



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)/SSL-394A/2022-23/1056

Date: 23 SEP 2022

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022-23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳಿಗೆ 3 ಮತ್ತು 4ನೇ 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. ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ ಸಭೆಯ ಠರಾವುಗಳ ದಿನಾಂಕ: 06.09.2022
3. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 01, ದಿನಾಂಕ: 17.09.2022
4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 22-09-2022

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022-23ನೇ
ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳ ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ
(NEP)-2020 ರಂತೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗಾಗಿ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ
ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. www.kud.ac.in ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ
ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ
ಕಾರ್ಯಪ್ರವೃತ್ತಿರಾಗಲು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

[Handwritten Signature]
ಕುಲಸಚಿವರು.

ಗೆ,

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

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.



Practical Subject

KARNATAK UNIVERSITY, DHARWAD

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

SYLLABUS

Subject: Industrial Fish and Fisheries

[Effective from 2022-23]

DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM III & IV,

OPEN ELECTIVE COURSE (OEC) FOR SEM III& IVand

AS PER NEP – 2020

Sem	Type of Course	Theory/ Practical	Instruction hour per week	Total hours of Syllabus / Sem	Duration of Exam	Formati ve Assessm ent Marks	Summ ative Assess ment Marks	Total Marks	Credits
III	DSCC-3	Theory	04hrs	56	02 hrs	40	60	100	04
		Practical	04 hrs	52	03 hrs	25	25	50	02
	OEC-3	Theory	03 hrs	42	02 hrs	40	60	100	03
IV	DSCC-4	Theory	04 hrs	56	02 hrs	40	60	100	04
		Practical	04 hrs	52	03 hrs	25	25	50	02
	OEC-4	Theory	03 hrs	42	02 hrs	40	60	100	03
Details of the other Semesters will be given later									

Name of Course (Subject): Industrial Fish and Fisheries

Programme Specific Outcome (PSO):

On completion of the 03/ 04 years Degree in Industrial fish and fisheries students will be able to:

- PSO 1** :Fisheries education provides in depth knowledge on fish, fishing, and fisheries resource management issues, responsible aquaculture, ecosystem management, fish health management and use of modern tool to increase productivity.
- PSO 2** In India, fisheries and fisheries education have always been playing a pivotal role in the food and nutritional security of people, especially in rural area hence, fisheries education is important.
- PSO 3** : It has been recognized the fisheries sector as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a source of cheap and nutritious food besides being a foreign exchange earner.
- PSO 4** : Skilled human resource development for fisheries sector, and the skilled workforce can be prepared through proper education and training.
- PSO 5** : The fisheries education programmes in fisheries sector are required to gear up inland, marine and fish processing areas like, finfish and crustacean breeding, molluscan culture, feed preparation, seaweed cultivation, fish processing, fish boat building, etc. with skilled human resource.
- PSO 6** : Fisheries graduate/ post-graduate students and trained trainees will contribute in development of fisheries sector sustainable manner
- PSO 7** : Fisheries education plays very important role in socio economic development of the state.
- PSO 8** : Conservation, development and sustainable use of natural resources of fisheries through fisheries education.
- PSO 9** :Community development and rural area development and enhancing production and productivity of fishermen, fish farmers and fishing industry.
- PSO 10**: Employment generation, and Conservation of depleted species of fish.

B.Sc. Semester –III

Subject: Industrial fish and fisheries

Discipline Specific Course (DSC): 033IFF011

The course Industrial fish and fisheries in III 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)033IFF011

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-03	DSCC	Theory	04	04	56hrs	2hrs	40	60	100

Course No.1 (Theory): Title of the Course (Theory):**Capture Fisheries and Inland Fisheries033IFF011**

Course Outcome (CO):

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

- CO 1** :Knowledge regarding capture fisheries resource of world with statistics.
- CO 2** :Students get information of Inland fisheries resource India.
- CO 3** :Lake and estuarine fisheries resource of India.
- CO 4** :Student will get complete information marine pelagic fisheries resources of India.
- CO 5** :Information regarding demersal fisheries resource of Indian sub-continent.
- CO 6** : Students will get complete capture and inland fisheries resource of India and world.

