DEPARTMENT OF BIOSCIENCES

Veer Narmad South Gujarat University, Surat – 395 007.

Outline of Syllabus for Semester System (2011-12)
M.Sc.- Biosciences
Semester – III (Animal Science)

Theory :

Paper	Subject	Credits
Bios-(A)-301	Structure and function in invertebrates and vertebrates	4
Bios-(A)-302	Comparative Functional anatomy	4
Bios-(A)-303	Microscopic anatomy of mammalian tissues & their functions	4
Bios-(A)-304(a)	Basic Human Cytogenetics (Elective)	4
Bios-(A)-304(b)	General Fisheris (Elective)	4

Practicals:

Bios-(A)-305 :	Practical Based on Bios. - (A)-301 Bios. - (A)-302 Bios. -(A)-303 Bios. -(A)-304(a) Bios. -(A)-304(b)	8

Semester – IV (Animal Science)

Theory :

Paper	Subject	Credits
Bios-(A)-401	Wild Life conservation and management	4
Bios-(A)-402	Developmental Biology	4
Bios-(A)-403	Neuro endocrinology and animal Behavior	4
Bios-(A)-404(a)	Molecular Human Cytogenetics (Elective)	4
Bios-(A)-404(b)	Advances in fish Technology (Elective)	4

Practicals:

Bios-(A)-405 :	Practical Based on Bios. - (A)-401 Bios. - (A)-402 Bios. -(A)-403 Bios. -(A)-404(a) Bios. -(A)-404(b)	8

Total - 48 Credits

M.Sc. Semester - III (ANIMAL SCIENCE)

Structure and function in invertebrates and vertebrates

Bios-(A)-301

Unit – I :

Movement and locomotion in invertebrates

- Movement and fibrils
- Movement and hydrostatic skeleton
- Movement and Coelom
- Movement and metamerism
- Movement and arthropodization

Unit – II :

Structural adaptations with reference to modes of locomotion

- Swimming (How fish swims)
- Running (How animals run)
- Flying (Birds as a flying machine)

Unit – III :

Patterns of reproduction

- Patterns of reproduction in invertebrates
- Comparative account of chordate reproductive system
- Larvae and larval behaviours
  - Larval forms in free living invertebrates
  - Larval forms of parasites
  - Strategies of evolutionary significance of larval forms.

Unit – IV :

Food and feeding habits and mechanism

- Pattern of feeding and digestion in lower matazoa
- Filter feeding in Polychaete, mollusca and ectino dermata.
- Vertebrate feeding apparatus
- Denition in animals

References :

1. Invertebrate structure and function — E, J.W.Barrington (19)
2. General and comparative physiology — W.S.Hoar
3. Comparative anatomy of vertebrates — Kent C. G.
4. An introduction to Vertebrate anatomy — Webster & Webster
5. Chordate structure and function — Waterman

M.Sc. – Semester -III (ANIMAL SCIENCE)

Comparative Functional anatomy

Bios-(A)-302

Unit – I :

- Overview of comparative functional anatomy of digestive system of vertebrates .
- Overview of comparative account of Excretory system of vertebrates.
- Overview of comparative account of respiratory system.
  - Organs of respiration
  - Mechanism of respiration

Unit – II :

- Overview of comparative account of nervous system
  - Primitive nervous system.
  - Advanced nervous system.
- Comparative account of circulatory
  - General plan of circulation in various groups
  - Structure of Hearts
  - Aortic Arches.

Unit – III :

- Osmoregulatory mechanism in various environments :
  - Fresh water
  - Marine water
  - Estuaries
  - Terrestrial

Unit – IV :

- Physiological adaptations to Extreme environmental condition
  - Desert rat
  - Desert squirrel
  - Physiology of camel
  - Temperature regulation in reptiles
  - Adaptation to cold
  - Wonderful net

References :

1) Hormones – A.W. Norman and G. Litwick (1987)
2) Animal Behaviour – John lcock (1984)
   An evolution approach
3) The chectan – Tne Biol.
   Ecology & behaviour of an endangered sp. - R.L.Eaton (1974)
4) Wild life wealth of India - T.C.Majupuria (1980)

M.Sc. - Semester - III (ANIMAL SCIENCE)

Microscopic anatomy of mammalian tissues and their functions

Bios-(A)-303

Unit-I :

Histological Aspects of

- Epithelial tissue
- Connective tissue
- Muscular tissue
- Nervous tissue

Unit –II:

Histological studies of

- Skin
- Digestive system
- Respiratory system
- Circulatory system

Unit – III :

