeration cycle.

UNIT II

Application of Refrigeration in fisheries Refrigeration in sea food processing plant coefficient of Performance (CoP).

UNIT III

Types of freezers and their efficiency, Heat load calculations – Insulations.
Frosting and defrosting in freezers and cold stores.

UNIT IV

Refrigeration in Factory Trawlers. Refrigerated Transport.

UNIT V

Sources of energy: General structure of electrical power systems, Power transmission and distribution via overhead lines and underground cables. Steam, Hydel, Gas and Nuclear power generation.

UNIT VI

Principal and application of DC Networks, single phase AC Circuits, three phase AC circuits, magnetic, transformers, induction motor, DC Motors etc.

UNIT VII

Electrical Measuring Instruments: DC PMMC instruments shunt and multipliers, multimeters, moving iron ammeters and voltmeters, dynamometer, wattmeter, AC watt-hour meter, extension of instrument ranges.

UNIT VIII

Principles and working; electronic components; Audio; R.F. circuits; electron tubes, transistors; principles of electronic circuits; amplifiers, oscillators, rectifier, tuned circuits – transmission of reception.

UNIT IX
Classification of waves according to frequency and their propagation through different media.
UNIT X
Principles of working of radio, radio telephone, radio direction finder, echo sounder, sonar, radar, GPS etc.

Practical
Visit to refrigeration plants, heat load calculations. Handling and operation of refrigeration equipments – compressor, condenser, evaporator, liquid return system, gas purging, oil drain, oil charging, refrigerant charging, defrosting; ice making and harvesting; study of various automatic control devices; expansion valves, L.P. and H.P. switches, solenoid valves. Study of various types of fish processing machineries; electrical motors, transformers, GPS, SONAR etc.

Suggested Readings
Ayyappan VP. 2002. *Elements of Electrical Technology*. CIFNET, Cochin.
Joshy CD & Devadhason M. 2001. *Basic Electronics and Fish Finding Equipments*. CIFNET, Cochin.
Shawyer M & Pizzali AFM. 2003. *The Use of Ice on Small Fishing Vessels*.
FAO Tech. Paper No. 436. Rome.
Sternin UG. Nikonorou IV & Yu BK. 1976. *Electrical Fishing*. Keter Publ. House.

FE 505 MARINE ENGINEERING 1+1

Objective
To learn engineering aspects of marine engines for effective utilization during fishing and propulsion system of fishing vessels.
Theory
UNIT I
Engine characteristics – capacity of cylinders, IHP, BHP, FHP, BMEP, torque determinations: SFC values. IC engines – working cycles – Indicator diagrams – Performance number – Supercharging – Engine performance curves – Duel-fuel engines. Handling of IC engine and maintenances – Engine and boiler room arrangements – Steering gears – auxiliary engines – Heat exchangers – Propeller Shaft driver steam generators.
UNIT II
Compression ratio and thermal efficiency; volumetric efficiency; mechanical efficiency different ratings – continuous, peak, intermittent. Feel and lubricant – Strokes – Cooling method – Running characteristics – Size weight – Power requirement.
UNIT III
Propulsion system – Combinations of engine, power transmission and propeller.
UNIT IV
Function of main engine, friction, clutch, hydraulic coupling, gearbox, thrust; bearing, shafting, propeller.
UNIT V
Auxiliary machinery systems – Requirements of a winch, windlass, line and net hauler – estimation of their driving torque and power; Operation of a hydraulic steering gear; Rudder torque. Floating offshore structures – Diving underwater vehicles. Diving – Underwater vehicles. Estimation grower requirement for various types of fishing – Efficiency group of fishing techniques – Resistance group of fishing methods – Computation of engine power.

Practical

Study of basic machine parts. shafts. keys. couplings. levers. joints. pulleys. belts. gears and bearings. Study of Engine parts. engine testing. dissembling and assembling a running condition marine engine: study of marine diesel engines. fuel consumption testing with load; Propeller calculations using the computers; calculations related to engine power.

Suggested Readings

Calder N. 1992. *Marine Diesel Engines*. Waterline Books.
CIFNET. 2004. *Fishery Engineering*. Cochin.
Morgan N. 1990. *Marine Technology Reference Book*. Butterworths.
Rajput RK. 2006. *Thermal Engineering*. Laxmi Publ.
Rethinadhas C. 2002. *Marine Engineering*. CIFNET, Kochi.
Watson GO & Harvey RA. 1971. *Steering Gear*. Butterworths.

FE 506 FISHING HARBOUR AND FLEET MANAGEMENT 1+1

Objective

To learn fishing harbour Engineering, fishing fleet management and manning regulations.

Theory

UNIT I

FAO classification of fishing vessels. Indigenous fishing boats of India – fishing boats of maritime states of India, fishing boats used in the inland and brackish waters, account of mechanized boats introduced in India.

UNIT II

Personnel management, planning of fishing cruises. Fishing fleet capacity, fleet registration, fleet insurance, seaworthiness assessment, tonnage measurements.

UNIT III

Statutory rules and regulations under MSA, classified societies, manning regulations and requirements; regulations to prevent collisions at sea.

UNIT IV

Classification and functions of fishing harbour. Facilities – waterside and landside facilities, services and utilities provided, layout of a modern fishing harbour, stages in the planning of fishing harbours. Dredging. Economic evaluation on fishing harbour project.

UNIT V

Dry docks and slipway –.Fishing harbour management and maintenance.

Practical

Visit to dry dock; Visit to fishing harbour, study of boats with the help of boat models and making sketches; Visit to various vessel types of fishing vessel.

Suggested Readings

FAO. 1960. *Report to Government of India on Fishing Harbours Based on the Work of C. G. B. Juke and C.R.B. Juke.* FAO Report No. 1242.
Rome.
FAO. 1962. *Second Report to Government of India on Fishing Harbour Based on the Work of B. W. Johnson.* FAO Report No. 1538. Rome.
Ramakrishnan TK. 2007. *Ocean Engineering*. Gene Tech Books.

Sciortino SA, Barcali A & Carlesi M. 1995. *Construction and Maintenance of Artisanal Fishing Harbours and Village Landingss*. FAO, Rome.
Sreekrishna Y & Shenoy L. 2001. *Fishing Gear and Craft Technology*. ICAR.

FE 507* ADVANCED FISHING GRAFT TECHNOLOGY 2+1

Objective

To understand advanced aspects of fishing craft such as better design and modification of existing craft layout.

Theory

UNIT I

Different types of fishing crafts-purse seiner, trawler, stern and side trawler, long liner, gill netter, etc; main differences in the method of construction and design; consideration regarding the speed and other fishing requirements. Deck layout and deck equipments of fishing vessels based on the fishing method; Planning internal capacities of fish hold, engine room, crew accommodation, fuel tanks and freshwater tanks.

UNIT II

Engine installation in fishing vessels; engine bearers for wooden boats; alignment of shaft; stern gear assembly; length of shafts; intermediate shafts; reverse and reduction gear assembly.

UNIT III

Principles of operating steering arrangement; remote control; mast and derrick arrangements; fish hold; - Rudder principles; helm – design details. Principal dimensions of a boat. Importance of shape of under water hull, classification and description of hull forms based on shape and speed – length ratio.

UNIT IV

Theory of waves; rolling, pitching and heaving; wall sides formula; resistance and motion – wave and eddy creating resistance, fluid resistance. Safety and stability aspects of fishing vessels – factors affecting stability, stability information to be carried on vessels, hydrostatic curves, and static stability curves and safety measures on fishing vessels.

UNIT V

Barnaby's tables; speed length ratios; effects of wetted surfaces on speed; angle of entrance, parallel body, propeller action; types of propellers; design data; D/P values. Powering of fishing boats, different types of resistance and their calculations, power requirements of various types of fishing boats, auxiliary power, propulsive efficiency, type of propellers, and use of kort nozzle.

UNIT VI

Rudder design and principles of operation; model test etc. Boat fastenings and fittings used in boat construction.

UNIT VII

Biodeterioration of wood – marine fouling and boring organisms, preventive measures.

UNIT VIII

Raw materials, properties and construction of FRP, Aluminum, Ferrocement and Steel boats. Corrosion – types, fundamentals, measurement and preventive measures.

UNIT IX

Construction of a wooden boat – Various stages of construction, description of various machines and tools used in boat building yard, layout of a typical wooden boat building yard.

UNIT X

Inspection of fishing boat under construction and in operation. Care and maintenance of wooden boats – factors causing damage, hull protection methods and maintenance schedule

Practical

Visit to boat building yards for on – the – spot study of different stages of wooden boat construction and to study the layout. Identification of various tools and machines used in boat building. Study of various stages of boat construction with the help of boat models and making their sketches. Calculation of various dimensions: Study of deck lay outs of different types of fishing vessels and preparation of sketches: Visit to dry dock

Suggested Readings

Fyson JF. (Ed). 1985. *Design of Small Fishing Vessels*. Fishing News Books.
Marine Institute. 1988. Proc. World Symposium on Fishing Gear and Fishing Vessel Design. The Newfoundland and Labrador Institute of Fisheries and Marine Technology, St. John's. Newfoundland, Canada.
Pike D. 1992. *Fishing Boats and Their Equipments*. Fishing News Books.
Ponnambalam A. 2003. *Fishing Craft Technology*. CIFNET, Cochin.
Sanisbury JC. 1996. *Commercial Fishing Methods-An Introduction to Vessels and Gear*. Fishing News Books.
Shenoy L. 1988. *Course Manual in Fishing Technology*. CIFE, Mumbai.
Sreekrishna Y & Shenoy L. 2001. *Fishing Gear and Craft Technology*. ICAR.
Traung T. 1967. *Fishing Boats of the World*. Fishing News Books. 227
Yadav YS. 2002. *Traditional Fishing Craft of the Bay of Bengal*. BOBP, Chennai.

FE 508 ENGINEERING GRAPHICS 0+1

Objective

To gain knowledge on practical aspects of computer aided engineering graphic.

Practical

UNIT I

Introduction to engineering graphics – Drawing instruments and their use – Different types of lines – Lettering & dimensioning – Familiarisation with current India Standard Code of Practice for Engineering Drawing.

UNIT II

Introduction to scales. Introduction to orthographic projections – Horizontal, vertical and profile planes – First angle and third angle projections – Projection of points in different coordinates – Projections of lines inclined to one of the reference planes.

UNIT III

Projections of lines inclined to both the planes – True lengths of the lines and their angles of inclination with the reference planes – Traces of lines.

Projection of plane laminae of geometric shapes inclined one of the reference planes – inclined to both the planes – auxiliary projections.

UNIT IV

Projections of poly hedra and solids of revolution – Frustum – projection of solids with axis parallel to one of the planes and parallel or perpendicular to the other plane – Projections with

the axis inclined to one of the planes. Projections of solids with axis inclined to both the planes – Projection of spheres. Sections of solids by planes perpendicular to at least one of the reference planes – True shapes of sections. Developments.

Suggested Readings

Bhatt ND. 2002.*Elementary Engineering Drawing*. Charotar Publ. House, Anand.
Rising JS & Almfeldt MW. 1964. *Engineering Graphics: An Integration of Engineering Drawing, Descriptive Geometry and Engineering Problems Solution*. WC. Brown.
Venugopal K. 2004. *Engineering Drawing and Graphics*. New Age International.