Syllabus- Course 1(Theory): Title- Capture Fisheries and Inland Fisheries033IFF011	Total Hrs: 56
Unit-I	14 hrs
Capture Fisheries Resource: Importance of capture fisheries of the World. Present yield and estimate of potential capture fisheries of the world. National and 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.	
Unit-II	14 hrs
Lake and Estuarine Fisheries: Lacustrine fisheries sources of India, fisheries potentials and problems of development and management. Estuarine fisheries resource of India; fishes of clupeoids, prawns, molluscs, mullets and other important groups. Fisheries of brackishwater lakes and backwaters. Coldwater fisheries resources of India; Fisheries of trout, Mahaseer and other Coldwater fish species. Development and management.	
Unit-III	14 hrs
Capture fishers and 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.	
Unit-IV	14 hrs
Mid water and demersal fisheries of India; Fisheries of elasmobranchs, Bombay duck, Catfishes, Silver bellies, Sciaenids, Pomfrets, Threadfins, Perches, Flatfish, Prawns, Lobsters, Crabs, Mussels, Oysters and Clams and their economic importance. Fishing regulatory and Laws of India and International.	

Books recommended.

1. Marine Capture Fisheries: P. K. Singh (Author)
2. Coastal aquaculture and mariculture: Iqbal Ahmed, S.Felix
3. Inland Fisheries (2+1): N. Jayakumar
4. Limnology: A. T. Ramachandra Naik & P. Padmavathy
5. Marine Biology (2+1): A. Srinivasan & Dr. A. T. Ramachandra Naik
6. Marine fisheries: S. M. Shivaprakash & N. Jayaprakash
7. A Text Book of Fishery Science and Indian Fisheries: Dr C B L Srivastava (Author)
8. Fish and Fisheries: Pandey (Author)

B.Sc. Semester –III

Subject: Industrial fish and fisheries

Discipline Specific Course (DSC)033IFF012

Course No.-3 (Practical)033IFF012

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-03	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

Course No.1 (Practical): Title of the Course (Practical):Industrial fish and fisheries**033IFF012**

Course Outcome (CO):

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

- CO 1** :Student will get information about different gear of freshwater and marine fisheries sector.
- CO 2** : Information about different indigenous craft used for fish catching.
- CO 3** : To know working principle of different gear used in India and world.
- CO 4** : Student will know the length and weight relationship of fish species for assessing stock in natural water body.
- CO 5** :To know the length and frequency date in particular fish species for new fish add to same group that infer that stock assessment.
- CO 6** : Study trip will give information regarding fish landing Centre and Fisheries Institute and different beach observation.

List of the Experiments for 52 hrs / Semesters033IFF012

1. Freshwater fish gears and crafts. (04 Practicals)
2. Marine water gears and crafts. (04 Practicals)
3. Length and weight relationship in fishes. (03 Practicals)
4. Population structure and Length frequency data in fishes. (02 Practicals)
5. Compulsory Field Visit to marine fish landing center, beach etc., (Carries 05 marks for Field Report)

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

SCEME OF PRACTICAL EXAMINATION

- | | |
|--------------------------------------------------------|----------|
| 1. Length and weight relationship in fishes | 06 marks |
| 2. Population structure and frequency data | 05 marks |
| 3. Identification of gears and crafts 2X2 | 04 marks |
| 4. Field visit Report
(Compulsory study tour visit) | 05 marks |
| 5. Journals+ Viva | 05 marks |

Total 25 marks

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

B.Sc. Semester –III

Subject: Industrial fish and fisheries

Open Elective Course (OEC-1)003IFF051

(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-3	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

OEC-1: Title of the Course:**Principles and Practice of Aquaculture003IFF051**

Course Outcome (CO):

After completion of course, students will be able to:

CO 1 : Student will know importance of aquaculture and its history.

CO 2 : Breeding of air breathing fish, prawn and cold-water fishes and its culture.

CO 3 : To know the different fish culture system used in India and world.

CO 4 : To know the present status of Aquaculture in India and World.

CO 5 : To know fish pond preparation and culture of different freshwater fishes.

Syllabus- OEC: Title- Principles and Practice of Aquaculture003IFF051	Total Hrs: 42
Unit-I	14 hrs
<p>Definition and history of Aquaculture in India and world; Scope and importance of aquaculture. Principles of site selection, Kinds of fish farm, Productivity of water, Soil and soil characteristics and other parameters.</p> <p>Breeding and culture of freshwater Prawns and their polyculture with finfish. Air breathing fish culture. Coldwater fish culture.</p>	
Unit-II	14 hrs
<p>Different systems of aquaculture, monoculture, polyculture, integrated fish farming, pond culture, cage culture, pen culture, raft culture, extensive, semi-intensive and intensive fish culture, raceway culture, sewage fed fish culture.</p> <p>Factors for success of fish culture enterprises. Aquaculture diversification-Aquaponics, Biofloc culture, periphyton culture.</p>	
Unit-III	14 hrs
<p>Present status of Aquaculture of world and India, Preparation of fish culture pond, Pre-stocking management, Control of aquatic weeds, aquatic insects, weed fishes, predators, algal blooms and their control, liming and organic and inorganic fertilization, manuring of nursery and rearing ponds.</p> <p>Criteria of selection of species for culture, seed procurement and stocking. Post-stocking management, phased manuring, supplementary feeds and feeding.</p>	

Books recommended.

