ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

YOGI VEMANA UNIVERSITY - KADAPA

COURSE STRUCTURE

(W.E.F. Academic Year 2023-24)

ZOOLOGY MINOR

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
	II	1	Animal Diversity-I Biology of Non-Chordates	3	3
			Animal Diversity-I Biology of Non-Chordates Practical Course	2	1
II	III	2	Animal Diversity-II Biology of Chordates	3	3
			Animal Diversity-II Biology of Chordates Practical Course	2	1
	IV	3	Embryology	3	3
			Embryology Practical Course	2	1
		4	Animal Physiology: Life Sustaining Systems	3	3
			Animal Physiology: Life Sustaining Systems Practical Course	2	1
III	V	5	Poultry Management-I (Poultry Farming)	3	3
			Poultry Management-I (Poultry Farming) Practical Course	2	1
		6	Poultry Management-II (Poultry Production and Management)	3	3
			Poultry Management-II (Poultry Production and Management)Practical Course	2	1

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

FIRST YEAR-SEMESTER -II

(W.E.F. Academic Year 2023-24)

COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Theory **Credits: 3** **3hrs/week**

LEARNING OBJECTIVES:

- To understand the taxonomic position of protozoa to helminthes.
- To understand the general characteristics of animals belonging to protozoa to hemichordata.
- To understand the structural organization of animals phylum from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phyla from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phylum from annelids to hemichordates.

LEARNING OUTCOMES: By the completion of the course the graduate should able to –

- Describe concept of animal kingdom classification and general characters of Protozoa
- Classify Porifera and Coelenterata with taxonomic keys
- Classify Phylum Platy & Nemathelminthes using examples, parasitic adaptation
- Describe Phylum Annelida & Arthropoda using examples and economic importance of vermicomposting & economic importance of insects.
- Describe Mollusca, Echinodermata & Hemi chordata with suitable examples in relation to the phylogeny

SYLLABUS:

UNIT-I

1.1 Whittakers five kingdom concept and classification of Animal Kingdom.
1.2 Protozoa General Characters and classification up to classes with suitable examples
1.3 Protozoa Locomotion & nutrition
1.4 Protozoa reproduction

Activity: Assignment /Seminar on the above
Evaluation: Marks to be awarded for written and oral presentations

UNIT –II

2.1 Porifera General characters and classification up to classes with suitable examples
2.2 Canal system in sponges
2.3 Coelenterata General characters and classification up to classes with suitable examples
2.4 Polymorphism in coelenterates & Corals and coral reefs

Activity: Assignment /Seminar /Quiz/Project on the above

Evaluation: Evaluation of Written part + Evaluation of oral Presentation, Assessment of studentsin Quiz participation and Ranking - Evaluation of Project Report and oral presentation

UNIT – III

3.1 Platyhelminthes General characters and classification up to classes with suitable examples
3.2 Parasitic Adaptations in helminthes
3.3 Nemathelminthes General characters and classification up to classes with suitable examples
3.4 Life cycle and pathogenicity of *Ascaris lumbricoides*

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

4.1 Annelida General characters and classification up to classes with suitable examples
4.2 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost
4.3 Arthropoda General characters and classification up to classes with suitable examples
4.4 *Peripatus* - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

5.1 Mollusca General characters and classification up to classes with suitable examples
5.2 Pearl formation in Pelecypoda
5.3 Echinodermata General characters and classification up to classes with suitable examples
Water vascular system in star fish
5.4 Hemichordata General characters and classification up to classes with suitable examples
Balanoglossus - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Preparation of chart/model of phylogenic tree of life, 5-kingdom classification
- Visit to Zoology Museum or Coral Island as part of Zoological tour
- Charts on polymorphism
- Clay models of canal system in sponges
- Plaster-of-paris model of *Peripatus*
- Construction of a vermicompost in each college, manufacture of manure by students anddonating to local farmers
- Chart on pearl forming layers using clay
- Visit to a pearl culture rearing industry/institute
- Live model of water vascular system
- Observation of Balanoglossus for its tubicolous habit

REFERENCE BOOKS:

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

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

FIRST YEAR-SEMESTER -II

(W.E.F. Academic Year 2023-24)

COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Practical **Credits: 1** **2 hrs/week**

LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labelled record of identified museum specimens

SYLLABUS:

