

Syllabus template

Semester: 2	
Course: Major 2	
Paper Title: Mammalian Physiology	
Paper Code: C1BT230222T/P	Credits: 4 (3 Th + 1 Pr)
Hours/week: 3 + 3	
Category: Core/MDC/SEC/VAC: Core	
Theory / Practical / Composite: Composite	
No of Modules: 2 (Theory)	
Course Overview:	
<ol style="list-style-type: none"> 1. Gaining a comprehensive overview of the principles and basic concepts of mammalian physiology with reference to human physiology. 2. Acquiring a comprehensive idea about blood, circulatory system and functioning of the heart. 3. Acquiring a comprehensive idea about respiratory biology and nervous system. 4. Acquiring an advanced understanding of skeleton-muscle physiology, digestive system functioning and endocrine physiology. 5. Gaining an overview of renal physiology and physiological adaptations. 6. Being familiarized with laboratory techniques and equipment used in physiological studies. (Practical) 	
Course Outcome:	
Theory Module A	
<ol style="list-style-type: none"> 1. Outline concepts of mammalian physiology with reference to circulatory, respiratory and nervous systems. 2. Discuss the composition of blood, blood coagulation, blood groups, mechanism of working of heart, mechanism of respiration and gaseous exchange and structure and functional implications of neurons and glial cells. 3. Illustrate the roles of plasma proteins and blood cells, mechanism of coagulation, blood grouping, and regulation of blood pressure, the oxygen dissociation curve, mechanism of heart rhythmicity and role of heart in blood circulation and determine the process of exchange of gases, transport of O₂ and CO₂ and how neuronal ultrastructure supports signal transmission. 4. Analyse variations in the composition of blood and blood pressure, how the heart works by relating structural features and heart rhythmicity to cardiac output, factors shifting the oxygen dissociation curve and structural and functional differences among neuron and glial cell types. 5. Critically evaluate various aspects of circulatory, respiratory and nervous systems with reference to circulatory and respiratory efficiency and nervous system responses and functional relevance. 6. Develop a comprehensive overview of the basic principles of mammalian physiology. 	
Theory Module B	
<ol style="list-style-type: none"> 1. Recognise fundamental concepts of mammalian physiology with reference to gastro-intestinal physiology, excretion, skeleto-muscle physiology, endocrine coordination, thermoregulation and physiological adaptations. 	

2. Explain the functional relevance of the gastro-intestinal tract, digestive glands, skeleto-muscular system, nephron, endocrine glands and basic thermoregulatory adaptations.
3. Use concepts of skeleto-muscle physiology, renal physiology, hormone-receptor interactions and physiological adaptations to demonstrate overall physiological homeostasis.
4. Analyze the relationships between endocrine glands, their hormones and target tissues, and differentiate how gastrointestinal, renal and thermoregulatory mechanisms integrate to regulate body functions.
5. Evaluate specific pathologies or disorders pertaining to gastro-intestinal, skeleto-muscle, endocrine and renal physiology as well as thermoregulation and physiological adaptations by judging how alterations in structure or function disrupt normal physiological regulation.
6. Develop a comprehensive overview of the basic principles of mammalian physiology, emphasising digestive, skeleto-muscular, excretory, endocrine and thermoregulatory processes and coordinated physiological adaptations.

Practical

1. To understand principles of haematological analysis by determining blood groups and haemoglobin concentration using standard laboratory methods and to interpret the results.
2. To develop proficiency in blood cells analysis by TLC and RBC counts using standard laboratory methods and to interpret the results in terms of physiological significance.
3. To differentiate leukocyte populations by performing DLC and to interpret variations and their physiological basis.
4. To identify and analyse physiologically important substances through qualitative biochemical tests.
5. To recognize and analyse mammalian tissue organization by studying histological sections and structural features of some major tissue types.

