

# **B.SC. SEMESTER-I**

**Core Course No. : UFITC 101**  
**Core Course Title: FISH AND SHELLFISH BIOLOGY**  
**CREDITS : 4**

## **UNIVERSITY OF JAMMU**

**Syllabi and Course of Study in Industrial Fish & Fisheries**  
**For the examination to be held in the years Dec 2016, 2017 and 2018**  
**UNDER CHOICE BASED CREDIT SYSTEM**

1. Course /Paper Title	:	<b>Fish and Shellfish Biology (Theory)</b>
2. Maximum Marks	:	100
i) External (Univ. Exam.)	:	80
ii) Internal Assessment	:	20
4. Minimum Pass Marks	:	
i) External	:	29
ii) Internal	:	07
5. Duration of Univ. Exam.	:	3 Hrs.

### **Unit-I Taxonomy and Morphology** **13 Hrs**

- 1.1 General characteristics of fish
- 1.2 Fish diversity and adaptation
- 1.3 Classification of fishes upto order level
- 1.4 Methods of fish identification ( Morphometric and meristic)
- 1.5 Skin and colouration
- 1.6 Types of fins
- 1.7 Types of scales

### **Unit-II Anatomy and Physiology** **13 Hrs**

- 2.1 Alimentary canal and associated structures ( Digestive glands)
- 2.2 Circulatory system ( Heart, Blood, Blood vessels and circulation of blood)
- 2.3 Respiratory system ( Gill structure and mechanism of respiration)
- 2.4 Nervous system ( Brain, Spinal cord and cranial nerves)
- 2.5 Sense organs (Eye, Lateral line and Membranous labyrinth)
- 2.6 Skeletal system ( Axial and Appendicular skeleton)

### **Unit-III Social and Reproductive Behaviour** **13 Hrs**

- 3.1 Osmoregulation of freshwater and marine fishes
- 3.2 Feeding habits of various group of fishes
- 3.3 Migration of fishes
- 3.4 Aggregation and shoaling behaviour

- 3.5 Male and female reproductive system of fishes
- 3.6 Sexual maturity and maturity stages of gonads

#### **Unit-IV Breeding and Development**

**13 Hrs**

- 4.1 Spawning habits ( Nest building, Courtship and spawning)
- 4.2 Fecundity of fishes and methods of estimation of fecundity
- 4.3 Types of fish eggs
- 4.4 Embryonic development of fish
- 4.5 Hatching and development of fish larvae
- 4.6 Parental care

#### **Unit-V Shellfish Biology**

**13 Hrs**

- 5.1 General characters and classification of crustacean
- 5.2 External morphology of prawn
- 5.3 General account of Bivalves and cephalopods
- 5.4 Digestive, respiratory and excretory system of
  - 5.4.1 Prawn
  - 5.4.2 Unio
- 5.5 Food and feeding habits of
  - 5.5.1 Crustaceans
  - 5.5.2 Bivalves
  - 5.5.3 Cephalopods

**Note: 1** There shall be one written theory paper of 100 marks and one practical paper of 100 marks. 20% (20 marks) of the marks shall be reserved for internal assessment in theory paper and 50 % (50 marks) in the practical paper. Theory paper will be set for 80 marks and the practical paper for 50 (40 marks for paper and 10 for viva-voce). Daily evaluation of practical records/viva voce/attendance etc. will be of 50 marks (including 20% (10 marks) for attendance, 20% (10 marks) for viva voce and 60% for the internal test and day to day performance (15 marks each) In case of the regular students internal assessment received from the college will be added to the marks obtained by them in the university examination and in case of private candidates marks obtained by them in the University examination shall be increased proportionately in accordance with the statutes / regulation.

#### **Internal Assessment Test**

One long answer type question of 10 marks and five short answer type questions of 2 marks each

**Note 2: For paper setters:**

#### **External End Semester University Exam**

**Section A:** 10 very short answer type questions are to be set. The maximum length of answer shall be 50 words. All the questions are compulsory. Each question will carry 2 marks, total weightage being 20 marks.

**Section B:** This section will comprise of ten long answer type questions, with two questions from each unit. Candidate will have to attempt 5 questions selecting one question from each unit. Each question will, carry 12 marks and the totalweightage being 60 marks.

### **Books Recommended**

1. Jhingran, V.G. (1985) Fish and Fisheries of India
2. Gupta, S.K and Gupta, P.C (2008) General and applied ichthyology (Fish and Fisheries)
3. Ayyappan, S (2010) Handbook of Fisheries and Aquaculture
4. Srivastava, C.B.L (2006) Atextbook of fishery science and Indian fisheries
5. Khanna, S.S Introduction to fishes
6. Khanna, S.S and Singh, H.R. A text book of Fish Biology and Fisheries

## **B.SC. SEMESTER-I**

**Core Course No. : UFIPC 101**

**Core Course Title: FISH AND SHELLFISH BIOLOGY (PRACTICAL)**

**CREDITS : 2**

1. Museum survey ( Morphological study) of at least three specimen of each
  - (a) Holocephali
  - (b) Dipnoi
  - (c) Elasmobranch
  - (d) Teleost
  - (e) Crustacean
  - (f) Mollusk ( Bivalve and cephalopods)
  
