GOVERNMENT DEGREE COLLEGE FOR WOMEN, BEGUMPET,

HYDERABAD-16

(AUTONOMOUS Affiliated To Osmania University, Re-Accredited With 'B+' Grade by NAAC)

DEPARTMENT OF ZOOLOGY

(CBCS)

SYLLABUS (2021-2022)

GOVERNMENT DEGREE COLLEGE FOR WOMEN, BEGUMPET, HYDERABAD-16

(AUTONOMOUS Affiliated To Osmania University, Re-Accredited With 'B'' Grade by NAAC)

Constitution of Board of Studies - 2021-2024

S. No.	Members	Name	Signature
01.	Chairman BOS, GDC(w),Begumpet	Dr.G.S.Jyothirmai Assistant Professor of Zoology Head of the Department	
02.	Chairperson BOS, University Nominee, Osmania University	Prof.M.Madhavi Professor & CBOS Department of Zoology Osmania University Mobile No.9848569309 Prsmadhavi@gmail.com	CHAIR PERSON Board of Studies in Zoology Osmania University, HYD-7.
03	Subject Experts Nominated by Academic Council	Dr.Suresh Yenugu Associate Professor Department of Animal Biology School of Life Sciences ,University of Hyderabad Mobile No.9912852355 ysnaidu@yahoo.com 1.Dr. Raj kumar Assistant Professor of Zoology, GDC, Hyathnagar,Osmania University Siddiraj61@gmail.com	
05.	Representative from Industry	Md.Rehanuma Siddiqui Asst. Zoologist,Fresh Water Biology Regional Centre, Zoological Survey of India,Hyd rehansiddbu@gmail.com	
06.	Member	Dr.D.Prasanna Assistant Professor of Zoology	
07.	Member	Dr.P.S.Rajani Assistant Professor of Zoology.	
08	Member	Dr.C.Jyothsna Assistant Professor Zoology	
09.	Dr.K.B.Snehaprabha Principal Silver Jublee Degreee College for Women Habsiguda,Hyd.	Alumnus Mobile No.~~9542744155~~ 9391356979 kbsnehaprabha@yahoo.in	PRINCIPAL SILVER JUBILEE DEGREE COLLEGE FOR W Habsiguda X Road, R.R. Dist. - 5

Keeping in view of the CBCS Pattern, rearrangement of B.Sc. III yr syllabus was discussed at length for the approval with the members of BOS Committee. It is resolved to make following changes:

1. The ratification of the existing pattern of marks distribution of B.Sc. III yr Semester-V&VI Zoology syllabus has been approved by the members in the BOS Committee.

Marks distribution for Semester-V & VI is

Theory-Internal Assessment- 40 Marks

(2 Internals-20+20, Average of the two internals will be taken)+5M Assignment (write up of 4-5 pages)+ 5M Seminar+10 M MCQS(Average of4 MCQS Tests)

External Examination -60 Marks

Total: 100 Marks

Practical External Examination: 50 Marks

Project: 100 Marks

2. SEMESTER –V, Title of the Paper-V (DSE-I) is" IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY " (Theory& Practical)

Paper V (GE-I) PREVENTIVE MEDICINE (Theory)

SEMESTER –VI, Title of the Paper-VI (DSE-II) is "ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION" (Theory& Practical)

PROJECT

3. Topics included in paper-V (DSE-1) (THEORY) are

A.. In UNIT II

The chapter 2.4 and 2.5 of the existing syllabus have been combined as follows: "

2.4. Hypersensitivity reactions ***Autoimmunity and Immunodeficiency diseases.***

The chapter 2.5 is modified to ***Vaccines – types, Immunisation.***

B. In UNIT III

The chapter 3.5 –One more example of Transgenic animal, Mice is included.

C. In UNIT IV

The chapter 4.5 - ***Applications of Animal Biotechnology is added.***

4. Topics added in addition to the existing syllabus in Paper-V (DSE-1) (PRACTICAL) are as follows:

A. In UNIT II (Chaper I)

a) *ELISA – Virtual Lab*
b) *Visit to ZSI , Department of Fisheries-Field trips*

5. Topics added in addition to the existing syllabus Paper -V (GE-I) *PREVENTIVE MEDICINE (Theory)* are as follows:

A.UNIT III

The chapter 3.3 is modified by adding ***Herd Immunity*** along with its existing syllabus.

The chapter 3.4 is modified by adding ***Food Adulteration*** along with its existing syllabus.

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE
Choice Based Credit System (CBCS) 2021-2022

Year	Semester	Paper	Module (Paper)	No. of Credits	No. of Classes/week
I	I	Paper I (Core)	Animal Diversity-Invertebrates	04	04
		Practical-I	Animal Diversity-Invertebrates	01	02
	II	Paper II (Core)	Animal Diversity-Vertebrates	04	04
		Practical-II	Animal Diversity-Vertebrates	01	02
II	III	Paper III (Core)	Animal Physiology and Animal Behaviour	04	02
		Practical-III	Animal Physiology and Animal Behaviour	01	04
		SEC – I	Public Health & Hygiene	02	02
		SEC – II	Sericulture	02	02
	IV	Paper IV (Core)	Cell Biology, Genetics and Developmental Biology	04	04
		Practical-IV	Cell Biology, Genetics and Developmental Biology	01	02
		SEC – III	Aquaculture	02	02
		SEC – IV	Vermiculture	02	02
III	V	Paper V (DSE-I)	Immunology & Animal Biotechnology	04	04
		Practical-V (DSE-I)	Immunology & Animal Biotechnology	01	02
		General Elective	Preventive Medicine		04
	VI	Paper-VI (DSE-II)	Ecology, Zoogeography & Evolution	04	04
		Practical- VI (DSE-II)	Ecology, Zoogeography & Evolution	01	02
			Project or Tools & Techniques in Biology	04	04
			TOTAL	46	52

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Choice Based Credit System (CBCS) 2021-2022

Year	Semester	Paper	Module (Paper)	No. of Credits	No. of Classes/week
I	I	Paper I (Core)	Animal Diversity-Invertebrates	04	04
		Practical-I	Animal Diversity-Invertebrates	01	02
	II	Paper II (Core)	Animal Diversity-Vertebrates	04	04
		Practical-II	Animal Diversity-Vertebrates	01	02
II	III	Paper III (Core)	Animal Physiology and Animal Behaviour	04	02
		Practical-III	Animal Physiology and Animal Behaviour	01	04
		SEC – I	UGC Specified SEC	02	02
		SEC – II	Sericulture	02	02
	IV	Paper IV (Core)	Cell Biology, Genetics and Developmental Biology	04	04
		Practical-IV	Cell Biology, Genetics and Developmental Biology	01	02
		SEC – III	UGC Specified SEC	02	02
		SEC – IV	Vermiculture	02	02
III	V	Paper V (DSE-I)	Immunology & Animal Biotechnology	04	04
		Practical-V (DSE-I)	Immunology & Animal Biotechnology	01	02
		General Elective	Preventive Medicine		04
	VI	Paper-VI (DSE-II)	Ecology, Zoogeography & Evolution	04	04
		Practical-VI (DSE-II)	Ecology, Zoogeography & Evolution	01	02
			Project or Tools & Techniques in Biology	04	04
			TOTAL	46	52

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OBJECTIVES OF THE DEPARTMENT OF ZOOLOGY

The primary objective of the department is to impart quality education in the subject of Zoology as a basic science and its applied branches to the students from rural Telangana with very minimum fees.

