

Post Graduate Semester wise Syllabus
 as recommended by Central Board of Studies and approved by the Governor of M.P.
 उच्च शिक्षा विभाग, म.प्र. शासन
 स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम
 केंद्रीय अध्ययन मण्डल द्वारा अनुमोदित तथा म. प्र. के राज्यपाल द्वारा अनुमोदित

Session - 2010-2011

~~2013-14~~ 2016-17

: M.Sc
 : IV
 : Zoology
 : ANIMAL BEHAVIOUR AND
 NEUROPHYSIOLOGY
 : Paper- I (Compulsory)
 : 35

Group

<p>1. Introduction:</p> <ul style="list-style-type: none"> - Ethology as a branch of biology. - Animal psychology, classification of behavioral patterns, analysis of behaviour (ethogram). <p>2. Reflexes and complex behaviour.</p> <p>3. Perception of the environment: mechanical, electrical, chemical, olfactory, auditory and visual.</p> <p>4. Evolution and ultimate causation: Inheritance behaviour and relationships.</p>
<p>1. Neural and hormonal control of behaviour.</p> <p>2. Genetic and environmental components in the development of behaviour.</p> <p>3. Motivation: Drive, timing and interaction of drives, physiological basis of motivation, hormones and motivation, aggregation.</p> <p>4. Communication: Chemical, visual, light and audio, evolution of language (primates).</p>
<p>1. Ecological aspects of behaviour: Habitat selection, food selection, optimal foraging theory, anti-predator defenses, aggression, homing territoriality, dispersal, host-parasite relations.</p> <p>2. Biological rhythms: Circadian and circannual rhythms, orientation and navigation, migration of fishes, turtles and birds.</p> <p>3. Learning and memory: Conditioning, habituation, insight learning, association learning and reasoning.</p>
<p>1. Reproductive behaviour. Evolution of sex and reproductive strategies, mating systems, courtship, sexual selection, parental care.</p> <p>2. Social behaviour. aggregations, schooling in fishes, flocking in birds, herding in mammals, group selection, kin selection, altruism, reciprocal altruism, inclusive fitness, social organization in insects and primates.</p>
<p>1. Thermoregulation: Homeothermic animals, poikilotherms & Hibernation.</p> <p>2. Receptor physiology a comparative study -</p> <ul style="list-style-type: none"> Mechano receptor Photo receptor Phono receptor Chemo receptor Equilibrium receptor <p>3. Bioluminescence</p>

sted Readings -

Eibl-Eibesfeldt, I. Ethology. The biology of Behaviour. Holt, Rineheart & Winston, New York:
 Gould, J.L. The mechanism and Evolution of Behaviour.
 Kerbs, J.R. and N.B. davies : Behaviourable Ecology. Blackwell, Oxford, U.K.
 Hinde, R.A. Animal Behaviour : A Synthesis of Ethology and Comparative Psychology. McGraw Hill, New York.
 Alcock, J. Animal Behaviour : An Evolutionary approach. Sinauer Assoc. Sunderland, Massachsets, USA.
 Bradbury, J.W. and S.L. Vehrencamp. Principles of Animal Communication. Sinauer Assoc. Sunderland, Massachsets, USA.

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Session - 2010-2011

~~2010-11~~ 2016-17

Class : M.Sc
Semester : IV
Subject : Zoology
Title of Subject Group : Gamete Biology, Development and differentiation
Paper No. : Paper- II (Compulsory)
Max. Marks : 35

Unit-1	<ol style="list-style-type: none">1. Comparative account of differentiation of gonads in mammals and invertebrate.2. Spermatogenesis : Morphological basis in rodents and in any invertebrates. Gamete specific gene expression and genomics3. Biochemistry of Semen : Semen composition and formation, assessment of sperm function.4. Fertilization : Prefertilization events Biochemistry of fertilization post fertilization events.
Unit-2	<ol style="list-style-type: none">1. Ovarian follicular growth and differentiation : morphology, endocrinology, molecular biology oogenesis and vitellogenesis, ovulation and ovum transport in mammals.2. Biology of sex determination and sex differentiation a comparative account.3. Multiple ovulation and embryo transfer technology : in vitro oocyte maturation, superovulation.
Unit-3	<ol style="list-style-type: none">1. Hormonal regulation of ovulation, pregnancy and parturition.2. Hormonal regulation of development of mammary gland and lactation.3. Endocrinology and Physiology of placenta.4. Cryopreservation of gametes and Embryo.5. Teratological effects of xenobiotics on gametes.
Unit-4	<ol style="list-style-type: none">1. Cell commitment and differentiation.2. Germ cell determinants and germ cell migration.3. Development of gonads.4. Melanogenesis.
Unit-5	<ol style="list-style-type: none">1. Creating new cell types, the basic evolutionary mystery.2. Cell diversification in early Amphibian embryo, totipotency and pluripotency.3. Embryonic stem cells, renewal by stem cells, epidermis.4. Connective tissue cell family5. Haemopoietic stem cells : Blood cells formation, stem cell disorders.

Suggested Readings :

1. Long J.A. Evan H.M. 1922 : the oestrous cycle in the Rat and its associated phenomenon.
2. Nalbandou. A.C. - Reproductive physiology
3. Prakash A.S. 1965-66 Marshall's, Physiology Reproduction (3 Vol.)
4. Gilbert, S.F. Developmental Biology, Sinauer Associated Inc. Massachusetts.
5. Ethan Bier, the cold Spring. The cold spring Harbor laboratory Press, New York.
6. Balinsky B.I. Introduction to Embryology sanders, Philadelphia.
7. Berril N.J. and Karp. G. Development Biology. McGraw Hill New York.
8. Davidson, E.H. Gene Activity During Early Development. Academic Press, New York.


