



# ST. ALOYSIUS COLLEGE (AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC (CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

## Faculty of Science

Bachelor of Science (B.Sc.)

Session – 2024-25

**SUBJECT: ZOOLOGY**

B.Sc. IV Semester

Course Title - Physiology and Biochemistry

Core Course – Elective (Zoology)

### Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	How organs function at different levels i.e. from cellular to system levels.	U, ANALYSE
CO 2	Examine internal harmony of different body systems by learning inherent disorders and deficiencies, which is needed to maintain good health.	K
CO 3	Understand functions of biomolecules & their role in metabolism by studying biochemistry.	U
CO 4	Develop a strong foundation for research & employability skills	U, APPLY
CO 5	Improve the student's perspective of health biology through deep study of physiology.	U, CREATE

### Credit and Marking Scheme

	Credits	Marks		Total Marks	Min Passing Marks
		Internal	External		
Theory	3	40	60	100	35
Practical	1	40	60	100	35
Total	4				

31/7/24





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## Evaluation Scheme

	Marks	
	Internal	External
<b>Theory</b>	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exam (At the End of Semester)
<b>Practical</b>	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exam (At the End of Semester)

## Content of the Course

### Theory Syllabus

No. of Lectures (in hours per week): 2 hours per week

Total No. of Lectures: 60 hrs.

Maximum Marks: 60

Units	Topics	No. of Lectures
I	<p><b>Introduction and Historical background of Physiology and Biochemistry Biomolecules and Regulatory mechanism.</b></p> <p><b>1. Contribution of Indian Scientists</b> 1.1 Contribution of Charak 1.2 Contribution of Sushrut</p> <p><b>2. Biomolecules</b> 2.1 Micro and Macro molecules 2.2 Water and Buffer System</p> <p><b>3. Enzymes</b> 3.1 Definition and General Properties 3.2 Nomenclature and Classification and functions 3.3 Mechanism and Regulation of Enzyme action 3.4 Coenzyme</p> <p><b>4. Vitamins and Minerals</b> 4.1 Types and Sources 4.2 Biological importance 4.3 Deficiencies and Disorders</p> <p><b>Keywords/Tags : Biomolecules, Buffer system, Enzymes, Vitamins</b></p>	11

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II	<p><b>Metabolism, Physiology and Regulation</b></p> <p><b>1. Protein</b></p> <p>1.1 Structure, Nomenclature, Classification and Biological importance.</p> <p>1.2 Metabolism -Deamination, Decarboxylation, Transamination of amino acids and Ornithine cycle</p> <p><b>2. Carbohydrates</b></p> <p>2.1 Structure, Nomenclature, Classification and Biological importance.</p> <p>2.2 Metabolism -Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis, Citric Acid Cycle and Electron Transport Chain</p> <p><b>3. Lipids</b></p> <p>3.1 Structure, Classification and Biological importance</p> <p>3.2 Metabolism -Beta oxidation of fatty acids.</p> <p>4. Physiology of Digestion, regulation and disorders wsr Gastroenteritis &amp; Constipation.</p> <p>5. Homeostasis and Basal Metabolic Rate (BMR)</p> <p>6. Thermoregulation</p> <p><b>Keywords/Tags: Proteins, Carbohydrates, Krebs cycle, Digestion, Homeotherms</b></p>	13
III	<p><b>Respiration, Excretion and Immune System</b></p> <p><b>1. Respiration</b></p> <p>1.1 Mechanism -Inspiration and Expiration</p> <p>1.2 Physiology- Exchange and Transport of Gases (Oxygen and carbon dioxide), Chloride shift, role of Respiratory pigment.</p> <p>1.3 Disorders - Apnea, Hypoxia, Asphyxia, Carbon monoxide poisoning, Bronchitis, Asthma</p> <p><b>2. Excretion</b></p> <p>2.1 Physiology -Urea, Urine formation and Counter Current mechanism</p> <p>2.2 Excretory products, disorders</p> <p>2.3 Osmoregulation</p> <p><b>3. Immunity</b></p> <p>3.1 Innate and acquired Immunity</p> <p>3.2 Immune cells and Immunoglobulins</p> <p>3.3 Antigen responses</p> <p><b>Keywords/Tags: Chloride shift, Excretion, Urea, Immunity, Antigen</b></p>	10

