

UNIVERSITY OF JAMMU, JAMMU
(NAAC ACCREDITED 'A+' GRADE UNIVERSITY)

NOTIFICATION
(18/Dec./Adp/82)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the revision in the Syllabi and Courses of Study in the subject of **Zoology** of **B.Sc.** for the following Semesters under the **Choice Based Credit System** at the Undergraduate level (as given in the Annexure) for the Examinations to be held in the years indicated against each semester as under:-

Subject	Semester	For the examinations to be held in the year	%Change
Zoology	Semester-I	December 2019, 2020 and 2021	} < 25%
	Semester-II	May 2020, 2021 and 2022	

The alternative question papers are required to be set as per the University regulation given as under:-

- If the change in the syllabi and courses of study is less than 25%, no alternative question paper will be set
- If the change is 25% and above but below 50%, alternative Question paper be set for one year
- If the change is 50% and above or whole scheme is changed, alternative Question paper be set for two years.

The Syllabi of the courses is available on the University website: www.jammuuniversity.in

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/18/12374-12409
Dated: 01-01-2019

Copy for information and necessary action to:

1. Dean, Faculty of Life-Science
2. HOD/Convener, Board of Studies in Zoology
3. All the members of Board of Studies
4. C.A to the Controller of Examinations
5. I/c Director, Computer Centre, University of Jammu
6. Asst. Registrar (Conf. /Exams. UG/Pub.)
7. Incharge, University Website for necessary action please.

Assistant Registrar (Academic)

26/12

26/11/18

SYLLABUS AND COURSES OF STUDY IN ZOOLOGY FOR B.SC. SEMESTER I-II (CBCS)

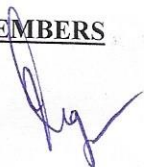
Semester	Course No.	Course Title	Credits	Nature of Course
I	UZOTC 101	ANIMAL DIVERSITY	4	CORE
	UZOPC 101	ANIMAL DIVERSITY	2	PRACTICAL
II	UZOTC 201	COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES	4	CORE
	UZOPC 201	COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES	2	PRACTICAL
III	UZOTC 301	PHYSIOLOGY AND BIOCHEMISTRY	4	CORE
	UZOPC 301	PHYSIOLOGY AND BIOCHEMISTRY	2	PRACTICAL
	UZOTS 301	APICULTURE	4	SKILL ENHANCEMENT
IV	UZOTC 401	PRINCIPLES OF GENETICS AND EVOLUTIONARY BIOLOGY	4	CORE
	UZOPC 401	PRINCIPLES OF GENETICS AND EVOLUTIONARY BIOLOGY	2	PRACTICAL
	UZOTS 401	AQUARIUM FISH KEEPING	4	SKILL ENHANCEMENT
V	UZOTE 501	PARASITOLOGY & APPLIED ZOOLOGY	4	CORE
	UZOPE 501	PARASITOLOGY & APPLIED ZOOLOGY	2	PRACTICAL
	UZOTS 501	PUBLIC HEALTH AND HYGIENE	4	SKILL ENHANCEMENT
VI	UZOTE 601	INSECT VECTORS AND DISEASES	4	CORE
	UZOPE 601	INSECT VECTORS AND DISEASES	2	PRACTICAL
	UZOTS 601	SERICULTURE	4	SKILL ENHANCEMENT

(HEAD OF THE DEPARTMENT)

**Prof. & Head
Department of Zoology
University of Jammu
JAMMU**

DAC MEMBERS

1.



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B.SC. SEMESTER-I

Core Course No. : UZOTC 101
Core Course Title : ANIMAL DIVERSITY
CREDITS : 4

UNIVERSITY OF JAMMU
Syllabi and Course of Study in Zoology
For the examination to be held in the years 2019, 2020 and 2021
UNDER CHOICE BASED CREDIT SYSTEM

1. Course /Paper Title	:	Animal Diversity (Theory)
2. Maximum Marks	:	100
i) External (Univ. Exam.)	:	80
ii) Internal Assessment	:	20
4. Minimum Pass Marks	:	
i) External	:	29
ii) Internal	:	07
5. Duration of Univ. Exam.	:	2 ½ Hrs.