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

- Protozoa: Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation,Vorticella, Entamoeba histolytica, Plasmodium vivax*
- Porifera: *Sycon, Spongilla, Euspongia, Sycon*- T.S & L.S, Spicules, Gemmule
- Coelenterata: *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium,Gorgonia,Pennatula*
- Platyhelminthes: *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium,Redia,Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
- Nemathelminths: *Ascaris (Male & Female), Drancunculus, Ancylostoma,Wuchereria*
- Annelida: *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
- Arthropoda: Cancer, *Palaemon*, Scorpion, *Scolopendra*, *Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male &female *Anopheles*and *Culex,* Mouthparts of Housefly and Butterfly.
- Mollusca:*Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
- Echinodermata: *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva
- Hemichordata: *Balanoglossus,* Tornaria larva

Dissections:

Computer - aided techniques should be adopted or show virtual dissections Dissection of edible (Prawn/Pila) invertebrate as per UGC guidelines

An “Animal album” containing photographs, cut outs, with appropriate write up about the above-mentioned taxa. Different taxa/ topics may be given to different setsof students for this purpose

RFERENCE WEB LINKS:

- https://virtualmicroscopy.peabody.yale.edu/
- https://tnhm.in/category/assorted-gallery-for-vertebrates-and-invetebrates/invertebrates/
- http://www.nhc.ed.ac.uk/index.php?page=24.25.312
- https://biologyjunction.com/invertebrate-notes/
- https://lanwebs.lander.edu/faculty/rsfox/invertebrates/
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

FIRST YEAR-SEMESTER -II

(W.E.F. Academic Year 2023-24)

THEORY MODEL QUESTION PAPER

COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NONCHORDATES

Time: 3 Hours **Marks : 75**

SECTION – A **5X5=25M**

Answer any FIVE of the following questions

1. Classification of Animalia Kingdom
2. Protozoa – Flagellar Locomotion
3. Coral reefs
4. General characters of porifera
5. Turbellaria
6. Aphasmidia
7. Crustacea
8. Vermiculture
9. Cephalopoda
10. Balanoglossus - Structure

SECTION – B

5X10=50M

Answer the following questions

11(a).Describe the general characters and classification of Phylum Protozoa up to Classes with examples.

(OR)

(b). Explain Conjugation in Paramecium.

12(a). Explain different types of Canal systems in sponges.

(OR)

(b). Write an account on Polymorphism in Coelenterates.

13(a).Write an account on Parasitic Adaptations in helminthes.

(OR)

(b). Describe the life cycle and pathogenicity of Ascaris lumbricoides.

14(a). Explain the general characters and classification of Phyla Annelida upto classes With suitable examples.

(OR)

(b). Describe the structure and affinities of Peripatus.

15(a). Write an account on Pearl formation in Pelecypoda.

(OR)

(b). Explain Water vascular system in Echinoderms.

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER –II1

(W.E.F. Academic Year 2023-24)

COURSE 2: ANIMAL DIVERISTY-II BIOLOGY OF CHORDATES

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

LEARNING OUTCOMES: By the completion of the course the graduate should able to –

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalia with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to Mammalia.

SYLLABUS:

UNIT - I

1.1 General characters and classification of Chordata up to classes
1.2 Salient features of Cephalochordata, Salient features of Urochordata
1.3 Structure and life history of *Herdmania*, Retrogressive metamorphosis –Process and Significance
1.4 Cyclostomata, General characters, Comparison of Petromyzon and Myxine

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - II

2.1 General characters of Fishes, Salient features Dipnoi
2.2 *Scoliodon*: External features, Digestive system, Respiratory system
2.3 *Scoliodon* Structure and function of Heart, Structure and functions of the Brain.
2.4 Migration in Fishes, Types of Scales

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - III

3.1 General characters of Amphibia, General characters of Reptilia
3.2 *Rana hexadactyla*: External features, Respiratory system, Structure and function of Heart
3.3 *Rana hexadactyla* structure and functions of the Brain
3.4 *Calotes*: External features, Digestive system, structure and function of Brain
3.5 Identification of Poisonous snakes

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - IV

4.1 General characters of Aves
4.2 *Columba livia*: External features, Digestive system, Respiratory system
4.3 *Columba livia*: Structure and function of Heart, structure and function of Brain
4.4 Migration in Birds, Flight adaptation in birds

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - V

5.1 General characters of Mammalia
5.2 Classification of Mammalia up to sub - classes with examples
5.3 Comparison of Prototherians, Metatherians and Eutherians
5.4 Dentition in mammals, Aquatic mammals Adaptations

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)

- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology Museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

