

डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद

परिपत्रक क्रमांक/एस.यु./विज्ञान/अभ्यासक्रम/७४/२०१४

या परिपत्रकाद्वारे सर्व संबंधितांना सुचित करण्यात येते की, विज्ञान विद्याशाखेने शिफारस केल्यानुसार बी. एस्सी. / एम. एस्सी. प्रथम व द्वितीय वर्षाच्या सुधारित अभ्यासक्रमास आणि बी. एस्सी. प्रथम वर्षाच्या अभ्यासक्रमात किरकोळ बदल करण्यास विद्यापरिषदेच्या वतीने मा. कुलगुरु यांनी, त्यांना प्राप्त असलेल्या विशेष अधिकार महाराष्ट्र विद्यापीठ अधिनियम-१९९४ कलम १४(७) अन्वये मान्यता दिलेली आहे. त्या अनुषंगाने सुधारीत तयार केलेल्या अभ्यासक्रमाची प्रत या परिपत्रकासोबत आपल्या पुढील कार्यवाहीसाठी पाठविण्यात येत आहे.

[1]	B.Sc. Physics	Semester-III & IV,
[2]	B.Sc. Chemistry	Semester-III & IV,
[3]	B.Sc. Botany	Semester-III & IV,
[4]	B.Sc. Zoology with minor changes	Semester-I & II,
[5]	B.Sc. Zoology	Semester-III & IV,
[6]	B.Sc. Fisheries	Semester-III & IV,
[7]	B.Sc. Electronics (Opt.)	Semester-III & IV,
[8]	B.A./B.Sc. Mathematics	Semester-III & IV,
[9]	B.Sc. Computer Science	Semester-I & II,
[10]	B.Sc. Information Technology	Semester-I & II,
[11]	B.C.A.	Semester-I & II,
[12]	B.Sc. Computer Science(Opt.)	Semester-I & II,
[13]	B.Sc. Information Technology(Opt.)	Semester-I & II,
[14]	B.Sc. Computer Application(Opt.)	Semester-I & II,
[15]	B.Sc. Computer Maintenance(Opt.)	Semester-I & II,
[16]	B.Sc. Biotechnology (Progressively)	Semester-I to VI,
[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

S-29 Nov., 2013 AC after Circulars from Circular No.55 & onwards

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[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
औरंगाबाद-४३१ ००४.
संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
६५९९-७०२
दिनांक :- २७-०५-२०१४.

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संचालक,
महाविद्यालये व विद्यापीठ
विकास मंडळ.

या परिपत्रकाची एक प्रत :-

- १) मा. परिक्षा नियंत्रक, परिक्षा विभाग,
 - २) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,
 - ३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर उपलब्ध करुण देण्यात यावेत.
 - ४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,
 - ५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,
 - ६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,
 - ७) कक्ष अधिकारी, बी.ए. / बी.एस्सी./ बी.सी.एस./एम.एस्सी. विभाग, परीक्षा भवन,
 - ८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,
- डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.



Revised Syllabus of

B. Sc. Second Year

Fishery Science

[Optional]

(Semester – III & IV)

(Effective for June 2014-2015)

BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD.
FISHERY SCIENCE.
SYLLABUS
B.Sc.II (Semester III and IV)

(Revised Syllabus effective form June 2014.)

Semester	Course Code	Paper	Title of the paper	Periods	Marks
III	Fish. Sci.107	VII	Capture Fisheries	45	50
III	Fish. Sci.108	VIII	Culture Fisheries- I	45	50
III	Fish. Sci.109	IX	Practical's Based on Paper VII	45	50
III	Fish. Sci.110	X	Practical's Based on PaperVIII	45	50
IV	Fish. Sci.111	XI	Fish Technology and population dynamics	45	50
IV	Fish. Sci.112	XII	Culture Fisheries – II Aquarium Management	45	50
IV	Fish. Sci.113	XIII	Practical's based on paper-XI	45	50
IV	Fish. Sci.114	XIV	Practical's based on paper-XII	45	50

B.Sc. (Fishery Science)

Semester – III

Capture Fisheries

Paper – VII

Unit-A	1) Inland Fisheries resources of India	(8)
	Riverine Fisheries – The Ganga river system, Brahmaputra river system, East coast river system. West coast river system. Reservoir fisheries Cold water fisheries	
	2) Estuarine fisheries resources of India.	(6)
	Principle fisheries of brackish water. Fisheries of Chilka, Pulicat and Kolleru Lake.	
Unit -B	1) Marine capture fisheries resources of India	(20)
	Commercially important fisheries in India (Taxonomy; distribution, food and feeding ,methods of catching and Catch trends of the following fisheries Oil Sardine fishery Mackerel fishery Bombay duck fishery Pomfret fishery Sole fishery Hilsa fishery.	
Unit – C	1) Fisheries of Non fish organisms.	(11)
	Prawn and Shrimp capture fishery Crab capture fishery Molluscan fisheries Chank fisheries.	

