Department of Higher Education U.P. Government, Lucknow



National Education Policy-2020
Common Minimum Syllabus for all U.P. State
Universities and Colleges for first Three Years of
Higher Education(UG)

Of

Fisheries



National Education Policy-2020 Common Minimum Syllabus for all U.P.State Universities/Colleges Subject: Fisheries

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Syllabus Developed by:

Cno	Name	Designation	Department	College/University
S.no.	Dr. Kayam Singh,	Retd. Associate Professor	Deptt. of Fishries,	BVRI Bichpuri, Agra.
2	Dr. Vijay Kumar Singh,	Associate Professor	Deptt. of Zoology,	Agra College, Agra.
3	Dr. Rajveer Singh,	Associate Professor	Deptt. of Zoology,	R B S College, Agra
4	Dr. Praveen Ojha	Assistant Professor	Department of Zoology	K R College, Mathura.

Department of Higher Education U.P. Government, Lucknow

National Educational Policy-2020 Common Minimum Syllabus for all U.P. State Universities

Semester-wise Titles of the Papers in B.A. Fisheries

			Paper Title	Theory/Practical	Credits
Year	Sem.	Course Code	Control of the Contro	T	04
	I	A490101T	Fish Morphology	P	02
1		A490102P	Morphological study of Local fishes	T	04
	II	A490201T	Fish Taxonomy	P	02
		A490202P	Fish Identification	T	04
	III	A490301T	Fish Ecology (Limnology)	P	02
2	111	A490302P	Limnological Study of a Fish Pond/Farm	T	04
_	IV	A490401T	Fish Culture	P	02
	1	A490402P	Study of Indian Major Carps and Exotic Carps	T	04
	V	A490501T	Capture Fisheries		04
3		A490502T	Fish Breeding Technology	T	02
3		A490503P	Identification of Fish and record making	P	
	XII	A490601T	Aquaculture	T	04
	VI		Fisheries Administration and Rural	T	04
		A490602T	Development		02
		A490603P	Study of Fish Projects	Р	02

Proposed Year wise Structure, of UG Program in B.A. Fisheries

Year	Sem	Course	Paper Title	Credits	Teaching Hours
		Code		04	60
1	I	A490101T	Fish Morphology	02	60
Certificate		A490102P	Morphological study of Local fishes	04	60
Course in	II	A490201T	Fish Taxonomy	02	60
Fisheries Resource		A490202P	Fish Identification	02	
Management			~ 1	04	60
2	III	A490301T	Fish Ecology (Limnology)	02	60
Diploma course		A490302P	Limnological Study of a Fish Pond/Farm	04	60
in Aquatic	IV	A490401T	Fish Culture	02	60
Environment Management		A490402P	Study of Indian Major Carps and Exotic Carps	04	60
3	V	A490501T	Capture Fisheries	04	60
Degree in		A490502T	Fish Breeding Technology	02	60
Bachelor of Arts		A490503P	Identification of Fish and record making	04	60
in Fisheries	VI	A490601T	Aquaculture		60
	V 1	A490602T	Fisheries Administration and Rural	04	00
		111700021	Development	02	60
	Tage 1	A490603P	Study of Fish Projects	02	00

Semester: First Year: First Programme/Class: Certificate Subject: Fisheries Course Title: Fish Morphology Course Code: A490101T The student at the completion of the course will be able to understand fish and fisheries. Core: Compulsory Credits: 4 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 No. of Lectures (1 hr **Topics** Unit duration) Part I Study of Indian ancient fish science, scientists and traditions of fisheries Introduction of Fish. 8 Fish structure 1 Fish Morphology. Fishery as vocational subject Importance of Fishery. Fishery as 8 Source of employment. II Economic importance of fishery. Study of Fish skin structure and functions, Type of scales Study of fish scales, importance of scales, Ш Modification of scales. Colouration of fish. 7 Sources of colouration IV Benefits of colouration Part II Fish Locomotion, Migration Factors Advantage of migration 8 V Types of fins, Fish Locomotory organs. Food and alimentary canal. Feeding habits of Fishes. Types based on food contents. 7 VI Food cycle in nature Respiration, Types of respiratory organs. 8 Structure of gills. VII Mechanism of respiration Reproduction in fishes 7 Male reproductive organs VIII Female reproductive organs