FE509 BASIC ENGINEERING PRINCIPLES –I. (1+1)

Objective To impart basic knowledge of civil and mechanical engineering topics to the Fisheries graduates.

Theory

CIVIL ENGINEERING

UNIT I

Materials: cement-varieties and grade of cement and its uses.Steel-types of steel for reinforcement bars. steel structural sections. Brick-varieties and strength. tests on bricks.
Aggregates-types &requirements of good aggregates.Concrete-grades of concrete as per IS code. Water cement ratio. Workability, mixing, batching, placing, compaction and curing. construction: Foundation-types of foundations-isolated footing, combined footing. raft, pile &well foundations.

UNIT 2

Super structure: Brick Masonry. English bond and flemish bond. Stone masonry. Random rubble masonry. Roofing. steel trusses. roofing for industrial buildings.
Surveying: Levelling, Theodolite

Mechanical Engineering

UNIT 3

Thermodynamics: thermodynamic systems-open, closed and isolated systems. Equilibrium state of a system, property and state, process, cycle, work, Zeroth law of thermodynamics-concepts of temperature, temperature scales. First law-internal energy, enthalpy, second law-Kelvin Plank and Claussius statements, Carnot Cycle.
Refrigeration and Airconditioning: Vapour compression and vapour absorption refrigeration systems. summer and winter air-conditioning. Comfort and Industrial Air Conditioning. Elementary ideas of simple reaction and impulse turbines. compounding of turbines.

UNIT 4.

Internal combustion Engines: Working of two stroke and four stroke petrol and Diesel engines. Simple carburetor. ignition system, fuel pump. fuel injector, cooling system. lubricating system. Transmission of power. Belt drive(open and Closed).chain drive. Metal fabrication-welding - Arc, gas, resistance welding, Welding defects, Soldering. Brazing.

Practical.

Surveying practicals-Area measurements using Planimeters.
levelling experiments. Theodolite experiments.
Testing of materials using UTM.Site visits.

Suggested Readings

P.K.Nag.*Engineering Thermodynamics.*
Rogowsky. *Elements of Internal combustion engines*-Tata McGraw Hill
Stocker .*Refrigeration and Air-conditioning*:. Tata McGraw Hill
Kanetkar,T.P.& Kulkarni,S.V.Surveying and Levelling.1980.Vidhyarthi Griha Prakasan.Pune.

2..FE 510 :BASIC ENGINEERING PRINCIPLES. -2 (1+1)

Objective To impart basic knowledge of electrical and electronics engineering topics to the Fisheries graduates.

Electrical

UNIT 1

Basic principles of Electric Circuits.Review of ohms law-Definitions of resistance,current voltage and power-series and parrallel circuits-constant source and constant current source.

Network Theorems: Kirchoff's laws,Network analysis by Maxwell's circulation current voltage and power.Thevenin's theorem-superposition theorem-Norton Theorem-simple illustrative problems on network theorems.

Review of Electrostatics-Coulomb's law.Electric field strength and Electric flux density-capacitance.

UNIT 2.

Review of electromagnetic induction.Faraday's Law.Lenz's Law-mutually induced emf.Magnetic circuits-magnetic field of a coil-Ampere turns calculation-magnetic flux-flux density-field strength.

Measuring Instruments: working principle of galvanometer,Ammeter,Voltmeter,wattmeter&energy meter.

Ac Fundamentals: Generation of aleternating voltage and current-equations of sinusoidal voltage and current-wave form, cycle frequency, time period,amplitude,phase difference, rms vaue, average value, power factor &form factor.Vector diagram-addition and subtraction nof vectors-sine wave in phase and out phase .AC circuits.

Electronics

UNIT 3.

Passive components: resistor-capacitor-inductor-color coding-transformer-different types, construction.

Semiconductors: Energy band diagram-intrinsic and extrinsic semi conductors,doping-PN junction-Diodes, Zener diodes-characteristics-Application of diodes. Rectifiers-Half wave,full wave and bridge rectifiers-Ripple factor and regulation.

Transistors:PNP and NPN transisters-theory of operation-transistor configurations-characteristics-comparison.

Special conductor devices-FET-SCR-LED-LCD-V-I characteristics, applications.

UNIT 4.

Fundamentals of Instrumentation: Transducers-Definition-Classification-Active &passive .Transducers for position,pressure,velocity,vibration and temperature measurements.CRO principle of operation-measurement of amplitude frequency and phase.

Fundamentals of Communication

Analog communication-concept of modulation-demodulation.Types:AM-FM-PM-Block diagram of general communication system-Basic concepts of digital communication-block diagram

Practical

Star Delta Connections.
Starters.
Electrical motors. Tranformers
Fault finding of Electrical motors, pumpsets, Diesel Engines

Suggested Readings

B.L.Theraja- ***Fundamentals of Electrical Engineering & Electronics,***.S.Chand New Delhi.
G.K.Mithal&Ravi Mithal.***Electronic Devices&Circuits,***.Khanna Publishers New Delhi.

FE 511.ENGINEERING WORK SHOP PRACTICE. (0+2)

Objective To impart basic knowledge engineering work shop practice to the Fisheries graduates.

ELECTRICAL WORKSHOP

1.One lamp controlled one switch.
2.Series and parallel connections of lamps.
3.Star case wiring.
4.Hospital wiring.
5.Gowdown wiring.
6.Fluroscent lamp.
7.Connection of plug socket.
8.Different kinds of joints.
9.Transformer wiring.
10.Soldering practice.
11.Familiarization of CRO

MECHANICAL WORKSHOP

1.Fitting shop.
2.Sheetmetal shop
3.Foundry shop.
4.Welding shop.
5.Carpentryshop

Suggested Readings.

Raghuwanshi.. *Workshop Technology,* Dhanpat Rai & Sons, Delhi.
B.L.Theraja- *Fundamentals of Electrical Engineering & Electronics,*. S.Chand New Delhi

Preamble

The Department of Fishery Biology, College of Fisheries has been conducting M. F. Sc. Degree programme since 1984. A large number of M. F. Sc. Degree holders has been repeatedly requesting for pursuing Ph. D. prgramme in this discipline. In this context the department proposes a Ph. D. programme. The syllabus is appended herewith and is adopted from ICAR approved syllabus with minimal deviation. The syllabus for Minor and supporting courses have already been approved by KAU. The Board of studies has also approved the syllabus.

Placed for favour of approval

Doctoral programme

FISHERIES RESOURCE MANAGEMENT

Course Structure at a glance

Code	Course Title	Credits
FB 601*	Conservation of Aquatic Biodiversity	2+1
FB 602*	Applications of Fisheries models in stock assessment	2+1
FB 603*	Conservation and management of exploited fisheries resources	2+1
FB 604	Ecology of Coral reef and Mangroves	2+1
FB 605	Estimation of exploited fisheries resources	0+2
FB 606	Fisheries environment	2+1
FB 607	Management of capture fisheries	1+1
FB 691	Doctoral seminar – I	1+0
FB 692	Doctoral seminar – II	1+0
FB 699	Doctoral research	0+45
	Common Supporting Courses	
MS 601	Advanced statistical methods	2+1
MS 602	Software for fisheries data analysis and management	0+2

* Compulsory for Doctoral Programme

Credit Requirements

Major - 15 credits

Minor - 8 credits

Supporting - 5 credits

Doctoral seminars - 2 credits

Research - 45 credits

FB 601 CONSERVATION OF AQUATIC BIODIVERSITY 2+1

Objective

To impart in-depth knowledge on aquatic biodiversity, its assessment and conservation methods.

To understand the ecological impact of various aquatic resources.

Theory

UNIT I ; Definitions and measurement: Methods, scales and indices of biodiversity assessment.

UNIT II : Biodiversity (microalgae to aquatic vertebrates) of riverine, estuarine, marine and sensitive ecosystems

UNIT III : Threats to biodiversity: Overexploitation, land reclamation, pollution, habitation, conversion of agricultural land and aquacultural farms (case studies pertaining to any sensitive marine/estuarine/freshwater hot spots).

UNIT IV : Conservation and Restoration: Declaration of mangrove sanctuaries and mangrove afforestation, marine protected areas, Ganga Action Plan, introduction of exotic species and their implications; potential consequences and conflicts of linking rivers.

UNIT V : Impacts of anthropogenic intervention on aquatic biodiversity: Damming of rivers, construction of sea walls, micro hydel power stations, oil rigs.

UNIT VI : Legal regimes of biodiversity: International and national conventions and Acts for biodiversity.

UNIT VII : Institutional frame work for biodiversity conservation (Such as creation of Biodiversity Boards/Authority).

Practical

Preparation of records and inventories of biodiversity of any three critically important ecosystems based on secondary data and field visits- Compilation of all important International and National laws and conventions related to biodiversity

Suggested Readings

Brian G. 1992. Global Biodiversity - Status of the Earth's Living Resources. Chapman & Hall.

Denton TE. 1973. *Fish Chromosome Methodology*. Charles Thomas Publ.

Elliott AN. (Ed.). 1993. *Global Marine Biological Diversity*. Inland Press.

Gunderson DR. 1993. *Surveys of Fisheries Resources*. John Wiley & Sons.

Khanna DR, Chopra AK & Prasad G. 2005. *Aquatic Biodiversity in India*. Daya Publ. House.

Kumar U & Asija M. J. 2000. *Biodiversity Principles and Conservation*. Agrobios.

Lakra WS, Abidi R, Singh AK, Sood N, Rathore G & Swaminathan TR. 2000. *Fish Introductions and Quarantine: Indian Perspective*. National Bureau of Fish Genetic Resources (NBFGR), Lucknow.

Lambshead PJD, Paterson GLJ & Gage JD. 1997. *Biodiversity Professional*. Version 2. National History Museum and the Scottish Association of Marine Science.

Magurran AE. 1988. *Ecological Diversity and its Measurement*. Taylor & Francis.

Mahanta PC & Tyagi LK. 2003. *Participatory Approach for Fish Biodiversity Conservation in North East India*. National Bureau of Fish Genetic Resources (NBFGR), Lucknow.

Ponniah AG & Gopalakrishnan A. (Eds.). 2000. *Endemic Fish Diversity of Western Ghats*. National Bureau of Fish Genetic Resources (NBFGR), Lucknow.

Zoological Survey of India. 2007. *National Symposium on Conservation and Valuation of Marine Biodiversity*.

FB 602 APPLICATIONS OF FISHERIES MODELS IN STOCK ASSESSMENT 2+1

Objective

To study the application of various dynamic and holistic models used in fish stock assessment.

Theory

UNIT I : History and development of analytical models

UNIT II : Virtual population analysis; a predictive age-based Thompson and Bell model; Beverton and Holt's yield per recruit model & Holt's relative Y/R concept; Biomass per recruit

UNIT III : Surplus production models; estimation of Maximum sustainable yield; Fox model & Schaefer model – assumptions behind the models

UNIT IV : Prey predator models. Stock recruitment relationship; Classical S/R considerations; the stability of recruitment, towards modeling recruitment; Ricker, Beverton and Holt models.