REFERENCE BOOKS

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
- Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker &Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
- Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
- A.K. Sinha, S. Adhikari& B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
- R.L. Kotpal, 2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
- E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
- G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
- Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -III

(W.E.F. Academic Year 2023-24)

COURSE 2: ANIMAL DIVERISTY-II BIOLOGY OF CHORDATES

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labeled record of identified museum specimens

SYLLABUS:

1. Protochordata: *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomes: *Petromyzon and Myxine.*
3. Pisces: *Pristis, Torpedo, Hippocampus, Exocoetus, Echeneis, Labeo, Catla,Clarius, Channa, Anguilla*.
4. Amphibia: *Ichthyophis, Amblystoma, Axolotl larva, Hyla,*
5. Reptilia: *Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja,* Krait, *Hydrophis, Crocodile.*
6. Aves: *Psittacula, Eudynamis, Bubo, Alcedo.*
7. Mammalia: *Ornithorhynchus, Pteropus, Funambulus.*
8. **Dissections**-As per UGC guidelines
   Scoliodon IX and X, Cranial nerves
   Scoliodon Brain
   Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.
2.Laboratory Record work shall be submitted at the time of practical examination.

RFERENCE WEB LINKS:

- https://nt7-mhe-complex-assets.mheducation.com/nt7-mhe-complex-assets/Upload-20190715/InspireScience6-8CA/LS15/index.html
- https://themammallab.com/
- http://abacus.bates.edu/acad/depts/biobook/LabConCh.htm
- https://virtualzoology.wordpress.com/scoliodon/
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -III

(W.E.F. Academic Year 2023-24)

COURSE 2: ANIMAL DIVERISTY-II BIOLOGY OF CHORDATES

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Section - A

Answer any FIVE of the following Questions **5×5= 25M**

1. Salient features of Cephalochordate?
2. Comparison of Petromyzon and Myxine ?
3. Salient features of Diponi.
4. Types of scales.
5. Characters of reptiles.
6. Functions of frog brain.
7. Migration of birds.
8. Characters of Aves.
9. Metatheria
10. Aquatic mammalian adaptations

Section – B

Answer the following Questions **5×10= 50 M**

11 . (a) Explain the general characters and classification of chordate up to classes

(Or)

(b) Explain the structure and life history of Herdmania ?

12. (a) Describe the digestive system in scoliodon

(Or)

(b) Describe the migration in fishes ?

13. (a) Explain the structure and function of heart in frog

(Or)

(b) Explain identification of poisonous snake?

14. (a) Explain the respiratory system in columba?

(Or)

(b) Explain flight adaptations in birds

15.) Explain the classification of mammalian up to sub- classes with examples ?

(Or)

(b) Explain the dentition in mammals?

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 3: EMBRYOLOGY

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- The objective of this course is to provide a comprehensive understanding of the concepts of early animal development.
- Students taking this course must develop a critical appreciation of methodologies specifically used to study the process of embryonic development in animals.
- In this course different concepts of animal development will be elaborated
- Students will be made familiar with different approaches that have been used to study embryology.
- Topics that will be discussed are organogenesis and regeneration.

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of concepts of embryology. This course will provide students with a deep knowledge in embryology by the completion of the course the graduate shall able to –

- Understand the historical perspective and concepts of embryology
- Acquire knowledge on gametogenesis, fertilization and cleavage patterns
- Understand the fate of germinal layers and extraembryonic membranes
- Explain the process of regeneration in certain animals
- Examine the process of organogenesis

SYLLABUS:

UNIT-I:

1.1 Historical perspective and basic concepts: Phases of development
1.2 Cell-Cell interaction, Pattern formation, Differentiation and growth
1.3 Differential gene expression,
1.4 Cytoplasmic determinants and asymmetric cell division

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-II:

2.1 Gametogenesis, Spermatogenesis, Oogenesis;
2.2 Types of eggs, Egg membranes; Fertilization (External and Internal)
2.3 Planes and patterns of cleavage; Types of Blastulae; Fate maps
2.4 Early development of frog and chick up to gastrulation

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Model preparation on cleavage planes
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-III:

3.1 Fate of Germ Layers
3.2 Extra-embryonic membranes
3.3 Placenta (Structure, types and functions of placenta)
3.4 Amniocentesis

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Chart preparation on the placenta
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-IV:

4.1 Metamorphosis: Changes, hormonal regulations in amphibians
4.2 Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (in Turbellarians)
4.3 Ageing: Concepts and Theories
4.4 Teratogenic agents and their effects on embryonic development