	Parental care.	
	A MANAGEMENT OF THE PROPERTY O	
Suggested	Readings:	
l.	E' 1 and Eighories Whiten by VOL I	
	Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur	
	Fish & Fisheries written by S.D.Kulshratha Vol II	
2.	ADB Publishing House Jaipur. (Hindi medium)	
3.	An Introduction to fishes. Written by S.S.Khanna. English medium	
4.	A Hand book of Fish Farming by S.C. Agrawal. Narendra Publish	ing House, Delhi.
	English Medium.	नसंधान पसा गेट.
5.	मछली पालन एक उद्योग, लेखक डी० विश्व रमण प्रसाद रिएठा, म्हान उ	3/1911, 8/11
	नई दिल्ली -110012	
	Fishes. Written by Mary Chandy. National Book Trust India (E	nglish Medium).
6.	T' 1 L. II C Dhiimrah Kavila IIIIEa. Allilloi I dollod.	
7.	he ented as an elective by the students of following subjects.	
This cours	e can be opted as an elective by the standard	
	1 C Tark Opig / Assignmen	t / Seminar/ Research
Suggested	Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignmen	(/ Doillings
Orientation	assignment 05 marks for Class Interaction	
	erequisites: To study this course, a student must have had the subject.	in class/12 th /
certificate	/diploma.	
	1.	
Suggested	l equivalent online courses:	
	,	
E des C	uggestions:	
Further 5	uggestions.	
At the En	d of the whole syllabus any remarks/ suggestions:	
At the Lin	d of the vibers sy	

Semester: First Year: First Programme/Class: Certificate Subject: Fisheries Course Title: Morphological study of Local fishes Course Code: A490102P Course outcomes: The student at the completion of the course will be able to identify the fishes. Core: Compulsory Credits: 2 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 0-0-2 No. of Lectures (2 hrs **Topics** duration) Unit Part I Morphological study of Local fishes. Fish identification. 7 I Preparation or making of file of local Fish studied. 7 II Dissection of fish to show or study of Internal organs, like, alimentary 7 canal, reproductive organs, slide study of scales etc. III 9 Viva. IV Suggested Readings: Fish and Fisheries. Written by Vol. I, Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur Fish & Fisheries written by S.D.Kulshratha Vol II 2. ADB Publishing House Jaipur. (Hindi medium) An Introduction to fishes. Written by S.S.Khanna. English medium 3. A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. 4. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट, 5. नई दिल्ली -110012 Fishes. Written by Mary Chandy. National Book Trust India (English Medium) 7. Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi This course can be opted as an elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research Orientation assignment 05 marks for Class Interaction

Course prerequisites: To study this course, a student must have had the subject in class/12 th / certificate/diploma.
Suggested equivalent online courses:
Further Suggestions:

Programme/Class: Certificate Year: First Semester: Second

Subject: Fisheries

Course Code: A490201T Course Title: Fish Taxonomy

Course outcomes:
The student at the completion of the course will be able to classify and identify the various species of fisheries.

Credits: 4

Max. Marks: 25+75

Core: Compulsory

Min. Passing Marks: as per rules

Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0

Unit	Total No. of Lectures-Tutorials-Practical (in nours per week). D Topics	No. of Lectures (1 hr duration)
	Part I	
I	 Meaning of fish Taxonomy General classification of Fishes Importance of Fish classification 	8
II	 Evolution of Fishes. Super class Agnathas Explanation in detail Define ostracoderms Define cyclostomes Explain Hag fishes Explain Lampreys 	8
III	 Study of superclass Gnathostomata General characters of anathostomes Define Placoderms. 	7
IV	 Study of class Elasmobranch fishes. General characters of class elasmobranchii Fish of commercial importance of the class Elasmobranch. Special characters of class elasmobranchii. 	7
	Part II	
V	 General characters of class Holocephali Special characters of Holocephali Economic importance of the class 	8
VI	 General characters of Dipnoi Special characters of class Dipnoi or Lung Fishes. Distribution of lung Fishes. Economic importance of Lung fishes. 	7
VII	 General characters of Teleostomi class. Classify teleostomi group of fishes. Define Modern group or class of fishes. 	8
VIII	 Define carp -fishes Define cat fishes 	7

