

Faculty of Fisheries Science (PCC)

**AQUACULTURE**  
**Course Structure - at a Glance**

CODE	COURSE TITLE	CREDITS
AQC 501*	SUSTAINABLE AQUACULTURE	2+1
AQC 502*	SOIL AND WATER QUALITY MANAGEMENT IN AQUACULTURE	2+1
AQC 503*	NUTRITION AND FEED TECHNOLOGY	2+1
AQC 504*	AQUATIC ANIMAL HEALTH MANAGEMENT	2+1
AQC 505	SEED PRODUCTION AND HATCHERY MANAGEMENT OF FINFISHES	2+1
AQC 506	SEED PRODUCTION AND HATCHERY MANAGEMENT OF SHELLFISHES	1+1
AQC 507	APPLIED GENETICS IN AQUACULTURE	2+1
AQC 508	NON-FOOD AQUACULTURE	1+1
AQC 509	COASTAL AQUACULTURE	2+1
AQC 510	FRESHWATER AQUACULTURE	2+1
AQC 511	LARVAL NUTRITION AND CULTURE OF FOOD ORGANISMS	1+1
AQC 512	AQUACULTURE ENGINEERING	2+1
AQC 591	MASTER'S SEMINAR	1+0
AQC 599	MASTER'S RESEARCH	20
AQC 601**	ADVANCES IN AQUACULTURE PRODUCTION SYSTEMS	2+1
AQC 602**	ADVANCES IN SEED PRODUCTION AND HATCHERY MANAGEMENT	2+1
AQC 603**	AQUACULTURE AND ECOSYSTEM MANAGEMENT	2+1
AQC 604	AQUATIC ANIMAL HEALTH MANAGEMENT AND QUARANTINE	1+1
AQC 605	FISH AND SHELLFISH PHYSIOLOGY AND ENDOCRINOLOGY	1+1
AQC 606	ADVANCES IN FISH GENETICS	2+1
AQC 607	INTENSIVE FARMING SYSTEMS FOR TILAPIA AND CATFISHES	1+1
AQC 608	AQUACULTURE DEVELOPMENT PLANNING AND MANAGEMENT	1+1
AQC 609	APPLIED BIOTECHNOLOGY	1+1
AQC 691	DOCTORAL SEMINAR I	1+0
AQC 692	DOCTORAL SEMINAR II	1+0
AQC 699	DOCTORAL RESEARCH	45

\* Compulsory for Master's programme; \*\* Compulsory for Doctoral programme

**FISH BIOTECHNOLOGY**  
**Course Structure - at a Glance**

CODE	COURSE TITLE	CREDITS
FBT 501*	FUNDAMENTALS OF MOLECULAR BIOLOGY	2+1
FBT 502*	BASIC CONCEPTS OF CELL BIOLOGY	2+1
FBT 503*	GENE STRUCTURE AND REGULATION OF EXPRESSION	2+1
FBT 504*	GENETIC ENGINEERING AND ITS APPLICATION IN FISHERIES	2+1
FBT 505#	MOLECULAR AND IMMUNOGENETICS	1+1
FBT 506#	BIOINFORMATICS	1+1
FBT 507#	CELL AND TISSUE CULTURE	1+1
FBT 508	MARINE BIOTECHNOLOGY	1+1
FBT 509	AQUACULTURE BIOTECHNOLOGY	1+1
FBT 591	MASTER'S SEMINAR	1+0
FBT 599	MASTER'S RESEARCH	20
FBT 601**	ADVANCES IN MOLECULAR AND CELL BIOLOGY	2+1
FBT 602**	GENETIC ENGINEERING OF EUKARYOTES	2+1
FBT 603**	GENETIC ENGINEERING OF BACTERIA AND VIRUSES	2+1
FBT 604	BIOSAFETY AND PATENT LAWS	2+0
FBT 605	FUNCTIONAL GENOMICS AND PROTEOMICS	1+1
FBT 606	PROTEIN CHEMISTRY AND ENGINEERING	1+1
FBT 607	RNAI TECHNOLOGY	1+1
FBT 608	BIOPROCESS TECHNOLOGY	1+1
FBT 691	DOCTORAL SEMINAR I	1+0
FBT 692	DOCTORAL SEMINAR II	1+0
FBT 699	DOCTORAL RESEARCH	45