UNIT V : Bioeconomic modeling; multi-species, multi-fleet problems; biological interaction; Economic interactions; Technical interactions

UNIT VI : Ecopath and ecosim models; evaluate ecosystem effects on fishing and analyze impact and placement of marine protected areas; model effect of environmental changes; trophic models of aquatic ecosystems.

Practical

Application of logistic and analytical models in marine, riverine and estuarine systems. Ecopath modeling based on secondary data.

Suggested Readings

Beverton RJH & Holt SJ. 2004. *On the Dynamics of Exploited Fish Population*. The Blackburn Press.

Edwards EF & Megrey BA. 1989. *Mathematical Analysis of Fish Stock Dynamics*. American Fisheries Society, Maryland.

Gulland JA (Ed.). 1977. *Fish Population Dynamics*. John Wiley & Sons.

Nickolskhi GV. 1980. *Theory of Fish Population Dynamics as the Biological Background for Rational Exploitation and Management of Fishery Resources*. Bishen Singh Mahendra Pal Singh, Dehra Dun.

Ray H & Carl JW. 1992. *Quantitative Fisheries Stock Assessment Choice, Dynamics and Uncertainty*. Kulwer.

Ricker WE. 1971. *Methods for the Assessment of Fish Production in Freshwaters*. Blackwell, Oxford & IBH.

FB 603 CONSERVATION AND MANAGEMENT OF EXPLOITED FISHERIES RESOUCES 2+1

Objective

To apprise the students on the various conservation and management strategies of exploited fisheries resources.

Theory

UNIT I : Marine parks, marine protected areas, biosphere reserves, closed seasons.

UNIT II : Cryopreservation of exploited and endangered species.

UNIT III : Fishing regulation policies - A critique on the draft Indian Fisheries policy.

A critical appraisal of inland Fisheries Legislation of any two states of India.

UNIT IV : Protection of habitat of corals, mangrove, seaweeds, sea grass beds. Implementation of square cod end mesh – to reduce by-catch.

UNIT V : Legal proceedings / implementation for protection of exploited and endangered fishery resources.

UNIT VI : Total allowable catch, regulation of mesh size for conservation of exploited fishery resources.

UNIT VII : Management of major reservoirs of India; optimal stocking and production of cultivable resources.

UNIT VIII : A comparative study of the marine regulation acts of any two neighboring countries with reference to Environmental Protection Act (EPA).

UNIT IX : Compile the rules relating to marine fisheries exploitation included in the final UNCLOS III treaty.

Practical

Based on the existing policy, suggest and draft ideal inland and marine fishery legislation for any one Indian State. With reference to the laws of the sea (UNCLOS III) treaty, recommend ways and means to solve dispute of shared stocks. Develop a framework for conflict resolution of traditional and mechanized fisheries. Impact of conservation measures like closed seasons in fisheries – Data analysis. Turtle exclusion device. Visit to fisheries parks.

Suggested Readings

Mahanta PC & Tyagi LK. 2003. *Participatory Approach for Fish Biodiversity Conservation in North East Inidia*. National Bureau of Fish Genetic Resources (NBFGR), Lucknow.

Menon AGK. 2004. *Threatened Fishes of India and their Conservation*. Fishries Survey of India.

Michael RR. 1997. *Fisheries Conservation and Management*. Prentice Hall.

Pascoe S. 2005. *Bycatch Management and the Economics of Discarding*. Daya Publ. House.

Thorpe JE, Talbot C & Miles MS. (Ed.) 1995. *Conservation of Fish and Shell Fish Resource; Managing Diverisity*. Academic Press.

FB 604 ECOLOGY OF CORAL REEF AND MANGROVES 2+1

Objective

To classify coral reefs and mangroves
To learn the ecology and function of these ecosystems
To gain knowledge on the natural and anthropogenic interference on these habitats
To impart information on the conservation and management of these ecosystems.

Theory

UNIT I : Types of coral reefs and their distribution; coral reefs of the world
UNIT II : Factors influencing the growth, productivity and reproduction of coral reefs
UNIT III : Ecology of coral reefs : reef communities, food chains and food webs, symbiotic relationships
UNIT IV: Types of mangroves; plant diversity, zonation, and adaptations. Mangrove functions.
UNIT V: Ecology of mangroves: mangrove communities, food chains and food webs
UNIT VI: Degradation and destruction of coral reefs and mangroves : natural processes, climate change, anthropogenic interventions including destructive fishing practices.
UNIT VII: Conservation and management; principles of ecological restoration – habitat enhancement, afforestation, use of remote sensing and GIS techniques, joint mangrove management (JMM) programme

Practical

Case study of selected coral reef ecosystem and mangrove ecosystem. Inventory of associated faunal and floral communities and their seasonal variations.

Suggested Readings

Bakus GJ. 1994. *Coral Reef Ecosystems*. Oxford & IBH Publishing Co., New Delhi.
Kumudranjan Naskar, 2004. *Manual of Indian Mangroves*. Daya Publishers, New Delhi
Naiman RJ & H Decamps (eds.). 1990. *The ecology and Management of Aquatic – terrestrial ecotones*. Man and Biosphere series, UNESCO & Parthenon Publishing group, London.
Peter S. (Ed.).2006. *Coral Reef Fishes: Dynamics and Diversity in a Complex Ecosystem*. Academic Press.
Singh V P & K Odaki, 2004. *Mangrove ecosystem : structure and function*. Science Publishers, New Delhi

FB 605 ESTIMATION OF EXPLOITED FISHERIES RESOURCES 0+2

Objective

To learn in detail the sampling designs and estimation of catch and effort data.

Practical

Collection of fishery data at landing centres from different gears separately. Details of craft and gear of landing centres. Recording of data in the entry forms. Definition of length for various groups of fish/crustaceans/molluscs. Collection of length

frequency data of fishes at landing centres. Estimation of age and growth based frequency data. Growth, mortality, population and stock parameters employing FiSAT, Length structured VPA, Thompson and Bell yield stock prediction for single and multifleet version. Beverton and Holt yield-per-recruit model; biomass-per-recruit. Relative yield-per-recruit model and yield isopleths diagram.

Suggested Readings

Beverton RJH & Holt SJ. 2004. *On the Dynamics of Exploited Fish Population.* The Blackburn Press.

Callucci VG, Saila SB, Gustafson DJ & Rothschild BJ. 1996. *Stock Assessment. Quantitative Methods and Applications for Small Scale Fisheries.* Lewis Publ.

Gulland JA. 1977. *Fish Population Dynamics.* John Wiley & Sons.

Gulland JA. 1992. *A Review of Length Based Approaches to Assessing Fish Stocks.* FAO Tech. Paper. 323.

Nickolskhi GV. 1980. *Theory of Fish Population Dynamics as the Biological Background for Rational Exploitation and Management of Fishery Resources.* Bishen Singh Mahendra Pal Singh, Dehra Dun.

Ricker WE. 1971. *Methods for the Assessment of Fish Production in Freshwaters.* Blackwell, Oxford & IBH.

Sparre P & Venema SC. 1998. *Introduction to Tropical Fish Stock Assessment.* Part 1 *Manual.* FAO Fisheries Tech. Paper No. 301, Rome.

FRM 606 FISHERIES ENVIRONMENT 2+1

Objective

To know the probable impacts of environmental factors on fishery resources and gain knowledge on the standard methods applicable in fisheries environmental assessment.

Theory

UNIT I : Critically important climatic factors (temperature, rainfall and wind pattern / monsoon influencing aquatic (inland and marine) productivity and production.

UNIT II : Remotely sensed SST, Chlorophyll and Wind pattern features of Indian seas used in locating Potential Fish Zones (PFZ).

UNIT III : Influence of rainfall intensity, its seasonal and annual variations on fish migration, breeding, recruitment and production. (Correlation of rainfall data from IMD and catch data on fishes from same region for bringing out the impact of rain on production).

UNIT IV : Optimum water quality parameters prescribed for various water bodies (marine and inland) for different user groups including fisheries.

UNIT V: Environmental Impact Assessment of various anthropogenic causes; domestic and industrial/ effluent discharge into waters and their impact on fisheries. Tannery discharge and its impact on fisheries.

UNIT VI: Status, structure and trophic profile (at primary, secondary and tertiary levels) of four typical water bodies: i) Marine, ii) Estuarine iii) Reservoir iv) River in relation to nutrient profile, plankton profile and oxygen profile in spatial and temporal terms.

UNIT VII : Climate change and fisheries

Practical

Preparation of isoclines of temperature, rainfall and chlorophyll pattern of data gathered from satellites and demarcation of the PFZ's. Development of a graphic picture of the vertical and horizontal profiles of various nutrients, temperature, oxygen, plankton and fish density of any well defined aquatic system.

Suggested Readings

Canter LW. 1994. *Environmental Impact Assessment.* Mc-Graw Hill.
Grilbert M & Gould R. 1998. *Achieving Environmental Standards.* Pitman Publ.
Peter W. (Ed.). 1988. *Environmental Impact Assessment: Theory and Practice.* World Research Institute, Routledge, London.

FB 607 MANAGEMENT OF CAPTURE FISHERIES 1+1

Objective

To get comprehensive knowledge on the major issues / challenges faced in capture fisheries.

Theory

UNIT I ; Scope and objectives of FAO Code of conduct for Responsible Fisheries. Articles of CCRF-Description of the code.

UNIT II : Elaboration of Article 8-Fishing operations; Over capacity (excessive fishing efforts); Over exploitation; By-catch and discards. Definitions, bycatch reduction devices, Turtle excluder devices, finfish and shrimp excluder devices.

UNIT III : Fish Aggregation devices (FADs) – Objectives and types of FADs.

UNIT IV: Application of Remote sensing and PFZ and GIS in fisheries.

UNIT V : Illegal, Unregulated and Unreported fishing methods (IUU); Destructive and prohibited fishing systems and practices. Ghost fishing.

UNIT VI : Eco friendly fishing methods and fishing gears.

UNIT VII : Effect of fishing on nontarget species – Effect of bottom trawl on benthic fauna and habitats. Conservation methods issues and implications for biodiversity.

Practical

Assessment of fishing capacity; stages of overexploitation, case studies and field visits.