General characters of commercial fishes. Suggested Readings: Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur Fish & Fisheries written by S.D.Kulshratha Vol II 2. ADB Publishing House Jaipur. (Hindi medium) An Introduction to fishes. Written by S.S.Khanna. English medium 3. A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. 4. English Medium. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट, 5. नई दिल्ली -110012 Fishes. Written by Mary Chandy. National Book Trust India (English Medium) 7. Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi This course can be opted as an elective by the students of following subjects: Open for all Suggested Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research Orientation assignment 05 marks for Class Interaction Course prerequisites: To study this course, a student must have had the subject in class/12th/ certificate/diploma. Suggested equivalent online courses: Further Suggestions:

Semester: Second Year: First Programme/Class: Certificate Subject: Fisheries Course Title: Fish Identification Course Code: A490202P The student at the completion of the course will be able to identify the fishes present in various water bodies. Core: Compulsory Credits: 2 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 0-0-2 No. of Lectures(2 hrs **Topics** duration) Unit Part I Study of common river fishes. 7 7 Study of Marine fishes II 7 Making of record. 9 Viva. ·IV Suggested Readings: Fish and Fisheries. Written by Vol. I 8. Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur Fish & Fisheries written by S.D.Kulshratha Vol II

- 9. ADB Publishing House Jaipur. (Hindi medium)
- An Introduction to fishes. Written by S.S.Khanna. English medium 10.
- A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. 11.
- मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट, 12. नई दिल्ली -110012
- Fishes. Written by Mary Chandy. National Book Trust India (English Medium). 14. Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi

This course can be opted as an elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research Orientation assignment 05 marks for Class Interaction
Course prerequisites: To study this course, a student must have had the subject in class/12 th /certificate/diploma.
Suggested equivalent online courses:
Further Suggestions:

Semester: Third Year: Second Programme/Class: Diploma Subject: Fisheries Course Title: Fish Ecology (Limnology) Course Code: A490301T Course outcomes: The student at the completion of the course will be able to maintain fish environment. Core: Compulsory Credits: 4 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 No. of Lectures (1 hr **Topics** Unit duration) Part I Meaning of Environment. Different components of environment of Fish Pond. Abiotic Factors of pond. Physical factors of Pond as Depth of pond, Temperature of Pond, 8 I Sun/solar energy/Light, Turbidity, Transparency Importance of Physical factors in fish Culture. Meaning and types of chemical factors of Fish Pond importance of chemical factors in fish Pond environment. Types of chemical factors as Dissolved 02, Dissolved Co2, or Dissolved Carbon di oxide, PH, Inorganic 8 II Salts, Nutrients, Minerals. Hole of chemical factors in Pond environment. Affects of chemicals on plant & animal life. Meaning and types of biological properties of Fish Pond Plants found in a Fishery Pond or Types of Aquatic plant of a fish Pond Types of animals found in a fishery pond. III Relationship between aquatic plants & aquatic animals Biological properties of a fish Pond. Planktonlogy, Definition of Planktons Zooplanktons, Phytoplanktons 7 Nectons, Algal blooms, Swarms IV Role or importance. Part II Weeds of Pond. Definition of weeds 8 Weeds Management of fish pond, Demerits/Merits of weeds Life of fish and impact of its environment. Stress created by environment & Fish life. 7 Co-relations of Temperature, light, dissolved gases O2, CO2, PH of pond VI water, Bicarbonates and Acidity