The Department is having the following objectives:

- To provide quality education in a branch of Biological sciences i.e., Zoology with different specializations.
- To facilitate Higher education & research in zoology.
- To provide quality education offering skill based programs and motivate the students for self employment in applied branches of Zoology.
- To inculcate the value based education and entrepreneurial skills among the students.
- To Inculcate the spirit of resource conservation and love for nature
- To conduct field studies and different projects of local and global interests.
- To provides opportunities for professional and personal development through curricular and co- curricular activities.

Provide consultancy and organize extension activities.

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PROGRAMME OUTCOMES

PO 1 Domain Expertise:

- Acquire comprehensive knowledge and skills.
- Make use of the knowledge in an innovative manner.
- Effectively apply the knowledge and skills to address various issues..

PO 2 Modern equipment Usage

- Use ICT effectively.
- Access, retrieve and use authenticated information.
- Access, retrieve and use authenticated information.Have knowledge of software applications to analyze data.

PO 3 Computing Skills and Ethics

- Develop rationale and scientific thinking process.
- Use technology intelligently for communication, entertainment and for the benefit of mankind.
- Ensure ethical practices throughout ones endeavors for the wellbeing of human race.

PO 4 Complex problem Investigation & Solving

- Predict and analyze problems.
- Frame hypotheses.
- Investigate and interpret empirical data.
- Plan and execute action.

PO 5 Perform effectively as Individuals and in Teams

- Work efficiently as an individual
- Cooperate, coordinate and perform effectively in diverse teams/groups.
- Prioritize common interest to individual interest.

PO 6 Efficient Communication & Life Skills

- Express thoughts in an effective manner
- Listen, understand and project views in a convincing manner.
- Decide appropriate media to share information

- Develop skills to present significant information clearly and concisely to interested groups.

PO 7 Environmental Sustainability

- Understand sensibly the Environmental challenges.
- Think critically on environment sustainability measures.
- Propagate and follow environment friendly practices.

PO 8 Societal contribution

- Render service for the general good of the society.
- Involve voluntarily in social development activities at Regional, National, global levels.
- Have own pride in volunteering to address societal issues viz: calamities, disasters, poverty, epidemics.
- Be a patriotic citizen to uphold the values of the nation

PO 9 Effective Project Management

- Identify the goals, objectives and components of a project and decide the appropriate time of completion.
- Plan, organize and direct the endeavors of teams to achieve the set targets in time.
- Be competent in identifying opportunities and develop strategies for contingencies.

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PROGRAM SPECIFIC OUTCOMES (PSOs) OF B. SC., ZOOLOGY

PSO1 Demonstrate a broad understood of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals.

PSO2 Recognize the relationships between structure and functions at different levels of biological organization (e.g., molecules, cells, organs, organisms, populations, and species) for the major groups of animals.

PSO3 Characterize the biological, chemical, and physical features of environments (e.g., terrestrial, freshwater, marine, host) that animals inhabit.

PSO4 Explain how animals function and interact with respect to biological, chemical and physical processes in natural and impacted environments.

PSO5 Explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system.

PSO6 Drawing upon this knowledge, they are able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life.

PSO7 Understand the applied biological sciences or economic Zoology such as Sericulture, Apiculture, Aquaculture, Industrial microbiology, Biotechnology and Medicine for their Higher studies and Career opportunities.

PSO8 Environmental Consciousness: Discern the issues of environmental contexts and engages in promoting values and attitudes that claim coexistence and sustainable living with reduced, minimal, or no harm upon ecosystems.

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –I
PAPER – I: ANIMAL DIVERSITY – INVERTEBRATES

LEARNING OBJECTIVES:

- Understand the Origin of Animal Diversity
- New Views of Animal Phylogeny
- Outline the General Characters and Classification of the Invertebrate Phyla.
- Distinguish among the acoelomate, pseudocoelomate, and coelomate grades.
- Distinguish between the canal system in sponges.
- Explain the evolutionary significance of a Coelom and Coelomoducts
- Explain Pearl formation, Torsion and detorsion in Gastropods
- Explain the Significance of Echinoderm Larvae

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –I
Core-I
Animal Diversity - Invertebrates

Periods: 60 **Max. Marks: 100**

COURSE OUTCOMES:
After completion of the course the student is able to:
CO1. Knowledge about the Diversity and Phylogeny of Invertebrate Phyla

CO2. Discuss the Diversity Of Invertebrate and their Economic Significance

CO3. Know about some of the important and common Protozoans and Helminthes of parasitic nature causing diseases in human beings.

CO4. Understand the diversity and classification and functional aspects of different systems of Arthropoda, Mollusca and Echinodermata.

CO5. Identify the resemblance and evolutionary significance of larval forms of Echinoderms

UNIT – I **(15 Periods)**

1.1 Protozoa.

1.1.1 General characters and classification of Protozoa up to order levels with examples
1.1.2 Type study – *Elphidium*
1.1.3 Locomotion and Reproduction in Protozoa.
1.1.4 Epidemiology of Protozoan diseases - Amoebiasis; Giardiasis; Leishmaniasis and Malaria.

1.2 Porifera

1.2.1. General characters and classification of Porifera up to order levels with examples
1.2.2 Type study – *Sycon*
1.2.3 Canal system in sponges and Spicules.

UNIT – II **(15 Periods)**

2.1. Cnidaria

2.1.1 General characters and classification of Cnidaria up to order levels with examples
2.1.2 Type study - *Obelia*
2.1.3 Polymorphism in Siphonophora
2.1.4 Corals and coral reef formation

2.2 Platyhelminthes

2.2.1 General characters
2.2.2 Classification of Platyhelminthes up to classes with examples
2.2.3 *Schistosoma* structure and lifecycle

2.3 Nemathelminthes

2.3.1 General characters
2.3.2 Classification of Nemathelminthes up to classes with examples
2.3.3 *Dracunculus* structure and lifecycle
2.3.4 Parasitic Adaptations in Helminthes

UNIT – III *(15 Periods)*

3.1 Annelida

3.1.1. General characters
3.1.2. Classification of Annelida up to classes with examples
3.1.3. Type study: *Hirudinaria granulose*
3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

3.2.1 General characters
3.2.2 Classification of Arthropoda up to classes with examples
3.2.3 Type study: Prawn
3.2.5 Insect metamorphosis
3.2.6 *Peripatus* – external features and affinities

UNIT – IV *(15 Periods)*

4.1 Mollusca

4.1.1 General characters
4.1.2 Classification of Mollusca up to classes with examples
4.1.3 Type study: *Pila.*
4.1.4 Pearl formation
4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

4.2.1 General characters
4.2.2 Classification of Echinodermata up to classes with examples
4.2.3 Water vascular system in star fish
4.2.4 Echinoderm larvae and their significance

Suggested Readings

1. **L.H. Hyman** *'The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S.** Verma *'Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** *'Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.,** *'Invertebrate structure and Function'* by ELBS.
6 **P.S. Dhami and J.K. Dhami.** Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell** *'A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).** *Invertebrate Zoology,* V Edition"

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PRACTICAL SYLLABUS SEMESTER –I

Core-I

Animal Diversity - Invertebrates

1. Study of museum slides / specimens / models (classification of animals upto orders)

i. Protozoa: Amoeba, Paramecium, Paramecium- binary fission & conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax.

ii. Porifera: Sycon, Spongilla, Euspongia, Sycon- TS & LS, Spicules, Gemmule.

iii. Coelenterata: Obelia- colony & medusa, Aurrelia, Physalia, Velella, Corallium, Gorgonian, Pennatula

iv.Plathyhelminhes: Planaria, Fasciola hepatica, Fasciola larval forms – Miracidium, Redia, Cercaria, Echinococcus granulosus, Taenia solium, Schistosoma haematobium.

v.Nemathehelminthes: Ascaris (male & female), Dracunculus, Ancylostoma, Wuchereria.

vi. Annelida: Nereis, Aphrodite, Chaetopterus, Hirudinaria, Trochophore larva.

vii. Arthropoda: Cancer, Palaemon, Scorpion, Scolopendra, Sacculina, Limulus, Peripatus, Larvae-Nauplius, Mysis, Zoea, Mouth parts of male & female Anopheles and Culex, mouth parts of Housefly and Butterfly.

viii.Mollusca: Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus, Glochidium larva

ix.Echinodermata: Asterias, Ophiothrix, Echinus,Clypeaster, Cucumaria, Antedon, Bipinnaria larva.

