



UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A' GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

Academic Section

Email: academicsectionju14@gmail.com

NOTIFICATION (22/Sept./Adp/28)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Study in the subject of **Industrial Fish and Fisheries** of Semesters **Ist and IInd** for **Four Year Under Graduate Programme** under the **Choice Based Credit System** as per **NEP-2020** (as given in the annexure) for the examinations to be held in the years as per the details given below:

Subject	Semester	for the examination to be held in the years
Industrial Fish and Fisheries	Semester-I	December 2022, 2023 and 2024
	Semester-II	May 2023, 2024 and 2025

The Syllabi of the courses is available on the University website: www.jammuuniversity.ac.in

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/22/ 5670-5684

Dated: 19-9-2022.

Copy for information and necessary action to:

1. Special Secretary to the Vice-Chancellor, University of Jammu for information of Hon'ble Vice-Chancellor
2. Dean, Faculty of Life Science
3. HOD/Convener, Board of Studies in **Industrial Fish and Fisheries**
4. Sr. P.A. to the Controller of Examinations
5. All members of the Board of Studies
6. Confidential Assistant to the Controller of Examinations
7. I/C Director, Computer Centre, University of Jammu
8. Deputy Registrar/Asst. Registrar (Conf. /Exams. UG/ Exam Eval Non-Prof/CDC)
9. Incharge, University Website for Uploading of the notification.

Sumitasharma
Deputy Registrar (Academic) 16/9/22

[Signature]
15/9/22

Department of Zoology
University of Jammu
Course Scheme of Syllabus
Bachelor of Industrial Fish and Fisheries (General/Honors/Honors with Research)
(As per the Guidelines of National education Policy-2020)

SEMESTER-I

S No	Course Type	Course No.	Course Title	Credits	Marks				Total marks
					Theory		Practical		
					Mid Semester	End Exam	Assessment	Exam	
1.	Major	UMJIFT101	Introduction to Fish & Fisheries	4(3T+1P)	15	60	10	15	100
2.	Minor	UMIIFT102	Basics of Fish & Fisheries	4(3T+1P)	15	60	10	15	100
3.	MDC	UMDIFT103	Basics of Fish Culture	3	15	60	NA	NA	75
4.	SEC	USEIFT104	Fish Farming of Indian Major Carps	2	5	40	NA	5	50

SEMESTER-II

S No	Course Type	Course No.	Course Title	Credits	Marks				Total marks
					Theory		Practical		
					Mid Semester	End Exam	Assessment	Exam	
1.	Major	UMJIFT201	Fish Behavior	4(3T+1P)	15	60	10	15	100
2.	Minor	UMIIFT202	Behavioral Patterns in Fishes	4(3T+1P)	15	60	10	15	100
3.	MDC	UMDIFT203	Fisheries Extension Education	3	15	60	NA	NA	75
4.	SEC	USEIFT204	Aquarium Management	2	5	40	NA	5	50

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND
FISHERIES UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(MAJOR COURSE)
UG SEMESTER-I

MAJOR CORE COURSE NO.	:	UMJIFT101
MAJOR CORE COURSE TITLE	:	INTRODUCTION TO FISH & FISHERIES
CREDITS	:	04 {03 (THEORY) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
I) Continuous assessment	:	10
II) Final examination	:	15

Objectives and expected learning outcomes

The course provides an introduction to the Fishes and basic knowledge of Fisheries sciences. After successfully completing this course, the students will be able to understand about the Fishes, their general characters, habits and adaptations. Students will be able to know the importance of fishes in daily life

UNIT I: Fish and fisheries at a glance (12 Hrs.)

- 1.1 Fisheries Science and its Branches
- 1.2 Definition and General Characteristics of a Fin fish- *Cyprinus carpio*
- 1.3 Scope and Present scenario of Indian Fisheries
- 1.4 General characteristics of a Shell fish- *Palaemon*
- 1.5 General morphometry of a fish

UNIT 2: Fish morphology (13 Hrs.)

- 2.1 Mouth part modifications
- 2.2 General structure of gills in fishes
- 2.3 Types of fins and their modifications
 - 2.3.1 Paired fins
 - 2.3.2 Unpaired fins
- 2.4 Types of scales in fishes
 - 2.4.1 Ganoid scales
 - 2.4.2 Cycloid scales
 - 2.4.3 Ctenoid scales

2.4.3 Placoid scales

UNIT 3: General habits of fishes

(10 Hrs.)

