

**GULBARGA UNIVERSITY  
GULBARGA**



***SYLLABUS***

*for*

***M.Sc.***

***ZOOLOGY***

(CHOICE BASED CREDIT BASED SYSTEM)

2017 ONWARDS

Proceedings of the Meeting of the Board of Studies in Zoology held on 08<sup>th</sup> March, 2017 to prepare Credit Based Choice Based Syllabus for M.Sc. Zoology Course for the Academic year 2017-18 onwards.

Members Present:

- |                            |                 |
|----------------------------|-----------------|
| 1. Prof. K.Vijaykumar      | Chairman, BOS   |
| 2. Dr.Murali Jadesh        | Member          |
| 3. Prof. B.B.Hosetti       | External Member |
| 4. Prof. M.Venkateshwerulu | External Member |
| 5. Prof. Jacob Dass P      | External Member |
| 6. Prof. P.M.Basha         | External Member |
| 7. Prof. S. Ramakrishna    | External Member |

1. The CBCS syllabus for the M.Sc. Zoology course was drafted after several deliberations and discussions during the meetings of the Departmental Council and placed in the Meeting of the Board of Studies in Zoology for approval and implementation from the academic year 2017-2018 and onwards (copy enclosed).
2. It was unanimously decided that the practical courses covering the theory papers mentioned in the scheme of teaching and examinations be evolved by the teacher(s) concerned during beginning of the every academic year.
3. Each candidate shall undertake compulsory “Animals in Nature” **Study Tour** covering different Institutions and natural biomes with a stress on Biodiversity study. The duration of this Tour shall be about 10 days. The Study Tour shall be undertaken during third Semester only and shall be completed within the two years period.

### Scheme of Teaching and Examination

Semester	Paper No & Title	Teaching Hrs / week	Exam. Hrs.	Examination	Internal Assessment	Credits
<i>IV</i>	4.1: HCT: Biodiversity	04	03	80	20	04
	4.2: HCT: Animal Behavior	04	03	80	20	04
	4.3: HC: Project	04	03	100	-	04
	4.1: SCT: General Endocrinology	04	03	80	20	04
	4.1: HCP: Practical based on 4.1	04	03	40	10	02
	4.2: HCP: Practical based on 4.2	04	03	40	10	02
	4.3: HCP: Presentation, Colloquium & Viva	04	03	40	10	02
	4.1: SCP: Practical based on 4.1	04	03	40	10	02
<b>Total Marks ( I to IV Semester) 2400</b>						96

**HC: Hard Core;    SC: Soft Core    OE: Open Elective**

**Paper: 4.1 HCT:  
BIODIVERSITY**

**Preamble:** The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources

**UNIT – I:**

**64 hr**

- 1.1 Biodiversity: Concepts, Definition. Values of biodiversity: Consumptive use and Productive use ; Social, Ethical, Aesthetic, Option & Environment service values.
- 1.2 Genetic diversity: Nature and origin of genetic variations; Measurement of genetic Diversity.
- 1.3 Species diversity: History and origin of species diversity; Species diversity indices ; Measures of diversity – Alpha, Beta & Gamma diversity.
- 1.4 Ecosystem diversity: Classification and nature of ecosystems (in brief); Ecosystem diversity of India (in brief), Agro- biodiversity: Origin and evolution of cultivated species diversity; Vavilovian centers ; Diversity in domesticated animal species.

**UNIT – II:**

- 2.1 Biodiversity at global, national and local levels.
- 2.2 Hot spots of biodiversity; India as a mega diversity nation. Endemism and endemic species.
- 2.3 Threats to biodiversity: Deforestation & habitat destruction, Hunting & Overexploitation; Introduction of exotic species, Pollution. Endangered, Vulnerable, Rare and Threatened species.
- 2.4 Conservation of Biodiversity: Objectives and action plans; Strategies – In-situ and Ex- situ conservation; Peoples movement, Role of educational Institutions and NGO's, Biodiversity Awareness programmes

**UNIT – III:**

- 3.1 Biodiversity legislation: Legal aspects with special reference to India; CITES; Trade-related Intellectual Property Rights.
- 3.2 Biodiversity conventions: Earth Summit and other conventions; Convention on Biological Diversity.
- 3.3 Biodiversity and Biotechnology: Role of Biotechnology in: Assessment of biodiversity and bioresources.
- 3.4 Biodiversity conservation; Utilization of Biodiversity/Bioresources. GMO's and their impact on biodiversity.

**UNIT – IV:**

- 4.1 Biodiversity Management: Organizations associated with biodiversity management – IUCN, UNEP, UNESCO, WWF, FAD, WCMC –their role and contributions.
- 4.2 Bioprospecting; Biopiracy; Biosafety.
- 4.3 Intellectual property rights and patents.
- 4.4 Future strategies for biodiversity conservation in India.