Suggested Readings

Bergstrom M. 1983. *Review of Experiences with and Present Knowledge about Fish Aggregating Devices*, BOBP/WP/23 Bay of Bengal Programme, Madras.
FAO. 1995. *Code of Conduct for Responsible Fisheries*, Rome.
FAO. 1996. *Fishing Operations. FAO Training Guidelines for Responsible Fisheries.* No. 1. Rome.
FAO. 2003. *Fisheries Management. The Ecosystem Approach to Fisheries.*
FAO Technical Guidelines for Responsible Fisheries. No.4, Suppl.2, Rome.
Kaiser MJ & de Groot SJ. 2000. *Effect of Fishing on Non-Target Species*

List of Journals

- Aquaculture Nutrition
- Bio-Techniques.
- Bulletin of Mathematical Biology
- Conservation
- Conservation Biology
- Conservation Letters
- Coral Reefs
- Ecological Management and Restoration
- Ecology of Freshwater Fish
- Ecosystem Health
- Environmental Biology of Fishes
- Environmental Management
- Estuaries and Coasts
- Fish and Fisheries
- Fisheries Management and Ecology
- Fisheries Research
- Fisheries Science
- Freshwater Biology
- Gene
- Hydrobiologia
- Indian Journal of Ecology
- Indian Journal of Fisheries
- Indian Journal of Marine Sciences
- Journal of Aquaculture in the Tropics
- Journal of Biosciences
- Journal of Evolutionary Biology
- Journal of Fish Biology
- Journal of Ichthyology and Aquatic Biology
- Journal of Indian Ocean studies
- Jounral of Inland Fisheries Society of India
- Journal of Mathematical Biology
- Journal of the Marine Biological Association of India.
- Lakes and Reservoirs: Research and Management
- Limnology and Oceanography
- Marine Ecology
- Molecular Ecological Notes
- Molecular Marine Biology and Biotechnology
- Natural Resource Modeling
- Plant Biology
- Reviews in Fish Biology and Fisheries
- Plant Breeding
- www.barcodinglife.org
- www.reefbase.org

Suggested Broad Areas for Doctoral Research

- Mapping of fisheries resources in different freshwater bodies
- Estimation of biodiversity and abundance of various freshwater fishes
- Fish stock assessment in different freshwater bodies using FiSAT
- Analysis of productivity in different freshwater bodies
- Fish stock assessment in various marine ecosystems using FiSAT
- Assessment of bycatch from trawl, bottom set gill net
- Sea ranching and effect of ranching in the marine ecosystem

- Estimation of biodiversity and abundance of endangered species of sponges, corals, gastropods, bivalves, sea cucumbers, fishes, sea snakes, turtles, birds and marine mammals
- Effect of conservation measures on the restoration of depleting fish stocks
- Estimation of biomass in various marine ecosystems
- Estimation of MSY in various marine ecosystems
- Fish stock assessment in various marine ecosystems using FiSAT
- Development of proper guidelines for commercial deep sea fishing
- Impact of Coastal Regulation Zone on the stock replenishment
- Monitoring, Control and Surveillance (MCS) systems for inland and marine capture fisheries
- Collection of satellite information on various aquatic resources and ground truthing
- Interpretation of satellite pictures for resource management
- Use of remote sensing for Potential Fish Zone
- Estimation of floral/ faunal diversity of mangroves and coral reefs.
- Estimation of fleets and catches at landing sites for effective fisheries management
- Studies on biodiversity estimates for coastal resources
- Estimation of biodiversity of aquatic floral resources.
- Catalogue preparation of commercially important aquatic floral resources
- Neuro-hormones controlling the reproduction of commercial crustacean species
- Identification of commercially important species of finfish and shellfish eggs and larvae, spat.
- For casting the fishery potential through the study of abundance of finfish and shellfish eggs and larval in the marine ecosystem.
- Food and feeding habits of larval stages of shell, fin fishes and aquatic organisms
- Stock assessment of individual freshwater and marine fish using FiSAT
- Assessment of By catch from trawl, bottom set gill net
- Catalogue preparation of commercially important fishes (FW, BW, Marine)
- Studies on biodiversity estimates for coastal resources, fresh water bodies.
- Food and feeding habit of commercially important group of fishes and shellfishes.
- Reproductive biology of aquatic organisms
- Ecology of aquatic organisms
- Microsatellite base identification of commercial fishes
- Karyo-taxonomy of commercially important fishes and shellfishes
- Studies on biodiversity estimate for fisheries resources in various aquatic ecosystem.
- Stock assessment of individual freshwater and marine fish using FiSAT
- Assessment of By catch from trawl, bottom set gill net
- Ecopath modelling for minor reservoir, small water body
- Conservation biology and marine pollution
- Coral reef reproduction, assessment, monitoring and management
- Coral reef resilience, restoration and interaction with associated fauna and flora
- Remote sensing and geospatial analysis of coral reef ecosystem.
- Biogeochemical cycles in coral reef environments.
- Estimation of biomass in various marine ecosystems
- Estimation of MSY in various marine ecosystems
- Fish stock assessment in various marine ecosystems using FiSAT
- Fishery Independent survey for coral resource estimation
- Estimation of Taxonomic distinctness for major finfish and shellfish resources
- Mapping of various marine and inland fisheries resources
- Estimation of biodiversity of various marine and inland fisheries resources
- Analysis of Catch composition by gear and craft in marine and inland water bodies
- Fish stock assessment in various marine and inland ecosystems using FiSAT
- Assessment of bycatch from trawl, bottom set gill net

[Updated 11 July 2010]

MICHAEL BERNARD NEW

Curriculum vitae

Michael New OBE CBiol FIBiol BSc ARCS FiFST
Wroxton Lodge, 25 Institute Road, Marlow, Bucks SL7 1BJ, England
Tel/Fax: +44 1628 485631 e-mail: Michael_New@compuserve.com

Michael Bernard New, OBE

Michael New is an international expert in freshwater prawn farming and his two books, several review papers, two FAO technical manuals and an FAO cultured species fact sheet on this topic are well-known. Several have been translated into a number of languages, including Arabic, Chinese, Farsi, French, Malayalam, Spanish and Vietnamese.

Since 1969 Michael New has worked in the private and public sectors of aquaculture development in more than 40 countries in Africa, Asia and the Pacific, Europe and Central, North and South America. In Asia & the Pacific he is best remembered for his management of FAO and European Commission projects in ASEAN countries, based in Bangkok.

A Past-President of the World Aquaculture Society and of the European Aquaculture Society, Michael New has chaired or been a keynote/plenary speaker at numerous international conferences, including *Freshwater Prawns 2003* (Kochi, India). He was also the V.G. Jhingran Memorial Lecturer at the *Workshop on the Status of Freshwater Prawn Farming in India* organised by the Asian Fisheries Society (Indian branch) in Mumbai (1994). Mr. New was the Steering Committee Chair for *World Aquaculture '99* (Sydney, Australia) and *AQUA 2000* (Nice, France), Programme Chair for *World Aquaculture '05* (Bali, Indonesia) and a member of the Steering and Programme Committees for *World Aquaculture '08* (Busan, Republic of Korea). Currently, besides being an organiser of *Giant Prawn 2011* (Kochi, India), he is a member of the Steering Committee for *World Aquaculture 2011* (Natal, Brazil) and Programme Co-Chair for *AQUA 2012* (St. Petersburg, Russia).

In 1999 Her Majesty Queen Elizabeth II appointed Michael New an Officer of the Order of the British Empire (OBE) in recognition of his services to aquaculture in developing countries. In 2002 he was appointed an Honorary Life Member of the World Aquaculture Society and in 2003 he was elected an Honorary International Life Member of the China Society of Fisheries. In 2009 he was awarded the World Aquaculture Society Exemplary Service Gold Medal.

In 2003 Michael New formed the NGO *Aquaculture without Frontiers* (AwF) (www.aquaculturewithoutfrontiers.org) to help to alleviate poverty in developing countries through voluntary services in small-scale responsible aquaculture. Currently, AwF has projects and on-going activities in several countries, including Bangladesh, India, Indonesia, Malawi, Nepal and Thailand. A few shrimp farmers in Kerala were also fortunate to receive support from AwF, when AwF provided an assistance of US$ 1000 to Tsunami-affected shrimp farmers, which was distributed by Sri. Mullakkara Ratnakaran, the Hon. Minister for Agriculture, Govt. of Kerala at College of Fisheries, Panangad in 2007. Michael New's keenness to harmonize aquaculture and charity work has set a new example of the significant role aquaculture could play in solving global food crisis.

Michael New has always been a guiding spirit for Indian aquaculture in general, and particularly freshwater prawn farming development in Kerala. He visited Kerala in 2003, and is presently the International Patron of the Kuttanad SCAMPI Society (Society for the Culture of Aquatic Animals and Good Management Practices In Kuttanad) formed by freshwater aquaculture farmers in Kuttanad under the aegis of KVK Kottayam, Kerala Agricultural University.

MICHAEL BERNARD NEW

Born	British	Married 1960
1932	Citizen	Widowed 2003

CAREER SUMMARY

Founder - Chairman, *Aquaculture without Frontiers* (AwF) **2004-08**
(international, based UK) – **Presently serving as a Member of the Board of Directors**

Independent Sustainable Aquaculture Development Consultant **1995-**
(International, based UK)

Programme Coordinator **1992-94**
AADCP (ASEAN-EEC Aquaculture Development and Coordination Programme)
Development Directorate, EUROPEAN COMMISSION
(ASEAN region, based Thailand)

Senior Fishery Resources Officer (Aquaculture) **1991-92**
Fisheries Department, FAO
(International, based Italy)

Programme Coordinator **1988-91**
AADCP (ASEAN-EEC Aquaculture Development and Coordination Programme)
Development Directorate, EUROPEAN COMMISSION
(ASEAN region, based Thailand)

Senior Aquaculturist **1986-88**
ADCP (Aquaculture Development and Coordination Programme)
Fisheries Department, FAO
(International, based Italy)

Director (aquaculture consultancy) **1984-86**
MICHAEL NEW LIMITED
(International, based UK)

Partner (aquaculture/food processing/market research consultancy) **1981-84**
NORTHCROFT & NEW (International, based UK)

Senior Fisheries Biologist (Aquaculture) and Co-Project Manager **1979-81**
Programme for the Expansion of Freshwater Prawn Farming
FAO/UNDP
(Thailand)

Senior Consultant **1973-79**
KELVIN HUGHES AQUACULTURE SERVICES
(Subsidiary of SMITHS INDUSTRIES LIMITED)
(International, based UK)

Head of Aquaculture Sciences Research **1972-73**
SYNTEX (USA) INC.
(North America, based USA)

Head of Marine Biology Department **1969-72**
LORD RANK RESEARCH CENTRE (RHM)
(UK)

MICHAEL BERNARD NEW

CAREER SUMMARY (continued)

Assistant Head of Nutrition Department — **1967-69**
LORD RANK RESEARCH CENTRE (RHM)
(UK)

Research Chemist — **1964-67**
CENTRAL AGRICULTURAL RESEARCH AND ADVISORY SERVICES (RHM)
(UK)

Chief Chemist — **1959-64**
CHRISTOPHER HILL LIMITED
(UK)

Laboratory Assistant — **1958-59**
BRITISH DRUG HOUSES LIMITED
(UK)

Articled Clerk (chartered accountancy) — **1957-58**
FORD, BULL, ELLIS and SALES
(UK)

Research Assistant — **1957**
PUBLIC HEALTH LABORATORY SERVICE
(UK)

Royal Air Force (National Service) — **1955-57**
(UK)

HONOURS, QUALIFICATIONS AND ACTIVE MEMBERSHIPS

Order of the British Empire	**Officer [OBE] 1999** **(Citation: for services to aquaculture in developing countries)**
Royal College of Science	Associate [ARCS] 1954
Imperial College of Science, Technology and Medicine (London University)	Graduate [BSc (Special) Hons] 1954
Institute of Biology	Member 1972 Fellow [FIBiol] 1989 Chartered Biologist [CBiol] 1989
Institute of Food Science and Technology	Fellow [FIFST]
World Aquaculture Society	**Exemplary Service Gold Medal 2009** Member 1972; Lifetime Member 1992 Honorary Life Member 2002 Board Member 1993-1999 & 2005-2008 President 1997-1998
European Aquaculture Society	Member 1976 **Life Member 2005** Board Member 1998-2006 President 2002-2004
China Society of Fisheries	**Honorary (International] Life Member 2003**
Asian Fisheries Society	Member 1986
Royal Over-Seas League	Member 1969

MICHAEL BERNARD NEW

SUMMARY OF AQUACULTURE EXPERIENCE

Michael New entered the field of aquaculture in 1969 after extensive experience in the animal feedstuff industry. After conducting research on freshwater prawn culture in the UK and North America, he worked from 1973-1979 and 1981-1986 as an international consultant in finfish and crustacean culture. His work included site selection, leadership of multi-disciplinary teams studying economic and technical feasibility, fish farm design, the provision of technical aquaculture advice (particularly in nutrition, feed development, and shrimp and prawn culture), and fisheries studies in relation to rural development. His clients included major public companies, private individuals, governments, and aid organisations.