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Flow chart preparation on the process of metamorphosis highlighting the periodical changes vs hormone activity
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-V:

5.1 Organogenesis of Central Nervous system
5.2 Organogenesis of Eye, Ear
5.3 Organogenesis of Skin
5.3 Organogenesis of Circulatory system
(* Organogenesis in Human need to be explained)

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Flow chart preparation on the process of organogenesis highlighting the gradual developments of organ systems
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)

- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.
- Chart on the organogenesis
- RBPT on the Placenta
- Model of extra embryonic membrane
- Laboratory observation of chick embryonic development

REFERENCES BOOKS:

- Developmental Biology by Balinksy
- Developmental Biology by Gerard Karp
- Chordate embryology by Varma and Agarwal
- Embryology by V.B. Rastogi

- Austen CR and Short RV. 1980. *Reproduction in Mammals*. Cambridge UniversityPress.
- Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer Associates Inc.,Publishers, Sunderland, USA.
- Longo FJ. 1987. *Fertilization.* Chapman & Hall, London.
- Rastogi VB and Jayaraj MS. 1989. *Developmental Biology*. KedaraNath Ram NathPublishers, Meerut, Uttar Pradesh.
- Schatten H and Schatten G. 1989. *Molecular Biology of Fertilization.* AcademicPress, New York.

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 3: EMBRYOLOGY

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- The objective of this course is to provide a comprehensive practical knowledge on the embryology
- Must develop a critical understanding of the early embryological events
- Acquire knowledge on the developmental stages of chick
- Understand the histology of placenta

SYLLABUS:

1. Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages)
2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages)
3. Study of different sections of placenta (photomicrograph/ slides)
4. Project report on chick embryo development

RFERENCE WEB LINKS:

- https://praxilabs.com/en/3d-simulations/cultivation-and-preparation-of-the-virus-in-chick-embryo-virtual-lab
- https://vlab.amrita.edu/
- https://www.vlab.co.in/
- https://www.youtube.com/watch?v=p_tx88He8Pk
- https://core.ac.uk/download/143957972.pdf
- https://egyankosh.ac.in/bitstream/123456789/57549/1/Exercise%207%20Chick%20Embryo.pdf
- http://www.macollege.in/app/webroot/uploads/department_materials/doc_501.pdf
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

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YOGI VEMANA UNIVERSITY - KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR – SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 3: E M B R Y O L O G Y
MODEL PAPER

Time: 3 Hours **Marks : 75**

SECTION – A 5X5=25M

Answer any FIVE of the following questions

1. Cell interaction
2. Differential gene expression
3. Types of eggs
4. Types of Cleavages
5. Fate of germ layers
6. Amniocentesis
7. Metamorphosis in amphibians
8. Ageing
9. Organogenesis of brain
10. Organogenesis of skin

SECTION – B 5X10=50M

Answer the following questions

11(a). Describe the phases of development.

(OR)

(b). Explain cytoplasmic determinants and asymmetric cell division.

12(a). Write an account on gametogenesis.

(OR)

(b). Describe the development of frog upto gastrulation.

13(a). Explain the extra – embryonic membranes in detail.

(OR)

(b). Explain the structure, types and functions of placenta.

14(a). What is Regeneration? Give an account on regeneration in Turhellarians.

(OR)

(b). Write a note on Teratogenic agents and their effects on embryonic development.

15(a). Describe the organogenesis of eye.

(OR)

(b). Explain the organogenesis of circulatory system.

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- To acquire knowledge of organ systems function.
- To develop the ability to integrate physiology from the cellular and molecular level to the organ system and organismic level of organization.
- To Effectively read, evaluate and communicate scientific information related to physiological processes in the body.
- To gain a deep knowledge of current topics in physiology.

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of concepts of Physiology. This course will provide students with a deep knowledge in physiology by thecompletion of the course the graduate shall able to –

- Understand the physiology of digestion and hormonal control of digestion
- Develop a comprehensive picture of respiratory physiology
- Acquire knowledge on the Renal physiology
- Understand the physiology of Nerve and muscle
- Understand the physiology of heart

SYLLABUS:

UNIT-I: Physiology of Digestion

1.1 Structural organization and functions of gastrointestinal tract and associated glands;
1.2 Vitamins & Mineral composition of food & Mechanical and chemical digestion of food;
1.3 Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins;
1.4 Hormonal control of secretion of enzymes in Gastrointestinal tract.