\* Compulsory for Master's programme; \*\* Compulsory for Doctoral programme  
#FBT 505, FBT 506 and FBT 507 cross listed with Fish Genetics and Breeding FGB 507, FGB 510 and FGB 512 respectively

**FISH GENETICS AND BREEDING**  
**Course Structure - at a Glance**

CODE	COURSE TITLE	CREDITS
FGB 501*	PRINCIPLES OF GENETICS AND BREEDING	2+1
FGB 502*	POPULATION GENETICS	2+1
FGB 503*	QUANTITATIVE GENETICS	2+1
FGB 504*	PRINCIPLES OF SELECTION AND SELECTION METHODS	2+1
FGB 505	FISH BREEDING	2+1
FGB 506	FISH GENETIC RESOURCES AND CONSERVATION	2+1
FGB 507#	MOLECULAR AND IMMUNOGENETICS	1+1
FGB 508	MOLECULAR GENETICS	1+1
FGB 509	CYTOGENETICS	1+1
FGB 510#	BIOINFORMATICS	1+1
FGB 511	COMPUTER APPLICATIONS IN FISH GENETICS	1+1
FGB 512#	CELL AND TISSUE CULTURE	1+1
FGB 591	MASTER'S SEMINAR	1+0
FGB 599	MASTER'S RESEARCH	20
FGB 601**	ADVANCES IN FISH BREEDING	2+1
FGB 602**	SELECTION INDEX METHODOLOGIES	2+1
FGB 603**	APPLICATION OF GENETICS IN COMMERCIAL AQUACULTURE	2+1
FGB 604	RESEARCH METHODOLOGY IN FISH GENETICS	1+1
FGB 605	ADVANCES IN CYTOGENETICS	2+1
FGB 606	MOLECULAR BREEDING	2+1
FGB 607	TRANSGENIC PRODUCTION AND GMOS	1+1
FGB 608	LINEAR MODELS IN FISH GENETICS	2+1
FGB 691	DOCTORAL SEMINAR I	1+0
FGB 692	DOCTORAL SEMINAR II	1+0
FGB 699	DOCTORAL RESEARCH	45

\* Compulsory for Master's programme; \*\* Compulsory for Doctoral programme  
# FGB 507, FGB 510 and FGB 512 cross listed with Fish Biotechnology FBT 505, FBT 506 and FBT 507 respectively

**FISHERIES RESOURCE MANAGEMENT**  
**Course Structur - at a Glance**

CODE	COURSE TITLE	CREDITS
FRM 501*	INLAND FISHERIES RESOURCES	2+1
FRM 502*	MARINE FISHERIES RESOURCE MANAGEMENT	2+1
FRM 503*	MARINE ECOSYSTEMS, BIODIVERSITY AND CONSERVATION	2+1
FRM 504*	TROPICAL FISH STOCK ASSESSMENT	2+1
FRM 505	FISHERIES REGULATIONS	2+1
FRM 506	REMOTE SENSING AND GIS FOR FISHERIES MANAGEMENT	1+1
FRM 507#	INTEGRATED COASTAL ZONE MANAGEMENT	2+1
FRM 508	AQUATIC FLORAL RESOURCES	2+1
FRM 509	FEEDING AND REPRODUCTIVE BIOLOGY OF FINFISH AND SHELLFISH	2+1
FRM 510	DEVELOPMENTAL BIOLOGY OF FINFISH AND SHELLFISH	2+1
FRM 511	FISHING AND ALLIED TECHNOLOGIES	2+1
FRM 512	MODERN TECHNIQUES IN ICHTHYOTAXONOMY	2+1
FRM 591	MASTER'S SEMINAR	1+0
FRM 599	MASTER'S RESEARCH	20
FRM 601**	ASSESSMENT OF AQUATIC BIODIVERSITY	2+1
FRM 602**	APPLICATIONS OF FISHERIES MODELS IN STOCK ASSESSMENT	2+1
FRM 603**	CONSERVATION AND MANAGEMENT OF EXPLOITED FISHERIES RESOURCES	2+1
FRM 604	CORAL REEF MANAGEMENT	2+1
FRM 605	DATA COLLECTION AND ESTIMATION OF EXPLOITED FISHERIES RESOURCES	0+2
FRM 606	FISHERIES ENVIRONMENTAL ASSESSMENT	2+1
FRM 607	ISSUES IN CAPTURE FISHERIES	1+1
FRM 691	DOCTORAL SEMINAR I	1+0
FRM 692	DOCTORAL SEMINAR II	1+0
FRM 699	DOCTORAL RESEARCH	45