Histological view of

- Excretory system
- Male reproductive system
- Female reproductive system

Unit – IV:

Histochemistry, Cytochemistry

- Nucleic acid
- Proteins
- Lipids

- Immunochemistry
  - Methods of labelling Antibodies
  - Methods of labelling Antigens
  - Overview of diagnosis of disease

References :

1. Text book of histology — N.N.Majumdar
2. Text book op histology — W.F.Windle
3. Histology — R.O.Greep
4. Basic histology — L.C.Junquiera, J.Carbeuro & Cantapoulous

M.Sc. – Semester - III (ANIMAL SCIENCE)

Basic Human cytogenetics

Bios-(A)-304 (1)

Unit – I :

- Historical Background of human chromosome.
- Chromosome Structure and various models.
- Human meiotic chromosome.

Unit – II :

- Various cytogenetic techniques of studying human chromosome
- Genetic inactivation of heterochromatin
- Human chromosome and genetic map.

Unit – III :

- Autosomal abnormalities in group – G (Chromosome # 21)
- Autosomal abnormalities in group – D (Chromosome # 13)
- Autosomal abnormalities in group – E (Chromosome # 18)

Unit – IV :

- Abnormal sex chromosome plements in male.
- Abnormal sex chromosome complements in female.
- Sex-chromosome and intersexuality.
- Cytogenetic of human pregnancy wastages.

References :

1. Human cytogenetics Vol. I & II - J.L.Hamerton (1965)
2. Diagnosis cytogenetics (Lab manual) - R.D.Wegner (1980)
3. Human chromosomes - O.J.Miller and E.Truman
4. Masoni – Molecular and Genetic analysis of human Traips - (2001)
5. The human genome – Howley and Mori Academic Press (1999)

M.Sc. – Semester - III (ANIMAL SCIENCE)

General Fisheries

Bios-(A)-304 (2)

Unit – I :

- General Characters of fishes fresh water fisher
  - Catla
  - Rohu
  - Mrigal
  - Prawn – M. rosenbergii

Unit – II :

- Food and feeding habits of fishes
- Fish and prawn nutrition
- Induced breeding in fishes
- Hatchery, Spawning and Rearing

Unit – III :

- Oyster Culture
- Fish Culture (Fresh Water)
- Prawn Culture – Estuarine
- lobster Culture – Marine

Unit – IV :

- Commercial fisheries of Gujarat.
  - Bombay duck
  - Pomfret
  - Ghol-dara
  - Pearl Oyster
  - Prawns
  - Placuna
  - Hilsa

M.Sc. – Semester - IV (ANIMAL SCIENCE)

Wild Life Conservation and management

Bios-(A)-401

Unit – I :

- Wildlife Habitat,
  - Components of habitat
  - Management of habitat
  - Importance of habitat
- Methods of of studying free-living animal in their Natural habitats.

Unit – II :

- Marking and tagging of animals for study.
- Radiolocation
- Telemetry & Importance of methodology.
- Animal Capturing techniques.

Unit – III :

- Wildlife protection Act – 1972
- Biodiversity Act. – 2004
- Bioresources of India
- Project Tiger.

Unit – IV:

- Over view of National parks of Gujarat.
  - Marine National Park
  - Blackbuck National Park
  - Gir National Park
  - Vansda National Park
  - Overview of Sanctuaries of Gujarat. 23 Sanctwries

Reference :

1) Wildlife wealth of India - T. C. Majupuria

2) The biology, Ecology and Behaviour of - R. L. Eaton.
of endangered Special

3) Fundamentals of wildlife management – Rajesh Gopal

4) Ministry of environment & forest Publication – Act. 2004

M.Sc. - Semester - IV (ANIMAL SCIENCE)

Developmental Biology

Bios-(A)-402

Unit - I :

- Historical perspective of the science of embryology
- Spermatogenesis
- Oogenesis
- Fertilization

Unit – II :

- Basic concepts of growth and differentiation
- Dynamics of gastrulation
- Primary embryonic induction and concept of organizer

Unit – III :

- Tetrapod limb development
- Metamorphosis (amphibian & insect)
  - Morphogenesis
  - Hormonal control
  - Biochemical indices
- Regeneration
  - Distribution
  - Cellular basis
  - Control mechanisms

Unit – IV :

- Medical implications of developmental Biology
  - Genetic errors of human development.
  - Infertility
  - Teratogenesis

References :

1. Developmental Biology J.W.Saunders
2. Animal Development Hopper & Hart
3. Embryology B.I.Belinsky
4. Developmental Biology S.G.Goyal