	 Pond construction Methodology Sight selection of Pond. Soil Properties Water quality. Water resources. 	8
VII	1 등 전체 전 경기 전 경기 등 전 경기 등 전 전 경기 등 보고 있다면 하는 경기를 보고 있습니다. 그는 사람들은 보고 있는 것이 되었다면 보다 보고 있다면 보다 되었다면 보다 되었다면 보다 보다 보다 보다 되었다면 보다	
	Types of Ponds and their ecological properties.	
	Hapa, Nursery ponds, rearing	7
	Ponds, Stocking ponds, Breeding	
VIII	Towns nonds Prenticed Ponds.	
	Ponds, Temporary ponds, Trendeed 1	
uggested l	Readings:	
1. F	ish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur	
	Dr. S.D.Kulshrestna. (Fillul medium.). 7222	
	V 11 de Vol II	
2.	Fish & Fisheries written by S.D.Kulshratha Vol II	
۷.	ADB Publishing House Jaipur. (Hindi medium)	
	An Introduction to fishes. Written by S.S.Khanna. English medium	
3.	An introduction to hones.	II Dolhi
	A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishin	g House, Denn.
4.	A Hand book of Fish Lathing of	
	English Medium.	संधान, पूसा गट,
5.	English Medium. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनु	
	नई दिल्ली -110012	
	T. C. Char	lich Medium)
	Fishes. Written by Mary Chandy. National Book Trust India (Eng.	Jan Dolhi
6.	Fishes. Witten by HS Rhumrah, Kavita Junea. Anmol Publication I	New Dellii
7. Intr	Fishes. Written by Mary Chandy. National Book Trust India (2007) and Coduction to Fishes by H.S. Bhumrah, Kavita Junea. Annual Publication of the can be opted as an elective by the students of following subjects: Oper	for all
This cours	e can be opted as an elective by the students	
	Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment /	Seminar/Research
Suggested	Continuous Evaluation Methods: 20 marks for restriction	
Officiation	erequisites: To study this course, a student must have had the subject	in class/12 th /
Course pr	erequisites: To study this course, a student must have had the say	
certificate		
certificate	/dipionia.	
Suggested	d equivalent online courses:	
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Semester: Third Year: Second Programme/Class: Diploma Subject: Fisheries Course Title: Limnological Study of a Fish Pond/Farm Course Code: A490302P The student at the completion of the course will be able to study the limnological parameters required for fisheries. Core: Compulsory Credits: 2 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 0-0-2 No. of Lectures(2 hrs **Topics** duration) Unit Part I Study of a Fish Pond/Farm. 7 I Making a report on physical Parameters of fish pond project 7 II Making a report on weeds of the pond Record, 7 Ш 9 Viva : IV Suggested Readings: Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur Fish & Fisheries written by S.D.Kulshratha Vol II 2. ADB Publishing House Jaipur. (Hindi medium) An Introduction to fishes. Written by S.S.Khanna. English medium 3. A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. 4. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट, 5. नई दिल्ली -110012 Fishes. Written by Mary Chandy. National Book Trust India (English Medium). 7. Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi This course can be opted as an elective by the students of following subjects: Open for all

Suggested Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research Orientation assignment 05 marks for Class Interaction
Course prerequisites: To study this course, a student must have had the subject in class/12 th /certificate/diploma.
Suggested equivalent online courses:
Further Suggestions:

Programme/Class: Diploma
Year: Second
Subject: Fisheries

Course Code: A490401T
Course outcomes:
The student at the completion of the course will be able to culture and forming of fishes.

Credits: 4

Max. Marks: 25+75

Core: Compulsory

Min. Passing Marks: as per rules

Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0

Unit	Total No. of Lectures-Tutorials-Practical (in nours per week). 2	No. of Lectures(1 hr duration)	
	Part I		
1	Basic principals of fish culture / fish farming Primary Producer, Secondary Producer, Tertiary producer of fish pond carbon cycle, Nitrogen cycle, Phosphorous cycle of Pond.	8	
II	 Culturable fishes of India (Major carps), Types of culture. Monoculture, Polyculture, Mixed Farming Brief Idea on culturable fishes in India, Indigenous Exotic etc. Characteristics of culturable in a cultured animal like reproductive behaviour, Food habits. Team behaviour 	8	
III	Food and feeding of culturable fishes food of carp fry, Food of carp fingerlings, Food of yearlings and adults. Artificial food feeding of carps.	7	
IV	 Fish culture in paddy fields. Fish culture in man made lakes. Sewage fed Fisheries Technology, sewage treatment plant study. Science or method of sewage. Filtration. 	7	
	Part II		
V	Exotic fishes . Definition. Types of fishes introduced in India. Cultural or farming Importance. Indian and Exotic fish composite farming.	8	
	Integrated fish farming. Fish cum Poultry farming Fish cum Horticulture Fish cum duck Culture, Fish cum prawn culture, Fish cum dairy farming.	7	
VII	Fish seed, Definition, Fish Seed collection from Natural resources. Rivers etc. New Technology in seed production, Chinese Hatcheries, Modern Fish Hatcheries, CIFED- 80 Model CIFED – 81 model.	8	
VIII	Economics of fish culture and integrated fish farming Economics of Composite fish Farming, Fish cum paddy culture.	7	