Prerequisites: *Basic knowledge about biology*

SYLLABUS

UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
Module A	UNIT I: Circulation: Composition of blood: plasma proteins & their role, blood cells. Mechanism of coagulation of blood, blood groups, blood pressure. Mechanism of working of heart. UNIT II: Respiration: Exchange of gases, transport of O ₂ and CO ₂ , oxygen dissociation curve. UNIT III: Nervous System: Functional relevance of	1 class per week	CO1-CO6	K1-K6

	nervous system, ultrastructure of neurons and glial cells and functional implications.			
Module B	<p>UNIT IV: Gastro-intestinal physiology: Phases of nutrition, functional relevance of gastro-intestinal tract and digestive glands.</p> <p>UNIT V: Skeleto-muscle physiology: Functional relevance of skeleto-muscular system and joint physiology, basic principles of skeletal muscle contraction.</p> <p>UNIT VI: Excretion: Functional relevance of renal system, ultra-structure of nephron and functional implications.</p> <p>UNIT VII: Endocrine coordination: Hormones and receptors, Endocrine glands and their functional significance, endocrine pathologies.</p> <p>UNIT VIII: Thermoregulation and physiological adaptations: Basic thermoregulatory adaptations, basic physiological adaptations in high altitude and sea depth.</p>	2 classes per week	CO1-CO6	K1-K6
Practical	<ol style="list-style-type: none"> 1. Determination of blood groups 2. Determination of TLC 3. Determination of DLC 4. Counting of mammalian RBCs 5. Determination of haemoglobin. 6. Qualitative tests for physiologically important substances. 7. Study of histology of mammalian tissue. 	3 classes per week		
Text Books				
1. J.E. Hall. Guyton and Hall Textbook of Medical Physiology.				
2. K. Barrett, S. Barman et al. Ganong's Review of Medical Physiology				

3. C.C. Chatterjee. Human Physiology
4. K. C. Ghose, B. Manna. Practical Zoology (For Practical)
Suggested readings
1.
2.
3.
Web Resources
1.
2.
3.
Evaluation: Theory: CIA: 15 marks; Semester Exam: 45 marks Practical: 40 marks (30 marks Continuous Assessment; End Semester Viva: 8 Marks; Attendance: 2 marks)
Paper Structure for Theory Semester Exam: Module A: 18 marks Any two from three questions: Each of 2 marks Any two from three: Each of 7 marks with subparts [No sub-part will be less than 2 marks and more than 5 marks] Module B: 27 marks Any three from four questions: Each of 1 mark Any three from four: Each of 8 marks with subparts [No sub-part will be less than 2 marks and more than 5 marks]

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
	Theory Module A	
CO1	Outline concepts of mammalian physiology with reference to circulatory, respiratory and nervous systems.	K1
CO2	Discuss the composition of blood, blood coagulation, blood groups, mechanism of working of heart, mechanism of respiration and gaseous exchange and structure and functional implications of neurons and glial cells.	K2
CO3	Illustrate the roles of plasma proteins and blood cells, mechanism of coagulation, blood grouping, and regulation of blood pressure, the oxygen dissociation curve, mechanism of heart rhythmicity and role of heart in blood circulation and determine the process of exchange of gases, transport of O ₂ and CO ₂ and how neuronal ultrastructure supports signal transmission.	K3
CO4	Analyse variations in the composition of blood and blood pressure, how the heart works by relating structural features and heart rhythmicity to cardiac output, factors shifting the oxygen dissociation curve and structural and functional differences among neuron and glial cell types.	K4
CO5	Critically evaluate various aspects of circulatory, respiratory and nervous systems with reference to circulatory and	K5

	respiratory efficiency and nervous system responses and functional relevance.	
CO6	Develop a comprehensive overview of the basic principles of mammalian physiology.	K6
	Theory Module B	
CO1	Recognise fundamental concepts of mammalian physiology with reference to gastro-intestinal physiology, excretion, skeleto-muscle physiology, endocrine coordination, thermoregulation and physiological adaptations.	K1
CO2	Explain the functional relevance of the gastro-intestinal tract, digestive glands, skeleto-muscular system, nephron, endocrine glands and basic thermoregulatory adaptations.	K2
CO3	Use concepts of skeleto-muscle physiology, renal physiology, hormone-receptor interactions and physiological adaptations to demonstrate overall physiological homeostasis.	K3
CO4	Analyze the relationships between endocrine glands, their hormones and target tissues, and differentiate how gastrointestinal, renal and thermoregulatory mechanisms integrate to regulate body functions.	K4
CO5	Evaluate specific pathologies or disorders pertaining to gastro-intestinal, skeleto-muscle, endocrine and renal physiology as well as thermoregulation and physiological adaptations by judging how alterations in structure or function disrupt normal physiological regulation.	K5
CO6	Develop a comprehensive overview of the basic principles of mammalian physiology, emphasising digestive, skeleto-muscular, excretory, endocrine, and thermoregulatory processes and coordinated physiological adaptations.	K6