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Dr. Anika Dageunten

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Session - 2010-2011

2016-17

Class
 Semester
 Subject
 Title of Subject Group

: M.Sc
 : IV
 : Zoology

: Pisci Culture and Economic

Importance of Fishes (Ichthyology)

: Paper- ~~III~~ A (Optional)

Paper No.
 Max. Marks

: 35

Unit-1	1. Collection of fish seed from natural resources. 2. Dry bundh breeding of camps. 3. Wet bundh breeding of camps. 4. Hypophysation and breeding of Indian major camps.
Unit-2	1. Drugs useful in induced breeding of fish 2. Types of ponds required for fish culture farms 3. Management of hatcheries, nurseries and reany ponds 4. Management of stocking ponds
Unit-3	1. Composite fish culture 2. Prawn culture and pearl industries in India. 3. Fisheries resources of MP 4. Riverine fishries.
Unit-4	1. Costal fishries in India 2. Offshore and deep sea fisher's in India 3. Role of fishries in rural development 4. Sewage fishries
Unit-5	1. Methods of fish preservation 2. Marketing of fish in India. 3. Economic importance and by product of fishes 4. Shark liver oil industry in India Transport of live fish & fish seed.

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केंद्रीय अध्येषण मंडळ द्वारा अनुमोदित परीक्षा पत्र
Session - ~~2016-2017~~ 2016-17

Class : M.Sc
Semester : IV
Subject : Zoology
Title of Subject Group : Ichthyology (Fish)
Structure and Function
Paper- IV A (Optional)
Max. Marks : 35

Unit-1	1. Origin and evolution of fishes 2. Classification of fishes as proposed by Berg 3. Fish integument 4. Locomotion
Unit-2	1. Alimentary canal and digestion 2. Accessory respiratory organs 3. Air bladder and its functions 4. Weberian ossicles their homologies and functions
Unit-3	1. Excretion and osmoregulation 2. Acoustico-lateral line system 3. Luminous organs 4. Colouration in fishes
Unit-4	1. Sound producing organs 2. Deep sea adaptations 3. Hill stream adaptations 4. migration in fishes
Unit-5	1. Sexual cycle and fecundity 2. parental care in fishes 3. Early development and hatching 4. Poisonous and venomous fishes.

Practicals - Fish (based on paper III (a))

- Dissection of local fishes for the following
 - Nervous system
 - Urinogenital system
- Minor dissection and preparation - scales, otolith, Ampulla of Lorenzini, types of tails, Weberian ossicles
- Study of museum specimens
- Collection and study of development stages of fish
- Age determination by scales

Scheme of Practical examination

	MM - 25	
1. Major dissection		07 Marks
2. Minor dissection		03 Marks
3. Spotting		08 Marks
4. Viva voce	04 Marks	
5. Practical Record		03 Marks
Total		25 Marks

Suggested Readings : Paper III A & IV A

- J.R. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler - Ichthyology
- Herden Jones - Fish migration.
- Marshals - The life of fishes.
- Thomas - Diseases of fish
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown - Physiology of fishes Vol. I & II.
- Hoar and Randall - Fish physiology of fishes Vol. I & IX.
- Gunther Stead C.S.D. - Freshwater fishes of the world Vol. VII.
- W. Lamb - The Fishes.
- G.V. Nikolsky - The ecology of Fishes.
- Borgstram - Fish as food Vol. I & II.
- Nilsson - Fish physiology - Recent Advances
- P.B. Myle and J.J. Cech - Fishes - An Introduction to Ichthyology.
- Carl E. Pond - Biology of fishes
- M. Jobling - Environmental Biology of fishes.
- Santosh Kumar & Manju Tembhe - Fish and Fisheries.
- S.K. Gupta - Fish and Fisheries
- K.P. Vas - Fish and Fisheries
- Bhingan - Fish and Fisheries.

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Dr. Anita Jagannathan

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Session - 2010-2011

2016-17

Class
Semester
Subject
Title of Subject Group
Paper No.

: M.Sc
: IV
: Zoology

: General Practical
: Paper- I & II (Compulsory)

Animal behavior and gamete biology

Max Marks

: 50

Scheme for Practical Examination

1. Exercise based on animal behavior
2. Exercise based on developmental biology
3. Practical record
4. Viva Voce
5. Collection

20
16
05

04
05

Total

50 Marks

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Session - 2010-2011

2016-17

: M.Sc

: IV

: Zoology

: General Practical

: Paper- I & II (Compulsory)

Animal behavior and gamete biology

Semester

Subject

Title of Subject Group

Paper No.

1. Exercise on Animal behavior

- Taxes
- Reflexes
- Biological clocks
- Social behavior
- Learning behavior
- Reproductive behavior

2. Developmental Biology

- > Study of embryological slides
- > Study of gametes of frog and chick
- > Study of fate maps
- > Study of different stages of spermatogenesis and oogenesis

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Dr. Anurag Daga
Dr. Anurag Daga

M.Sc. IV sem Ichthyology practical examination scheme based on

paper III(a) and IV (a) 2016-17

Zoology
Practical II (Special Paper)
Ichthyology (III & IV)

Time: 5 hour

M: M 50

- | | |
|--|--------|
| 1. Major dissection Nervous system of Walago, Mystus, Labeo, Torpedo. | 10 |
| 2. Minor dissection of internal ear, accessory, respiratory, organ, pituitary glands, Weberian ossicles. | 03 |
| 3. Mounting preparation of permanent slides. | 03 |
| 4. Age determination of fish with the help of scales | 03 |
| 5. Identification of fish | 08 |
| 6. Spotting of museum specimen slides and bones. | 08 |
| 7. Viva Voice. | 05 |
| 8. Practical record, collection. | 5+5 10 |

Total

50

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