2.Dissections:

a. **Prawn: appendages, Digestive system, Nervous system, Mounting of Statocyst.**

b **Insect mouth parts.**

3. Laboratory Record work shall be submitted at the time of practical examination.

4. An **"animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. Computer aided techniques should be adopted- show virtual dissections.

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PRACTICAL MODEL PAPER

SEMESTER-I/ PAPER-I

Animal Diversity - Invertebrates

Max. Marks: 50

Q2. Major: Dissect and display the---------- system and draw a neat labeled diagram.

(Diagram 3m + dissection 5m) **8M**

Q3. Minor: Dissect and display the---------- system and draw a neat labeled diagram.

(Diagram 2m + dissection 3m) **5M**

Q3. Identify and give reasons for the following Spotters **8X3=24M**

(Identification, classification, diagram and description= 3m)

Q4. Viva **3M**

Q5. Record **5M**

Q6. Animal Album **5M**

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B.Sc. ZOOLOGY COURSE (CSEMESTER –II
PAPER – II: ANIMAL DIVERSITY – VERTEBRATES

LEARNING OBJECTIVES:

- Understand the Origin of Animal Diversity
- Outline the General Characters and Classification of the Vertebrate Phyla.
- Explain the anatomy of Respiratory, Circulatory and Nervous System
- Distinguish between Poisonous and Non poisonous snakes
- Explain Migration and flight adaptations in Birds
- Explain Dentition and Aquatic adaptations in Mammals

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022
SEMESTER –II
Core-II
Animal Diversity- Vertebrates

Periods: 60 **Max. Marks: 100**

COURSE OUTCOMES:
After completion of the course the student is able to:
CO1. Knowledge about the Diversity and Phylogeny of Vertebrates Phyla

CO2. Understand the Nomenclature and Classification of the Major Vertebrate Phyla

CO3. Describe the Morphology and Anatomy of various Vertebrates through type Study

CO4. Understand the Evolutionary importance of Temporal Fossae in Reptiles

CO5. Knowledge about the significance of various types of Adaptations in different Phyla

UNIT – I **(15 Periods)**

1.1. Hemichordata
- 1.1.1 General characters
- 1.1.2 Classification of Hemichordata up to classes with examples
- 1.1.3 *Balanoglossus* - Structure and affinities
- 1.1.4. General characters and classification of Chordata upto orders with examples.

1.2. Urochordata, Cephalochordata, Cyclostomata
- 1.2.1. Salient features of Urochordata
- 1.2.2. Retrogressive metamorphosis and its significance in Urochordata
- 1.2.3. Salient features and affinities of Cephalochordata
- 1.2.4. General characters of Cyclostomat. Comparison of the *Petromyzon* and *Myxine*

UNIT – II **(15 Periods)**

2.1. Pisces
- 2.1.1. General characters of Fishes
- 2.1.2. Classification of fishes up to order level with examples
- 2.1.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
- 2.1.4. Types of Scales and types of Fins

2.2. Amphibia
- 2.2.1. General characters of Amphibians
- 2.2.2. Classification of Amphibians up to orders with examples.
- 2.2.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.

UNIT – III **(15 Periods)**

3.1 Reptilia
- 3.1.1. General characters of Reptilia
- 3.1.2. Classification of Reptilia up to orders with examples
- 3.1.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
- 3.1.4. Temporal fosse in reptiles and its evolutionary importance

3.1.5. Distinguished characters of Poisonous and Non poisonous snakes.

3.2. Aves

3.1.1. General characters of Aves

3.1.2. Classification of Aves up to orders with examples.

3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and Nervous system.

UNIT – IV **(15 Periods)**

4.1. Mammalia

4.1.1. General characters of Mammalia

4.1.2. Classification of Mammalia up to orders with examples

4.1.3. Rabbit –Digestive, Respiratory, Circulatory and Nervous system.

4.1.4. Dentition in mammals.

4.2. Adaptations in Vertebrates

4.2.1. Parental care in amphibian, neoteny and paedogenesis.

4.2.2. Migration in Birds.

4.2.3. Flight adaptation in Birds

4.2.4. Aquatic adaptations in Mammals

Suggested Readings:

1. **E.L.Jordan and P.S. Verma** '*Chordate Zoology*' -. S. Chand Publications.
2. **Mohan P.Arora**. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.
3. **Marshal, Parker and Haswell** '*Text book of Vertebrates*'. ELBS and McMillan, England.
4. **Alfred Sherwood Romer**. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS college Publishing, Saunders College Publishing
5. **George C. Kent, Robert K. Carr**. *Comparative Anatomy of the Vertebrates*, 9th ed. McGraw Hill.
6. **Kenneth Kardong** *Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed, 'McGraw Hill.
7. **J.W. Young**, *The Life of Vertebrates*, 3rd ed, Oxford University press.
8. **Harvey Pough F, Christine M. Janis, B. Heiser,** *Vertebrate Life,* Pearson, 6th ed, Pearson Education Inc.2002.

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B.Sc. I Year

ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER

CORE PAPER – II : Animal Diversity- Vertebrates

Periods: 30 **Max. Marks: 50**

Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Hemichordata:** *Balanoglossus,* Tornaria larva
2. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
4. **Pisces:** Sphyrna *Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous,Bufo,Rana,* Axolotal larva
6. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russelli, Naja, Bungarus, Enhydrina, Typhlops, Testudo, Trionyx, Crocodilus, Ptyas.*
7. **Aves:** Archaeopteryx, *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo;* Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Laboratory Record work shall be submitted at the time of practical examination

An "**Animal album**" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

Computer aided virtual dissections.

Suggested manuals:-

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology – Chordata

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B.Sc. I Year

ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER

ZOOLOGY - CORE PAPER - II

Animal Diversity- Vertebrates

Time: 2 Hrs. **Max. Marks: 50**

1. Identification, labeled diagram and salient features of spots: **7x3=21M**

(4 Museum specimens + 2 slides)

2. Histology (02 spots **06M**

3. Osteology (02 Spots **06M**

4. Dissection (one) (Diagram + Dissection & Display) **08M**

5. Certified practical record **05M**

6. Viva voce **04M**

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –III
PAPER – III: ANIMAL PHYSIOLOGY & ANIMAL BEHAVIOUR

LEARNING OBJECTIVES:

- Students will be able to explain the molecular and cellular basis of physiological functions in animals.
- Students will be able to integrate the regulation of organ system functions in a whole animal using a conceptual model of feedback to explain homeostasis.
- Students will know the anatomical components of circulatory systems.
- Students will know how the excretion of nitrogenous wastes is linked to the regulation of water and salt balance in animals.
- Students will know the anatomical components and types of different types of muscles..
- Students will know the structure of the neuron and be able to describe how electrical signals are generated and propagated in it.
- Students will understand the role that myelination plays in nervous system function.
- Students will be able to name various endocrine glands and their hormones.