Unit 1: Protista, Porifera and Cnidaria

13 Hrs

- 1.1 Introduction to kingdoms of organisms (Five kingdom system -a brief overview viz. Monera, Protista, Fungi, Plantae & Animalia).
- 1.2 Protista
 - 1.2.1 General characters and classification up to class level
 - 1.2.2 Locomotory Organelles and locomotion in Protozoa
- 1.3 Porifera
 - 1.3.1 General characters and classification up to class level.
 - 1.3.2 Canal System in Sponges
- 1.4 Cnidaria
 - 1.4.1 General characters and classification up to class level.
 - 1.4.2 Polymorphism in Siphonophora
 - 1.4.3 Corals & Coral reefs

Unit 2: Helminthes and Annelida

13 Hrs

- 2.1 Helminthes
 - 2.1.1 Platyhelminthes
 - 2.1.1.1 General characters and classification up to class level.
 - 2.1.1.2 Structure, reproduction, life cycle and pathogenesis of *Taenia solium*
 - 2.1.2 Nematelminthes
 - 2.1.2.1 General characters and classification up to class level.
 - 2.1.2.2 Structure, reproduction, life cycle, parasitic adaptations and pathogenesis of *Ancylostoma duodenale*
- 2.2 Annelida
 - 2.2.1 General characters and classification up to class level.
 - 2.2.2 Metamerism in Annelida

Unit 3: Arthropoda, Mollusca and Echinodermata

13 Hrs

- 3.1 Arthropoda
 - 3.1.1 General characters and classification up to class level.
 - 3.1.2 Eye structure and Vision in Arthropoda
- 3.2 Mollusca
 - 3.2.1 General characters and classification up to class level.
 - 3.2.2 Torsion in gastropods
 - 3.2.3 Shell in mollusca
- 3.3 Echinodermata
 - 3.3.1 General characters and classification up to class level.
 - 3.3.2 Water-vascular system in Asteroidea

Unit 4: Protochordates, Agnatha, Pisces and Ambhibia

13 Hrs

- 4.1 Origin of Chordates
- 4.2 Protochordates: General features and Phylogeny.

4.3	Agnatha	4.3.1	General features of Agnatha and classification of cyclostomes up to class level.
4.4	Pisces	4.4.1	General features and Classification up to order level.
4.5	Amphibia	4.5.1	General features and Classification up to order level.
		4.5.2	Parental care in Amphibians

Unit 5: Reptiles, Aves and Mammals

13 Hrs

5.1	Reptiles	5.1.1	General features and Classification up to order level.
		5.1.2	Biting mechanism in snakes
5.2	Aves	5.2.1	General features and Classification up to order level.
		5.2.2	Flight adaptations in birds
5.3	Mammals	5.3.1	Classification up to order level.
		5.3.2	Origin of mammals

Internal Assessment Test (20 marks)

The internal assessment under Choice Based Credit System shall be of 1 hour duration and shall comprise of two parts.

Part A: Total weightage of Part A will be 10 marks and shall comprise of 8 short questions selecting atleast from 2 to 3 units (50% of syllabus covered).A candidate will have to attend any 5 questions each carrying 2 marks.

Part-B: Total weightage of Part-B will be 10 marks and shall comprise of 2 long answer questions from first 2 to 3 units. A Candidate will have to attempt only 1 question of 10 marks.

Note 2: For paper setters :External End Semester University Examination

The External examinations in theory shall consist of the 3 sections.

Section A:Section-A shall be of 15 marks and will comprise of 5 short answer type questions, one from each of the units and carrying 3 marks each. Answers should be precise having 70 to 80 words only and without any detailed explanation (**All Compulsory**).

Section B:Section-B shall be of 35 marks and will comprise of 5 medium answer type questions, one from each of the units and carrying 7 marks each. Answers should be comprehensive having 250 to 300 words only and with detailed explanation (**All Compulsory**).

Section C:Total weightage of Section-C shall be 30 marks and will comprise of 5 long answer type questions, one from each of the units. A candidate will have to attempt only 2 questions from all the questions and will carry 15 marks each. Answers should be of 500 to 600 words with detailed analysis/explanation/critical evaluation to the question.