Between these two periods of consultancy work he managed an UNDP/FAO project in Thailand (1979-1981) concerned with the expansion of freshwater prawn farming. From 1986-1988 Michael New was Senior Aquaculturist in the Aquaculture Development and Coordination Programme (ADCP), a global and inter-regional programme funded by the United Nations Development Programme (UNDP) and based at the Rome headquarters of the Food and Agriculture Organisation (FAO) of the United Nations. In 1988 the EC appointed him Programme Coordinator of the ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP), a regional programme based in Bangkok. From 1991-1992 he was Senior Fishery Resources officer (Aquaculture) in FAO headquarters, based in Rome. In 1992 he returned to his post as AADCP Coordinator in Bangkok; the project successfully completed its practical activities at the end of 1994.

From 1995 onwards he has been engaged in international free-lance consultancy work, specialising in project design and evaluation, freshwater prawn farming, aquafeed development, and the development of policies for sustainable aquaculture.

Michael New has had aquaculture assignments in Australia, Bangladesh, Belgium, Brazil, Brunei Darussalam, Canada, China (PRC), Colombia, Denmark, Dominica, Egypt, Germany, Greece, Guam, Hong Kong (China), India, Indonesia, Italy, Japan, Jordan, Kuwait, Malaysia, Martinique, Mexico, Morocco, Namibia, Nepal, Nigeria, Norway, Pakistan, the Philippines, Portugal, Saudi Arabia, Singapore, Sri Lanka, Switzerland, Taiwan, Thailand, Tunisia, Turkey, UK, USA, and Zambia. He has also visited aquaculture developments in Costa Rica, Guadeloupe, Hawaii, Puerto Rico, and Sweden.

Michael New has authored nearly 150 technical manuals, scientific papers, and popular articles on aquaculture, and has chaired or been a keynote/plenary speaker at numerous international conferences and was Steering Committee Chair for World Aquaculture '99 (Sydney) and AQUA 2000 (Nice) and Programme Chair for World Aquaculture '05 (Bali) and a member of the Steering and Programme Committees for *World Aquaculture '08* (Busan, Republic of Korea). Currently, besides being an organiser of *Giant Prawn 2011* (Kochi, India), he is a member of the Steering Committee for *World Aquaculture 2011* (Natal, Brazil) and Programme Co-Chair for *AQUA 2012* (St. Petersburg, Russia). He is a Past-President of the World Aquaculture Society (President 1997-1998) and of the European Aquaculture Society (President 2002-2004). He has recently been re-elected to the board of the World Aquaculture Society for 2005-2008.

In 2004 he formed the NGO *Aquaculture without Frontiers* (AwF) to help to alleviate poverty in developing countries through small scale responsible aquaculture. By mid-2005, he had raised over US$ 25,000 from friends, family, colleagues and the public for AwF. In addition, AwF had obtained access to a fund for tsunami relief work in Aceh, Indonesia and commenced its first three projects there, with a budget of over US$ 33,000. AwF also provided assistance worth 1000 US Dollars to a few shrimp farmers hit by Tsunami in Kerala, India in 2007.

In 1999 Her Majesty Queen Elizabeth II appointed him Officer of the Order of the British Empire (OBE) in recognition of his services to aquaculture in developing countries. In 2002 he was appointed an Honorary Life Member of the World Aquaculture Society and in 2003 he was elected an Honorary International Life Member of the China Society of Fisheries. In 2009 he was awarded the Exemplary Service Gold Medal from World Aquaculture Society.

MICHAEL BERNARD NEW

WORK EXPERIENCE

Current and recent assignments

Aquaculture without Frontiers: Founder and Chairman of this NGO, formed for alleviating poverty through responsible aquaculture. (2004 to 2008); presently serving as a Member to the Board of Directors
INTERNATIONAL

FAO: Consultant, reviewing and editing forty species aquaculture fact sheets for the Fisheries Department. (2004 to date)
INTERNATIONAL

World Aquaculture Society: Programme Co-Chair for *AQUA 2012* (St. Petersburg, Russia)
RUSSIA

World Aquaculture Society: Organiser of *Giant Prawn 2011* (Kochi, India)
INDIA

World Aquaculture Society: Member of the Steering Committee for *World Aquaculture 2011* (Natal, Brazil)
BRAZIL

World Aquaculture Society: Board Member (2005-2008)
INTERNATIONAL

World Aquaculture Society: Member of Steering and Programme Committees for World Aquaculture '08. (Busan, Korea)
KOREA

FAO: Consultant, editing publication on capture-based aquaculture for the Fisheries Department. (2004)
INTERNATIONAL

World Aquaculture Society: Programme Co-Chair for World Aquaculture '05. (2004-2005)
INDONESIA

FAO: Consultant, preparing a chapter of capture-based aquaculture for the 2004 SOFIA document. (2004)
INTERNATIONAL

FAO: Consultant, preparing fact sheet on the giant freshwater prawn *Macrobrachium rosenbergii* for the Fisheries Department. (2004)
INTERNATIONAL

EUROPEAN COMMISSION: Membership of Expert Evaluators Panel for Co-operative Research under the Horizontal Research Activities involving SMEs FP6-2002-SME1. (2004)
BELGIUM

FAO: Consultant, evaluating the work of the General Fisheries Commission for the Mediterranean Committee on Aquaculture, including its networks, SIPAM, TECAM and SELAM. (2003-2004)
REGIONAL (MEDITERRANEAN)

EUROPEAN COMMISSION: Member, Steering Committee, ASEM (Asia-Europe Meeting) Aquaculture Platform.
(2003-to date)
REGIONAL (EUROPE)

European Aquaculture Society: Member of the Programme Committee of Aquaculture Europe 2002.
(2003-2004)
SPAIN

FAO: Consultant, technical and general editing of report on capture-based aquaculture. (2003-2004)
INTERNATIONAL

European Aquaculture Society: President. (2002-2004)
REGIONAL (EUROPE)

EUROFISH Magazine: Member of Editorial Board. (2000 to date)
REGIONAL (EUROPE)

NACA (Network of Aquaculture Centres in Asia and the Pacific): Member of the Editorial Board of the magazine Aquaculture Asia. **(1996-to date)**
REGIONAL (ASIA)

international Foundation for Science (IFS): Scientific Adviser (aquaculture). **(1995-to date)**
INTERNATIONAL

Blackwell Scientific Publications: Member of the Editorial Board for the journal 'Aquaculture Nutrition'. (1994-2005)
INTERNATIONAL

Kluwers (formerly Chapman and Hall): Member of the Editorial Board for the journal 'Aquaculture International'. **(1993-2005)**
INTERNATIONAL

Blackwell Scientific Publications: Member of the Editorial Board for the journal 'Aquaculture Research'. **(1992-2005).**
INTERNATIONAL

FAO: Consultant, assisting in preparation of project proposal for new GFCM Committee on Aquaculture Mediterranean sustainable aquaculture project. (2003)
REGIONAL (EUROPE)

SEFABAR (EU-funded project): Member of Management Group and European Aquaculture Society representative, Sustainable European Farm Animal Breeding and Reproduction thematic network (2001-2003)
REGIONAL (EUROPE)

World Aquaculture Society: Keynote speaker at World Aquaculture '03, Salvador, Brazil (2003).
BRAZIL

Freshwater Prawns 2003 (Kochi): Keynote speaker.
INDIA

2002

FAO: Consultant, preparing new technical manual on freshwater prawn farming. (2000-2002)
UNITED KINGDOM and ITALY

World Aquaculture Society: Member of the Steering Committee of World Aquaculture '02, Beijing and Co-Chairman, freshwater prawn session. (2000-2002)
PEOPLE'S REPUBLIC OF CHINA

FAO: Consultant, assisting Development Planning Service, Fisheries Department. (2000-2002)
ITALY

European Aquaculture Society: Member of the Steering Committee of Aquaculture Europe 2002. (2000-2002)
ITALY

2001

Marine Stewardship Council: External member of assessment panel in evaluation of tenders for aquaculture feasibility study (eco-labelling).
UNITED KINGDOM

EASTFISH/EUROFISH: Consultant, advising on programme and speakers for AquaVision 2002 (Stavanger, Norway), organised by Nutreco, EASTFISH, BASF, and Fish Farming International.
DENMARK

Asian Fisheries Society: Chairman of session on post-retirement careers in fisheries and aquaculture, 6th Asian Fisheries Forum.
TAIWAN

2000

EUROPEAN COMMISSION: Consultant, making scientific and technical evaluation of research proposals for European Union funding through the 1999 Call under the INCO-DEV programme for DG-XII.
BELGIUM

The Commonwealth of Australia: Expert Assessor for the Department of Industry, Science and Tourism in the Cooperative Research Centres (CRC) Program: 2000 Selection Round, concerning application # 20000048 (Sustainable Aquaculture of Finfish).
UNITED KINGDOM

China Society of Fisheries: Keynote speaker, aquaculture session, 3rd World Fisheries Conference, Beijing.
PEOPLES REPUBLIC OF CHINA

World Aquaculture Society and European Aquaculture Society: Conference Chairman of AQUA 2000 (combining World Aquaculture 2000 and Aquaculture Europe 2000), Nice. Additionally, presented technical papers and chaired the final thematic session.
FRANCE

Blackwell Science: completion of book (co-edited with Wagner Valenti) on freshwater prawn culture.
UNITED KINGDOM

1999

FAO: Consultant (Team Leader), for the project 'Consultation on the Application of Article 9 (Aquaculture) of the FAO Code of Conduct for Responsible Fisheries in the Mediterranean Region'.
ITALY

World Aquaculture Society: Conference Chairman of the annual meeting (World Aquaculture '99), Sydney.
AUSTRALIA

China Society of Fisheries: Member of the International Steering Committee of the 3rd World Fisheries Conference, Beijing.
PEOPLES REPUBLIC OF CHINA

1998

FAO: Consultant (Team Leader), for the project 'Consultation on the Application of Article 9 (Aquaculture) of the FAO Code of Conduct for Responsible Fisheries in the Mediterranean Region' (first mission; further two missions in 1999).
ITALY