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UNIT – III (15 periods)

3.1. MUSCLE CONTRACTION

3.1.1 Types of Muscles

3.1.2 Ultra structure of skeletal muscle fibre

3.1.3 Sliding Filament theory, muscle contraction mechanism. Biochemical changes during muscle contraction.

3.1.4 Twitch tetanus summation,Treppe fatigue.

3.2. NERVE IMPULSE

3.2.1 Structure of Neuron

3.2.2 Resting potential ,action potential and conduction of nerve impulse

3.2.3 Transmission of nerve impulse

3.2.4 Synapse, Synaptic transmission neurotransmitters EPSP,IPSP

3.3 ENDOCRINE SYSTEM

3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary, Thyroid, Parathyroid, Adrenal gland and Pancreas

3.3.2 Hormone action and concept of Secondary messengers

3.3.3 Male and Female Hormones, Hormonal control of Menstrual cycle in human beings.

UNIT – IV (15 periods)

4.1. Anmal Behaviour

4.1.1. Types of Behaviour – instinctive and acquired behavior

4.1.2. Behaviour – taxes, reflexes and tropisms

4.2. **Learning and Memory**

4.2.1. Types of learning- trial and error learning, habituation and imprinting

4.2.2. Conditioning – classical conditioning, instrumental conditioning, examples of conditioning, Pavlov's experiment.

4.3. **Social behavior and Communication**

4.3.1. Colonial existence of bees and termites, pheromones

4.4. Biological rhythms,

4.4.1. Biological clocks, circadian rhythms, circum lunar rhythms, circannular rhythms

Suggested readings

1. **Gerard J. Tortora and Sandra Reynolds Garbowski** Principles of Anatomy and Physiology, Tenth Ed., John Wiley & Sons

2. Arthur C. Guyton MDA Text Book of Medical Physiology, Eleventh ed., JohnE. Hall, Harcourt Asia Ltd.

3. **William F. Ganong A Review of Medical Physiology** 22 ed, McGraw Hill, 2005

4. **Sherwood, Klandrof, Yanc**, Animal Physiology Thompson Brooks/Coole, 2005.

5. **Sherwood, Klandrof, Yanc**, Human Physiology.Thompson Brooks/Coole, 2005.

6. **Knut Semidt**-Nielson, Animal Physiology 5th ed, Cambridge Low Price Edition.

7. **Roger Eckert and Randal**, Animal Physiology 4th ed, Freeman Co, New York

8. **Singh. H.R**,Text Book of Animal Physiology and Biochemistry

9. **Nagabhushanam ,** Comparative Animal Physiology

10. **Veer Bal Rastogi,** Text Book of Animal Physiology

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B.Sc II Year ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER – III

ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

Periods: 30 **Max. Marks: 50**

1. Qualitative tests for identification of carbohydrates, proteins and lipids.
2. Qualitative tests for identification of ammonia, urea and uric acid (Nitrogenous excretory products)
3. Effect of pH and Temperature on salivary amylase activity.
4. Study of permanent histological sections of Mammalian Endocrine glands - pituitary, thyroid, pancreas, adrenal gland.
5. Estimation of Haemoglobin by Sahli's method.
6. Estimation of total protein by Lowry's method.

•Laboratory Record work shall be submitted at the time of practical examination

•Computer aided techniques should be adopted as per UGC guide lines.

ZOOLOGY PRACTICAL MODEL PAPER III

SEMESTER- III

Core Paper – III

Animal physiology and Animal Behaviour

Time: 3 Hrs. **Max. Marks: 50**

1. Identification, labeled diagram and salient features of spots: (03 spots)	3x4=12M
2. Estimation of .....from Biochemistry	10M
3. Identification/Study of.....from Physiology	10M
4. Qualitative Test	10M
5. Certified practical record	05M
6. Viva voce	03M

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022
Semester – III
Skill Enhancement Course-I – Sericulture

PERIODS: 30 **MAX. MARKS: 50**
NO. OF CREDITS: 2

COURSE OUTCOMES

After completion of the course the student is able to:
CO1. Knowledge about the Geographical distribution of different economic races of Silk worms
CO2. Describe the Morphology and Anatomy of silk glands and the Composition of Silk
CO3. Understand the culture methods of different varieties of mulberry plants.
CO4. Identify the diseases and pests of B.mori and their control and management
CO5. Apply the various aspects of Silkworm rearing to establish Sericulture as an Agro industry

UNIT – I (15 periods)

1.1.History and economic importance of sericulture- types of silkworms- Mulberry and Non mulberry (Tasar, Eri and Muga).
1.2. Systematic position of Bombyx mori and Life cycle- Morphology of silk gland
1.3.Horticulture- Mulberry cultivation-Environmental conditions for Mulberry cultivation- soil, climatic factors, preparation of land.
1.4.Intercultivation-Pruninng methods-harvesting methods
1.5. Diseases and pests of mulberry and control methods.

UNIT – II (15 periods)

2.1. Silkworm rearing-general principles of Silkworm rearing- primary requisite for successful rearing
2.2. Feeding of Silkworm, bed cleaning,sparing,moulting,late age silkworms- Moulting and harvesting economics of Silkworm.
2.3. Diseases and pests of silkworm.
2.4. Reeling- reeling appliances and process of reeling cocoons.
2.5. Sericulture as a cottage industry.

References:

1. Handbook of sericulture – S.R. Ullal and M. N. Varasimhanna
2. An introduction to sericulture – G. Ganga, J. Sulochana Chetty
3. Manual of Sericulture – FA O Volumes
4. Handbook of Practical sericulture:Ullal,S.R.and Narasimhanna,M.N.(1987),Central Silk Board Publication,Bangalore.
5.FAO Manuals on Sericulture:Anonymous(1972),Vol. I-IV
6.Sericulture for Rural Development:Hanumappa(1978),Himalaya Publication
7.The Silkworm,an important Laboratory Tool:Tazima,Y.(1978),Kodansha Publications,Tokyo.
8.Control of Silkworm Reproduction,Development and Sex:Strunnikov,V.A.(1983),MIR Publications,Mascow.
9.Ericulture in India Sarkar,D.C.(1988),CSB,Bangalore.
10.Silkworm Rearing:Wupang-Chun and Chen Da-

B.Sc. II year Zoology
Semester – III and IV

Skill Enhancement Course Model Question Paper

Max. Marks 40

Section – A (Short Answer type) **(4x4 =16 M)**

Answer any 4 questions

1.

2.

3.

4.

5.

6.

Section – B (Essay Answer type) **(2x12 =24 M)**

5. a) unit I

Or

b) unit I

6. a) unit II

Or

b) unit II

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022
Semester – III
Skill Enhancement Course-II – Public Health and Hygiene

PERIODS: 30
NO. OF CREDITS: 2 **MAX. MARKS: 50**

COURSE OUTCOMES

After completion of the course the student is able to:
CO 1 Describe interconnected relationships among physical, social, and environmental aspects of health and disease.

CO 2 Appreciate the role of multiple determinants of health across diverse populations and health issues.

CO 3 Identify social injustices and propose strategies for change.

CO 4 Understand and communicate using public health terminology, including epidemiological measures.

CO 5 Synthesize information from a variety of sources to understand and act upon population health problems.