3.1 Types of food and feeding habits in fishes

3.1.1 Types of food-Basic, Occasional, Incidental

3.1.2 Feeding habits of fishes on the basis of- Type of food, Selection of food, Trophic niche and Manner of capture and ingestion

3.2 Nutritional value of fishes- Proteins, Lipids, Vitamins, Health benefits of food fishes

UNIT 4: Adaptations to special conditions of life

(10 Hrs.)

4.1 Adaptations in freshwater fishes

4.1.1 Hill stream fishes

4.1.2 Tropical fishes

4.2 Adaptations in marine water fishes- Body shape and size

4.3 Adaptations in deep sea fishes

4.3 Colouration in fishes

4.4 Bioluminescence in fishes

Practicum

(30 Hrs.)

1. Museum survey of morphology of Commercially important fin fishes
2. Museum survey of morphology of Commercially important shell fishes
3. Study of structural modifications of mouth parts in fishes through specimen/charts
4. Study of structural modifications of gills through specimen/charts
5. Study of structural modifications of fins in fishes through specimen/charts
6. Study of morphometric characters
7. Microscopic study and preparation of temporary/ permanent mounts of Placoid scales
8. Microscopic study and preparation of temporary/ permanent mounts of Cycloid scales
9. Microscopic study and preparation of temporary/ permanent mounts of Ctenoid scales
10. Dissection/ Anatomical study of Digestive system of fish

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr. & 30 Minutes	15
External Theory End Semester	100%	3 Hrs.	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Pandey, K. and Shukla, J. P. (2005). Fish and Fisheries (4th edition) Rastogi Publications.
2. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries, Kitab Mahal
3. Khanna, S.S. (1980) Introduction to fishes, Surjeet Publications
4. Kyle, H. (2006) The biology of fishes, Sidgewick and Jackson
5. Marshal, N.B. (1976) The life of fishes, Universe
6. Talwar P.K. And Jhingran, V.G. (1992) Inland fishes of India and adjacent countries, vol. I and II, Oxford

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND
FISHERIES UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(MINOR COURSE)
UG SEMESTER-I

MINOR CORE COURSE NO.	:	UMIIFT102
MINOR CORE COURSE TITLE	:	BASICS OF FISH & FISHERIES
CREDITS	:	04{03 (THEORY)+01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
I) Internal Practical Assessment	:	10
II) External Practical	:	15

Objectives and expected learning outcomes

The course provides basic knowledge of Fishes and Fisheries sciences. After successfully completing this course, the students will be able to understand about the Fishes, their general characters, habits and adaptations. Students will be able to know the importance of fishes in daily life

UNIT I: Fish and fisheries at a glance (12 Hrs.)

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- 1.2 Definition and General Characteristics of a Fin fish- *Cyprinus carpio*
- 1.3 Scope and Present scenario of Indian Fisheries
- 1.4 General characteristics of a Shell fish- Palaemon
- 1.5 General morpho-metry of a fish

UNIT 2: Fish morphology (13 Hrs.)

- 2.1 Mouth part modifications
- 2.2 general structure of gills in fishes
- 2.3 Types of fins and their modifications
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(10 Hrs.)

- 3.1 Types of food and feeding habits in fishes
 - 3.1.1 Types of food-Basic, Occasional, Incidental
 - 3.1.3 Feeding habits of fishes on the basis of- Type of food, Selection of food, Trophic niche and Manner of capture and ingestion
- 3.2 Nutritional value of fishes- Proteins, Lipids, Vitamins, Health benefits of food fishes

UNIT 4: Adaptations to special conditions of life

(10 Hrs.)

- 4.1 Adaptations in freshwater fishes
 - 4.1.1 Hill stream fishes
 - 4.1.2 Tropical fishes
- 4.2 Adaptations in marine water fishes- Body shape and size
- 4.3 Adaptations in deep sea fishes
- 4.3 Colouration in fishes
- 4.4 Bioluminescence in fishes

Practicum

(30 Hrs.)