Suggest	ted Readings:	
1.	Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur	100
2.	Fish & Fisheries written by S.D.Kulshratha Vol II ADB Publishing House Jaipur. (Hindi medium)	
3.	An Introduction to fishes. Written by S.S.Khanna. English medium	
4.	A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi.	-
5.	English Medium. मछली पालन एक उद्योग, लेखक डॉ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट,	
	नई दिल्ली -110012	-
6.	Fishes. Written by Mary Chandy. National Book Trust India (English Medium) Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi	
This co	ourse can be opted as an elective by the students of following subjects: Open for all	
Sugge	sted Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research ation assignment 05 marks for Class Interaction	
Official	in class/12 th /	
Course	e prerequisites: To study this course, a student must have had the subject in class/12 th /	
certific	cate/diploma.	
Sugge	ested equivalent online courses:	
Furthe	er Suggestions:	
		1
1-15		

Programme/Class: Diploma		Year: Second		Semes	Semester: Fourth	
	-	Subject:	Fisheries			
Course Co	de: A490402P	Course Title:	Study of I	ndian Major Carps a	nd Exotic Carps	
ourse outcomes the student a	mes: t the completion of the	ne course will be a	ble to ident	ify various carps fis	shes found in India.	
	Credits: 2			Core: Compu	ilsory	
	Max. Marks: 25+7	75		Min. Passing Marks	: as per rules	
	Total No. of Lectur	res-Tutorials-Pract	tical (in hou	ars per week): L-T-l	P: 0-0-2	
Unit		Topics			No. of Lectures(2 hrs duration)	
		Part I				
I	Making records of In	ndian major carps.			7	
П	Preparing records of	Exotic fishes			7	
Ш	Practical Record				7	
IV	Viva				9	
2. 3. 4. 5.	Fish & Fisheries wr ADB Publis An Introduction to f A Hand book of Fi English Me मछली पालन एक उ नई दिल्ली	shrestha. (Hindi m itten by S.D.Kulshi shing House Jaipur ishes. Written by S ish Farming by S. dium. उद्योग, लेखक डॉ0 —110012 Mary Chandy. Na H.S. Bhumrah, Kay	atha Vol II (Hindi me S.S.Khanna. C. Agrawal विश्व रमण ! ational Boo	dium) English medium . Narendra Publishi प्रसाद सिन्हा,कृषि अन् k Trust India (En Anmol Publication N	ng House, Delhi. नुसंधान, पूसा गेट, glish Medium) New Delhi	
Suggested C	ontinuous Evaluation ssignment 05 marks f	n Methods: 20 mar or Class Interaction	ks for Test	Quiz / Assignment	/ Seminar/ Research	
	equisites: To study th			e had the subject	in class/12 th /	

Suggested equivalent online courses:	
Further Suggestions:	

Semester: Fifth Year: Third Programme/Class: Degree Subject: Fisheries Course Title: Capture Fisheries Course Code: A490501T

Course outcomes:
The student at the completion of the course will be expert in management of capture fisheries, fish health management and fish preservation.

Credits: 4	Core: Compulsory		
Max. Marks: 25+75	Min. Passing Marks: as per rules		

Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0

Unit	Topics	No. of Lectures(1 hr duration)			
	Part I				
I	Concept or Meaning of capture Fisheries. Capture Fishery resources of India. Fresh Water capture resources of India. Riverine resources of India, Marine water resources of India History of capture fishery Importance of capture fishery capture Fishery and Employment.				
II	Methods of fishing and fishing gears. Historical background of capture fishery. Fishing Without gear. Fishing gears, Fishing old methods. Modern methods of fish capturing Fish screens, Nets, Electrical fishing, Nets Preservation & safety.				
III	Fish Preservation and Processing. Principals of fish Preservation. Methods of Fish Processing old methods of fish Preservation. Modern Technology of Fish Preservation Causes of fish rot, fish By- Products.	7			
IV	Fish disease and control. Common disease of fish. Disease caused by-Bacteria, Virus, Fungus, Nematodes etc.				
	Part II				
V	Disease caused by environmental stress as Temperature, light, Dissolved gases as O2 & CO2 Ph, Acidity, Nutritional deficiency disease.	8			
VI	Preparation and maintenance of fish Aquarium Benefits of fish aquarium. Making of fish aquarium. Aquarium plants. Aquarium fishes. Aquarium care. Food of aquarium fishes Aquarium and health. Aquarium business.	7			
VII	Plans to develop capture fishery of India present status of capture Fishery. Modern Technology employed in capture fishery. Need of capture resources conservation due to over exploitation problems of capture resources.	8			
VIII	Fishery Extension. Methods employed to develop fishery sector, importance of fishery education.	` 7			