1. Principles of Aquaculture (1+1): Dr.A.Gopalakannan & Mr.K.S.Vijay Amritharaj & Dr.K.Ramesh
2. Freshwater aquaculture: K.S. Ramesh & B. Ahilan
3. Culture of fish organisms: K.M. Shankar & Rosalind George
4. Freshwater Aquaculture: R. K. Rath (Author)
5. Aquaculture: Principles and Practices: T.V.R. Pillay (Author), M.N. Kutty (Author)
6. TEXT BOOK OF AQUACULTURE: Mouliraj (Author)
7. A Text Book of Aquaculture: M. S. Reddy (Author)
8. Text Book of Fish, Fisheries and Aquaculture Kindle Edition: DR D. K. Belsare (Author)

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 04questions:20 marks

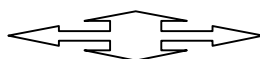
Part-C

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

(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 weightage shall be given to each unit based on number of hours prescribed.



B.Sc. Semester –IV

Subject: Industrial Fish and Fisheries

Discipline Specific Course (DSC)034IFF011

The course Industrial fish and fisheries in VI 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.-2 (Theory)034IFF011

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-04	DSCC	Theory	04	04	56 hrs	2hrs	40	60	100

Course No.4 (Theory): Title of the Course (Theory): **FISHERIES TECHNOLOGY AND FISHERIES EXTENSION034IFF011**

Course Outcome (CO):

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

- CO 1** : Principles of fish preservation and different methods for fish preservation.
- CO 2** : To know different fish by-products preparation and its uses.
- CO 3** : Sea weed commercial uses and pearl production in India.
- CO 4** : Fish catching methods and use of different gear used in India.
- CO 5** : Fisheries cooperative society and fisheries extension in India.

Syllabus- Course 2(Theory): Title- FISHERIES TECHNOLOGYAND FISHERIES EXTENSION 034IFF011	Total Hrs: 56
Unit-I	14 hrs
Principles and importance of fish preservation – Sun drying, Salt curing, Pickling, Smoking, Chilling, Frying and Canning. Processing and preservation of fish products and byproducts. Paste products, Fish ball, Minced meat, Fish Protein Concentrate, Fish meal, Shark liver oil, Fish body oil, Liquid fish (fish ensilage), Shark fins and fin rays, Fish skin leather,	
Unit-II	14 hrs
Ambergris, Fish cake, Fish salads, Fish wafers, Fish soup powder, Fish hydrolysate, Fish Sauce, Fish glue, Isinglass, Chitin and Chitosan, Pearl essence, bêche-de-mer. Sea weeds – Edible, Industrial and Pharmaceutical products and their uses. Handling, preservation and transportation of fresh fish, freezing preservation of fish, modern techniques employed in fish preservations.	
Unit-III	14 hrs
Sanitation in processing and quality control of fresh and processed fish and fisheries products. Fish catching methods; Indigenous fishing gears of India. Recent development in fishing gears in India. Indigenous fishing crafts of India. Mechanization of Indian fishing crafts, fishing vessels. Electronics in fishing industry. Sea fishing methods.	
Unit-IV	14 hrs
Pearl producing molluscans; Freshwater and marine pearl producing molluscans. Pearl formation. Pearl production states in India. Fisherman Co-operative Societies; Roll of co-operative in fishery economy. Organization of fisherman Co-operative society. Roll of Co-operative Societies in fish production and marketing. Fisheries extension.	

Books recommended.

1. Fish Products and By-products Technology: Dr. B.A. Shamasundar, Dr. Sukumar
2. Fisheries Extension Education (2+1): Dr. M. Nagoormeeran
3. Fishing and gear technology: B. Hanumanthappa & N. Neethiselvan
4. Fishing craft technology: S. Varadaraju & N. Neethiselvan
5. Canning and fish packaging technology: M.H.Bhandary & C.V.Raju & S.A.Shanmugam
6. Fish Farming and Fish Product: K. G. A. Rao (Author)
7. Post-Harvest Technology of Fish and Fish Products: K. K. Balachandran (Author)
8. Microbiology of Fish and Fishery Products: F & S Felix Parthiban (Author)
9. Fish Processing Technology and Product Development: Arun Ninawe (Author), K. Rathnakumar (Author)

B.Sc. Semester –IV

Subject: Industrial fish and fisheries

Discipline Specific Course (DSC)034IFF012

Course No.-2 (Practical)034IFF012

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-04	DSCC	Practical	02	04	52 hrs	3hrs	25	25	50

Course No.4 (Practical): Title of the Course (Practical): Industrial fish and fisheries**034IFF012**

Course Outcome (CO):

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

- CO 1** : Student will know different fish by-products and their production and its economic importance.
- CO 2** :To know the preparation of chitosan and its commercial importance.
- CO 3** : To know the preparation of fish liver oil and fish body oil and its commercial importance.
- CO 4** : Student will know the preparation of fish feed formulation and preparation methods.
- CO 5** : Study tour will help the student get the knowledge of fish processing industry, plants and other fish feed industry.
- CO 6** : Overall, the student will get knowledge of fish by-products its production and commercial importance.