EUROPEAN COMMISSION: Consultant, making scientific and technical evaluation of research proposals for European Union funding through the 1997 Call under the INCO-DC programme for DG-XII.
BELGIUM

EUROPEAN COMMISSION (ACP-EU Fisheries Research Initiative): Invited speaker at the International Conference on Sustainable Use of Aquatic Biodiversity: Data, Tools and Collaboration, Lisbon. Topic: Trends in aquaculture in the next Century.
PORTUGAL

The Commonwealth of Australia: Overseas Panel Member of Stage 2 of the Fifth Year Review of the Aquaculture CRC Limited for the Department of Industry, Science and Tourism.
AUSTRALIA

Association for the Development of Aquaculture in Martinique (ADAM): Consultant to the prawn farmers of Martinique, Guadeloupe and Guyana and technical seminar speaker. Topics freshwater prawn (*Macrobrachium rosenbergii*) farming, and nutrition and feeding.
MARTINIQUE

World Aquaculture Society: Immediate Past-President, **1998-1999.**
INTERNATIONAL

European Aquaculture Society: elected Board Member, **1998-2000.**
REGIONAL (EUROPE)

Latin American Chapter of the World Aquaculture Society: Plenary opening speaker at 'Aquicultura Brasil '98', Recife. Topic: aquaculture trends and challenges for the 21st Century.
BRAZIL

Aquaculture Center, Sao Paulo State University (CAUNESP): Presented seminar (topic: 'Sustainable Aquaculture') and reviewed general and freshwater prawn (*Macrobrachium rosenbergii*) research programmes.
BRAZIL

VICTAM '98: Organiser and Chairman of aquaculture nutrition session during the symposium 'Safe feed – safe food', Utrecht.
NETHERLANDS

1997

GTZ: Consultant, drafting National Master Plan for Aquaculture Development for the Ministry of Fisheries and Marine Resources (MFMR) within the GTZ-funded GOPA-Consultants project 'Advisory Services to the MFMR'.
NAMIBIA

The Commonwealth of Australia: Overseas Panel Member of Stage 2 of the Third Year Review of the Aquaculture CRC Limited for the Department of Industry, Science and Tourism.
AUSTRALIA

World Aquaculture Society: President , **1997-1998.**
INTERNATIONAL

Second International Symposium on Sustainable Aquaculture: Member of International Advisory Group and invited speaker. Topic: national aquaculture policies.
NORWAY

World Aquaculture Society: Plenary opening speaker at the annual meeting (World Aquaculture '97), Seattle. Topic: current status and future of aquaculture.
USA

European Aquaculture Society: Invited plenary speaker at the annual meeting ('Martinique '97). Topic: global emergence of tropical aquaculture.
MARTINIQUE

James Cook University, Queensland: Invited visiting lecturer. Topic: global status and potential of aquaculture.
AUSTRALIA

1996

GTZ: Consultant (Team Leader), reviewing status of aquaculture and drafting national aquaculture policy for the Ministry of Fisheries and Marine Resources (MFMR) within the GTZ-funded GOPA-Consultants project 'Advisory Services to the MFMR'.
NAMIBIA

EUROPEAN COMMISSION: Consultant, making scientific and technical evaluation of research proposals for European Union funding through the 1995 Call under the INCO-DC programme for DG-XII.
BELGIUM

Asian Development Bank (ADB): Aquaculture planner in Viet Nam Coastal Aquaculture Development Project for SCP Fisheries Consultants Australia (desk work).
UK (for VIET NAM)

INVE Aquaculture NV: Consultant, reviewing potential market for premixes for farm-made aquafeeds.
THAILAND

Cooperative Research Centre for Aquaculture (Aquaculture CRC Limited): Member of Scientific Review Committee, **1996-1999.**
AUSTRALIA

VICTAM-ASIA '96: Organiser and Chairman of aquaculture nutrition session during the symposium 'Developments in Asian Aquafeeds', Bangkok.
THAILAND

World Aquaculture Society: President-Elect, **1996-1997.**
INTERNATIONAL

World Aquaculture Society: Moderator of crustacean session and panel member of session on aquaculture sustainability and the environment at the annual meeting World Aquaculture '96, Bangkok
THAILAND

NACA (Network of Aquaculture Centres in Asia and the Pacific): Member of the Panel of Expert Technical Advisers, **1996-2001.**
REGIONAL (ASIA)

1995

Saudi Fisheries Company: Consultant on shrimp (*Penaeus monodon*) feed and feeding to the Red Sea Shrimp Farm.
SAUDI ARABIA

FAO: Freshwater prawn consultant, hired to assess the feasibility of freshwater prawn (*Macrobrachium rosenbergii*) farming and the establishment of a government hatchery and demonstration farm in Sind, 1995-1996.
PAKISTAN

ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP): Technical consultant.
THAILAND

FAO: Consultant hired to draft an information paper on the status and trends of aquaculture 1984-1992, for the 21st Session of the FAO Committee on Fisheries (COFI).
ITALY

Asian Development Bank/Network of Aquaculture Centres in Asia and the Pacific (ADB/NACA): ADB resource person for aquaculture policy during the 'Final Workshop for the Regional Study on Aquaculture Sustainability and the Environment'.
PEOPLE'S REPUBLIC OF CHINA

International Foundation for Science/European Union (EU/IFS): Invited speaker at conference on 'Aquaculture Research and Sustainable Development in Inland and Coastal Regions in South-East Asia', Can Tho University. Topic: Asian freshwater prawn farming.
VIET NAM

VICTAM '95: Organiser and Chairman of aquaculture nutrition session during the symposium 'From feed to food', Utrecht.
NETHERLANDS

Freshwater Prawn Association of Brazil (GTCAD): invited speaker at the National Conference. Topic: global freshwater prawn (*Macrobrachium rosenbergii*) farming and farm-made prawn aquafeeds. Appointed Honorary Member of GTCAD 'for services to the global development of freshwater prawn farming'.
BRAZIL

Aquaculture Centre, Sao Paulo State University (CAUNESP): Invited visiting lecturer. Topic: global freshwater prawn farming.
BRAZIL

Brazilian Academy of Animal Nutrition (CBNA): Invited speaker at the 'International Symposium on Fish and Crustacean Nutrition'. Topic: shrimp and prawn nutrition.
BRAZIL

PACON; Invited keynote speaker at 'Sustainable Aquaculture '95'. Topic: sustainable aquafeeds.
HAWAII

1994

EUROPEAN COMMISSION: AADCP Coordinator (see 1992)
REGIONAL (ASEAN and EU countries)

FAO: Session chairman (aquaculture) in 'Ad hoc Consultation on Fisheries Research'.
ITALY

First International Symposium on Sustainable Fish Farming: Invited speaker. Topic: availability of marine resources for aquafeeds.
NORWAY

University of Trondheim: Guest lecturer in the Brattora Research Center (Department of Zoology).
NORWAY

Asian Fisheries Society (Indian Branch): V.G. Jhingram Memorial Lecturer at 'Workshop on the Status of Freshwater Prawn Farming in India', Bombay. Topic: global freshwater prawn farming.
INDIA

FAO/SEAFDEC: Session chairman (aquaculture) in 'Regional Workshop on Fishery Information and Statistics in Asia', Bangkok.
THAILAND

1993

EUROPEAN COMMISSION: AADCP Coordinator (see 1992)
REGIONAL (ASEAN and EU countries)

FAO/AADCP: Joint organiser of 'Expert Consultation on Farm-made Aquafeeds', Bangkok.
THAILAND

World Aquaculture Society: elected Board Member, **1993-1996**.
INTERNATIONAL

VICTAM-ASIA '93: Organiser and Chairman of aquaculture nutrition session during the symposium 'Feed production tomorrow II', Bangkok.
THAILAND

1992

EUROPEAN COMMISSION: Programme Coordinator of the ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP), a US$ 13 million regional project linking three EC and six ASEAN institutes with common interests in aquaculture research, training and information exchange. Topics: brackishwater aquaculture, lake and reservoir management, technology transfer, nutrition, and genetics. 1988-1991 and 1992-1994.
REGIONAL (ASEAN and EC countries)

FAO: Senior Fishery Resources Officer (Aquaculture) (see 1991)
INTERNATIONAL

International Working Group on Crustacean Nutrition (IWGCN): Director, **1993-1997**.
INTERNATIONAL

1991

FAO: Senior Fishery Resources Officer (Aquaculture), Fisheries Department, Rome. Responsibility: regular programme activities, **1991-1992**.
INTERNATIONAL

EUROPEAN COMMISSION: AADCP Coordinator (see 1988)
REGIONAL (ASEAN and EU countries)

World Aquaculture Society: Keynote speaker at the annual meeting 'World Aquaculture **'91**'. Topic: status of global aquaculture.
PUERTO RICO

VICTAM-ASIA '91: Organiser and Chairman of aquaculture nutrition session during the symposium 'Feed production tomorrow', Bangkok.
THAILAND

1990

EUROPEAN COMMISSION: AADCP Coordinator (see 1988)
REGIONAL (ASEAN and EU countries)

INFOFISH and LKIM (the Fisheries Development Authority of Malaysia): Conference chairman, 'AQUATECH '90'. Also presented paper on shrimp feeds.
MALAYSIA

1989

EUROPEAN COMMISSION: AADCP Coordinator (see 1988)
REGIONAL (ASEAN and EU countries)

IDRC: Member of review mission evaluating the Network of Aquaculture Genetics Centres in Asia.
CANADA, PEOPLE'S REPUBLIC OF CHINA, INDONESIA, PHILIPPINES, AND THAILAND

1988

EUROPEAN COMMISSION: Programme Coordinator of the ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP), a US$ 13 million regional project linking three EC and six ASEAN institutes with common interests in aquaculture research, training and information exchange. Topics: brackishwater aquaculture, lake and reservoir management, technology transfer, nutrition, and genetics. 1988-1991 and 1992-1994.
REGIONAL (ASEAN and EC countries)

FAO: Feed technologist, advising the Netherlands-funded, FAO-executed, 'Development of Fish Culture Project', mainly on common carp (*Cyprinus carpio*) feeds and feeding.
ZAMBIA

NACA (Network of Aquaculture Centres in Asia and the Pacific): Co-opted member of working group formed to develop a five-year programme of work.
REGIONAL (ASIA)

FAO: Senior Aquaculturist, ADCP. (see 1986)
INTERNATIONAL

International Foundation for Science (IFS): Advisor (aquaculture), **1988-1991.**
INTERNATIONAL

1987

FAO: Senior Aquaculturist, ADCP. (see 1986)
INTERNATIONAL

EUROPEAN COMMISSION: Member of the Expert Panel selecting participating institutes for the ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP). [Loaned by FAO]
NETHERLANDS

FAO: Mission Leader in a review of the Italian Government support to the FAO-executed project, the Mediterranean Regional Aquaculture Programme (MEDRAP).
EGYPT, MOROCCO, and TUNISIA

FAO: Member of the European Inland Fisheries Advisory Commission (EIFAC) Expert Group on Fish Nutrition.
GERMANY

A.A. Balkema Publishers: Member of the Editorial Board of the 'Journal of Aquaculture in the Tropics', **1987-1993.**
INTERNATIONAL

1986

FAO: Senior Aquaculturist, Aquaculture Development and Coordination Programme (ADCP), Fisheries Department, Rome, **1986-1988.** Special responsibility for crustacean culture, aquaculture nutrition, and the Asian interests of this global and inter-regional project.
INTERNATIONAL

FAO: Organiser of ADCP/MEDRAP 'Workshop on the Markets for Sea bass, Sea bream, Mullets, and Eel, and their links with investment.
ITALY

Michael New Limited: Director. (see 1984)
INTERNATIONAL.