**REFERENCE BOOKS:**

1. Dasmann. F Raymond. Wildlife Biology. Wiley Eastern Ltd. India. 1982.
2. Encyclopedia of Nature and Science. Vols 1-18. Bay Books Pvt.Ltd. Sydney, 1974.
3. Burnie. D. (Ed). Animal: the Definitive Visual Guide to the Worlds Wildlife. D.K.Publications, 2001.
4. B.B.Hosetti, 2005: Glimpses in Biodiversity, Daya Publishing House, Delhi.
5. B.B.Hosetti, 2008: concepts in wildlife management, Daya Publishing House, Delhi.
6. K.C.Agrwal, 2006. Concepts in biodiversity, Narendra Publishers Meerut
7. B.B.Hosetti, 2008: Wild life management in India, Pointer Publishers, Jaipur ,

**Paper HCT 4.2**  
**ANIMAL BEHAVIOUR**

**Preamble:** Many of us derive inspiration from watching natural history documentaries and their astounding catalogue of wild animal behaviours. In this course, we will explore how scientists study animal behaviour, and in particular how behaviour is shaped by the evolutionary forces of natural and sexual selection. Topics include resource acquisition; avoiding enemies; mate choice and sexual conflict; cues, signals and communication; parental care and social behaviour; and the role of genes, environments and learning in regulating behavioural diversity. This course will help you understand the remarkable behaviours of wild animals from an evolutionary perspective.

**Unit-I****64 hrs**

- 1.1 Introduction to animal behaviour and brief history. Diversity and unity in the study of behaviour and complex behaviour.
- 1.2 Development of behaviour: Accommodative and Associate learning.
- 1.3 Hormones and early development. Genetic basis of behaviour. Neural control of behaviour.
- 1.4 Stereotyped behaviour: Kinesis, taxis, orientation and reflexes.

**Unit-II**

- 2.1 Motivation, decision making on different scales, drive, models of motivation, stress
- 2.2 Conflict behavior: territorial conflicts, threat display, displacement activities and fighting as conflict behaviour.
- 2.3 Stimuli and communication: Diverse sensory capacities, sign stimuli, stimulus filtering. Communication.
- 2.4 Application of pheromones and their biological actions in vertebrates and invertebrates

**Unit-III**

- 3.1 Ecological aspects of behaviour: Habitat selection, food selection, optimal foraging theory, anti-predator defenses.
- 3.2 Aggression, homing, territoriality, dispersal. Host-parasite relations.
- 3.3 Courtship and ritual behaviour: Mate selection, male-male selection, female choice and maternal behaviour.
- 3.4 Social organizations in insects and primates.

**Unit-IV**

- 4.1 Biological rhythms: Circadian and circannual rhythms.
- 4.2 Hormones and behaviour:
- 4.3 Chemical communication, body coloration, social life in insects (Termites and honey bees).
- 4.4 Hormone in insect & crustacean metamorphosis.

**REFERENCE BOOKS:**

1. Aubrey Manning and Marian. S. Dawkins. *An Introduction to Animal Behaviour*. Cambridge University Press, 1995.
2. McFarland. D. *The Oxford Companion to Animal Behaviour*.
3. McFarland.D. *Animal BehaviourPsychology, Ethology and Evolution*. Pitman Publications, 1985.
4. Slater.P.J.B. *Essentials of Animal Behaviour*. Cambridge University Press, 1999.
5. Krebs J.R and Davies, N.B. *An Introduction to behavioural Ecology-III* (Ed). Blackwell Science Ltd, 1993.

**Paper SCT 4.1**  
**GENERAL ENDOCRINOLOGY**

**Preamble:** Endocrinology is the study of the endocrine system in the human body. This is a system of glands which secrete hormones. Hormones are chemicals which affect the actions of different organ systems in the body. Examples include thyroid hormone, growth hormone, and insulin. The endocrine system involves a number of feedback mechanisms, so that often one hormone (such as thyroid stimulating hormone) will control the action or release of another secondary hormone (such as thyroid hormone). If there is too much of the secondary hormone, it may provide negative feedback to the primary hormone, maintaining homeostasis.

**Unit I: Invertebrate endocrine systems:** **64 hrs**

- 1.1 Autocrine, paracrine and endocrine secretions - an overview of mammalian endocrine system.
- 1.2 Endocrine glands of annelida and arthropoda- A comparative account.
- 1.3 Chemistry of invertebrate hormones.
- 1.4 Neuroendocrine control of metamorphosis in insects and crustaceans. Neuroendocrine regulation in amphibians and reptiles

**Unit II: Mechanism of hormone action:**

- 2.1 Types of hormone receptors-membrane bound cytoplasmic and nuclear receptors.
- 2.2 Regulation of receptor number, signal transduction- secondary messengers, cyclic AMP, prostaglandin
- 2.3 Calmodulin mediated pathways, genomic mechanism of hormone action
- 2.4 Steroid hormones, termination of hormone action.