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Chart preparation on the hormonal control of secretion of enzymes
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-II: Physiology of Respiration

2.1 Structural organization of Respiratory system, Mechanism of respiration, Control of respiration
2.2 Pulmonary ventilation; Respiratory volumes and capacities;
2.3 Transport of oxygen in blood and dissociation curves and the factors influencing it
2.4 Transport of Carbon dioxide in blood; dissociation curves and the factors influencing it, Carbon monoxide poisoning

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Group discussion on the CO poisoning/Debate on the dissociation curves

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-III: Renal Physiology

3.1 Structure of kidney and its functional unit

3.2 Mechanism of urine formation

3.3 Regulation of water balance

3.4 Regulation of acid-base balance

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Group discussion on the Urine formation/Working model of Kidney

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT-IV: Physiology of exciting tissues

4.1 Neuron structure and types

4.2 Nerve impulse transmission-(Myelinated, Non-myelinated, synaptic)

4.3 Ultra structure of muscle

4.4 Molecular and chemical basis of muscle contraction

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Group discussion on the impulse trasnmisson/Debate on the dissociation curves

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT- V: Physiology of Heart

5.1 Structure of mammalian heart, Coronary circulation;

5.2 Structure and working of conducting myocardial fibers. Origin and conduction of cardiac impulses

5.3 Cardiac Cycle-Cardiac output and its regulation

5.4 Nervous and chemical regulation of heart rate. Blood pressure and its regulation

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above /Group discussion on the phases of Cardiac output /case study on the Blood Pressure

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Working model of human / any mammalian urine formation
- Chart/model of sarcomere
- Chart/model on nerve impulse transmission

REFERENCES BOOKS:

- Eckert H. *Animal Physiology: Mechanisms and Adaptation.* W.H. Freeman &Company.
- Floray E. *An Introduction to General and Comparative Animal Physiology.* W.B.Saunders Co., Philadelphia.
- Goel KA and Satish KV. 1989. *A Text Book of Animal Physiology*, RastogiPublications, Meerut, U.P.
- Hoar WS. *General and Comparative Physiology.* Prentice Hall of India, New Delhi.
- Lehninger AL. Nelson and Cox. *Principles of Biochemistry.* Lange MedicalPublications, New Delhi.
- Prosser CL and Brown FA. *Comparative Animal Physiology.* W.B. SaundersCompany, Philadelphia.

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR-SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- To acquire knowledge of anatomy of certain important organs.
- To develop the ability to test the biological sample like saliva and urine.
- To Effectively estimate the blood haemoglobin.
- To Acquire skill to use the sphygmomanometer in recording blood pressure.
- To observe the ECG

SYLLABUS:

1. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney
2. Study of activity of Salivary amylase under optimum condition
3. Qualitative tests for identification of Carbohydrates
4. Qualitative tests for identification of Proteins
5. Qualitative tests for identification of Fats
6. Urine test for sugar, albumin
7. Estimation of haemoglobin using Sahli's haemoglobinometer
8. Recording of blood pressure using a sphygmomanometer
9. Recording of frog's heart beat under in situ and perfused conditions
10. ECG observation- Spotting/identification of curves from the given ECG

RFERENCE WEB LINKS:

- https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
- https://library.csi.cuny.edu/oer/virtuallabs-simulations#anatomy
- https://www.labster.com/simulations?course-packages=animal-physiology
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf
- https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_(2013).pdf

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YOGI VEMANA UNIVERSITY - KADAPA

B.S.c., (Minor) in ZOOLOGY

SECOND YEAR – SEMESTER -IV

(W.E.F. Academic Year 2023-24)

COURSE 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

MODEL PAPER

Time: 3 Hours **Marks : 75**

SECTION – A **5X5=25M**

Answer any FIVE of the following questions

1. Mechanical and Chemical digestion of food?
2. Absorptions of digested food?
3. Pulmonary ventilation?
4. Transport of Oxygen?
5. Regulation of Water balance.
6. Regulation of acid-base balance.
7. Structure of Neuron.
8. Ultra structure of Muscle.
9. Blood pressure and its regulation.
10. Nervous and chemical regulation of heart rate.

SECTION – B

Answer the following questions **5×10= 50 M**

11 . (a) Describe the physiology of digestion.

(Or)

(b) Explain the hormonal control of secretion of Enzymes in Gastrointestinal tract?

12. (a) Describe the structural organization of respiratory system.