Fish Farm Development International Limited: Feed Technologist (*Penaeus chinensis),* Dalian Prawn Farm Development (client: EUROPEAN COMMISSION).
PEOPLE'S REPUBLIC OF CHINA

Australia Prawn Farms Limited: Consultant, providing shrimp feed formulation and manufacturing advice.
AUSTRALIA

EUROPEAN COMMISSION: Consultant, hired to prepare a proposal for the ASEAN-EEC Aquaculture Development and Coordination Programme (AADCP).
BELGIUM, INDONESIA, ITALY, MALAYSIA, PHILIPPINES, SINGAPORE and THAILAND

1985

Michael New Limited: Director. (see 1984)
INTERNATIONAL.

FAO: Fish and Shrimp Feed Consultant to LKIM (the Fisheries Development Authority of Malaysia).
MALAYSIA

UNDP: Field Mission Leader, UNDP/Norway 'Thematic Evaluation of Aquaculture'.
NEPAL and THAILAND

Aquatic Farms Limited: Feed Adviser to the Brackishwater Aquaculture Development Programme, working mainly on marine shrimp (*Penaeus monodon*) feeds (client: Asian Development Bank and Directorate General of Fisheries, Indonesia).
INDONESIA
John C. Marr Associates: Aquaculture specialist in team provided to prepare a 20-year fishery development plan for Bangladesh (client: FAO/UNDP).
BANGLADESH

1984

Michael New Limited: Director, managing free-lance consultancy in aquaculture, **1984-1986.**
INTERNATIONAL.

Northcroft and New: Partner. (see 1981)
INTERNATIONAL

FAO: Consultant, hired to prepare a manual on feeds and feeding for aquaculture (which became a frequently cited document, and was translated into Chinese), **1984 and 1987**.
ITALY

Marine Resources Asia Limited: Consultant, providing advice on shrimp feed formulation and manufacture.
SRI LANKA

Australian Prawn Farms Limited: Director, **1983-1984**.
AUSTRALIA

Kuwait Institute for Scientific Research (KISR): Research Nutritionist. (see 1983)
KUWAIT

Aquatic Farms Limited: Fish Feed Adviser to Pakistan Aquaculture Development Project, providing formulations for carps and marine shrimp, selecting equipment, and training local staff in feed production techniques (client: Asian Development Bank and the Governments of Sind and Punjab).
PAKISTAN

Fratelli Coin: Consultant, hired to provide advice on the geothermal culture of freshwater prawns, *Macrobrachium rosenbergii.*
ITALY

1983

Northcroft and New: Partner. (see 1981)
INTERNATIONAL

Australian Prawn Farms Limited: Director, **1983-1984**.
AUSTRALIA

Kuwait Institute for Scientific Research (KISR): Research Nutritionist, Maricuiture and Fisheries Department, working mainly on the sea bream 'sobaity' (*Acanthopagrus cuvieri*), and on the improvement of facilities for dietary research, **1983-1984**.
KUWAIT

Aquatic Farms Limited: Consultant. (see 1982)
SINGAPORE AND MALAYSIA

1982

Northcroft and New: Partner. (see 1981)
INTERNATIONAL

Aquatic Farms Limited: Consultant, hired to formulate experimental dry feeds for marine shrimp (*Penaeus monodon* and *P. merguiensis*) (client: Ternaken Marine Sdn. Bhd., a member of the United Trading Group of Companies), **1982-1983**.
SINGAPORE and MALAYSIA

Jojoba Plantations Australia Pty. Limited: Aquaculture Consultant, advising on site selection and design for marine shrimp farm.
AUSTRALIA

Trafalgar Housing Limited: Aquaculture consultant. (see 1981)
HONG KONG

Binhai Prawn Farm Limited: Consultant. (see 1981)
PEOPLE'S REPUBLIC OF CHINA

ULG Consultants Limited: Fisheries and aquaculture specialist, Temburong Natural Resources Development Study (client: Royal Government of Brunei Darussalam).
BRUNEI DARUSSALAM

1981

Northcroft and New: Partner in consultancy firm providing services in aquaculture, food processing and market research, **1981-1984**.
INTERNATIONAL

Guam Aqua Research Inc: Research consultant, working on the physical and nutritional characteristics of production and maturation diets for marine shrimp (*Penaeus merguiensis*, *P. monodon*, *P. vannamei*, and *P. chinensis*) and finfish, **1981-1983**.
GUAM and SWITZERLAND

Binhai Prawn Farm Limited: Consultant, formulating diets for semi-intensive shrimp (*Penaeus chinensis*) farm, **1981-1982**.
PEOPLES' REPUBLIC OF CHINA

Trafalgar Housing Limited: Aquaculture consultant, working on nutrition and aquafeed manufacture, **1981-1982**.
HONG KONG

Kramer, Chin and Mayo, Inc., Peat Marwick Mitchell and Company, Northcroft and New, Wimpey Appledore Limited, and Trafalgar Housing Limited: Consultant, participating in a feasibility study for an intensive 10,000 t/yr shrimp farm in Sabah.
MALAYSIA

Shen Bau Aquaculture Limited: Consultant, planning production facilities for the manufacture of 50 t/day of moist aquafeeds in the People's Republic of China.
HONG KONG

FAO: Consultant, hired to prepare a manual on freshwater prawn (*Macrobrachium rosenbergii*) farming (revised by the author in 1985), which was translated by FAO into French and Spanish, and by others into Farsi and Vietnamese, and became the standard manual on this topic for more than two decades.
ITALY

FAO: Co-Project Manager. (see 1979)
THAILAND
Institute of Aquaculture, University of Stirling: Honorary Lecturer, **1981-1997**.
UK

1980

FAO: Co-Project Manager. (see 1979)
THAILAND

Royal Thai Government Department of Fisheries: Convenor of international conference on freshwater prawn (*Macrobrachium rosenbergii*) farming entitled 'Giant Prawn 1980'.
THAILAND

1979

FAO and the Royal Thai Government Department of Fisheries: Co-Project Manager of the Programme for the Expansion of Freshwater Prawn Farming in Thailand, an UNDP-funded FAO-executed joint project., **1979-1981**. From a modest 80 t when the project started in 1979, Thai prawn (*Macrobrachium rosenbergii*) production peaked at nearly 12,000 t/yr in both 1987 and 1988.
THAILAND

FAO: Consultant in marine finfish nutrition.
SINGAPORE

Elsevier Science Publishers: Member of the Advisory Board of the journal 'Aquaculture', **1979-1992**.
INTERNATIONAL

1973-1979

Kelvin Hughes Aquaculture Services: Senior Consultant, **1973-1979**, establishing new venture as a diversification for Kelvin Hughes, a division of Smiths Industries Limited.
INTERNATIONAL, based UK

UK Ministry of Overseas Development (ODA, now DFID): Team Leader, national feasibility study of freshwater finfish farming, producing a plan recommending various sites, mainly for tilapia farming.
JORDAN

Private client: Consultant for feasibility study of mariculture potential in Lesbos.
GREECE

UK Ministry of Overseas Development (ODA, now DFID): Project Manager in the survey, design and costing phase of carp (*Cyprinus carpio*) farm.
JORDAN

UK Ministry of Overseas Development (ODA, now DFID): Team Leader, feasibility study for the farming of the freshwater prawn (*Macrobrachium rosenbergii*).
DOMINICA

FAO: Consultant in freshwater prawn farming. Hatchery and nutritional work with the prawn *Macrobrachium acanthurus* for INDERENA, in Cartagena. (Two missions: **1976 and 1979**).
COLOMBIA

MUDA Agricultural Development Authority: Consultant, hired to assess regional aquaculture potential.
MALAYSIA

Private client: Consultant, developing proposal for experimental carp (*Cyprinus carpio*) farm in Kaduna.
NIGERIA

Private client: Consultant, hired to advise on aquaculture equipment.
ITALY

Herwa Limited: Consultant, employed to prepare a study of commercial aquaculture potential.
NIGERIA

Private client: Consultant, preparing a preliminary proposal for small lobster farm.
UK

Private work: preparation of review of shrimp and prawn nutrition for the journal 'Aquaculture'.
UK

Private clients: Consultant, conducting various site assessments for game and coarse fish farms.
UK

Sun Oil Company and the University of Arizona: Consultant, advising on prawn culture.
USA and **MEXICO**

Private client: Consultant for assessment of aquafeed manufacture.
UK

World Mariculture Society (now World Aquaculture Society): Member of the Nutrition Task Force, **1977-1981**.
INTERNATIONAL

1972-1973

Syntex Inc: Head of Aquaculture Research, **1972-1973**, developing a programme designed to make the company a major supplier of feedstuffs, pharmaceuticals, and equipment to the pet aquarium and aquaculture industries. The prawns (*Macrobrachium rosenbergii* and *M. americanum)* were cultured, and nutritional, engineering and other studies undertaken.
During this period a crustacean postlarval diet was developed, an attractant system designed, and three patent applications filed.
USA and MEXICO

1969-1972

Ranks Hovis McDougall (RHM) Limited: Head of Marine Biology Department,, **1969-1972**, managing research on the freshwater prawn *Macrobrachium rosenbergii.* During this period, prawns were reared for the first time, from metamorphosis to sexual maturity and the production of viable larvae, on a wholly artificial diet. Marine shrimp (*Penaeus monodon* and *P. merguiensis*) were also maintained.
UK

1967-1969

Ranks Hovis McDougall (RHM) Limited: Assistant Head of Nutrition Department in the Lord Rank Research Centre, managing a large team engaged in research on human and animal nutrition, particularly analytical work, including automated amino acid analysis, **1967-1969**.
UK

Agricultural Research Council (ARC): Member of Protein Evaluation Group, **1967-1969.**
UK

1964-1967

Ranks Hovis McDougall (RHM) Limited: Research Chemist in the Central Agricultural Research and Advisory Services, managing chemical (including amino acid analysis and bomb calorimetry), microbiological and veterinary laboratories serving a large animal feedstuff manufacturer, **1964-1967**.
UK

Compound Animal Feedstuff Manufacturers National Association: Founder Member of Analytical Panel, **1965-1967.**
UK

1955-1964

Thomas McLachlan & Partners: Microbiologist, working on food and antibiotic assay, **1964.**
UK

Christopher Hill Limited: Chief Chemist, **1959-1964**, managing quality control laboratory for animal feedstuff manufacturer.
UK

British Drug House Limited: Laboratory Assistant, **1958-1959**.
UK

Ford, Bull, Ellis, and Sales: Articled Clerk in chartered accountancy firm, **1957-1958**.
UK