UNIT- I : Nutrition, Environment and Health (15 Periods)

1.1. Classification of foods – Carbohydrates, proteins, lipids, vitamins and minerals
1.2. Nutritional deficiencies and disorders - Carbohydrates, proteins, lipids, vitamins and minerals
1.3. Environment and health impact assessment: concept, steps and applications
1.4. Occupational, industrial, agricultural and urban health- Exposure at work place, urban areas, health disorders and diseases.
1.5. Environmental pollution and associated health hazards

UNIT- I I : Communicable and non- communicable diseases. (15 Periods)

2.1. Causes, symptoms, diagnosis, treatment and prevention of **communicable** diseases – Malaria, Filaria, Measles, Polio, Chicken Pox, Rabies, Plague, Leprosy, Tuberculosis And AIDS

2.2. Causes, symptoms, diagnosis, treatment and prevention of **non- communicable** diseases – Hypertension, Coronary Heart Disease, Stroke, Diabetes Obesity And Mental Ill Health

2.3. Water borne diseases: Cholera, E.coli, Hepatitis, and Polio; Air borne diseases – Chicken pox, Influenza Measles and Tuberculosis.

2.4. Health care legislation in India.- Termination of pregnancy act, Maternity benefit act, Transplantation of human organs act, Child labour act,biomedical waste act, ESI act. First Aid and health awareness, personal health care record maintenance.

2.5. WHO programmes- Government and Voluntary organizations and their health services.

References:
1.Parks Textbook of Preventive and Social Medicine

SEMESTER –IV

PAPER – IV: CELL BIOLOGY, GENETICS AND DEVELOPMENTAL BIOLOGY

CELL BIOLOGY - LEARNING OBJECTIVES

- Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
- Students will understand how these cellular components are used to generate and utilize energy in cells
- Students will understand the cellular components underlying mitotic cell division.
- Students will apply their knowledge of cell biology to selected examples of changes o losses in cell function. These can include responses to environmental or physiologica changes, or alterations of cell function brought about by mutation.

GENETICS - LEARNING OBJECTIVES:

- Students will learn the basic principles of inheritance at the molecular, cellular an organismal levels.
- Students will understand causal relationships between molecule/cell level phenome ("modern" genetics) and organism-level patterns of heredity ("classical" genetics)
- Students will test and deepen their mastery of genetics by applying this knowledge i variety of problem-solving situations.

DEVELOPMENTAL BIOLOGY - LEARNING OBJECTIVES

- Be familiar with the events that lead up to and comprise the process of fertilization.
- Be able to draw the first four rounds of cell division of the frog embryo.
- Understand the process of formation foetal membranes in Chick embryo.

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER - IV
Core-IV
Cell Biology, Genetics & Developmental Biology

Periods: 60 **Max. Marks: 100+5**

COURSE OUTCOMES

After completion of the course the student is able to:

CO1. Describe the composition of prokaryotic and eukaryotic cells.

CO2. Understand the structure of cells and cell organelles in relation to their functional aspects.

CO3. Understand the Structure and functions of Nucleic acids and their role in Protein Synthesis

CO4. Apply the various concepts of Genetics in Problem Solving .

CO5. Understand the Process of Gametogenesis and its significance in the development of an Organism

UNIT – I **(15 Periods)**

1. Cell Biology

1.1. Cell theory, Differences of Prokaryotic and Eukaryotic cells

1.2. Structure and functions of plasma membrane: Structure, composition of Plasma membrane, fluid mosaic model.

1.3.Structure and functions of cell organelles –Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes ,Mitochondria and Nucleus

1.4. Chromosomes – Structure, types, giant chromosomes

1.5. Cell Division - Mitosis, Meiosis.

1.6. Cell cycle and its regulation.

UNIT – II **(15 Periods)**

2. Molecular Biology

2.1 DNA (Deoxyribo Nucleic Acid) - Structure

2.2 RNA (Ribo Nucleic Acid) - Structure, types

2.3 DNA Replication (Prokaryotes)

2.4 Protein Synthesis – Transcription and Translation (prokaryotes)

2.5 Genetic Code; operon concept: Lac operon

2.6 Molecular Biology Techniques- Polymerase Chain Reaction and Electrophoresis.

UNIT – III **(15 Periods)**

3. Genetics

3.1 Mendel's laws of Inheritance and Incomplete Dominance, Co-dominance.

3.2 Human Karyotyping and Amniocentesis.

3.3. Sex determination and Sex-linked inheritance

3.4. Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation.

3.5. Inborn errors of metabolism: Alkaptonuria, Phenylketonuria, Glycogen Storage disease.

3.6. Chromosomal disorders-Down's syndrome, Patau's syndrome, Klinefelter's syndrome and Turner's syndrome.

UNIT – IV

(15 Periods)

4. Developmental Biology and Embryology

4.1 Gametogenesis (Spermatogenesis and Oogenesis), Fertilization, Types of eggs, Types of cleavages

4.2 Development of Frog up to formation of primary germ layers

4.3 Formation of Foetal membrane in chick embryo and their functions

4.4 Types and functions of Placenta in mammals

4.5 Regeneration in Turbellaria and Lizards

Suggested readings

- Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell 'Molecular Cell Biology' W.H. Free man and company New York..
- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. VIII Edition. Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Edition. John Wiley and Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). Genetics- A Molecular Approach. III Edition. Benjamin Cummings.
- Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.
- 15.Gupta P.K., 'Genetics'
- Developmental Biology by Berryl
- Developmental Biology by S.Gilbert
- Developmental Biology-patterns,problems and principles by W.Saunders Jr

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ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

Core Paper – IV

Cell Biology, Genetics and Developmental Biology

Periods: 30 **Max. Marks: 50**

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
   - i). Different stages of Mitosis and Meiosis
   - ii) Lamp brush and Polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Embryology

1.. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

Laboratory Record work shall be submitted at the time of practical examination

An **"Album"** containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

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ZOOLOGY PRACTICAL SYLLABUS FOR IV SEMESTER

ZOOLOGY –MODEL CORE PAPER - IV

Cell Biology, Genetics and Developmental Biology

Time: 3 Hrs. **Max. Marks: 50**

1. Identification, labeled diagram and salient features of spots: (06 spots)	**18M**
2. Prepare and Identify Mitotic divisions with onion root tips:	**10M**
3. One Problem from Genetics	**05M**
4. **Two slides from developmental Biology**	**05M**
5. Certified practical record	**05M**
6. Album	**05M**
7. Viva voce	**02M**

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022

Semester – IV

Skill Enhancement Course-III

Paper – Vermiculture

PERIODS: 30 **MAX. MARKS: 50**

NO. OF CREDITS: 2

CO 1 Describe the decomposing process and be able to compost in a limited space .

CO 2 Knowledge of biodiversity of local earthworms

CO 3 Apply the Knowledge to get self employment,

CO 4 They can also generate employment for others,

CO 5 They will also turn towards organic farming

CO 6 Analyse the ways to maintain the environment pollution free

UNIT: I **(15 periods)**

1.1 Scope of Vermi-technology- Vermiculture and vermi composting – difference between Vermiculture and vermi composting.
1.2 Earthworm diversity – Ecological groups of earthworms, biology of composting earthworms – Eoisena foeitida, Eudrilus lugeniae.
1.3 Soil – Physical, chemical and biological features
1.4 Types small and large scale pit method, heap method.

UNIT: II **(15 periods)**

2.1. Vermiculture techniques – Vermi culture process – site selection - Selection and collection of species.
2.2. Essential parameters for Vermi culture – bedding. Methods of harvesting worms, general manual methods, self harvesting method, mechanical method
2.3. Nutritive value of vermi compost, storing and packing of compost
2.4. Applications of vermi-composting.

References:

1. Earthworm ecology by LEE
2. Biology of earthworm by Steven son
3. Vermi composting tech – soil health to human health by Ranganathan L.S.

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022

Semester – IV

Skill Enhancement Course-IV

Paper – Aquaculture

Periods: 30 *Max. Marks: 50*

No. Of Credits: 2

Course outcomes:

CO 1 To understand the techniques involved in aquaculture practices.

CO 2 To get a detailed information about aquaculture.