Total = 45

B.Sc. (Fishery Science)

Semester – III

Culture Fisheries- I

Paper – VIII

Unit – A	1) Introduction and history of aquaculture	(2)
	2) Purpose, importance and advantages of aquaculture	(2)
	3) Fresh water fish culture	(8)
	Planning, layout and construction of fish farm	
	Procurement of fish seed by induced breeding	
	Technique and hatcheries (Happa, Chinese hatchery, CIFE D- 80 and D-86 model)	
	Characteristics of cultivable species (major carps And Exotic carps)	(5)
Unit – B	1) Preparation and management of nursery,	
	Rearing and stocking ponds	
	Predatory and weed fishes and their control	(2)
	Fertilization of the pond	(2)
	Aquatic weeds and their control	(3)
	Fish food organisms and their production	(2)
	Stocking, artificial feeding and harvesting	(3)
	2) Brackish water fish culture	
	Construction and management of brackish water Fish farm	(3)
	Bhasa- Bhada and Non – Gheri farms.	(2)
	Milk fish, Mullet and Tilapia culture.	(6)
	3) Culture of Air Breathing fishes.	(5)

Total = 45

B.Sc. (Fishery Science)**Semester – III****Practical based on Theory Paper- VII****Paper – IX**

Unit- A	1) Study of Inland Capture Fishes	(06)
	a) Other carps (Any Three)	
	b) Cat fishes (Any Three)	
	c) Clupeids (Any Three)	
	d) Other miscellaneous fishes (Any three)	
	2) Study of Marine and brackish water Fishes	(05)
	<i>Rastrelliger kanagurta, Sardinella.</i>	
	<i>Longiceps, Harpodon nehereus, Pampus –</i>	
	<i>Argenteas, Cynilossus spp. Trichurus sp.</i>	
	<i>Polynemous sp. Chonos, Mugil corsula, Hilsa ilisha</i>	
	3) Study of Non Fish organisms.	(04)
	Prawns, Lobsters, Crabs, Shrimps, Edible oyster,	
	Chank, Sea weed (Gracillaria, Sargassum,	
	Digenia)	
	4) Collection of fish species from different areas.	
	The same should be submitted at time of Practical exam.	
		Total (15)

B.Sc. (Fishery Science)**Semester – III****Practical based on Theory Paper – XIII****Paper No- X****Unit – A 1) Identification, Classification and Culturable
Significance of the following****a) Fresh water fishes- (4)**

Catla catla, Labeo rohita, Cirrhina mrigala

Cyprinus carpio, Channa Sp. Notopterus

Sp., Clarius batrachus, Heteropheustes

Fossilis.

b) Brackish Water Fishes – (1)

Tilapia mossambica, Mugli cephalus,

Chanos chanos.

c) Non Fish organisms – (3)

i) Prawns – *Macrobrachium rosenbergii* And *Penaeus sp.*

ii) Lobsters

iii) Mussels – *Mytilus Sp.*

2) Identification and Mounting of plankton – (3)

i) Phytoplankton (Any Three)

ii) Zooplankton (Any Three)

3) Identification of Aquatic insects – (4)

Dragonfly (Nymph), Anisop, Ranatra, Balostoma,

Dytiscus

4) Submission of Plankton slides and collection of Fish species, fish food and fertilizers. (15)**B.Sc. (Fishery Science)****Semester – IV****Fish Technology and Population Dynamics****Paper – XI****Unit – A 1) Fishing Craft (5)**

- a) Catamaran b) Satpati c) Musula
d) Machwa e) Tuticorin

2) Fishing Gears

- A) a) Spear and harpoon
b) Fish poison
c) Hook and lines d) Fish traps
e) Types of nets- Dip net or lift net, Cast net, Purse Seine net, Trawl or Drag net and Bag net.

B) Preservation of Gears (12)**Unit – B 1) Preservation and Processing of fish**

Methods of Fish Preservation – Chilling,

Freezing, Freeze drying, sun-drying, smoking,

Salting, brining and canning; use of chemical and Radiation. (16)

2) Fish Population

Structure of population

Estimation of fish population

(Direct / Indirect methods)

Population dynamics (fluctuation) (4)

Unit – C 1) Different stages of wooden boat – construction (6)

Lofting, setting up the back bone assembly,

Temple fixation, planking, farming, Deck laying,

Mechanical and electrical installations.

