SRI VENKATESWARA UNIVERSITY: TIRUPATI

MINOR

Subject: ZOOLOGY

w.e.f. AY 2024-25

COURSE STRUCTURE

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

SRI VENKATESWARA UNIVERSITY: TIRUPATI

MINOR

SEMESTER – IV – W.E.F. 2024-25

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.

Verified and Approved By Dr.M.VANI HOD and BOS chairperson (Zoology)

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Four Year Honours Degree Examination
Choice Based Credit System
II BSC- SEMESTER – IV
Model Question Paper - 2024-2025
SUB: Zoology (Minor)
PAPER : EMBRYOLOGY

TIME : 3 Hrs **Max. Marks : 70**

Section-A

Answer any FIVE of the following **5 x 4 = 20 M**

1. Cytoplasmic determinants.
2. Fate maps.
3. Fertilization.
4. Germ layers.
5. Amniocentesis.
6. Modes of regeneration.
7. Teratogenic agents.
8. Structure of eye.

Section – B

Answer any FIVE of the following **5 x 10 = 50 M**

Unit – I

9. Describe the basic concepts of development.

OR

10. Write about the differential gene expression.

Unit – II

11. Explain the process of spermatogenesis.

OR

12. Write about the planes and patterns of cleavage.

Unit – III

13. Write an essay on extra embryonic membranes.

OR

14. Describe the structure and functions of placenta.

Unit – IV

15. Give an account of metamorphosis in amphibians.

OR

16. Explain about the concepts and theories of ageing.

Unit – V

17. Describe the organogenesis of central nervous system.

OR

18. Write about the organogenesis of skin.

SEMESTER-IV

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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Four Year Honours Degree Examination
Choice Based Credit System
II BSC- SEMESTER – IV
Model Practical Question Paper - 2024-2025
SUB: Zoology (Minor)

PAPER : EMBRYOLOGY

Time : 2 Hrs Max. Marks : 50

Practicals

1. Identification of given spotters A, B, C, D, E, and F with neat labelled diagram and write its characters. 6 X 5 = 30 Marks

2. Project Report on Chick embryo development 10 Marks

2. Certified Record 10 Marks

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50 Marks

SRI VENKATESWARA UNIVERSITY: TIRUPATI

MINOR

SEMESTER – IV – W.E.F. 2024-25

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 the completion 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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Four Year Honours Degree Examination

Choice Based Credit System

II BSC- SEMESTER – IV

Model Question Paper - 2024-2025

SUB: ZOOLOGY (MINOR)

PAPER : ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

TIME : 3 Hrs MAX. MARKS : 70

Section-A

Answer any FIVE of the following **5 x 4 = 20 M**

1. Absorption of carbohydrates.
2. Transport of gases.
3. Pulmonary ventilation.
4. Regulation of water balance.
5. Muscle contraction.
6. Nerve impulse.
7. Coronary circulation.
8. Cardiac cycle.

Section – B

Answer All Questions **5 x 10 = 50 M**

Unit – I

9. Write about the structural organization and functions of gastrointestinal tract.

OR

10. Explain about the hormonal control of enzymes in gastrointestinal tract.

Unit – II

11. Describe the mechanism of respiration.

OR

12. Give an account of dissociation curves and the factors influencing it.

Unit – III

13. Explain the structure and functions of kidney.

OR

14. Write about the regulation of acid-base balance.

Unit – IV

15. Describe the structure and types of neuron.

OR

16. Explain about the ultra structure of muscle.

Unit – V

17. Discuss about the origin and conduction of cardiac impulses

OR

18. Write an essay on blood pressure and its regulation.

SEMESTER-IV

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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Four Year Honours Degree Examination
Choice Based Credit System
II BSC- SEMESTER – IV
Model Practical Question Paper - 2024-2025
SUB: Zoology
PAPER : ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

TIME : 2 Hrs MAX. MARKS : 50

Practicals

1. Estimation of haemoglobin using sahli's haemoglobinometer. 15 Marks
2. Any two qualitative tests for identification of carbohydrates. 10 Marks
3. Identify the given spotters A, B and C with neat labelled diagram and write its characters. 3 x 5 = 15 Marks

4. Certified Record 10 Marks

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50 Marks