Books Recommended

1. Text book of Zoology-Hymen series McGraw Hills.
2. Protozoology-Kudo, Books & Periodicals Corporation (India).
3. Text-book of Zoology-Sedwick series. Central Book Depot.
4. Text-book of Zoology-Parker and Haswell Vol. I. Mac Millan & Co. 1986, New York.
5. Protozoology-Mackinen and Hawez, Canb University.
6. Treatise in Zoology-Lankester series.
7. Parasitic protozoa-Baker. Allen & Unwin, Inc. USA.
8. Human Helminthology-Faust, E.C, Lee and Febiger, Philadelphia.
9. Medical Parasitology- K. D. Charterjee
10. Helminthology- Kotpal
11. Arthropod Anatomy-Snod.,Grass. Principles of insect morphology (1935) Snodgrass, R.E. McGraw Hill London, New York.
12. Invertebrale-Bordale and Potts. C.L.
13. Integrated principles of Zoology by Hickman, C.P. Jr., F.M. Hickman &L.S. Roberts. (Mosby College Publ. St. Louis.).

14. Manual of Zoology Vol. I (invertebrata) part I and II. Ayyar, E.K. & T.N. Ananlha-Krishnan (S. Vishwanathan, Printers & Publ. Pvt. Ltd. Madras).
15. Invertebrate Zoology-Jordan, E.L. & P.S. Vemla (S. Chand & Co. Ltd. Madras).
16. Chordate Zoology- N. Arumugam, Vol. 2. SarasPublication
17. Chordate Zoology-E.L. Jordan & P.S. Verma. S. Chand Limited
18. Chordate zoology- P.S. Dhami & J.K. Dhami (1981) (R. Chand & Co.)
19. Principles of anatomy and physiology-G.J. Tortora & N.P. Anagnostakos (1984) (Harper & Row Publ., N.Y.).
20. Textbook of zoology, Vertebrates-A.J. Marshall (1995) (The McMillan Press Ltd., UK).
21. Modern textbook of Zoology (Vertebrates) -R.L. Kotpal (2000). (Rastogi Publ., Meerut).
22. Functional Anatomy of the Vertebrates: An Evolutionary Perspective- Liem, Karel F., William E. Bemis, Warren F. Walker, Lance Grande (2001). Brooks Cole.
23. Advanced Chordate Zoology-Gurdarshan Singh & H. Bhaskar (2002). Campus Books.

B.SC. SEMESTER-II

Core Course No. : UZOTC 201
Core Course Title: COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES
CREDITS : 4

UNIVERSITY OF JAMMU
Syllabi and Course of Study in Zoology
For the examination to be held in the years 2020, 2021 and 2022
UNDER CHOICE BASED CREDIT SYSTEM

1. Course /Paper Title	:	Comparative anatomy and developmental biology of Vertebrates (Theory)
2. Maximum Marks	:	100
i) External (Univ. Exam.)	:	80
ii) Internal Assessment	:	20
4. Minimum Pass Marks	:	
i) External	:	29
ii) Internal	:	07
5. Duration of Univ. Exam.	:	3 Hrs.

Unit 1: Integumentary Skeletal System **13 Hrs**

- 1.1 Integument System
 - 1.1.1 Integument: Structure and Function
 - 1.1.2 Derivatives of integument:
 - 1.1.2.1 Glands
 - 1.1.2.2 Scales
 - 1.1.2.3 Horns
 - 1.1.2.4 Feathers
- 1.2 Skeletal System
 - 1.2.1 Evolution of visceral arches
 - 1.2.2 Jaw suspension in vertebrates.

Unit 2: Digestive and Respiratory System **13 Hrs**

- 2.1 Digestive System
 - 2.1.1 Comparative account of alimentary canal and digestive glands in vertebrates (Salivary glands, Liver and Pancreas).
- 2.2 Respiratory System
 - 2.2.1 Brief account of Gills, lungs in Vertebrates
 - 2.2.2 Accessory Respiratory Organs in Vertebrates
 - 2.2.2.1 Swim Bladder
 - 2.2.2.2 Air Sacs

Unit 3: Circulatory and Urinogenital System **13 Hrs**

- 3.1 Circulatory System
 - 3.1.1 Evolution of heart in vertebrates
 - 3.1.2 Evolution and modifications of aortic arches in vertebrates
- 3.2 Urinogenital System
 - 3.2.1 Origin and types of Vertebrate Kidney
 - 3.2.2 Evolution of Urinogenital ducts in vertebrates

Unit 4: Nervous System and Sense Organs **13 Hrs**

- 4.1 Comparative account of vertebrate brain: Pisces, Amphibians, Reptiles, Aves and mammals.
- 4.2 Types of Sensory Receptors with special reference to Photoreception in Vertebrates

Unit 5: Development Biology **13 Hrs**

- 5.1 Gametogenesis: Spermatogenesis and oogenesis in mammals.
- 5.2 Fertilization
 - 5.2.1 Types of fertilization: External & Internal
 - 5.2.2 Capacitation, Acrosome Reaction, Penetration and Activation of Ovum, Migration of Pronuclei and amphimixis.