2) Care and maintenance of boats (2)**45**

B.Sc. (Fishery Science)**Semester – IV****Culture Fisheries – II and Aquarium Management****Paper – XII**

Unit – A	1) Mari Culture	
	Cultivable Crustacean resources and their culture	(06)
	i) Prawn	
	ii) Crabs	
	Cultivable Molluscan resources and their culture	(08)
	i)Mussels ii) Edible oyster	
	iii) Pearl oyster iv)Sea weed culture	
	2) Fish Culture Methods –	
	Pen culture	
	Cage culture	
	Sewage fed fish culture	(06)
Unit –B	1) Integrated fish farming practices	
	Paddy cum fish culture	
	Poultry cum fish culture	
	Live stock fish culture	(06)
Unit – C	1) Aquarium Management	
	Setting of aquarium (Gravels/Pebbles, Plants	
	Fishes and Ornamental objects)	(06)
	Selection of aquarium fishes and plants	(05)
	Maintenance of Aquarium – Cleaning, Water	(05)
	Quality, Control of algal growth Common	
	Diseases and treatment of aquarium fishes.	(03)

Total-45

B.Sc. (Fishery Science)

Semester – IV

Practical based on Theory Paper – XI

Paper no – XIII

- 1) **Study of fishing crafts (Models) Catamaran, Machwa, Satpati, Masula, and Tuticorine Type.** (2)
- 2) **Study of fishing gears (Models) Harpoon, Hook and lines, Dip net, cast net Gill net, Drag net.** (2)
- 3) **Preservation of fish by sun drying and salting.** (2)
- 4) **Identification of fishing materials** (3)
 - a) Types of floats and sinkers
 - i) Glass
 - ii) Aluminium, Steel, HDP, Lead, Iron Chain
 - b) Fishing gear accessories –
 - i) Anchor shackle, Iron Sooivel, Marline spike, Thimble, G.link, Hook, Purse ring.
- 5) **Make the following knots, Hitches and Bends in fishing gear.** (3)
 - a) Knot- Overhand knot, Reef knot sheep Shank knot, figure of eight knot.
 - b) Hitches – Rolling hitch, Two half hitch, Marline hitch, Round turn and two half hitch, Clove hitch.
 - c) Bends – Single sheet bend, Double sheet bend, Fishermen bend.

- 6) **Survey of Inland fishery resources of local reservoir and student should be submitting a project report at the time of practical exam. (3)**
- 7) **Submission of fishing gear.**

Total-15

B.Sc. (Fishery Science)

Semester - IV

Practical based on Theory Paper – XII

Paper No- XIV

i) Identification of predatory and weed fishes.

ii) Predatory fishes- Wallago, Anabus, Ophiocephallus, **Mystus** (1)

iii) Weed fishes – Punctius, Aplocheilus, Rosbora (1)

1) Identification of Aquatic Weeds –

i) Floting Weeds _ Pistia, Lemma, Azolla, Wolfia, Eichhornia (Any Two)

ii) Emergent Weeds – Nelumbium, Nymphoides, Nymphaea (Any one)

iii) Submerged Weeds – Vallisneria, Ceratophyllum, Utricularia, Potamogeton, Hydrilla, Nojans (Any two)

iv) Marginal Weeds – Typha, Sagittaria, Lpomea, Cyperus, Colocasia, (Any Two) (4)

2) Removal of fish pituitary gland and preparation of pituitary extract. (2)

3) Preparation of home aquarium. (2)

4) Identification of balanced and unbalanced aquarium. (2)

5) Preparation of artificial fish food. (2)

6) Identification of aquarium fishes. (Any Five) (1)

Note :- 1) Educational tour to fresh water, Coastal water fish Farming and aquarium centre is compulsory, students should submit a study tour report at the time of examination.

