



KARNATAK UNIVERSITY, DHARWAD

04 - Year B.Sc. (Hons.) Program

SYLLABUS

Subject: Industrial Fish and Fisheries (IFF)

[Effective from 2021-22]

DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM I & II,

OPEN ELECTIVE COURSE (OEC) FOR SEM I & II and

SKILL ENHANCEMENT COURSE (SEC) FOR SEM I

AS PER NE P - 2020



KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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NAAC Accredited
'A' Grade 2014

website: kud.ac.in

No.KU/Aca(S&T)/RPH-394A/2021-22/1155

Date: 29 OCT 2021

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2021-22ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳಿಗೆ 1 ಮತ್ತು 2ನೇ ಸೆಮೆಸ್ಟರ್
NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಆದೇಶ
ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ-1), ದಿ:7.8.2021.
2. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 19.08.2021
3. ಈ ಕಚೇರಿ ಸುತ್ತೋಲೆ ಸಂ.No. KU/Aca(S&T)/RPH-394A/2021-22/18 ದಿ:21.08.2021.
4. ಸರ್ಕಾರಿ ಆದೇಶ ಸಂ ಇಡಿ 260 ಯುಎನ್ಇ 2019(ಭಾಗ-1),ಬೆಂಗಳೂರು ದಿ. 15.9.2021.
5. ಎಲ್ಲ ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಸಭೆಗಳ ನಡವಳಿಗಳು
6. ಎಲ್ಲ ನಿಖಾಯದ ಡೀನರು / ಸಂಪನ್ಮೂಲ ತಜ್ಞರ ಸಭೆ ದಿನಾಂಕ: 24.25-09-2021.
7. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 01 ದಿನಾಂಕ: 28.9.2021.
8. ಈ ಕಚೇರಿ ಸುತ್ತೋಲೆ ಸಂ.No. KU/Aca(S&T)/RPH-394A/2021-22/954 ದಿ:30.09.2021.
9. ಎಲ್ಲ ನಿಖಾಯದ ಡೀನರು / ಸಂಪನ್ಮೂಲ ತಜ್ಞರ ಸಭೆ ದಿನಾಂಕ 21.10.2021.
10. ಎಲ್ಲ ಸ್ನಾತಕ ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಅಧ್ಯಕ್ಷರುಗಳ ಸಭೆ ದಿನಾಂಕ 22.10.2021.
11. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂಖ್ಯೆ: 01 ದಿನಾಂಕ: 27.10.2021.
12. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 29-10-2021

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2021-22ನೇ
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ಎಲ್ಲ B.A./ BPA (Music)/BVA/ BTM/ BSW/ B.Sc./B.Sc. Pulp & Paper
Science/ B.Sc. (H.M)/ BCA/ B.A.S.L.P./ B.Com/ B.Com (CS)/ & BBA ಸ್ನಾತಕ ಕೋರ್ಸುಗಳ 1 ಮತ್ತು 2ನೇ
ಸೆಮೆಸ್ಟರ್ಗಳಿಗೆ NEP-2020 ರಂತೆ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಈಗಾಗಲೇ
ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಮುಂದೆ ದಿನಾಂಕ 04.10.2021 ವರೆಗೆ ಸರ್ಕಾರವು ಕಾಲಕಾಲಕ್ಕೆ ನೀಡಿದ ನಿರ್ದೇಶನಗಳನ್ನು ಅಳವಡಿಸಿಕೊಂಡು
ದಿನಾಂಕ 27.10.2021 ರಂದು ಜರುಗಿದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯಲ್ಲಿ ಅನುಮೋದನೆ ಪಡೆದು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ
www.kud.ac.in ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು
ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ
ಅಧೀನದ/ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಆಡಕ: ಮೇಲಿನಂತೆ
ಗೆ,

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ
ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಭಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:

1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಮಂಡಳ (ಪಿ.ಜಿ.ಪಿ.ಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ
ಕೋರ್ಸುಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

Haniff. 29/10/21
ಕುಲಸಚಿವರು.

Karnatak University, Dharwad
Four Years Under Graduate Program in Industrial Fish and Fisheries
(IFF) for B.Sc. (Hons.)