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NOTE FOR PAPER SETTING

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Internal Theory Assessment	50%	1 Hr. & 30 Minutes	15
External Theory End Semester	100%	3 Hrs.	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

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3. Khanna, S.S. (1980) Introduction to fishes, Surjeet Publications
4. Kyle, H. (2006) The biology of fishes, Sidgewick and Jackson
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UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND
FISHERIES UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(MULTIDISCIPLINARY COURSE)
UG SEMESTER-I

MULTIDISCIPLINARY CORE COURSE NO.	:	UMDIFT103
MULTIDISCIPLINARY CORE COURSE TITLE	:	BASICS OF FISH CULTURE
CREDITS	:	03
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

The course provides a basic knowledge to the students about fishes and their culture. The students will learn the basic aspects, requirements, management along with the benefits of Fish culture. The course is designed for the students to choose Fish culture as a source of the self employment and income generation.

UNIT 1 – Basic knowledge about fishes (13 Hrs.)

- 1.1 An introduction to fisheries sciences
- 1.2 General characteristics of fishes
- 1.3 Nutritional value of fish
- 1.4 History of fish farming
- 1.5 Scope and Status of fish farming in India

UNIT 2 – Culture pond preparation (10 Hrs.)

- 2.1 Site selection for a fish farm
- 2.2 Types of fish ponds- Nursery, Rearing and Stocking pond
- 2.3 Important factors in the construction of an ideal fish pond ó site selection, topography, nature of the soil, water resources

UNIT-3 Basics of fish culture (10 Hrs.)

- 3.1 Criteria of selection of farmed species
- 3.2 Types of fish culture-
 - 3.2.1 Composite fish culture

- 3.2.2 Integrated fish farming
3.3 General introduction to Intensive, Semi-intensive and Extensive Fish culture

UNIT 4- Management of fish culture

(12 Hrs.)

- 4.1 Pre-stocking management of fish farms
4.2 Post stocking management of fish farms
4.3 Types of fish feed and nutritional requirements of fishes
4.4 Fish harvesting
4.5 Transportation of fishes

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr. and 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Pandey, K. and Shukla, J. P. (2005). Fish and Fisheries (4th edition) Rastogi Publications.
2. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries, Kitab Mahal
3. Khanna, S.S. (1980) Introduction to fishes, Surjeet Publications
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5. Marshal, N.B. (1976) The life of fishes, Universe
6. Talwar P.K. And Jhingran, V.G. (1992) Inland fishes of India and adjacent countries, vol. I and II, Oxford
7. Rath, R.K. (2000) Freshwater Aquaculture

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND
FISHERIES UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(SKILL ENHANCEMENT COURSE)
UG SEMESTER-I

SKILL ENHANCEMENT CORE COURSE NO.	:	USEIFT104
SKILL ENHANCEMENT CORE COURSE TITLE	:	FISH FARMING OF INDIAN MAJOR CARPS
CREDITS	:	02
MAXIMUM MARKS	:	50
I) External (University Exam)	:	40
II) Internal Assessment	:	10
DURATION OF UNIVERSITY EXAM	:	02 Hours & 30 Minutes

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

The course is designed to acquaint the students with basic understanding of the fish farming with special reference to Carp culture. The course consists of the basic necessities, management and benefits of fish farming. The learners will be skilled to choose fish farming as the source of self employment and self earning in the near future.

UNIT 1: Carp culture **(7 Hrs.)**

- 1.1 Morphological characteristics of Indian major carps
- 1.2 Criteria of selection of cultured fish species
- 1.3 Food and feeding habits of carps
- 1.4 Breeding habits of carps

UNIT 2: Pond management **(8 Hrs.)**

- 2.1 Criteria of selection of suitable site for fish farms
- 2.2 Types of fish ponds-nursery, rearing and stocking pond
- 2.3 Pre-stocking management of ponds
- 2.4 Post stocking management of ponds
- 2.5 Harvesting and Transportation of fishes
- 2.6 Role of F.F.D.A. in providing financial assistance to carp fish farmers

UNIT 3: Practical fish farming **(30 Hrs.)**

- 3.1 Museum survey of Indian major carps

- 3.2 Determination of physical parameters of pond water
 - i) Temperature
 - ii) Turbidity
- 3.3 Determination of chemical parameters of pond water
 - i) Dissolved oxygen
 - ii) Free carbon dioxide
 - iii) Alkalinity
 - iv) pH
- 3.4 Collection of fish food organisms
 - i) Phytoplanktons
 - ii) Zooplanktons
- 3.5 Feed formulation using locally available feed ingredients
- 3.6 Types of fishing gears
- 3.7 Control of weeds and predators in fish pond
- 3.8 Visit to local fish ponds and farms