(Or)

(b) Explain the transport of Carbon dioxide in blood?

13. (a) Describe the structure of Kidney and Nephron.

(Or)

(b) Write an account on mechanism of Urine formation?

14. (a) Write an account of Nerve impulse transmission?

(Or)

(b) Describe the molecular and chemical basis of muscle contraction

15.(a) Explain the structure of mammalian heart.

(Or)

(b) Explain cardiac cycle.

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR-SEMESTER -V

(W.E.F. Academic Year 2023-24)

SEMESTER-V

COURSE 5: POULTRY MANAGEMENT-I (POULTRY FARMING)

Theory Credits: 3 3 hrs/week

LEARNING OUTCOMES:

Students at the successful completion of the course will be able to

- Evaluate the status of Indian Poultry Industry
- Explain the Scientific Poultry keeping
- Compare the diversified Poultry practices
- Inspect the different breeds of chicken

SYLLABUS:

Unit 1 Indian poultry Industry

1.1 Importance of poultry farming and poultry development in India.
1.2 Present status and future prospectus of poultry Industry
1.3 Classification of poultry based on genetics Utility

Unit -2 Scientific Poultry Keeping

2.1 Modern breeds of Chicken
2.2 Present day egg production lines- meat production lines
2.3 Mini breeds- dwarfism in mini-Leghorns

Unit-3 Diversified Poultry

3.1 Ducks and Geese-classification- rearing system-classification-advantages
3.2 Guinea fouls - guinea fowl farming in India-Production-varieties
3.3 Emu-rearing- Economical aspects-commercial products

Unit-4 Desi Chickens:

4.1 Indigenous breeds and economical aspects of desi chicken
4.2 Indigenous breeds-Aseel-Chittagong-Kadaknath-Bursa
4.3 Improved varieties in India – Giriraja-Vanaraja-Giririani-Kalinga brown, Gramapriya,Swarnandhra

Unit -5 Breeds from Central Avian Research Institute – Izatnagar

5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)
5.2 CARI- Priya Layer, CARI- Sonali Layer,
5.3 CARIBRO-VISHAL, CARI-RAINBRO,
5.4 Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

REFERENCES:

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606

Web sources:

5. https://www.drvet.in/p/e-books.html
6. https://byjus.com/biology/animal-husbandry-poultry-farming/
7. https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR-SEMESTER -V

(W.E.F. Academic Year 2023-24)

COURSE 5: POULTRY MANAGEMENT-I (POULTRY FARMING)

Practical Credits: 1 2 hrs/week

LEARNING OUTCOMES:

On successful completion of this practical course, student shall beable to:

- Identify different types of Poultry rearing practices
- Evaluate the efficacy of different types of poultry practices in maximizing yield
- Understand the importance of different hybrid breeds in poultry

SYLLABUS:

1. Different types of Poultry rearing (Students has to observe and draw the different types of poultry rearing systems)
2. Different types of poultry Housing - Models / Images/charts
3. Different layer breeds images/charts/ Models (Observation of characters)
4. Types of broilers images/charts/ Models (Identification of important Characters)
5. CARI breeds characters –images/charts
6. Nandanam breeds- images/charts (Identification of characters)

*** (This practical is 70 % (Web based /virtual) 30% physical: student and teachers must browse the web for the specimens models – write down the important characters based on theweb resources)

REFERENCES:

1. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606
2. http://www.agritech.tnau.ac.in/expert_system/poultry/Poultry%20House%20Construction.html
3. https://petkeen.com/best-chicken-breeds-for-eggs/
4. https://garden.decorexpro.com/en/hozyajstvo/ptitsevodstvo/porody-brojlernyh-kur-s-foto-i-opisaniem.html

Co-Curricular Activities:

a) **Mandatory**:

1. For Teacher: Training of students by the teacher in laboratory and field on the techniques of identification of layers, broilers and management practices in poultry.
2. For Student: Students shall Individually visit a Poultry farm, make observations and report on the Rearing, Housing, Brooding, Feeding and water management activities. The student shall submit a handwritten Fieldwork/Project work Report on the observations along with pictures in the given format not exceeding 10 pages to teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detailsof place visited, observations made, findings and acknowledgements.*
5. Unit tests. (IE)

b) **Suggested Co-Curricular Activities**

1. Web resources – visiting the web sites of CARI-IZATNAGA https://cari.icar.gov.in procuring additional information on the poultry breeds
2. Web resources- visiting the web site of NANADANAM http://www.tanuvas.ac.in/ippmmadhavaram_tech.html
3. Collection of additional data on different types of Poultry breeds
4. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Video preparation etc.