Effective from 2021-22

Sem	Type of Course	Theory/ Practical	Instruction hour per week	Total hours of Syllabus / Sem	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks	Credits
I	DSCC 1	Theory	04hrs	56	02 hrs	40	60	100	04
		Practical	04 hrs	52	03 hrs	25	25	50	02
	OEC-1	Theory	03 hrs	42	02 hrs	40	60	100	03
	*SEC-1	Practical	03 hrs	30	02 hrs	25	25	50	02
II	DSCC2	Theory	04 hrs	56	02 hrs	40	60	100	04
		Practical	04 hrs	52	03 hrs	25	25	50	02
	OEC-2	Theory	03 hrs	42	02 hrs	40	60	100	03
Details of the other Semesters will be given later									

* Student can opt digital fluency as SEC or the SEC of his/ her any one DSCC selected

Name of Course (Subject): Industrial Fish and Fisheries (IFF)

Programme Specific Outcome (PSO):

On completion of the 03/ 04 years Degree in **Industrial Fish and Fisheries (IFF)** students will be able to:

PSO 1 : to understand fishes and shell fishes of India

PSO 2 : To understand the anatomy of fishes

PSO 3 : To understand the construction of aquarium and maintenance

PSO 4 : To understand the byproducts of fishes

PSO 5 : To understand hatchery management and seed production

PSO 6 : to understand mariculture and freshwater fish culture

PSO 7 ; to understand fish biochemistry, biotechnology and microbiology

PSO 8 : to understand fish preservation methods

PSO 9 : to understand fish feed preparation method

PSO 10 : to understand the fisheries resource of India

B.Sc. Semester – I

Subject: Industrial Fish and Fisheries (IFF)
Discipline Specific Course (DSC)

The course : Industrial Fish and Fisheries (IFF) in I semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.-1 (Theory)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-01	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

Course No.1 (Theory): Title of the Course (Theory): **Introduction to Fisheries Science**

Course Outcome (CO):

After completion of course (Theory), students will be able to:

CO 1 : Understand the difference between teleost and elasmobranchs

CO 2 : Understand anatomy of fish

CO 3 : Understand different feeding habit of fish

CO 4 : Understand different reproductive behavior of fish

CO 5 : Understand overall fish and their body anatomy

B.Sc. Semester - I
DSC - INDUSTRIAL FISH AND FISHERIES: IFF-Th : A

Credits: I. Theory : 04 Theory class 4hrs /wk. Total theory: 56 Lectures
60 marks for Sem end Examination (3 hrs) & 40 marks IA

II. Practical : 02 Practical: 4 hrs./wk. Total Practical: 52 hrs.
25 marks for Sem end Examination (3 hrs) & 25 marks IA

Total Credits : 06 Total Theory marks 100 and Practical marks 50

Syllabus :

Syllabus- Course 1(Theory): Title: Introduction to Fisheries Science:	Total Hrs: 56
Unit-I	12 hrs
<p>Classification of super class Pisces; The differences between elasmobranches and teleosts. Study of external morphology of typical elasmobranches and teleosts. The structures used in taxonomic studies like skin, colouration, scales, mouth, jaws etc., External characters of fishes – shape, head, mouth, eyes, barbules, operculum, fins, spines, trunk, tail, scales, lateral line. Introduction to shell fisheries. External characters of Prawn, Lobsters, Bivalve, Gastropods and Cephalopods (two examples from each)</p>	
Unit-II	12 hrs
<p>Commercially important orders, families, genera and species of elasmobranches and teleosts of Indian region and their identification. Identification of commercially important Fishes, Prawn, Lobsters, Bivalves, Gastropods and Cephalopods of India.</p>	
Unit-III	12 hrs
<p>Anatomy of fish: Alimentary canal and associated structures. Respiratory system, Gill, Swim bladder, Accessory respiratory organs. Heart and circulatory system. Nervous system and lateral line system, Sense organs.</p>	
Unit-IV	20 hrs
<p>Food and Feeding; Feeding habitat in various groups of marine and freshwater fishes. Natural food of fishes. Anatomical difference of herbivore and carnivore fishes. Feeding habitat of Prawn, Crab, Lobsters, Bivalve and Cephalopods.</p> <p>Reproductive Biology of Fish: Reproductive behavior, breeding pattern and parental care in fishes. Special behavior, aggregation and shoaling. Migration of fishes; anadromous and catadromous.</p>	

B.Sc. Semester – I

Subject: Industrial Fish and Fisheries (IFF)

Discipline Specific Course (DSC)

Course No.-1 (Practical)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-01	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

Course No.1 (Practical): Title of the Course (Practical **Industrial Fish and Fisheries (IFF)**)