B.Sc. – II Year (Fishery Science)**List of Books Recommended for Paper V and VI**

- 1) Jhingran V.G. fish and fisheries of India. Hindustan publication Corpn. (India) Delhi.
- 2) John E.Bardach, John H. Ryther and William O.Mc. Larney Aquaculture.
- 3) Rath R.K Fresh water Aquaculture. Scientific publishers, Jodhapur- 3420001 India.
- 4) M.Srinivaswa Reedy and K.R.S. Sambasiva Rao. Tex book of Aquaculture. Discovery publication House, New Delhi – 110002.
- 5) Venkhede G.N And S.V. Deshmukh. Fresh Water aquaculture Development and Management. Sarup and Sons, New Delhi – 110002.
- 6) R.Santhanam, N. Sukumaran and P. Natrajan Fresh Water Aquaculture. Oxford and IBH publishing Co. Pvt. Ltd. New Delhi – 1122 01.
- 7) Panday, A.K and G.S Sandhu. Encyclopaedia of Fishes and Fisheries of India (Vol.III& IV) Anmol Publications, New Delhi – 1100 02.
- 8) Khanna S.S. and H.R Singh A Text book of Fish Biology and Fisheries Narendra Publication House, Delhi – 1110 006.
- 9) Belsar, D.K. Tropical Fish Farming Environmental publications, Karad-415 110.
- 10) Srivastva C.B.L Fishery Science and Indian Fisheries KitabMahal, New Delhi – 110 002.
- 11) Satyanarayan V.A Symposium on Fish Culture, A Practical and Comprehensive guide on Inland Fish Framing complied Narendra publishing house, Delhi – 1100 06.
- 12) Marel Huet. Text book of fish culture Fishing News book. Ltd. Fornham, Surreys England.
- 13) Evira A. Baluyut, Aquaculture System and practices. A selected review. Daya publishing house, Delhi – 110 035.

- 14) Chakroff, M fresh water pond culture and management scientific publishers, Jodhapur 342001.
- 15) Biswas K.P.A Text book of Fish, Fisheries and Technology (2nd Edn.) Narendra Publication House – Delhi – 1100 06.
- 16) BAL, D.V and Rao K.V. Marine Fisheries of India (1st Revised Edition) Tata Mc Graw – Hill Publication Company Ltd. New Delhi – 110 020.
- 17) Moorjani, M.N. Fish processing in India ICAR Publ. New Delhi – 1100 01.
- 18) Panday, A.K and G.S. Fish Farming Hand book. AVI Publ. Company West port, connectient.
- 19) Santhanam R.Velajutham and G. Jegatheesan. A manual of Fresh water ecology. Daya Publ. House. Delhi – 110006.
- 20) Chakrabarathi N.M Biology Culture and production of Indian Major Carps A review. Narendra publ. House Delhi – 110006.
- 21) Mohekar A.D., Dr. K.R. Reddy and Dr. M.G Babare. A Manual of Fishery Science, Manjusha publ. Naldurg – 413 602
- 22) Hall C.B. Pond and Fish Culture. Agro Botanical Publishers (India) Bikaner -334003.
- 23) Chond S.L Hypohphysation of Indian Major Carps. Satish book Enterprise, Motikatra Agra – 3.
- 24) Benymi. Fishing with light. FAO by Fishing News books Ltd. Surrey, England.
- 25) Winton and Winton Fish and fish Products. Allied Scientific Publisher, Bikaner.
- 26) Francis Cherunilam Fisheries ; Globe perspective and Indian Development Himalaya publication Akola.
- 27) Maloo, R.A. A Practical approach to fresh water fish culture (Vol-I) Bharathi Publication Akola.
- 28) John C. Sainsburry. Commerical Fishing methods, An Introduction to Vessels andgear fishing news (Books) Ltd. Surey, England.

- 29) Reddy A.K Chandra Prakash, R.P Unyal Gaint Freshwater prawn culture CIFE, Versoa, Mumbai- 400061.
- 30) Dutta R. Tropical Fish; Setting up and maintaining Freshwater and Marine Aquaria 1972 Octopus books Ltd.
- 31) Hawkins A.D. (1981) Aquarium System, Academic Press.
- 32) Harnam P. Ward Lock (1981) Living Aquarium.
- 33) Rataj. K. and R. Zukal (1971) Aquarium Fishes and plants. Himalaya publication house.
- 34) Raw L.P (1956) Ornamental Fish for Garden ponds and Home aquariums. Home aquarium.
- 35) Collins Guide to Aquarium Fishes and plants. 1969 Schiolz A Collians.
- 36) Vogl and H. Wermuth. Thames (1963) Complete Aquarium.
- 37) Dawas J.A (1984) Freshwater Aquarium Robert Rovce Ltd.
- 38) Latja Sjempu (1987) Manual on Fishing Technology.
- 39) Latha Shenoy, Y Shreekrishna, S. Kamat (2004), Practical Course manual Fishing craft and Gear Technology.
- 40) CIFNET (1979) Hand book on basic Principles of construction and repairs of fishing nets.
- 41) FAO (1972) Catalogue of Fishing gears design. Fishing /news books, pp 155.