YOGI VEMANA UNIVERSITY - KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR – SEMESTER -V

(W.E.F. Academic Year 2023-24)

COURSE 5: POULTRY MANAGEMENT-I (POULTRY FARMING)

MODEL PAPER

Time: 3 Hours **Marks : 75**

SECTION – A **5X5=25M**

Answer any FIVE of the following questions

1. Poultry development in India.
2. Principles of Poultry farming.
3. Present day egg production lines.
4. Present day meat production lines.
5. Geese rearing.
6. Guinea fowl farming in India .
7. Economic aspects of Desi Chicken.
8. Giriraja fowl.
9. CARI-Sonali Layer.
10. CARIBRO-VISHAL.

SECTION – B

Answer the following questions 5×10= 50 M

11 . (a) Describe the present status and future prospectus of poultry industry.

(Or)

(b) Explain the classification of poultry based on genetics utility.

12. (a) Describe modern breeds of chicken.

(Or)

(b) Explain dwarfism in Mini-Leghorns.

13. (a) Explain the Classification and advantages of Ducks rearing.

(Or)

(b) Write an account on Emu rearing.

14. (a) Describe the indigenous poultry breeds in India.

(Or)

(b) Explain the improved varieties of poultry breeds in India.

15.(a) Describe CARI Nirbheek, CARI Shyama HITCARI.

(Or)

(b) Describe the Nandanam Chicken-I, Nandanam Chicken-II, Nandanam Quail.

YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR-SEMESTER -V

(W.E.F. Academic Year 2023-24)

COURSE 6: POULTRY MANAGEMENT-II
(POULTRY PRODUCTION AND MANAGEMENT)

Theory Credits: 3 3 hrs/week

LEARNING OUTCOMES:

Students at the successful completion of the course will be able to

- Suggest measure for Health care in Poultry
- Evaluate the economics of poultry production
- Elaborate the poultry Breeder flock management
- Differentiate the poultry hatchery practices

SYLLABUS:

Unit-1 HEALTH CARE

1.1 Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies.

1.2 Vaccination schedule for commercial layers and broilers: factors that govern vaccinationschedule; vaccination principles type, methods, pre and post vaccination care.

1.3 Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

Unit-2 ECONOMICS

2.1 Economics of layer and broiler production

2.2 Projects reports in different systems of rearing for layer & broilers.

2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.

2.4 Export/import of poultry and poultry products.

Unit-3 BREEDER FLOCK MANAGEMENT

3.1 Layer and broiler breeder flock management housing & space requirements

3.2 Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.

3.3 Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broilerbreeders of different age groups.

Unit-4 BREEDER HEALTHCARE

4.1Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.

4.2 Common diseases of breeders (Infectious and metabolic disorders)-prevention.

4.3 Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks

Unit-5 HATCHERY PRACTICES

5.1 Management principles of incubation.

5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene.

5.3 Importance of hatchery records, break even analysis of unhatched eggs.

5.4 Computer applications for hatchery management

REFERENCES:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018

Web resources:

2. https://www.drvet.in/p/e-books.html
3. https://byjus.com/biology/animal-husbandry-poultry-farming/
4. https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

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YOGI VEMANA UNIVERSITY – KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR-SEMESTER -V

(W.E.F. Academic Year 2023-24)

COURSE 6: POULTRY MANAGEMENT-II

(POULTRY PRODUCTION AND MANAGEMENT)

Practical Credits: 1 2 hrs/week

LEARNING OUTCOMES:

On successful completion of this practical course, student shall be able to:

- Identify Poultry diseases by observation
- Analyze Poultry establishment feasibility
- Understand the Poultry Records

SYLLABUS:

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters)
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

REFERENCES:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. Flow chart hatchery : http://lms.tanuvas.ac.in/mod/resource/view.php?id=45106
3. Feasibility report: https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf

Co-Curriular Activities

a) Mandatory:

1. For Teacher: Training of students by the teacher laboratory and field on skills in different practices employed in poultry with regard to the disease management – analysis of poultry project- preparation of flow chart – Observation ofPoultry records – computerization activities
2. For Student: students shall (individually) visit a Layer/ Broiler Poultry farming places (small scale/corporate), make observations on practices- resources – management and marketing - analysis and submit a handwritten Fieldwork/Project work Report of 10 pages with necessary images.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detailsof place visited, observations made, findings and acknowledgements.*
6. (IE): Unit tests.

b) Suggested Co-Curricular Activities

1. Preparation of Poultry diseases charts
2. Preparation of feasibility report poultry establishment with different variables
3. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Video preparation etc.