CO 3 To provide a basic idea about the importance of live feed in culture systems.

CO 4 The learners will be aware of all the techniques involved in aquaculture.

CO 5 At the end of the course, student can able to gain the knowledge on the aquaculture practices.

UNIT-I *15 periods*

1.1 Introduction and types of fisheries
1.2 Fishery resources- fresh water, brackish water and marine water
1.3 Construction and Management of fish pond
1.4 Fishing crafts and fishing gears.
1.5 Hatchery design, water quality and management

UNIT-II **15 periods**

2.1. Induced breeding-importance of induced breeding
2.2 Seed production, Seed transport and Seed stocking
2.3 Fish products-primary and secondary products.
2.4 Common diseases - Viruses, Bacteria and Fungi.
2.5 Post harvest technology-preservation method of fishes

References

1. Icthyology-SK Gupta and P C Gupta
2. An introduction to fishes - S S Khanna
3. Fish and fisheries –Pandey and Shukla

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B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –V
PAPER – V : IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Immunology : Learning Objectives:

- The students will be able to identify the cellular and molecular basis of immune responsiveness.
- The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
- The students will be able to describe immunological response and how it is triggered and regulated.
- The students will be able to demonstrate a capacity for problem-solving about immune responsiveness.
- The students will be able to transfer knowledge of immunology into clinical decision-making through case studies presented in class.

Animal Biotechnology: Learning Objectives:

Student will learn about:

- Identification and characterization of animal breeds,
- Developing DNA - based diagnostics and genetically engineered vaccines for animals,
- Studying animal genomics and its varied applications
- Developing embryo - transfer technology, cloning, transgenic animals DNA forensics, molecular diagnostics, cloning, wildlife conservation, stem cell research and bio - processing technologies are other import areas of animal biotechnology.
- Transgenic animals
- Steps in the production of transgenic animals
- Applications of transgenic animals
- Bio farming

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022

SEMESTER –V

PAPER-V (DSE –I) : Immunology and Animal Biotechnology

Periods: 60 **Max. Marks: 100 M**

Course Outcomes

After completion of the course the student is able to:

CO1. Understand the role of Immune System in maintaining Health

CO2. Knowledge of Structure and Function of major organs of Immune system

CO3. Understand the applications of Animal Biotechnology and implications of Organ Transplantation.

CO4. Apply the biotechnology techniques in the fields of medicine, diagnostics, pharmaceutical industry .

Unit I: Basics of Immune System **(15 periods)**

1.1. Cells of the immune system and Lymphoid organs.
1.2. First line of defenses – physical and chemical barriers; second line of defenses- inflammation and phagocytosis.
1.3. Types of immunity- inherent (Active and Passive) and acquired immunity (Active and Passive). Humoral immunity and Cell mediated immunity.
1.4. Major Histocompatibility complex (MHC) – structure and function of Class I & II proteins.
1.5. Significance of MHC in Organ transplantation. MHC restriction.

Unit II: Antigens and Antibodies and Immune system diseases **(15 periods)**

2.1. Antibodies/Immunoglobulins – structure,functions and classification, antibody diversity, Monoclonal antibodies.
2.2. Antigen structure,antigenic determinants/ Epitopes, Haptens, adjuvants and antigencity
2.3. Antigen-antibody reactions – agglutination, precipitation, opsonisation, cytotoxicity
2.4. Hypersensitivity reactions. ***Autoimmunity and Immunodeficiency diseases.***
2.5. Vaccines – types, Immunisation

Unit III: Animal Biotechnology and Genetically modified organisms **(15 periods)**

3.1. Concept and Scope of Animal Biotechnology.
3.2. Recombinant DNA technology and its applications
3.3. Cloning vectors – Plasmids, Cosmids and shuttle vectors; Cloning methods (cell, animal and gene cloning).
3.4. Transgenesis- Methods of Transgenesis.
3.5. Production of transgenic animals – Sheep,***Mice*** and Fish.

Unit IV: Applications of Biotechnology **(15 periods)**

4.1. In vitro Fertilisation and Embryo transfer
4.2. Hybridoma technology – concepts and applications.
4.3. Stem Cells – types and applications.
4.4. Biopesticides ;Bacillus thuringiensis – mode of action of toxin
4.5.Animal Bioreactors-Cocepts and applications, ***Applications of Biotechnology***

Suggested Readings

- **Arthur C. Guyton MD** A Text Book of Medical Physiology, Eleventh ed., John E. Hall, Harcourt Asia Ltd.
- **William F. Ganong** A Review of Medical Physiology, 22 ed, McGraw Hill, 2005
- **Sherwood, Klandrof, Yanc**, Human Physiology, Thompson Brooks/Coole, 2005.
- **Knut Scmidt-Nielson**, Animal Physiology 5th ed, Cambridge Low Price Edition.
- **Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kuby,**
- Immunology, 5th ed, Freeman and C.
- **Ivan Roitt, Immunology**, 4th ed, Johanthan Brostoff, Moshy, London.
- **Thomas C. Chung,** General Parasitology Hardcourt Brace and Co ltd. Asia. New Delhi.
- **Gerard D. Schmidt and Larry S Roberts**, Foundations of Parasitology ,McGraw HillKindt, T. J., Goldsby, R. A., Osborne, B. A., Kuby, J. (2006). VI Edition. Immunology. W.H. Freeman and Company.
- **Delves, P. J. Martin, S. J., Burton, D. R., Roitt, I.M. (2006).** XI Edition. Roitt's Essential Immunology, Blackwell Publishing..

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B.Sc. III Year PRACTICAL SYLLABUS

SEMESTER - V, DSE - I

Paper – V: IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Periods: 30 **Max. Marks: 50**

I. IMMUNOLOGY

1. Demonstration of agglutination (ABO Blood grouping/ Widal test) using kit.
2. Demonstration of precipitation (VDRL/RPR test) using kit.
3. Radial immuno diffusion kit
4. Histology of Lymphoid organs – Spleen, Thymus, Lymph node, Bone marrow

II. ANIMAL BIOTECHNOLOGY:

1. Study the following through photographs / virtual lab.

a) Identification of vectors.
b) Identification of transgenic animals
c) DNA sequencing(Sanger's Method)
d) DNA fingerprinting
e) Southern blotting
f) Western blotting
g) ELISA – Virtual Lab
h) Visit to ZSI , Department of Fisheries- Field trips

2. PCR demonstration / Virtual lab

Laboratory record work shall be submitted at the time of practical examination.

Computer aided techniques should be adopted as per UGC guidelines.

Suggested Readings

1,A hand book of practical immunology-Ivan Riott
2.Animal Biotechnology-PK.Gupta

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AUTONOMOUS (CBCS)

B.Sc. III year Zoology Practical Model paper-2021-22

Semester V (DSE-1) PAPER-V

Time: 3hrs **Max. Marks: 50**

Immunology and Animal Biotechnology

1.	Identification, labelled diagram and salient features of spots. (5 spots)	15M
2.	Identification / determination from immunology	10M
3.	Identification / study the technique from animal biotechnology	08M
4.	Demonstration of a technique	08M
5.	Certified practical record	05M
6.	Viva voice	04M

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B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –V
GENERIC ELECTIVE: PREVENTIVE MEDICINE

PREVENTIVE MEDICINE – LEARNING OBJECTIVES

- Apply knowledge of the fundamental biomedical, clinical, and public health sciences relevant to Public Health and Preventive Medicine practice
- Describe the natural history, epidemiology, risk factors and health burden of the major communicable and non-communicable diseases, including injury, of public health significance
- Apply knowledge of the principles of:
- Disease and injury prevention and control
- Health and disease surveillance
- Health protection
- Health promotion
- Population health assessment
- Describe the principles of infection control and their application to effective and appropriate procedures and policies to reduce risk
- Describe the general principles of emergency planning and incident management
- Discuss knowledge translation and social marketing strategies as relevant to the promotion of health
- Describe the methods used to explore knowledge, attitudes, beliefs and behaviours and public health interventions

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022
V - SEMESTER
Generic Elective- I, Paper –V : PREVENTIVE MEDICINE

Periods: 60 **Max. Marks: 50**
No, of Credits : 04

COURSE OUTCOMES
After completion of the course the student is able to:

CO1: Recognize the concepts and evaluation of public health

CO2: Relate food to nutrition health, balanced diet, deficiencies and its prevention

CO3: Identify avoidable habits for personal hygiene and health

CO4: Explain the principles of prevention and control of communicable and non-communicable diseases.