M.Sc. - Semester - IV (ANIMAL SCIENCE)

Neuro endocrinology and animal Behaviour

Bios-(A)-403

Unit - I :

- Chemical coordination:
  - Neurohumors and Neuro hormones
  - Hormones

Unit - II :

- Endocrine organs and hormonal regulation:
  - Invertebrates
  - Vertebrates
  - Chemistry of hormones

Unit - III :

Ethology

Mechanism of animal behaviour:

- Basic patterns of behaviour
- Nervous integration
- Learning and memory
  - Conditioning
  - Habituation
  - Insight learning
  - Reasoning
  - Cognitive skills
- Physiological basis of behaviour
- Genetic basis of behaviour
- Reproductive Behavioural Pattern
  - Courtship & ritual behaviour
  - Mating
  - Stickle back behaviour

Unit – IV :

- Specialized behavioural adaptations:
  - Navigation - Homing of salmon
  - Orientation - Echolocation in Bat
  - Communication

- Visual – Sound communication in Honey bees

- Auditory – Bird's songs
- Chemicals – Phero mones
  a) invertebrates
  b) vertebrates
- Biological rhythms :
  a) tidal
  b) seasonal
  c) circadian

- Methods of studying animal behaviour

Reference :

1. Animal behaviour: An evolutionary approach John Alcock (1984)
2. Evolution of brain and behaviour R.B.Masterton, M.E.Bitterman
3. Vertebrates C.B.G./Campbell, N.Hotton (1976)
4. Biology of communication D.Brain Lewis, D.Michael Grover (1980)
5. Animal Architecture and building behaviour H.M.Hansell (1984)

M.Sc. - Semester - IV (ANIMAL SCIENCE)

Molecular Human Cytogenetics

Bios-(A)-404 (1)

Unit – I :

- Understanding cancer
- Chromosomal bass of human neoplasias with special emphasis
  - Leukemias
  - Lymphomas
  - Carcinomas
- Chromosomal breakage and instability syndromes

Unit – II :

- Genetic Counseling
  - Components of genetic counseling
  - Physical Examination
  - Legal and ethical consideration
  - Genetic and Molecular tests in children
  - Preimplatation Screening diagnosis
  - Pre-natal screening and diagnosis

Unit – III :

- Molecular cytogenetic techniques :
  - FISH and GISH
  - DNA figer printing
  - flow cytometry
  - Automated karyotyping karyotyping
  - Chromosome Painting

Unit – IV :

- Human genome and Bioinformatics
  - Genome analysis overview
  - DNA typing
  - Human genome project
  - DNA and protein microarray
  - Database with reference to human genome EST, STS, GSS and SMP.
  - Methods of database searching BLAST AND FASTA.

References :

1. Chromosome and cancer from molecules to man - J.D.Fowley & J.E.Ultman (Ed.)
2. Chromosome mutation and neoplasia - J.German (Ed.)
3. The chromosomes in human cancer and leukaemia - A.A.Sansberg (1990)
4. Cytogenetic assays of environmental mutagens - T. C. Hsu
5. M.G.K. Menon and P. N. Tandon Human Genome Research, Allied Press (1999)
6. Jin Xiong. Essential of bioinformatics 1st Edition Cambridge Uni. Press (2006
7. Baxevanis and Oullette. Bioinformatics :
   A practical guide to analysis of genes and proteins 3rd (Ed.) Jonu Wiley & Sous (2004)

M.Sc. - Semester - IV (ANIMAL SCIENCE)

Advances in Fish Technology

Bios-(A)-404 (2)

Unit – I :

- Application of Biotechnology in Fisheries.
- Transgenic Fishes.
- Bioremediation
- Environmental Study.

Unit – II :

- Fish processing technology
- Fisheries resource of India
- Total Fish production of commercial fisheries of India.
- Total fish production of Gujarat.
- Fisher and its bi-product

Unit – III :

- Physiological condition of fisher.
  - GSI
  - Fecundity
  - K-factor
- Ecto and Endo parasites of fishes Y prawns

Unit – IV :

- Esfurine pollution impact of Environmental pollution on fisheries resources
  - Over fishing problem
  - Pollution and Sea fisheries

Reference :

1) Fish Nutrition - J. E. Halver
2) Physiology of Fishes - W.S.Hoar & Randall
3) Fish & Fisheries of India – V. G. Jhingran.
4) Prawn Fisheries – P. J. Kurian
5) Icfhyology - K. F. Legler
6) Prawn Culture - M.P.E.D.A. – Publication.