Course Outcome (CO):

After completion of course (Practical), students will be able to:

CO 1 : Understand morphometry of fish

CO 2 : Study of different fin fishes of India

CO 3 : Study of different fin fishes of India

CO 4 : Anatomy of fish to understand organ arrangement

CO 5 : Mounting of fish organs

List of the Experiments for 52 hrs / Semesters

INDUSTRIAL FISH AND FISHERIES LAB: IFF-Pr: A

Syllabus and distribution of marks in the practical Examination

B.Sc. I SEMESTER PRACTICAL

4 hrs/ week

1. Study of external morphology and morphometry of a typical teleost fish.

(Types of scales, fins and mouth type) (02 Practicals)

2. Taxonomic classification, identification, description and economic importance of fin fish and shell fish of India. (05 Practicals)

3. Anatomy of typical elasmobranchs a (Dissection of Cranial nervous system and Arterial system). (02 practicals)

4. Mounting of Scale, Amphullae of Lorenzini and mounting of brain of shark/fishes. (03 practicals)

Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination

SCHEME OF PRACTICAL EXAMINATION

1. Mounting of Amphullae of Lorenzini/Scale/brain.	05 marks
2. Morphometry of the given fish.	08 marks
3. Identification 05X2	10 marks
4. Journal	02 marks

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Total 25 marks

Note: Same Scheme may be used for IA(Formative Assessment) examination

B.Sc. Semester – I

Subject: **INDUSTRIAL FISH AND FISHERIES: IFF**

Open Elective Course (OEC-1)

(OEC for other students)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-1	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

OEC-1: Title of the Course: **Introduction to fisheries Science:**
Course Outcome (CO):

After completion of course, students will be able to:

CO 1 : to understand the different fin and shell fishes

CO 2 : to understand external character of fishes

CO 3 : to understand biochemical value of fish

CO 4 : to understand different fishery byproduct

CO 5 : to understand different ornamental fishes

Open Elective Course(OEC)
INDUSTRIAL FISH AND FISHERIES: IFF

BSc I sem

Credits: I. Theory : 03 Theory class 3hrs /wk. Total theory: 42 Lectures

100 marks in theory (**60 Sem. End exam +40 IA** Exam)

Total Credits : 03

Total Theory marks 100

Syllabus- OEC: Title- Introduction to fisheries Science	Total Hrs: 42
Unit-I	20 hrs
Study of external morphology of typical finfish and shell fishes. The structures used in taxonomic studies like skin, colouration, scales, mouth, jaws etc., External characters of fishes – shape, head, mouth, eyes, barbules, operculum, fins, spines, trunk, tail, scales, lateral line. Introduction to shell fisheries. External characters of Prawn, Lobsters, Bivalve, Gastropods and	

Cephalopods (two examples from each)	
Unit-II	10 hrs
Fish by-products: Chitosan, shark fins, Beche-de-mer, fish oils, fish meal, fish protein concentrate, fish glue, fish sauce, Isinglass, pearl essence, Ambergris, Fish cake, Fish cutlets, fish wafer, fish pickle, fish ensilage.	
Unit-III	12 hrs
<p>Ornamental fishes: Common species of ornamental fish suitable for aquarium. Freshwater and marine ornamental species- livebearers, egg layers. Maturation, secondary sexual characters, breeding habits. Parental care, development of eggs. Common ornamental fish diseases and treatment</p> <p>Nutritive values of fishes: Biochemical composition of fish meat (Protein, Fats, Carbohydrates.</p> <p>National fisheries institutes of India</p>	

B.Sc. Semester - I

**Subject: INDUSTRIAL FISH AND FISHERIES
SKILL ENHANCEMENT COURSE (SEC)-I**

Title of Paper: INDUSTRIAL FISH AND FISHERIES

Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Mode of Examination	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC-I	Theory + Practical	02	03hrs	30	Practical	2hr	25	25	50

Course Outcome (CO):

After completion of Skill Enhancement course, students will be able to:

CO 1 : to understand different uses of fishes and their products

CO 2 : to understand different preparation of fishery products

CO 3 : to understand uses of fish byproducts

CO 4 : to understand uses of sea weed and their uses

CO 5 : to understand fish handling methods

SEC shall have 25-30 hrs syllabus / semester for 50 marks in theory /

Practical (**25 Sem. End exams +25 IA Exam**).