- 5.3 Cleavage: Planes and patterns, Blastulation and fate maps in Frog
- 5.4 Gastrulation in Frog up to formation of three germ layers, types of morphogenetic movements
- 5.5 Extraembryonic membranes of chick
- 5.6 Placentation in mammals

Internal Assessment Test (20 marks)

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Books recommended:

1. Text book of Zoology ó Parker and Haswell Vol. II
2. Chordate Zoology and Elements of Animal Physiology óE.L. Jordon and Verma, P.S.
3. Zoology and Chordates by H.C. Nigam, Vishal Publications, Jalandhar
4. Comparative Anatomy- M.D.L. Srivastava
5. Comparative Anatomy ó Kingley
6. Manual of Zoology Vol II Chordata ó Ayyar, E.K., T.N. Anorthakrishnan
7. Chordate structure and function ó Waterman, A.N. and Others
8. General and Comparative Physiology ó W.S. Hoar
9. Principles of Animal Physiology ó Wood, D.W.
10. Animal Physiology óEckert
11. An Introduction to Embryology óBalinsky
12. Biology of Developing System ó Grant
13. Developmental Biology ó Gilbert.
14. Animal Physiology-Nagabhushnam
15. Chordate Zoology- N. Arumugam, Vol. 2. SarasPublication
16. Chordate Zoology-E.L.Jordan& P.S. Verma. S. Chand Limited
17. Chordate Zoology- P.S. Dhami&J.K. Dhami (1981) (R. Chand & Co.)
18. Principles of anatomy and physiology-G.J.Tortora&N.P. Anagnostakos (1984) (Harper & Row Publ., N.Y.).
19. Textbook of Zoology, Vertebrates-A.J. Marshall (1995) (The McMillan Press Ltd., UK).
20. Modern textbook of Zoology (Vertebrates) -R.L.Kotpal (2000). (Rastogi Publ., Meerut).
21. Functional Anatomy of the Vertebrates: An Evolutionary Perspective-Liem, Karel F., William E. Bemis, Warren F. Walker, Lance Grande (2001). Brooks Cole.
22. Advanced Chordate Zoology-Gurdarshan Singh & H. Bhaskar (2002). Campus Books.

B.SC. SEMESTER-II

Core Course No. : UZOPC 201
Core Course Title: COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES
(PRACTICAL)
CREDITS : 2

1. Preparation of permanent mounts of the following:
 - 1.1 Velum, Oral hood and Pharyngeal region of Amphioxus
 - 1.2 Ampullae of Lorenzini, Placoid scale, Ctenoid scale of fish
2. Study of following skeleton:
 - 2.1 Skull of Fowl and Rabbit
 - 2.2 Axial and Appendicular skeleton of Fowl
3. Frog - Study of developmental stages - whole mounts and sections through permanent slides of cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages.
4. Study of chick embryology through stained mounts (18 Hrs.; 24 Hrs.; 36 Hrs.; 48 Hrs.; 72 Hrs.)
5. Demonstration of different types of Placenta in mammals through models or preserved specimens.
6. Study of histological sections of mammalian placenta through permanent slides or photomicrographs.
7. Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs.
8. Study of types of feet and claws, feathers and beaks in birds.
10. Dissect a locally available fish to study the following systems:
 - 10.1 Digestive system
 - 10.2 Taking out Pituitary and Weberian ossicles

Note: There will be one practical paper of 50 marks. 50% (25 marks) shall be reserved for internal assessment including 20% (05 marks) for attendance, 20% (05 marks) for viva and 60% (15 marks i.e. 5 marks for internal test and 10 marks for day to day performance). In case of regular students internal assessment received from the college will be added to the marks obtained by them in the University examination and in case of private candidates marks obtained by them in the University examination shall be increased proportionately in accordance with the statutes/regulations.