



Course Syllabus  
Gyanmanjari science college  
Semester-1(M.Sc.)

**Subject:** Physiology-MSZO11504

**Type of course:** Major

**Prerequisite:** Understanding basic physiology effectively, it's essential to grasp some basic biological concepts, particularly regarding cell structure and function.

**Rationale:** Physiology is an ever-evolving field that focuses on the mechanisms governing the functions of living organisms. As new research emerges, we continually gain insights into the intricate processes that regulate bodily functions, from cellular metabolism to systemic interactions. Understanding these dynamics is crucial for deciphering how organisms adapt to their environments, respond to stress, and maintain homeostasis. Given the complexity of physiological systems, there is always more to explore regarding the interplay between different organ systems and their roles in health and disease. This ongoing discovery enhances our ability to develop new treatments and improve health outcomes.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

*Legends: CI-Classroom Instructions; T-Tutorial; P-Practical; C-Credit; ESE-End Semester Examination; MSE-Mid Semester Examination; V-Viva; CA-Continuous Assessment; ALA-Active Learning Activities.*

**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Prepare a chart</b> Students will create a chart about human digestive system and submit it on GMIU web portal.	10



2	<b>Brain writing</b> Faculty will provide a picture, text passage or video clip, student observe, analyze and write about it and upload on GMIU web portal.	10
3	<b>Model Creation</b> Each student creates a 3D model of a Respiratory system of human using construction paper or modeling clay. Then submit a photo to the GMIU web portal.	10
4	<b>Paper Review</b> Faculty will provide a particular portion of the research paper and a group of students will review it and prepare a conclusion in 100 words and upload it to GMIU web portal.	10
5	<b>MCQ Test</b> Faculty will provide the students a set of MCQs according to the leaning objective of the course and students will answer it individually on GMIU web portal.	10
Total		50

**Course Content:**

Unit No.	Course content	Hrs	% Weightage
1	<b>Chapter-1 Digestion and Absorption</b> Human digestive system, Physiology of digestion and absorption (A brief account on vertebrates and invertebrates), Neural regulation of thirst, Events of absorptive and post absorptive states - their neural and endocrine regulation, Physiology of starvation and obesity, Leptin: synthesis, secretion and its role in adipogenesis	15	25
2	<b>Chapter-2 Circulation</b> Circulatory mechanisms in different animal groups, Haemodynamics, Blood volume and its regulation, Myogenic heart, Conducting system, Cardiac cycle, Cardiac output, stroke volume, Neural and chemical regulation of cardiac activity, blood pressure, ECG - its principle and significance.	15	25

3	<p><b>Chapter- 3 Respiration</b></p> <p>Anatomy of respiratory organs and mechanism of respiration in invertebrates and vertebrates, pulmonary ventilation, surfactants, Neural and chemical regulation of respiration. Respiration in unusual environment – foetal and neonatal respiration, high altitude, diving.</p> <p><b>Chapter – 4 Muscle Physiology</b></p> <p>Skeletal muscle- ultra structure and molecular organization. Red and white muscles, Mechanism of muscle contraction and relaxation. Energetics of muscle contraction. Catch muscle and fibrillar muscle.</p>	15	25
4	<p><b>Chapter- 5 Endocrinology</b></p> <p>Invertebrate and vertebrate endocrine glands, Synthesis (Peptide- Insulin, Steroid hormones) physiological role and mechanism of hormone action. Bioamines, Ecosanoids, Chalcones, Lumones, Synthetic hormones.</p> <p><b>Chapter -6 Reproductive physiology</b></p> <p>Anatomy and histology of Testis and Ovary, Hormonal regulation of gametogenesis, Physiology of implantation, pregnancy, parturition, and lactation.</p>	15	25

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30	30	20	20	0	0



**Course Outcome:** Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

After learning the course the students should be able to:	
CO1	Explain physiological concepts and different systems of life forms.
CO2	Analyze the processes of blood circulation, including systemic and pulmonary circulation.
CO3	Illustrate osmoregulatory mechanisms in aquatic and terrestrial animals
CO4	Elucidate the interactions of endocrine system with other systems.

### Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

### Reference Books:

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4. Chatterjee, C.C. 1997. Human Physiology. Medical allied agency, Calcutta.
5. Ganong, W. F. (1995). Review of medical physiology. McGraw-Hill.
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7. Guyton, A. C., & Hall, J. E. (2015). Textbook of medical physiology (13th edition). Philadelphia: Saunders.



8. Hill, W. R., Wyse, G. A. & Anderson, M. (2007). *Animal Physiology* (2nd edn). Sinauer Associates Inc. Publishers.
  9. Hoar, W. S. (1983). *General and comparative physiology* (No. 591.1 H6 1983).
  10. Hochachka, P. W., & Somero, G. N. (1984). *Biochemical Adaptation*. Princeton University Press.
  11. Hochachka, P. W., & Somero, G. N. (2002). *Biochemical adaptation: mechanism and process in physiological evolution*. Oxford University Press.
  12. Jain, A. K. (2019). *Textbook of physiology*. (8th edn). Avichal.
  13. Jenkins, G., Kemnitz, C., & Tortora, G. J. (2017). *Anatomy and physiology: from science to life*. John Wiley & Sons Incorporated.
  14. Kay, I. (1998). *Introduction to animal physiology*. Springer.
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  16. Kronenberg, H. M., Shlomo Melmed, M. D., Polonsky, K. S., Wilson, J. D., Foster, D. W., & Kronenberg, H. M. (2002). *Williams's textbook of endocrinology*. (10th edn). W.B. Saunders, Philadelphia.
  17. Moyes, C. D., & Schulte, P. M. (2008). *Principles of animal physiology* (Vol. 754). San Francisco: Pearson/Benjamin Cummings.
  18. Prosser, C.L and Brown, F.A. (1973). *Comparative Animal Physiology*. W.B Saunders Company, Philadelphia.
  19. Schmidt-Nielsen, K. (1997). *Animal physiology: adaptation and environment*. Cambridge University Press.
  20. Sembulingam, K., & Sembulingam, P. (2019). *Essentials of medical physiology*.(8th edn). JP Medical Ltd.
  21. Squires, E. J. (2010). *Applied animal endocrinology*. Cabi.
  22. W., & French, K. (1997). *Eckert animal physiology-mechanisms and adaptation*. W.H. Freeman & Co, New York.
  23. Willmer, P., Stone, G., & Johnston, I. (2009). *Environmental physiology of animals*. John Wiley & Sons.