Credits: I. Theory + practical : 02

INDUSTRIAL FISH AND FISHERIES LAB: IFF

BSc I SEM

Syllabus

Syllabus- OEC: Title- Fish preservation techniques	Total Hrs: 42
Unit-I	10 hrs
Processing and preservation of fish products and byproducts. Handling, preservation and transportation of fresh fish, freezing preservation of fish	

B.Sc. I SEMESTER PRACTICAL

2 hrs/ week

Study of By-products and their economic importance.

(Fish wafers, Soup powder, Fish Ensilage, Shark fin and fin rays, Sardine oil, Chitosan, Fish sauce, Fish cake, FPC) etc.,

1. Preparation of Chitosan from prawn shells
2. Extraction of fish body oil and liver oil
3. Fish Food formulation and pellet preparation

SCHEME OF PRACTICAL EXAMINATION

1. Identification, economic importance and edible importance of fish by-products 05X2	10 marks
2. Preparation of Chitosan/Fish liver oil/Body oil extraction and uses	05 marks
3. Fish feed preparation	05 marks
4. Journal	05 marks
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Total	25 marks

B.Sc. Semester – II

Subject: **Industrial Fish and Fisheries (IFF)**

Discipline Specific Course (DSC)

The course : Industrial Fish and Fisheries (IFF) in I semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.-1 (Theory)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-01	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

Course No.1 (Theory): Title of the Course (Theory): **Ornamental Fisheries and Entrepreneurship:**

Course Outcome (CO):

After completion of course (Theory), students will be able to:

CO 1 : To understand different ornamental fishes

CO 2 : To understand ornamental fish breeding techniques

CO 3 : to understand how to construction of aquarium

CO 4 : To understand maintenance of aquarium

CO 5 : To understand Ornamental Fisheries and Entrepreneurship

B.Sc. Semester - II

DSC -INDUSTRIAL FISH AND FISHERIES: IFF-Th: B

Credits: I. Theory : 04 Theory class 4hrs /wk. Total theory: 56 Lectures
60 marks for Sem end Examination (3 hrs) & 40 marks IA
II. Practical : 02 Practical: 4 hrs./wk. Total Practical: 52 hrs.
25 marks for Sem end Examination (3 hrs) & 25 marks IA
Total Credits : 06 Total Theory marks 100 and Practical marks 50

Syllabus:

Syllabus- Course 1(Theory): Title- Ornamental Fisheries and Entrepreneurship:	Total Hrs: 56
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Unit-I	14 hrs
<p>Ornamental fishes: Common species of ornamental fish suitable for aquarium. Water quality management, selection and conditioning of fish. Freshwater ornamental species- livebearers, egg layers. Maturation, secondary sexual characters, breeding habits. Parental care, development of eggs.</p> <p>Breeding of ornamental fish; Egg scatters, egg depositors, mouth brooders, bubbles nest builders, livebearers etc., Hatching, larval rearing and their feeds and feeding. Use of pigment for colour enhancement.</p>	
Unit-II	12 hrs
<p>Marine ornamental fishes: Marine ornamental fishes, their habitat, collection from natural habitat. Methods of collection. Transportation of live fish, use of sedatives. Other ornamental organisms like Sea anemone, Lobster, Shrimps, Octopus, and Starfish etc., used in the aquarium.</p> <p>Freshwater ornamental Plants: Rooted plants; Limnophila, Ditch moss, Potamogeton spp., Cabomba, Ceretophyllum, Indian fern, Cryptocorne spp., Amazon sward plant, Hair grass, Sagittaria, and Vallisneria.</p> <p>Floating Plants; Duck weed, Pistia, Riccia and Salvinia. Multiplication of ornamental plants, nutrients and optimum environmental conditions for their growth.</p>	
Unit-III	22 hrs
<p>Construction and maintenance of Aquarium: Construction of home aquarium, material used, wooden and metal frame, frameless tanks, sealants and gums. Design and construction of public freshwater and marine aquaria. Aerators and filters, pebbles, ornamental objects and other equipment used in the aquaria. Cleaning the aquarium, maintenance of water quality, control of snails. Nutritional requirement for aquarium fishes. Preparation of dry feeds, feeding methods. Maintenance of aquarium</p> <p>Live feed – brine shrimp, bloodworm, water flea, earthworm, infusoria, mosquito larvae, tubifex worm, other natural and artificial foods</p>	
Unit-IV	14 hrs
<p>Aquarium trade and entrepreneurship: Ornamental fisheries status of Global and India. Domestic aquarium trade, Govt. policies and aids in fisheries development in India. National and International ornamental fish trade. National and international agencies associated with ornamental fish entrepreneurships. Marketing and management of ornamental fishes</p>	