UK Public Health Laboratory Service: Research Assistant (virology), 1957.
UK

National Service (compulsory): Royal Air Force, **1955-1957.**
UK

MICHAEL BERNARD NEW

AQUACULTURE PUBLICATIONS

1. New, M.B., Valenti, W.C., Tidwell, J.H., Freshwater Prawns - The Farming of Giant Freshwater Prawn. 2nd Edition (Mic D'Abramo, L.R. & Kutty, M.N. 2010. Wiley Blackwell, UK.
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7. Nair, C.M., New, M.B., Kutty, M.N., Mather, P.B. & Nambudiri, D.D., 2005. Editorial: Freshwater Prawns 2003 - special issue on the international symposium on freshwater prawns. Aquaculture Research, 36:209.
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11. Lovatelli, A. & New, M.B., 2004. Capture-based aquaculture. pp. 69-74 in: The State of World Fisheries and Aquaculture 2004. FAO, Rome, Italy.
12. Nandeesha, M.C. and New, M.B., 2004. The experience of NGOs in aquaculture development and potential opportunities. p. 424. In: Abstracts of Aquaculture 2004, 1-5 March 2004, Honolulu, Hawaii.
13. Ottolenghi, F., Silvestri, C., Giordano, P., Lovatelli, A. and New, M.B., 2004. Capture-based aquaculture: the fattening of eels, groupers, tunas and yellowtails. FAO, Rome Italy. 308 pp.
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15. New, M.B., 2003b. Aquaculture without frontiers – a proposed new NGO to champion aquaculture. INFOFISH International, 4/2003: 12, 14-16.
16. New, M.B., 2003c. The biology of decapod crustacean larvae (Crustacean Issues 14). Aquaculture, 216: 383-387. (Book review)

17. New, M.B., 2003d. Crustacean farming, ranching and culture, 2nd edition. Aquaculture Research, 34:269-270. (Book review)
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29. New, M.B., 2002j. Trieste conference highlights Europe's seafarm prospects. Fish Farmer, 25(6): 18-21.
30. New, M.B., 2002k. Palaemonid Prawns: biodiversity, taxonomy, biology and management. Aquaculture International, 9:545-548. (Book review)
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32. New, M.B. and Wijkstrom, U.N., 2002. Use of fishmeal and fish oil in aquafeeds: further thoughts on the fishmeal trap. FAO Fisheries Circular (975): 61 pp. FAO, Rome Italy.
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53. D'Abramo, L.R. and New, M.B., 2000a. Nutrition, feeds and feeding. pp. 203-220. In: M.B. New and W.C. Valenti (eds), Freshwater Prawn Culture. Blackwell Science, Oxford, England.
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International Conference AQUA 2000, 2-6 May 2000, Nice, France. European Aquaculture Society Special Publication No. 28. European Aquaculture Society, Oostende, Belgium.

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MICHAEL BERNARD NEW

CONFERENCE CHAIRMANSHIP (CC), PROGRAMME CHAIRMANSHIP (PC), SESSION CHAIRMANSHIP (SC), KEYNOTE, PLENARY OR INVITED PAPERS (PP), ORAL PAPERS (P), LECTURES AND SEMINARS (L) & INTERVIEWS (I)

1975	(P)	Site selection	WAS Annual Meeting Seattle, USA
1976	(P)	Shrimp nutrition	WAS Annual Meeting San Diego, USA
1977	(P)	Mullet and prawn polyculture	WAS Annual Meeting San Jose, Costa Rica
1977	(L)	Animal feedstuff manufacture	INDERENA Cartagena, Colombia
1978	(P)	Feasibility of farming prawns in Dominica	WAS Annual Meeting Atlanta, USA
1978	(L)	Intensive fish farming	University of Jordan Amman, Jordan
1978	(I)	The Azraq fish farm site	British Broadcasting Corporation London, England
1978	(L)	Role of the consultant	ODA (DFID) London, England
1979	(L)	Shrimp nutrition	NIFI Bangkok, Thailand
1980	(P)	Status of Macrobrachium farming in Thailand	WAS Annual Meeting New Orleans, USA
1980	(P)	Prawn nutrition	Giant Prawn 1980 Bangkok, Thailand
1980	(P)	Status of prawn farming in Thailand	Giant Prawn 1980 Bangkok, Thailand
1980	(P)	Shallow beach wells	Giant Prawn 1980 Bangkok, Thailand
1981	(L)	Freshwater prawn farming	University of Stirling Stirling, Scotland
1984	(L)	Shrimp farming in Southeast Asia	BADC Jepara, Indonesia
1984 Seminar	(PP)	Shrimp farming in Southeast Asia	2nd (CSIRO) National Prawn Brisbane, Australia
1985	(L)	Shrimp feeds for tambak farming	Directorate General of Fisheries Jakarta, Indonesia
1986	(PP)	Aquaculture potential	Australian Fishexpo '86 Adelaide, Australia
1987 Centre	(L)	Aquafeed production	FAO Regional Aquaculture Training Policoro, Italy
1988	(P)	Shrimp farming in other areas	Shrimp '88 (INFOFISH Conference) Bangkok, Thailand
1988	(L)	Prawn culture	NACA Regional Lead Centre Wuxi, China
1988	(L)	Feeds and feeding	NACA Regional Lead Centre Wuxi, China
1990	(CC)	AQUATECH '90	(INFOFISH Conference) Kuala Lumpur, Malaysia
1990 Conference	(P)	Shrimp feeds	AQUATECH '90 (INFOFISH Kuala Lumpur, Malaysia
1991	(SC)	Aquaculture nutrition session	Symposium at Victam Asia '91 Bangkok, Thailand
1991	(P)	Aquaculture status	Symposium at Victam Asia '91 Bangkok, Thailand
1991	(PP)	Aquaculture status and prospects	WAS Annual Meeting San Juan, Puerto Rico
1991	(SC)	Aquaculture nutrition session	Symposium at Victam Asia '91 Utrecht, Netherlands
1992	(L)	Farm-made aquafeeds	AADCP Regional Training Course Singapore
1992	(P)	Overview of ASEAN aquafeeds	FAO/AADCP Expert Consultation Bangkok, Thailand

1993	(L)	Farm-made aquafeeds	AADCP participating institutes in Jepara, Indonesia, Melaka, Malaysia, and Munoz and Pagbilao, Philippines
1993	(L)	Use of farm-made feeds in Asia	University of Stirling Stirling, Scotland
1993	(SC)	Aquaculture nutrition session	Symposium at Victam Asia '93 Bangkok, Thailand
1994	(PP)	Freshwater prawn farming (V.G. Jhingram Memorial Lecture)	Asian Fisheries Society Workshop Bombay, India
1994 Farming	(PP)	Use of marine resources in aquafeeds	1st International Symposium on Fish Oslo, Norway
1994	(L)	Feeds and feeding in ASEAN	AADCP Nutrition Workshop Singapore
1995	(PP)	Aquafeeds for sustainable aquaculture	Sustainable Aquaculture '95 Honolulu, Hawaii
1995	(PP)	Sustainable aquaculture policy	ADB/NACA Workshop Beijing, China
1995	(PP)	Feed management and nutrition	ADB/NACA Workshop Beijing, China
1995 (GTCAD)	(PP)	Freshwater prawn farming	Prawn Farmers Association Symposium Vitoria, Brazil
1995 (GTCAD)	(PP)	Farm-made aquafeeds	Prawn Farmers Association Symposium Vitoria, Brazil
1995 Nutrition (CBNA)	(PP)	Shrimp and prawn nutrition	Brazilian College of Animal Symposium Campos do Jordão, Brazil
1995 State)	(L)	Freshwater prawn farming	CAUNESP (University of San Paulo Jaboticabal, Brazil
1995	(SC)	Aquaculture nutrition session	Symposium at Victam '95 Utrecht, Netherlands
1996 Session)	(PP)	Policy recommendations	WAS Annual Meeting (NACA Panel Bangkok, Thailand
1996	(PP)	Aquaculture policy	IFS/EU Workshop Can Tho, Viet Nam
1996	(PP)	Feed management	IFS/EU Workshop Can Tho, Viet Nam
1996	(SC)	Aquaculture nutrition session	Symposium at Victam Asia '96 Bangkok, Thailand
1997	(PP)	Status and future of global aquaculture	WAS Annual Meeting Seattle, USA
1997 (EAS/WAS Annual Meeting)	(PP)	Global emergence of tropical aquaculture	Martinique '97 Fort-de-France, Martinique
1997	(PP)	Status and future of global aquaculture	James Cook University Townsville, Australia
1997 Aquaculture	(PP)	National aquaculture policies	2nd Int. Symp. on Sustainable Oslo, Norway
1998 Seminar	(L)	Freshwater prawn nutrition and feeding	Prawn farmers of French Antilles Fort-de-France, Martinique
1998	(PP)	Trends in aquaculture and challenges for the next Century	ACP/EU Symposium Lisbon, Portugal
1998	(PP)	Status of aquaculture and 21st Century challenges	Aquicultura Brasil '98 Recife, Brazil
1998 State)	(L)	Sustainable aquaculture	CAUNESP (University of San Paulo Jaboticabal, Brazil
1998	(SC)	Aquaculture nutrition session	Symposium at Victam '98 Utrecht, Netherlands
1999	(CC)	Conference Chairman	WAS Annual Meeting Sydney, Australia
2000	(I)	Aquaculture investment opportunities in China	Voice of America Washington, USA

2000 Meetings	(CC)	Conference Chairman.	AQUA 2000: WAS and EAS Annual Meeting Nice, France
2000 Meetings	(P)	Status of commercial freshwater prawn farming	AQUA 2000: WAS and EAS Annual Meeting Nice, France
2000 Meetings	(SC)	Thematic session: discussion and summary	AQUA 2000: WAS and EAS Annual Meeting Nice, France
2000 Meetings	(P)	Review of aquaculture in Namibia	AQUA 2000: WAS and EAS Annual Meeting Nice, France
2000 Meetings	(SC)	Macrobrachium session	AQUA 2000: WAS and EAS Annual Meeting Nice, France
2000	(PP)	Global status of aquaculture	3rd World Fisheries Congress Beijing, China
2001	(SC/PP)	Post-retirement fisheries/aquaculture careers session	6th Asian Fisheries Forum Kaohsiung, Taiwan
2002	(SC)	Macrobrachium session	WAS Annual Meeting Beijing, China
2003	(PP)	Responsible aquaculture in developing countries	WAS Annual Meeting Salvador, Brazil
2003	(PP)	Status and future of freshwater prawn farming	Freshwater Prawns 2003 Kochi, India
2004	(SC)	Work of NGOs in aquaculture in developing countries	WAS Annual Meeting Honolulu, Hawaii (USA)
2004	(P)	Aquaculture without Frontiers: concept & progress	WAS Annual Meeting Honolulu, Hawaii (USA)
2005	(PC)	Conference Programme Co-Chair	WAS Annual Meeting Bali, Indonesia
2005	(P)	Aquaculture without Frontiers: progress 2004-2005	WAS Annual Meeting Bali, Indonesia