CO5: Identify National Health programs its objectives functioning and outcomes

UNIT – I : Man and Medicine : Health for all (15 periods)

1.1. Antiquity medicine, types of medicines.
1.2. Dawn of scientific medicine, modern medicine – curative medicine, preventive medicine and social medicine.
1.3. Definition of health, dimensions of health, - Physical, mental Social, Spiritual , Emotional and vocational health.
1.4. Determinants of health, - Biological, Behavioural, Environmental, Socioeconomic and health Services.
1.5. Concept of Well being – Standard of living, Level of living and quality of life.

UNIT – II: Principles of Epidemiology (15 periods)

2.1 Definition of Epidemiology, measurements in epidemiology- rates, ratio and proportion.
2.2 Epidemiologic methods- observational and experimental studies.
2.3 Uses of Epidemiology and definitions of infectious disease epidemiology.
2.4 Dynamics of disease transmission – source and reservoirs.
2.5 Epidemiological triad, modes of disease transmission – direct and indirect.

UNIT – III: Concept of Disease causation (15 periods)

3.1. Germ theory of diseases
3.2. Disinfection – types of Disinfection
3.3. Immunity – Active Immunity, Passive Immunity, ***Herd Immunity*** and Immunising agents.
3.4. Nutrition and Health – Classification of foods; Nutritional requirements; ***Food adulteration***.
3.5. Screening of diseases – uses of Screening, types of Screening.

UNIT – IV: Concepts of control and prevention (15 periods)

4.1.Health care of the Community – health care systems, levels of health care

4.2. Modes of health interventons : Health promotion, Specific protection, early diagnosis and treatment, disability limitations and rehabilitations.

4.3. Concepts of control – Monitoring and surveillance.

4.4. Concepts of prevention – Primary, secondary and tertiary.

4.5. Health Programmes in India.

Suggested Readings

1.Parks Textbook of Preventive and Social Medicine

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B.Sc. ZOOLOGY COURSE (CBCS) 2021-22
SEMESTER –VI
PAPER VI (DSE – II) : ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

LEARNING OBJECTIVES OF ECOLOGY

Students will:

- Describe how interactions between organisms and between organisms and their environment are influenced by multiple factors that act at multiple spatial and temporal scales.
- Describe how abiotic and biotic factors influence distribution, relative abundance, and species diversity.
- Describe and distinguish patterns of dispersion of individuals in a population.
- Determine the relative importance of competition, predation, herbivory, and symbiosis, in driving changes in the community.
- Describe how energy is transferred from producers to consumers.
- Illustrate the movement of carbon, nitrogen, phosphorus, and water in ecosystems.

LEARNING OBJECTIVES OF ZOOGEOGRAPHY

Students will:

- interpret geographic distribution of animal species in nature present
- explain zoogeographic regions and animal species.
- compare zoogeographic regions
- explain the processes that regulate animal species distributions.
- explain biotic and abiotic interactions in influencing animal distributions.
- interpret patterns and process of animal distribution.

LEARNING OBJECTIVES OF EVOLUTION

Students will:

- understand the evidence that living species share descent from common ancestry and how this fact explains the traits of living species
- understand that evolution entails changes in the genetic composition of populations
- understand the source of genetic variation and how it is shaped in the absence of selection (Hardy-Weinberg; genetic drift)
- Understand Darwinian (individual-level) natural selection.
- understand the process of Speciation

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2021-2022
Semester - VI
PAPER- VI (DSE- II) : ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

Periods: 60 **Credits : 04**

COURSE OUTCOMES
After completion of the course the student is able to:

CO 1 Study the nature of ecosystem
CO 2 Understand Various kinds of Animal adaptations
CO 3 Knowledge about wild life conservation and management
CO 4 Knowledge about the Faunal Peculiarities of Various Zoogeographic regions
CO 5 Knowledge of Concepts and Theories of Organic Evolution

UNIT – I: **(15 periods)**

1.Ecology - I
1.1 Ecosystem – structure and functions. Types of Ecosystems- Aquatic and terrestrial.
1.2 Biogeochemical cycles – Nitrogen, Carbon, Phosphorous and Water.
1.3 Energy flow in an ecosystem
1.4 Food chain, food web and ecological pyramids
1.5. Animal associations – Mutualism, commensalism, parasitism, competition, predation and ***Symbiosis***

UNIT – II: **(15 periods)**

2. Ecology - II
2.1 Concept of species, population dynamics and Growth curve
2.2 Community structure, Dynamics and ecological succession
2.3 Ecological Adaptations
2.4 Environmental Pollution – Sources, effects and Control measures of Air, Water, Soil and Noise pollution, ***Green house effect.***
2.5 Wildlife conservation – National parks and Sanctuaries of India. Endangered species.

UNIT – III: **(15 periods)**

3. Zoogeography
3.1. Zoogeographical regions – Palearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions – their climatic and faunal peculiarities
3.2 Wallace line and discontinuous distribution.
3.3 Continental drift.
3.4 Biodiversity and hotspots of Biodiversity in India, ***Biodiversity mapping***

UNIT – IV *(15 periods)*

4. Evolution

4.1 Theories of Evolution – Lamarckism, Darwinism and Neodarwinism. Modern Synthetic theory.,

4.2 Evidences of evolution – Causes and role of extinction in evolution.

4.3 Forces of evolution – mutation,gene flow, genetic drift and natural selection. Hardy Weinberg Law,

4.4 Isolation – Premating and Post mating isolation mechanisms.

4.5 Speciation; Methods of speciation – Allopatric and Sympatric.

Suggested Readings

1. Ecology – P Odum.
2. Ecology and environment – P D Sharma.
3. Fundamentals of Ecology- P Odum and Gary W Barrett

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Semester - VI
PAPER- VI (DSE- II) : ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

Credits : 02

1.Determination of pH of Soil and Water

2.Estimation of salinity (chlorides) of water in given samples.

3. Estimation of Carbonates and bicarbonates in the given water samples.

4. Estimation of dissolved oxygen of pond water, sewage water and effluents.

5. Identification of Zooplankton from a nearby water body.

6. Study of Pond Ecosystem / local polluted site – Report submission.

7. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens / models.

8. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.

9. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.

10. Museum Study of Fossil animals: Peripatus, Coelacanth Fish, Dipnoi Fishes, Sphenodon, Archaeopteryx.

11. Study of homology and analogy from suitable specimens and pictures.

12. Problems on Hardy-Weinberg Law.

13. Macroevolution using Darwin finches (Pictures)

Laboratory Record Work shall be submitted at the time of practical examination.

Computer aided techniques should be adopted as per UGC guide lines.