YOGI VEMANA UNIVERSITY - KADAPA

B.S.c., (Minor) in ZOOLOGY

THIRD YEAR – SEMESTER -V

(W.E.F. Academic Year 2023-24)

COURSE 6: POULTRY MANAGEMENT-II
(POULTRY PRODUCTION AND MANAGEMENT)
MODEL PAPER

Time: 3 Hours **Marks : 75**

SECTION – A **5X5=25M**

Answer any FIVE of the following questions

1. Vaccination schedule for commercial layers.
2. Fungal diseases of poultry birds.
3. Feasibility studies on poultry rearing.
4. Project reports in different systems of rearing for broilers.
5. Artificial insemination.
6. Light management during growing and laying period.
7. Fertility disorder.
8. Selection and culling of breeder flocks.
9. Management principles of Incubation.
10. Importance of hatchery records.

SECTION – B

Answer the following questions **5×10= 50 M**

11 . (a) Describe the bacterial and viral diseases of poultry birds.

(Or)

(b) Explain the types of disinfectants in poultry farming.

12. (a) Explain the economics of layer and broiler production.

(Or)

(b) Describe Import/Import of poultry and poultry products.

13. (a) Explain the Layer and broiler breeder flock management housing & space requirementrs.

(Or)

(b) Describe the nutrient requirement of layer and broiler breeders of different age groups.

14. (a) Explain the vaccination schedule of broilers and commercial birds.

(Or)

(b) Explain the common diseases of breeder birds.

15.(a) Describe the selection, care and incubation of hatching eggs.

(Or)

(b) Write an account on Computer Applications for hatchery management.

YOGI VEMANA UNIVERSITY

Kadapa-516 005, Andhra Pradesh, INDIA

(A State University, Accredited with "A" Grade by NAAC)

Minutes of the BOS meeting in Zoology

Minutes of the BOS meeting in Zoology held on Tuesday, 10th October 2023 at 10.30 am in the Seminar Hall (180), Sir CV Raman Science Block, Yogi Vemana University, Kadapa-516 005.

MEMBERS PRESENT

Board of Studies in Zoology			
S. No.	**Name**	**Designation**	**Address**
1	Dr. M. Muniya Naik	Chairman	Lecturer in Zoology, Govt. Degree College, Rayachoti
2	Dr. C. Narasimha Rao	Member	Lecturer in Zoology, Govt. Degree College, Mydukur
3	K. Chandra Mohan	Member	Lecturer in Zoology, SCNRGovt. Degree College, Proddatur
4	M. Rama Mohan	Member	Lecturer in Zoology, SV Arts & Computer Science Degree College, Proddatur
5	Dr. N. Venkata Rami Reddy	University Nominee	YV University College, Kadapa

Agenda:

1. Approval of Academic regulations & Standard Operating Procedures (SOP) for 4 years UG Honors program as per NEP-2020
2. Approval of syllabus of B.Sc. Zoology for 4-year UG honors degree with single major subject.
3. Approval of syllabus of subject specific Skill Enhancement courses for B.Sc. Zoology, a 4-year UG honors degree with single major subject.
4. Approval of syllabus of Zoology as minor subject for 4-year UG honors degree with single major subject.

Resolution:

1. It is unanimously resolved to approve Academic regulations & Standard Operating Procedures (SOP) for 4 years UG Honors program with single major subject as per NEP-2020 and to implement from the academic year 2023-24.

2. After thorough discussion, 27 course papers including choice with 84 credits in B.Sc. Zoology as major subject prepared as per APSCHE curriculum credit frame work was unanimously approved by the BOS.
3. After thorough discussion, 8 subject specific Skill Enhancement course papers including choice with 16 credits in Zoology prepared as per APSCHE curriculum credit frame work was unanimously approved by the BOS.
4. After thorough discussion, 6 course papers with 24 credits in Zoology as minor subject prepared as per APSCHE curriculum credit frame work was unanimously approved by the BOS.

SIGNATURES OF THE MEMBERS:

Member	Signature
Dr. M. Muniya Naik	
Dr. C. Narasimha Rao	
K. Chandra Mohan	10/10/2023
M. Rama Mohan	
Dr. N. Venkata Rami Reddy	10/10/2023