Suggeste	d Readings:
1	Fish and Fisheries. Written by Vol. I (Hindi medium). ABD Publishers Jaipur
1.	Fish and Fisheries. Written by Vol. 1 Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur
	: 하늘(More Application) : 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
	Fish & Fisheries written by S.D.Kulshratha Vol II Hyper Joints (Hindi medium)
2.	Fish & Fisheries written by S.D.Kulshi and J.J. Ji modium)
۷.	Fish & Fisheries Written by S.B.Rational ADB Publishing House Jaipur. (Hindi medium)
	An Introduction to fishes. Written by S.S.Khanna. English medium
3.	An Introduction to fishes. Written by 3.3. Khamma.
٥.	1. Publishing House Delhi.
	the staff Eigh Farming by S.C. Agrawal. Narendra Publishing Troube, 2
4.	A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi.
	English Medium.
	English Medium. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट,
5.	मछला पार्टा प्रमान
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6.	Fishes. Written by Mary Chandy. National Book Trust India (English Medium) Fishes. Written by Mary Chandy. Kayita Junea. Anmol Publication New Delhi
7	Fishes. Written by Mary Chandy. National Book Trust field (English Parkers) Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi urse can be opted as an elective by the students of following subjects: Open for all
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	ted Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research
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Semester: Fifth Year: Third Programme/Class: Degree Subject: Fisheries Course Title: Fish Breeding Technology Course Code: A490502T Course outcomes: The student at the completion of the course will be able in fish breeding technologies. Core: Compulsory Credits: 4 Max. Marks: 25+75 Min. Passing Marks: as per rules Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 No. of Unit **Topics** Lectures (1 hr duration) Part I Types of Fish breeding, Natural Fish breeding habits of major Indian carps, Catla, Labeo, cirrihina mrigala. 1 8 Bund breeding of Indian major carps . Dry Bundh breeding Wet Bundh Bundh breeding . Bundh breeding Techniques 8 11 Factors influencing spawning of carps. Fish seed collection from Natural resources Techniques of Fish seed collection. Traditional Methods. Modern methods. III 7 Construction of Fish seed farm criteria for site collection 7 IV Topography, Soil type, Water supply Part II Different Ponds used in Fishery. And their importance. Nursery Ponds. Rearing ponds. Stocking ponds. Feeding pits. Hapa V 8 Embankment Fish seed Production Modern Technology Induced breeding or Forced breeding 7 VI Techniques. Environment of survival of fish & Sparm. Temperature, Dissolved Oxygen, PH, VII Silt management 8 Hatchery.Circular cistern Hatcheries. Fish Hatcheries and breeding unit. CIEF D-80 7 VIII Modern carp Hatchery, (CIFED-81-MODEL) Suggested Readings: Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur

Fish & Fisheries written by S.D.Kulshratha Vol II

ADB Publishing House Jaipur. (Hindi medium)

2.

	Introduction to fishes. Written by S.S.Khanna. English medium
	Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. English Medium.
5. मध	English Medium. इली पालन एक उद्योग, लेखक डॉ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट, नई दिल्ली —110012
6. Fi	shes. Written by Mary Chandy. National Book Trust India (English Medium) troduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi
7. In	be opted as an elective by the students of following subjects: Open for all
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Suggested Conti Orientation assign	nuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research nment 05 marks for Class Interaction
Course prerequis	sites: To study this course, a student must have had the subject in class/12 th /
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Suggested equiv	ralent online courses:
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Dr. S.D. Extended and medium.). ARD Publishers Juiput