List of the Experiments for 52 hrs / Semesters **034IFF012**

IV SEMESTER PRACTICALS

4Hrs/week

1. Study of Fish By-products, its production and their economic importance.
(Fish wafers, Soup powder, Fish Ensilage, Isinglass, fish pickle, Shark fin and fin rays, fish body oil, Chitin and Chitosan, Fish sauce, Fish cake, FPC) etc., (08 Practicals)
2. Preparation of Chitosan from prawn shells and importance. (02 Practicals)
3. Extraction of fish body oil and liver oil and importance. (02 Practicals)
4. Fish Food formulation and pellet preparation. (01 Practicals)
5. Compulsory visit to cold storages, Fisheries Institutes and processing plants and fish landing Centre and submission of study tour reports. (Carries 05 marks for Field Report)

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

SCHEME OF PRACTICAL EXAMINATION

- | | |
|--------------------------------------------------------------------------------------|----------|
| 1. Identification, economic importance and edible importance of fish by-products 5X2 | 10 marks |
| 2. Preparation of Chitosan/Fish liver oil/Body oil extraction and uses | 05 marks |
| 3. Field report (Compulsory visit) | 05 marks |
| 4. Journal + Viva | 05 marks |

Total **25 marks**

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

B.Sc. Semester – IV

Subject: Industrial Fish and Fisheries

Open Elective Course (OEC-2)004IFF051

(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-4	OEC	Theory	03	03	42 hrs	2hrs	40	60	100

OEC-4: Title of the Course:**Mariculture and Fish Pathology004IFF051**

Course Outcome (CO):

After completion of course, students will be able to:

CO 1 :Student will get information of marine and brackish water fisheries resource of India.

CO 2 :To know the Hatchery production of prawn seeds, nursery rearing and management.

CO 3 :Student will know Different brackish water fish and shell fishes breeding, seed production and pond rearing.

CO 4 :To know the different fish breeding, seed production and rearing with hatchery production.

CO 5 :To know the different type of disease occurring for the fishes and other aquatic animals and their diagnostic methods.

Syllabus- OEC: Title- Mariculture and Fish Pathology004IFF051		Total Hrs: 42
Unit-I		14 hrs
Mariculture: Marine fisheries resource of India, Brakishwater fisheries resource of India. Important species of Penaeid prawns and life history of typical Prawn, Hatchery set up and hatchery production of seed, nursery rearing, transportation of Prawn seed, hatchery management.		
Unit-II		14 hrs
Breeding and culture of brakishwater fish: Milk fish, Mulletts, Pearl spot, Sea bass etc. Mariculture of edible oysters, mussels, Clams, Sea urchin, Sea cucumber and culture of sea weeds. Different Fisheries Institutes of India.		
Unit-III		14 hrs
Fish pathology: Significance of fish disease in relation to aquaculture practices. Principles of disease diagnosis and fish health management. Disease caused by crustaceans, parasites (Ergasilosis, Lerniae, Argulus, Isopodeparasite). Protozoan diseases, Fungal diseases, Viral diseases and Bacterial diseases of fishes, symptoms and their control methods.		

Books recommended.

1. Culture of fish organisms: K.M. Shankar & Rosalind George
2. Aquaculture: Principles and Practices: T.V.R. Pillay (Author), M.N. Kutty (Author)
3. Text Book of Fish, Fisheries and Aquaculture Kindle Edition: DR D. K. Belsare (Author)
4. Coastal aquaculture and mariculture: Iqdas Ahmed, S. Felix
5. Finfish breeding and hatchery management: N. Basavaraja & Jaculine Pereira
6. Fish Diseases and Management (2+2): Dr. K. Riji John
7. Handbook of Mariculture: D. M. Pawar (Editor)
8. Marine Fisheries and Mariculture in India: N.G.K Pillai (Author)
9. AQUACULTURE FARMING AQUATIC ANIMALS AND PLANTS: LUCAS J.S. (Author)
10. Fish Diseases and Management: A Uma & S Felix Gopalakannan, A (Author)

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: 20marks

Part-C

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

(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.