NOTE FOR PAPER SETTERS

Total Marks of the USEIFT-104 is 50 of which 20% marks shall be reserved for internal assessment (10 marks). Remaining 80% of the marks (40 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (10 Marks)

Internal Assessment Paper of 10 Marks shall consist of Theory Question/s of 5 Marks from Unit I/II and 5 Marks of Practical Exercise from Unit III.

External End semester University / College Examination

External Theory Exam shall be of 40 Marks and consist of 2 sections:

Section A: Four (4) short answer questions representing all Units/Syllabi i.e., atleast one question from each unit. Each question shall be of 2.5 marks (All Compulsory)

Section B: Six (6) long answer questions (Three to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 10 marks

SUGGESTED READINGS

1. Fish and Fisheries by Pandey and Shukla
2. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries
3. Khanna, S.S introduction to fishes
4. Jhingran, V.G. (1985) Fish and fisheries of India
5. Rath, R.K. (2000) Freshwater Aquaculture
6. Agarwal, S.C. (2007) A handbook of fish farming
7. Ayyappan, S (2010) Handbook of Fisheries and Aquaculture
8. Pillay, T.V.R (1993) Aquaculture Principles and Practice

SEMESTER-I
TITLE- FISH FARMING OF INDIAN MAJOR CARPS
COURSE CODE- USEIFT104

2022-24

University of Jammu
Syllabi of Industrial Fish and Fisheries for FYUP under CBCS as per NEP-2020

SEMESTER-II
(Examination to be held in May 2023, 2024, 2025)

Major Course

Course Code: UMJIFT201	Course Title: Fish Behavior
Credits: 04 {03(Theory) + 01(Practical)}	Total no. of lectures: Theory: 45 hours Practical: 30 hours
Maximum Marks: 100 Theory: 75 Practical/Tutorial: 25	

Minor Course

Course Code: UMIIFT202	Course Title: Behavioral Patterns in Fishes
Credits: 04{03(Theory) + 01(Practical)}	Total no. of lectures: Theory: 45 hours Practical: 30 hours
Maximum Marks: 100 Theory: 75 Practical/Tutorial: 25	

Multidisciplinary Course

Course Code: UMDIFT203	Course Title: Fisheries Extension Education
Credits: 03	Total no. of lectures: Theory: 45 hours
Maximum Marks: 75 Theory: 75	

Skill Enhancement Course

Course Code: USEIFT204	Course Title: Aquarium Management
Credits: 02	Total no. of lectures: Theory/Practical: 45 hours (15 hours)/(30 hours)
Maximum Marks: 50 Theory/Practical: 50	

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(For the Examination to be held in Year May- 2023, 2024 & 2025)
(MAJOR COURSE)
UG SEMESTER-II

MAJOR CORE COURSE NO.	:	UMJIFT201
MAJOR CORE COURSE TITLE	:	FISH BEHAVIOR
CREDITS	:	04{03 (THEORY) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
I) Continuous assessment	:	10
II) Final examination	:	15

Objectives and expected learning outcomes

The course provides an introduction to the Fishes and basic knowledge of Fisheries sciences. After successfully completing this course, the students will be able to understand about the Fishes, their general characters, habits and adaptations. Students will be able to know the importance of fishes in daily life

UNIT 1: General behavioral patterns of fishes (13 Hrs.)

- 1.1. Osmoregulation in freshwater fishes
- 1.2. Osmoregulation in marine fishes
- 1.3. Migration in fishes- Alimetal and Gametic (Anadromous and Catadromous migration)
- 1.4. Aggregation and Shoaling behavior of fishes- Types of Shoals
- 1.5. Bioluminescence in Fishes

UNIT 2: Reproductive behavior of fishes (12 Hrs.)