Programme/Class: Degree Year: Third		Sem	Semester: Fifth		
		Subject:	Fisheries	AUGO STRAG RESINV	Pupa belangang
Course Co	ode: A490503P	Course Ti	tle: Identif	ication of Fish and	record making
Course outco The student a		f the course will be a	able to ident	tify fishes and mair	ntenance of records.
	Credits: 2			Core: Comp	ulsory
	Max. Marks: 25	+75		Min. Passing Marks	s: as per rules
in the	Total No. of Lec	tures-Tutorials-Prac	tical (in hou	irs per week): L-T-	P: 0-0-2
Unit		Topics			No. of Lectures(2 hrs duration)
		Part I			
1	Aquarium Prepara	tion. Chart formation	on.		7
п	Aquatic fishes ide	entification and Diag	ram making		7
m	Aquatic plants Identification and diagramme formation Record Making 7				7
IV	Viva, Record submission	n	,		9
 3. 4. 5. 7. 	h and Fisheries. W Dr. S.D.K Fish & Fisheries v ADB Pub An Introduction to A Hand book of English M मछली पालन एक नई दिल्ली Fishes. Written b Introduction to Fi	ulshrestha. (Hindi m vritten by S.D.Kulshr lishing House Jaipur. ofishes. Written by S. Fish Farming by S. ledium. उद्योग, लेखक डॉ० f —110012 y Mary Chandy. Na shes by H.S. Bhum	atha Vol II (Hindi med S.S.Khanna. C. Agrawal. वेश्व रमण प्र tional Book rah, Kavita J	lium) English medium Narendra Publishi साद सिन्हा,कृषि अन् Trust India (Engunea, Anmol Public	ng House, Delhi. नुसंधान, पूसा गेट, glish Medium) cation New Delhi
This course c	an be opted as an e	lective by the stude	nts of follov	ving subjects: Oper	i for all
Suggested Co Orientation as	ontinuous Evaluatio signment 05 marks	on Methods: 20 mark for Class Interaction	cs for Test /	Quiz / Assignment /	Seminar/ Research

Suggested equi	valent online courses:	
Further Sugges		
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	Record Wilderston	
	ndings and Scientes. Written by Vol. 1 "Le S.D Kufchesten (filmte medicent). ARD Fublishers James Fight S.Fisherrer written by S.D.Rulsbrokke Vol. II ADB Publishing House Japen. (Hindi medicent)	
	A Hand Sook of Fish Ferming by S.C. Agrawal. Narendra Publishin English Medium দুৱাৰী মান্তাৰ থকা ভাষায় কাৰ্যাক হাঁচ বিমান থকা মাধ্যম বিদ্যাকৃষি জানু কেই বিভাগ ভাষায়	
	Fishes, Written by Mary Chendy, National Book Trust ladia. (Engineering to Trisless by H.S. Bharana, Kavita Jones, Annol Public the optical as an elective by the students of following subjects: Open	

Semester: Sixth Programme/Class: Degree Year: Third Subject: Fisheries Course Code: A490601T Course Title: Aquaculture Course outcomes: The student at the completion of the course will be expert in aqua culture. Credits: 4 Core: Compulsory Max. Marks: 25+75 Min. Passing Marks: as per rules Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 No. of Unit **Topics** Lectures (1 hr duration) Part I Principals of Aquaculture Scope of aquaculture. 8 Fresh water aquaculture 8 II Ornamental Fish production & management. III 7 Mass Production of Fish Food organism. 7 IV Part II Fish Nutrition and artificial food V 8 Coastal aquaculture & Mariculture. 7 VI Prawn culture & Technology. VII 8 Aquaculture & animal care. 7 VIII Suggested Readings: Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur Fish & Fisheries written by S.D.Kulshratha Vol II 2. ADB Publishing House Jaipur. (Hindi medium) An Introduction to fishes. Written by S.S.Khanna. English medium 3. A Hand book of Fish Farming by S.C. Agrawal. Narendra Publishing House, Delhi. 4. English Medium. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनुसंधान, पूसा गेट,

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6. 7.	Fishes. Written by Mary Chandy. National Book Trust India (English Medium) Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publication New Delhi
This course	e can be opted as an elective by the students of following subjects: Open for all
Orientation	Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment / Seminar/ Research assignment 05 marks for Class Interaction
Course pre certificate/	requisites: To study this course, a student must have had the subject in class/12 th /diploma.
Suggested	equivalent online courses:
Further Su	iggestions:

Semester: Sixth Year: Third Programme/Class: Degree Subject: Fisheries Course Title: Fisheries Administration and Rural Development Course Code: A490602T Course outcomes: The student at the completion of the course will be able to maintain fisheries administration and rural development. Core: Compulsory Credits: 4 Min. Passing Marks: as per rules Max. Marks: 25+75 Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0 No. of Lectures (1 hr **Topics** Unit duration) Part I Meaning of Fishery Administration Importance of Fishery administration. Structure of Fishery administration. 8 Central Govt. fishery infrastructure and objectives. Financial and Technical support to states. Role of central fishery ministry. State Fishery administration. Infrastructure of state fishery administration administrative hierarchy from 8 II state to Block or panchayat level. Objective of state fishery administration, Problems of Administration. Role of Fisheries in rural development of India Government schemes for rural Development problems in Fishery development, solutions for fishery Ш 7 development Sector. Role of fishery education for rural development. Problems & prospects of fishery Education. Need of Fishery research to develop Fishery sector. Present status Problems and Prospects, Fishery Technical Institutes of 7 IV India Different Training Institutes of Fisheries sponsored or funded by central & State governments, administrative legislative structures Part II Role of Planning department to develop Fishery Sector Basics for Fishery planning (Survey etc). Resource planning, Field planning, Human V 8 resource & training Financial Support. Fishery Marketing, Types of Fish market. Regulated & unregulated market. Local Market, Regional, National & Global market. Role of Transport facilities in Fish Marketing. Role of store facilities Govt. 7 VI support scheme for Fishery marketing. Role of Co-operative marketing & benefits. Socio-Economics of Fisheries. Status of Fisherman and Fishermen VII 8 Community of India. Problems of Fishery Communities. Define

	Economic problems of Fishery Communities & Scheme of Eradication				
VIII	Role of (FFD'Cts) Fish Farmers development agencies Role of KVK'S for Fishery Development Structure of KVK's. Objective of KVK's Structure of FFDA. Structure of MFFDA. (Marine fish farmers development Agencies.)	7			
uggested R	Readings: Fish and Fisheries. Written by Vol. I Dr. S.D.Kulshrestha. (Hindi medium.). ABD Publishers Jaipur				
16.	Fish & Fisheries written by S.D.Kulshratha Vol II ADB Publishing House Jaipur. (Hindi medium)				
17.	An Introduction to fishes. Written by S.S.Khanna. English medium				
18. 19.	A Hand book of Fish Farming by S.C. Agrawal. Narendra Publish English Medium. मछली पालन एक उद्योग, लेखक डाँ० विश्व रमण प्रसाद सिन्हा,कृषि अनई दिल्ली —110012				
20.	Fishes. Written by Mary Chandy. National Book Trust India (English Medium)				
21.	Introduction to Fishes by H.S. Bhumrah, Kavita Junea. Anmol Publ	ication New Delhi			
Orientation	Continuous Evaluation Methods: 20 marks for Test / Quiz / Assignment assignment 05 marks for Class Interaction				
Course prer	equisites: To study this course, a student must have had the subject liploma.	in class/12 th /			
Suggested 6	equivalent online courses:				
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Further Sug	gestions:				

Drogramma	Class: Degree	Year: Thir	rd	Semes	ster: Sixth
Programme	Class. Degree	Subject: I	isheries		
			Course Title	Study of Fish Proj	ects
Course Code. A4300031					
ourse outcon he student at sheries and i	nes: the completion of as production.	f the course will be a	ible to study	and prepare variou	is projects related to
	Credits: 2			Core: Comp	ılsory
	Max. Marks: 2	5+75		Min. Passing Marks	: as per rules
		ctures-Tutorials-Prac	ctical (in hou	rs per week): L-T-	P: 0-0-2
Unit	Total No. of Ze	Topics			No. of Lectures (2 hrs duration)
		Part I			
I	Project Formation Making a project on Newly developed fish Farm, with special reference to cost incurred.			7	
П	Bichpuri campu	survey project report of a government Fish Farm Located near chpuri campus at Laramada.			7
III	A survey project Located near B	survey project report of a government sewage. Treatment plant ocated near BVRI, Bichpuri campus.			7
IV	Making a proje	ect on Fishery farm (Lay-out.)			9
This course		n elective by the stud			
Orientation a	assignment us ma	ation Methods: 20 ma ks for Class Interaction			
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Suggested e	equivalent online	courses:			
Further Sug	gestions:				