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Suggested Readings

1. Robert Desharnais,Jeffrey Bell,'Ecology Student Lab Manual,Biology Labs
2. Darrell S Vodopich,'Ecology Lab Manual'

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD

DEPARTMENT OF ZOOLOGY (CBCS)

VI Semester

Title: Project

Code : BS

Credits 4

DSE – 3

Marks:100

1. At the beginning of 6th Semester, Project work will be allotted to the students based on their choice and all formalities of the selection of the Topic and Mentor will be completed.
2. Project work will involve experimental work and the student will have to complete the same within the stipulated time.
3. Each year, number of students will vary from batch to batch depending upon the infrastructural facilities (not exceeding 5 students / group).
4. Project work will be offered on the basis of expertise and infrastructural facilities of the Department and will be evaluated for 4 credits.
5. The Project work evaluated by a panel of Examiners involving Internal and External Examiners.
6. The distribution of marks for the project will be :
   Project work: 100 Marks (60 marks for Dissertation + 40 Marks for presentation and Viva).

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), BEGUMPET, HYDERABAD.
SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21
Semester - VI
PAPER- VI: TOOLS AND TECHNIQUES IN BIOLOGY
(OPTIONAL PAPER IN PLACE OF THE PROJECT)

Periods: 60 **Credits : 04**

COURSE OUTCOMES

After completion of the course the student is able to:

CO1: Discuss the applications of biophysics and principles involved in bioinstruments.

CO2: Describe the methodology involved in biotechniques.

CO3: Demonstrate knowledge and practical skills of using instruments in biology.

CO4: Understand the techniques involved in molecular biology and diagnosis of diseases.

UNIT-I: Microscopy Centrifugation

1.1 Microscopy – Basic principle of microscopy, Types of microscopes and their applications.
1.2 Histopathological Techniques – Principle and applications.
1.3 Centrifugation – Basic principle of centrifugation; Preparatory and analytical centrifugation techniques and their applications.

UNIT-II: Separation Techniques

2.1 Colorimetry and Spectrophotometry – Basic Principle of Colorimetry and its applications, Basic principle of Spectrophotometry and its applications.

2.2 Chromatography – Basic principle of chromatography; Types of chromatography techniques and their applications.
2.3 Electrophoresis – Basic principle of electrophoresis and its applications

UNIT-III: Advanced Techniques

3.1: Immunoassay – Principle and applications of ELISA.
3.2: PCR Techniques – DNA extraction and isolation; Principles and applications of PCR techniques.
3.3: RIA and its applications.

UNIT-IV: Statistical Tools

4.1: Data – Definition and types of data, Concept of variables; Summarizing data; Averages (Mean, Median, Mode), Dispersion (Range, Standard deviation, Confidence limits)

4.2: Representing data – Array in data, Tabulation, Graphical representation of data (Histogram, Bar graph, Line graph, Scatter plot, Pie diagram)

4.3: Non Parametric Tests – Chi square test and parametric tests – Correlation; Student's 't' test; Regression analysis.

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Autonomous (CBCS)

The Panel of Examiners for B.Sc. I, II & III Year

Paper	Name	Designation	Address
	I Year		
Paper I	Uma Mobile:9866111810	Asst. Professor of Zoology	BJR GDC, Narayanaguda
	Dr. Chittaranjan Mobile:9440785877	Asst. Professor of Zoology	Govt. City College, Hyderabad.
	Prof.Jithender Nayak	Professor of Zoology	Osmania University
Paper II	Dr. Saday Kumar Mobile:9866549720	Asst. Professor of Zoology	GDC, Kukatpally
	Ramesh Babu Mobile: 9848549107	Asst. Professor of Zoology	Tara Govt. Degree College, Sangareddy.
	II Year		
Paper III	Prof.M.Madhavi,BOS, OU	Professor of Zoology	Osmania University
	Amruth Kumar 7093660710	Asst Professor of Zoology	IPGDC, Nampally.
Paper IV	D L Anuradha Mobile: 9008499762	Asst Professor of Zoology	GDC, Sitaphalmandi,Sec-bad.
	Prof.Reddaya Naik	Professor of Zoology	Osmania University.

	III Year		
Paper V & VI	Mrs. Anitha Mobile:9177599547	Lecturer in Zoology	Govt. City College, Hyderabad.
	Mr.Srinivas Patel	Asst Professor of Zoology	NG College,Nalgonda.
Paper VII & VIII	Dr.N.Thulasi Mobile: 8106303663	Lecturer in Zoology	GDC, Golconda, Hyderabad
	Mr.Srinivas Sarin	Asst Professor of Zoology	GDC,Kodada

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GOVERNMENT DEGREE COLLEGE FOR WOMEN, BEGUMPET, HYDERABAD.

AUTONOMOUS(CBCS)

B. Sc. I,II,III Year

MODEL QUESTION PAPER

Subject: Zoology

Time: 2 hrs

Max Marks:60

Min marks: 24

SECTION-A

I Write any 5 Short Answer Type Question **5×4=20M**

(2 from each unit)

1.

2.

3.

4.

5.

6.

7.

8.

SECTION-B

II Essay Type Questions (Internal Choice) **4×10=40M**

1. UNIT I : A (or) B

2. UNIT II : A (or) B

3. UNIT III : A (or) B

4. UNIT IV : A (or) B

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AUTONOMOUS(CBCS)

B. Sc. I Year

INTERNAL ASSESSMENT MODEL QUESTION PAPER

Subject: Zoology **Max.MARKS:20**

I. Answer any two questions (short answer type) 2x5=10M

1.

2.

3.

II. Answer any one question (essay answer type) 1x10=10M

1.

2.

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(AUTONOMOUS Affiliated To Osmania University, Re-Accredited With 'B++' Grade by NAAC)

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING

MINUTES OF THE MEETING

The meeting of the Board of Studies of the Department of Zoology, Government Degree College For Women, Begumpet, Hyderabad is held on 23.02.2021 in the Department of Zoology, GDC(W), Begumpet, Hyderabad. The meeting was attended by the following members,

1. **Dr.G.S.Jyothirmai**
Chairman BOS,
Assistant Professor of Zoology
Head of the Department.

2. **Prof. M. Madhavi**
Chairperson, BOS
Department of Zoology
Osmania University.

CHAIR PERSON
Board of Studies in Zoology
Osmania University, HYD-7.

3. **Dr.Suresh Yenugu**
Subject Expert
Associate Professor
Department of Animal Biology
School of Life Sciences,
University of Hyderabad

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3. Dr. Raj Kumar
Subject Expert
Assistant Professor of Zoology,
GDC, Hayathnagar.

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4. Md.Rehanuma Sulthana
Representative from Industry
Asst. Zoologist,
Fresh Water Biology Regional Centre,
Zoological Survey of India,
Hyderabad.

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Assistant Zoologist
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5. Dr.D.Prasanna
Member
Assistant Professor of Zoology

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6. Dr.P.S.Rajani
Member
Assistant Professor of Zoology

7. Dr.C.Jyothsna

8. Dr.K.B.Snehaprabha

Alumnus
Principal
Silver Jubilee Degree College for Women,
Habsiguda,Hyderabad.

The following resolutions were taken in the meeting:-

- The Pattern of study has been finalized as follows:

1. It is resolved to approve the syllabus for B.Sc III year i.e., Semesters V and VI according to the choice based credit system and got ratified with slight changes in Theory and Practical syllabi.
2. It is also resolved to reapprove B.Sc I and II year according to the choice based credit system.
3. It is also resolved to approve the model question papers for Papers V, VI and VII. Total marks have been changed to 60 marks for external exams and 40 marks for internal exams.
4. Generic Elective – Preventive Medicine, syllabus have been approved by the Committee members.
5. It is also resolved to approve Project in the Semester VI
6. It is also resolved to approve the Panel of Examiners for all the Semesters

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