SEMESTER-IV

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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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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