- 2.1 Spawning habits of fishes
 - 2.1.1 Live Bearers
 - 2.1.2 Egg Layers
- 2.2 Types of fish eggs- on the basis of quantity of yolk, float and spawning manner
- 2.3 Maturity stages of Male Teleostean fish
- 2.4 Maturity stages of Female Teleostean fish
- 2.5 Embryonic Development in a Teleostean fish
- 2.6 Larval Development in a Teleostean fish

UNIT 3: Fecundity in fishes

(10 Hrs.)

- 3.1 Courtship and mating behavior of fishes
- 3.2 Fecundity in fishes
 - 3.2.1 Methods of estimation of fecundity
- 3.3 Fecundity in relation to length, weight, age and food supply

UNIT-4: Parental care in fishes

(10 Hrs.)

- 4.1 Factors responsible for Parental care in fishes
- 4.2 Nest building in fishes- Basin, Circular, Foamy, Barrel and Burrow nest
- 4.3 Non nest building care behavior- Deposition eggs in suitable places and body
- 4.4 Viviparity and Care for young

Practicum

(30 Hrs.)

1. Histological study of maturity stages in Male Teleost through slides/charts
2. Histological study of maturity stages in Female Teleost through slides/charts
3. Estimation of relative condition factor, Gonado-somatic index of fishes
4. Estimation of fish fecundity by gravimetric method.
5. Identification of carp eggs
6. Identification of Trout eggs
7. Identification of Mahseer eggs
8. Field visits to fish farms to observe spawning in fishes
9. Identification and Collection of phytoplanktons as fish food organism
10. Identification and Collection of zooplanktons as fish food organism

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

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7. Ayyappan, S (2010) Handbook of Fisheries and Aquaculture

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SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND FISHERIES
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year May- 2023, 2024 & 2025)
(MINOR COURSE)
UG SEMESTER-II

MINOR CORE COURSE NO.	:	UMIIFT202
MINOR CORE COURSE TITLE	:	BEHAVIORAL PATTERNS IN FISHES
CREDITS	:	04{03 (THEORY) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
I) Continuous assessment	:	10
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10. Identification and Collection of zooplanktons as fish food organism

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Pandey, K. and Shukla, J. P. (2005). Fish and Fisheries (4th edition) Rastogi Publications.
2. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries, Kitab Mahal
3. Khanna, S.S. (1980) Introduction to fishes, Surjeet Publications
4. Kyle, H. (2006) The biology of fishes, Sidgewick and Jackson
5. Marshal, N.B. (1976) The life of fishes, Universe
6. Talwar P.K. And Jhingran, V.G. (1992) Inland fishes of India and adjacent countries, vol. I and II, Oxford
7. Ayyappan, S (2010) Handbook of Fisheries and Aquaculture

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND FISHERIES
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year May- 2023, 2024 & 2025)
(MULTIDISCIPLINARY COURSE)
UG SEMESTER-II

MULTIDISCIPLINARY CORE COURSE NO.	: UMDIFT203
MULTIDISCIPLINARY CORE COURSE TITLE	: FISHERIES EXTENSION EDUCATION
CREDITS	: 03
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
I) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 3 Hours

Objectives and expected learning outcomes

The course provides knowledge about Fisheries extension education, the general criteria and Principles to be followed during the Extension. The students will learn about framing a good extension program and the procedures to be followed while imparting extension education in the field of Fisheries.

UNIT 1 Fundamentals of fisheries extension education (12 Hrs)

- 1.1 Introduction to Extension education
- 1.2 Principles of Extension education
- 1.3 Objectives and Functions of Extension education
- 1.4 Role of Extension in Fisheries Development

UNIT 2 Extension program (10 Hrs)

- 2.1 Principles of Extension program
- 2.2 Steps in Extension program planning in Fisheries
- 2.3 Characteristics of a good Fisheries Extension program
- 2.4 A general view of Pradhan Mantri Matsya Sampada Yojana Extension program

UNIT 3 Leadership and communication channels in extension (13 Hrs)

- 3.1 Leadership in Extension
- 3.2 Qualities and Functions of a Leader in Extension program
- 3.3 Communication, Types and Problems
- 3.4 Channels of Communication

UNIT 4 Technology transfer (10 Hrs)

- 4.1 Technology-definitions and characters
- 4.2 Transfer of technology

- 4.3 Models of transfer of technology
4.4 Emerging concepts in Transfer of Technology

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr. & 30 Minutes	15
External Theory End Semester	100%	3 Hrs.	60