2. Study of structural modifications of
  - (a) Mouth
  - (b) Caudal fin
  - (c) Fins
  
3. Study of morphological/ Taxonomic characters
  - (a) Morphometric
  - (b) Meristic
  
4. Microscopic study from slides
  - (a) Placoid scale
  - (b) Cycloid scale
  - (c) Ctenoid scale
  
5. Histological studies from prepared slides
  - (a) Skin
  - (b) Stomach
  - (c) Gill
  - (d) Ovary
  - (e) Intestine
  
6. Dissection/ Anatomical study
  - (a) Digestive system of prawn/ fish
  - (b) Circulatory system of fish
  - (c) Nervous system of fish/ prawn
  
7. Identification of fish eggs/ larvae

## **B.SC. SEMESTER-II**

**Core Course No. : UFITC 201**

**Core Course Title: CAPTURE FISHERIES**

**CREDITS : 4**

### **UNIVERSITY OF JAMMU**

#### **Syllabi and Course of Study in Industrial Fish & Fisheries**

**For the examination to be held in the years May 2017, 2018 and 2019**

#### **UNDER CHOICE BASED CREDIT SYSTEM**

1. Course /Paper Title	:	<b>Capture Fisheries (Theory)</b>
2. Maximum Marks	:	100
i) External (Univ. Exam.)	:	80
ii) Internal Assessment	:	20
4. Minimum Pass Marks	:	
i) External	:	29
ii) Internal	:	07
5. Duration of Univ. Exam.	:	3 Hrs.

#### **Unit-I Inland Fisheries**

**13 Hrs**

- 1.1 Inland capture fisheries resource of India
- 1.2 Riverine fisheries with special reference to that of Ganga, Brahmaputra and Indus river system
- 1.3 Lacustrine fisheries
  - 1.3.1 Origin, Ecology and productivity of lakes
- 1.4 Warm water fisheries ( Carp and Cat fishes)
- 1.5 Cold water fisheries ( Trout and Mahseer)
- 1.6 Fisheries resources of J & K.

#### **Unit-II Estuarine and Marine Fisheries**

**13 Hrs**

- 2.1 Brackishwater fisheries resources of India
  - 2.1 Hoogly Matlah Estuary
  - 2.2 Chilka lake
- 2.2 Ecology of Estuaries
- 2.3 Marine fisheries resources of India
  - 2.3.1 Inshore fisheries
  - 2.3.2 Off- shore fisheries
- 2.4 Concept of EEZ

### **Unit-III Exploitation of Fishery Resources**

**13 Hrs**

- 3.1 Brackishwater fishery
  - 3.1.1 Hilsa fishery
  - 3.1.2 Mullet fishery
- 3.2 Marine fishery
  - 3.2.1 Oil sardine
  - 3.2.2 Bombay duck
  - 3.2.3 Tuna fishery
- 3.3 Shellfish fishery
  - 3.3.1 Prawns
  - 3.3.2 Lobsters
  - 3.3.3 Crabs,
  - 3.3.4 Mussels

### **Unit-IV Fishing Technologies**

**13 Hrs**

- 4.1 Traditional fishing gears (Design and Operation)
  - 4.1.1 Gill net
  - 4.1.2 Drag net
  - 4.1.3 Cast net
  - 4.1.4 Line fishing
- 4.2 Modern fishing gears (Design and Operation)
  - 4.2.1 Trawl net
  - 4.2.2 Purse seines

### **Unit-V Population Dynamics and Conservation**

**13 Hrs**

- 5.1 Structure and estimation of population
- 5.2 Factors affecting fish population
- 5.3 Problems of overfishing
- 5.4 Concept of MSY (Maximum Sustainable Yield), MEY (Maximum Economic Yield) and recruitment
- 5.5 Conservation of capture fisheries resources

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3. Ayyappan, S (2010) Handbook of Fisheries and Aquaculture
4. Srivastava, C.B.L (2006) Atextbook of fishery science and Indian fisheries
5. Talwar, P.K. Inland Fisheries of India
6. Bal,D and Rao,K.V. Marine Fisheries

## **B.SC. SEMESTER-II**

**Core Course No. : UFIPC 201**

**Core Course Title: CAPTURE FISHERIES (PRACTICAL)**

**CREDITS : 2**

1. Methods of collection, handling and preservation of fish for taxonomic purposes
2. Museum survey ( Morphology study) of at least three specimens of each
  - (a) Freshwater fishes
  - (b) Brackishwater fishes
  - (c) Marine fishes
  - (d) Cold water fishes
  - (e)
3. Study of design and working of gears
  - (a) Drag net
  - (b) Cast net
  - (c) Hand net
  - (d) Hook and line
  - (e)
4. Estimation of Age and Growth of fish through
  - (a) Direct method
  - (b) Indirect method
  - (c)
5. Length and weight relationship
6. Field visits to observe
  - (a) Fishing operation
  - (b) Collection of data regarding species composition
  - (c) Crafts and gears