**Unit III: Endocrine hormones**

- 3.1 Morphology, synthesis and action of hormones of endocrine glands-
- 3.2 Structure and functions of thyroid, parathyroid, adrenal gland, pancreas and pineal glands
  - 3.3 Pathophysiology of hormonal impairments such as cretinism, Cushing syndrome and Addison's disease.
- 3.4 Pathophysiology-pituitary dwarfism, gigantism and acromegaly

**Unit IV:**

**Hypothalamus and hypophysial axis**

- 4.1 Hypothalamus- structure and functions, hypothalamo hypophysial portal system, regulation of hypophysial secretions.
- 4.2 Morphology of pituitary gland (fishes – mammals).
- 4.3 Functional cell types of hypophysis, hypophysial hormones and physiological role
- 4.4 Causes for impaired and excessive secretions.

**REFERENCE BOOKS:**

1. Bentley, P.J.1994: Comparative vertebrate endocrinology –III Ed. Cambridge Univ. Press (NY)
2. Chandra. S. Nagi : Introduction to Endocrinology PHI (New Delhi)



3. Degroot. L.J. and Neill, J.D. 2001: Endocrinology-IV Ed, Vol. I-III. W.B. Saunders company(Ed)
4. Gorbman and Beru .1962: A text book of Comparative Endocrinology
5. Highman and Hill 1972: Comparative Endocrinology of Invertebrates
6. Machodley Prentree.1996: Comparative endocrinology and reproduction (Narosa publication house; New Delhi)
7. Mandal. A. 1994: Handbook of Neuroendocrinology, EMKAY publications
8. Nelson. R.J. 1995: An Introduction to behavioural endocrinology Sinauer Associates, Inc.
9. Nooris. D.O. 1996 :Vertebrate endocrinology IIIrd Ed., Academic Press
10. Pickford G.E & Atz W.J.1957: The Physiology of Pituitary gland of fishes (Zoological Survey; NewDelhi)
11. Saidapur.S.K.1989: (Ed) Reproductive cycles of Indian vertebrates. Allied Publishers Ltd, New Delhi
12. Turner. C.D. and Bugnara.J.T 1976: General Endocrinology., W.B. Saunders
13. Zarrow M.X and Mc Carthy. J.L 1964: Experimental endocrinology (Academic Press; New Yark).

#### **PRACTICALS:**

1. Display of endocrine glands-pituitary, thyroid, thymus, pineal, parathyroid, pancreas & adrenal glands.
2. Permanent slide preparations of above endocrine glands using different staining methods.
3. Histological studies of reproductive systems in crab, fish, frog , pigeon and rats ( slides)
4. Study of estrous cycle in rat- vaginal smear method
5. Demonstration of following technique:
  - a) Thyroidectomy
  - b) Adrenalectomy in a suitable animal (rat/mice).
6. Effect of unilateral or bilateral adrenalectomy on serum GOT activity in albino rat.

**DEPARTMENT OF ZOOLOGY,  
GULBARGA UNIVERSITY, GULBARGA**

**No: GUG/ZOOL/2016-17/**

**March, 8<sup>th</sup> 2017.**

MEETING OF THE BOARD OF STUDIES IN ZOOLOGY [POST GRADUATE] HELD ON WEDNESDAY THE **8th MARCH 2017** IN THE DEPARTMENT OF ZOOLOGY, G.U.KALABURAGI.

**Members present:**

- |                            |                 |
|----------------------------|-----------------|
| 1) Prof. K.Vijaykumar      | Chairman, BOS   |
| 2) Dr.Murali Jadesh        | Member          |
| 3) Prof. B.B.Hosetti       | External Member |
| 4) Prof. M.Venkateshwerulu | External Member |
| 5) Prof. Jacob Dass P      | External Member |
| 6) Prof. P.M.Basha         | External Member |
| 7) Prof. S. Ramakrishna    | External Member |

**AGENDA:**

- 1) Review of Ito IV Question Papers of 2016-17 examination
- 2) Approval of Panel of examiners for 2017-18 examinations
- 3) Approval of CBCS Syllabus for M.Sc. Zoology for the academic year 2017-18 onwards
- 4) Approval of Ph.D. entrance syllabus for the academic year 2017-18
- 5) Any other matter with permission of the Chair.

**Proceedings:**

- 1) The Chairman BOS in Zoology (PG) welcomed the members to the meeting. The minutes of the previous meeting were approved.
- 2) The question papers of M.Sc. I to IV semester examinations were reviewed and approved
- 3) The panel of examiners for various examinations at M.Sc. Zoology viz. Ito IV semester for the academic year 2016-17 was prepared and approved.
- 4) The CBCS Syllabus for M.Sc. Zoology was prepared and scrutinized and the same was approved for the academic year 2017-18 onwards.
- 5) The Ph.D. entrance syllabus was drafted and approved to be implemented from the academic year 2017-18 onwards.

The meeting was closed with a vote of thanks to all the members by the Chairman.

Chairman BOS in Zoology

Enclosure:

CBCS M.Sc. Zoology syllabus to be implemented from the 2017-18 academic year onwards