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Saxena, A. (2011) Fisheries Extension
2. Sharma, O., (2010) Fisheries Extension and Administration
3. Ayyappan, S (2010) Handbook of fisheries and aquaculture
4. Pillay, T.V.R (1993) Aquaculture principles and practices
5. Fish and fisheries by Shukla and Pandey
6. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries
7. Khanna, S.S- Introduction to fishes

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN INDUSTRIAL FISH AND FISHERIES
UNDER CBCS AS PER NEP ó 2020
(For the Examination to be held in Year May- 2023, 2024 & 2025)
(SKILL ENHANCEMENT COURSE)
UG SEMESTER-II

SKILL ENHANCEMENT CORE COURSE NO.	:	USEIFT204
SKILL ENHANCEMENT CORE COURSE TITLE	:	AQUARIUM MANAGEMENT
CREDITS	:	02
MAXIMUM MARKS	:	50
I) External (University Exam)	:	40
II) Internal Assessment	:	10
DURATION OF UNIVERSITY EXAM	:	02 Hours and 30 Minutes

Objectives and expected learning outcomes

The course is designed to skill the students with the knowledge of Aquarium construction, management and entrepreneurship related to aquarium business, its benefits and the basic requirements. The students will be able to start their own small scale business of aquaria. The students will also be made aware of the different ornamental fish species having a sound commercial value.

UNIT-1 Aquarium- construction, setting and its management (07 Hrs.)

- 1.1 Definition and types of aquaria
- 1.2 Construction and setting of aquarium
- 1.3 Maintenance of aquarium -Basic and Ornamental aquarium accessories
- 1.4 Business opportunities in ornamental/aquarium industry

UNIT – 2 Ornamental fishes and their management (08 Hrs.)

- 2.1 Important Indigenous ornamental fishes
- 2.2 important Exotic ornamental fishes
- 2.3 Common ornamental fish diseases and their management
- 2.4 Types of feeds of ornamental fishes

UNIT-3 Practicals (30 Hrs.)

- 3.1 Museum survey of indigenous aquarium fishes
- 3.2 Museum survey of exotic aquarium fishes
- 3.3 Basic accessories required for aquarium setting
 - i) Aerators
 - ii) Filters
 - iii) Thermostat

- 3.4 Ornamental accessories required for aquarium setting
- 3.5 Determination of water parameters of aquarium
 - i) pH
 - ii) Temperature
- 3.6 Construction of all glass aquarium
- 3.7 Study of fish pathogens through slides/charts
- 3.8 Visit to Aquarium Cum Awareness Centre at Bagh-e-Bahu
- 3.9 Visit to Local ornamental fish shops

NOTE FOR PAPER SETTERS

Total Marks of the USEIFT-204 is 50 of which 20% marks shall be reserved for internal assessment (10 marks). Remaining 80% of the marks (40 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (10 Marks)

Internal Assessment Paper of 10 Marks shall consist of Theory Question/s of 5 Marks from Unit I/II and 5 Marks of Practical Exercise from Unit III.

External End semester University / College Examination

External Theory Exam shall be of 40 Marks and consist of 2 sections:

Section A: Four (4) short answer questions representing all Units/Syllabi i.e., atleast one question from each unit. Each question shall be of 2.5 marks (All Compulsory)

Section B: Six (6) long answer questions (Three to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 10 marks

SUGGESTED READINGS

1. Fish and fisheries by Shukla and Pandey
2. Srivastava, C.B.L (2006) A textbook of Fishery science and Indian fisheries
3. Khanna, S.S introduction to fishes
4. Khanna, S.S and Singh, H.R. A text book of fish biology and fisheries
5. Jhingran, V.G. (1985) Fish and fisheries of India
6. Rath, R.K. (2000) Freshwater Aquaculture
7. Zaidi, S.G.S (2002) Ornamental fish culture
8. Mahapatra, B.K., Dutta S., Pailan, G.H.(2015) Ornamental Fish Breeding, Culture and Trade
9. Ahilan, B., Felix, N., Santham, R., (2008) A text book of Aquaculture
10. Dholakia A.D. (2010) Ornamental Fish culture and Aquarium Management

SEMESTER-II
TITLE- AQUARIUM MANAGEMENT
COURSE CODE- USEIFT204

2023-25