B.Sc. Semester – II

Subject: Industrial Fish and Fisheries (IFF)

Discipline Specific Course (DSC)

Course No.-1 (Practical)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-01	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

Course No.1 (Practical): Title of the Course (Practical **Industrial Fish and Fisheries (IFF)**)

Course Outcome (CO):

After completion of course (Practical), students will be able to:

- CO 1 : To understand different ornamental fishes
- CO 2 : To understand different marine ornamental fishes
- CO 3 : to understand how to construction of aquarium
- CO 4 : To understand maintenance of aquarium
- CO 5 : To understand different disease diagnose of aquarium fishes

List of the Experiments for 52 hrs / Semesters

INDUSTRIAL FISH AND FISHERIES LAB: IFF -Pr: B

Syllabus and distribution of marks in the practical Examination

B.Sc.II SEMESTER PRACTICALS

4 hrs/ week

1. Classification, Identification and Description of (06 Practicals)
 - a) Ornamental marine fishes
 - b) Ornamental freshwater fishes
 - c) Ornamental organism used in the aquarium
 - d) Ornamental plants
2. Construction and Maintenance of home aquarium. (03 Practicals)
3. Water quality management through testing kits. Disease diagnostics and management (03 Practicals)

SCHEME FOR PRACTICAL EXAMINATION

1. Dissection and display cranial/ arterial system in given fish-----	08 marks
2. Identification and describe of aquarium fish / plants / other materials 5X2	10 marks
3. Construction of aquarium	05 marks
4. Journal	02 marks

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Total: 25 marks

Note: Same Scheme may be used for IA(Formative Assessment) examination

B.Sc. Semester – II

Subject: **INDUSTRIAL FISH AND FISHERIES: IFF**

Open Elective Course (OEC-2)

(OEC for other students)

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-1	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

OEC-1: Title of the Course: **Introduction to fisheries Science:**

Course Outcome (CO):

After completion of course, students will be able to:

CO 1 : to understand different inland fishery source

CO 2 : to understand different Coldwater fishes

CO 3 : to understand different lake and estuarine fishes

CO 4 : to understand different capture fishes

CO 5 : to understand riverine fisheries

INDUSTRIAL FISH AND FISHERIES: IFF

BSc II SEM

Open Elective Course(OEC)

Credits: I. Theory : 03 Theory class 3hrs /wk. Total theory: 42 Lectures

100 marks in theory (**60 Sem. End exam +40 IA** Exam)

Total Credits : 03

Total Theory marks 100

Syllabus- OEC: Title- Capture and Inland fisheries	Total Hrs: 42
Unit-I	16 hrs
INLAND FISHERIES; Importance of fresh water fisheries . Present yield and estimate of potential fisheries. International fisheries commissions. The Inland capture fisheries resource of world and India. Riverine fisheries. Fisheries of major and minor carps, catfishes and other groups. Problems and managements.	

Coldwater fisheries resources; Fisheries of trout, Mahaseer and other coldwater fish species. Development and management.	
Unit-II	12 hrs
Lacustrine fisheries sources, potentials and problems of development and management Estuarine fisheries resource; fishes of clupeoids, prawns, molluscs, mullets and other important groups. Fisheries of brackishwater lakes and backwaters	
Unit-III	14 hrs
Capture fishers fisheries of marine; Marine fisheries resources of India. Pelagic fisheries; Fisheries of Oil sardines, Lesser sardines, Anchovies, Clupeoids, Mackerels, Ribbon fisheries, Tunas, Seer fish, Carangids and Cephalopods.	

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Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8 th Week
Written test-2	10%	1 hr	12 th Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	-----	--
Total	40% of the maximum marks allotted for the paper		

**Faculty of Science
04 - Year UG Honors programme:2021-22**

**GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSCC/ OEC
(60 marks for semester end Examination with 2 hrs duration)**

Part-A

1. Question number 1-06 carries 2 marks each. Answer any 05 questions : 10marks

Part-B

2. Question number 07- 11 carries 05Marks each. Answer any 04 questions : 20 marks

Part-C

3. Question number 12-15 carries 10 Marks each. Answer any 03 questions : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub questions for 7+3 or 6+4 or 5+5 if necessary)

Total: 60 Marks

Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.