\* Compulsory for Master's programme; \*\* Compulsory for Doctoral programme  
#FRM 507 cross listed with Aquatic Environment Management AEM 503

## COMMON SUPPORTING COURSES

CODE	COURSE TITLE	CREDITS
STM 501	STATISTICAL METHODS	2+1
STM 502	RESEARCH METHODOLOGY	1+1
STM 601	ADVANCED STATISTICAL METHODS	2+1
STM 602	SOFTWARE FOR FISHERIES DATA ANALYSIS AND MANAGEMENT	0+2

### Course Contents

**STM 501                      STATISTICAL METHODS                      2+1**

**Objective**

To acquaint the students with various statistical methods and techniques  
To provide hands on training in data analysis through statistical software.

**Theory**

UNIT I

Sampling distribution for mean and proportion, standard error, confidence interval for mean and proportion; Test of hypothesis: type I and type II errors, level of significance, tests based on Z, t,  $X^2$  and F distribution.

UNIT II

Properties of estimators: unbiasedness, efficiency, sufficiency and consistency.

UNIT III

Simple correlation and regression, Spearman's rank correlation.

UNIT IV

Basic concepts of sampling techniques: simple random, stratified, systematic, cluster and two stage sampling and their applications in fisheries.

UNIT V

Analysis of variance: one way and two way classification; Non-parametric test, advantages and disadvantages over parametric tests; Run test and Sign test.

**Practical**

Tests of hypothesis based on Z, t,  $X^2$  and F; Simple correlation and regression, Rank correlation; Analysis of variance: one way and two way; Simple random, stratified, systematic, cluster and two stage sampling; Sign test, Run test; Hands on experience in using the statistical software packages MS Excel, Systat and SPSS in data analysis and interpretation.

**Suggested Readings**

- Biradar RS. 2002. *Course Manual on Fisheries Statistics*. 2<sup>nd</sup> Ed. CIFE, Mumbai.  
Keller G. 2001. *Applied Statistics with Microsoft Excel*. Duxbury.  
Kothari CR. 1998. *Research Methodology*. 2<sup>nd</sup> Ed. Wishwa Prahashan.  
Levin RL & Rubin DS. 1983. *Statistics for Management*. Prentice-Hall of India.

## COMPULSORY NON-CREDIT COURSES

(Compulsory for Master's programme in all disciplines; Optional for Ph.D. scholars)

CODE	COURSE TITLE	CREDITS
PGS 501	LIBRARY AND INFORMATION SERVICES	0+1
PGS 502	TECHNICAL WRITING AND COMMUNICATIONS SKILLS	0+1
PGS 503 (e-Course)	INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE	1+0
PGS 504	BASIC CONCEPTS IN LABORATORY TECHNIQUES	0+1
PGS 505 (e-Course)	AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES	1+0
PGS 506 (e-Course)	DISASTER MANAGEMENT	1+0

### Course Contents

**PGS 501                      LIBRARY AND INFORMATION SERVICES                      0+1**

**Objective**

To equip the library users with skills to trace information from libraries efficiently, to apprise them of information and knowledge resources, to carry out literature survey, to formulate information search strategies, and to use modern tools (Internet, OPAC, search engines etc.) of information search.

**Practical**

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

**PGS 502                      TECHNICAL WRITING AND COMMUNICATIONS SKILLS                      0+1**

**Objective**

To equip the students/scholars with skills to write dissertations, research papers, etc.  
To equip the students/scholars with skills to communicate and articulate in English (verbal as well as writing).

**Practical**

*Technical Writing* - Various forms of scientific writings- theses, technical papers, reviews, manuals, etc; Various parts of thesis and research