*[Handwritten signatures and a decorative flourish]*



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IV	<p><b>Neuromuscular Co-ordination, Hormones, Endocrine system and Reproductive Physiology</b></p> <ol style="list-style-type: none"><li><b>1. Nerve</b><ol style="list-style-type: none"><li>1.1 Structure and type of Neurons</li><li>1.2 Neuromuscular disorders -Epilepsy, Alzheimer's and Parkinson's disease</li></ol></li><li><b>2. Muscles</b><ol style="list-style-type: none"><li>2.1 Structure and type of muscles</li><li>2.2 Muscular disorders – Fatigue</li></ol></li><li><b>3. Hormones</b><ol style="list-style-type: none"><li>3.1 Definition and classification</li><li>3.2 Mechanism of hormone action</li></ol></li><li><b>4. Endocrine system</b><ol style="list-style-type: none"><li>4.1 Structure, functions and disorders of Pituitary gland, Thyroid gland, Adrenal gland and Pancreas</li></ol></li><li><b>5. Reproductive Physiology</b><ol style="list-style-type: none"><li>5.1 Physiology of reproduction</li><li>5.2 Sex Hormones</li></ol></li></ol> <p><b>Key words/Tags: Neuron, Impulse conduction, Muscle, Hormones, Pituitary gland, Reproduction</b></p>	10
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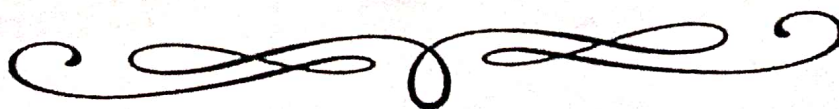
## Text Books, Reference Books

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3. Murray, R.K., Bender, D.A., Botham, K.M. Kennelly, P.J., Rodwell, V.W. and Well, P.A. "Harper's Illustrated Biochemistry", XXXVIII Edition, International Edition, The McGraw-Hill Companies Inc (2009).
4. Haines. B.D. and Hooper, N.M." Instant Notes in Biochemistry", II Edition, BIOS Scientific Publishers Ltd., U.K (2000).
5. Best & Taylor, "Physiological basis of Medical Practice" Wilkins Co (1990).
6. Guyton, A.C. & Hall, J.E., "Textbook of Medical Physiology", XI Edition Harcourt Asia PTE Ltd., W.B. Saunders Company (2006).
7. Tortora, G.J. & Grabowski, S.," Principles of Anatomy & Physiology", XI Edition, John Wiley & sons (2006).
8. Victor P. Eroshenko, diFiore's "Atlas of Histology with Functional Correlations" XII Edition, Lippincott W. & Wilkins (2008).
9. Vander A. Sherman J. And Luciano D, "Vander's Human Physiology: The Mechanism of Body Function". XIII Edition, McGraw Hills. (2014)
10. Hoar, W.S., " General Comparative Physiology & Biochemistry", Prentice & Hall (1975)
11. Subramanyam, S. and Madhavan Kutty, K. "The Textbook of Physiology", Orient Longman Ltd, New Delhi (1977).
12. Jain, J.L.et. al. "Fundamental of Biochemistry", S. Chand & co. New Delhi (2005)
13. Rastogi Veer Bala, "Text book of Animal Physiology", New Age International Publishers (2008).
14. Singh H.R., "Text book of Animal Physiology and Biochemistry", Vishal Publishing Co., 9<sup>th</sup> Edition (2014).
15. Kindt, T.J., Goldby, R.A., Osborne, B.A. & Kuby, J. " Immunology", VI Edition W.H. Freeman & company (2006)
16. Rastogi S.C., "Outline of Biochemistry" , CBS Publication, New Delhi 2007
17. Verma P.S., Tyagi B.S., Agrawal V.K., " Animal Physiology", S.Chand & company Ram nagar, New Delhi (2010)
18. Berry A.K., "A Text book of Animal Physiology", Emkay Publication, B-19, East Krishna Nagar, Swami Dayanand Marg, Delhi-11005(1991)

A. Saveng

V. Manohar

5/1/24





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## Practical Syllabus

Total No. of Lectures: 15 hrs.

Maximum Marks: 60

S,NO.	Topics	No. of lectures
1.	Qualitative estimations of Protein, Carbohydrates and Lipids. Study of effect of temperature and pH on salivary amylase activity. Study of enzymatic activity of Trypsin and Lipase. Detection of ammonia, urea and uric acid	15
2.	Estimation of haemoglobin using haemometer. Preparation of haemin crystals. Preparation of blood smear, study and identification of blood cells. Determination of ABO blood groups. RBC, WBC counting	
3.	Measurement of blood pressure using a sphygmomanometer.	
4.	Study of endocrine glands through histological slides of pituitary gland, adrenal gland, thyroid gland, pancreas, testis, ovary.	
5.	Study of histological slides of organs. Systems of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, and kidney.	
Keywords/Tags: Protein test, Haemoglobin, Blood Groups, Endocrine glands, Mammalian Systems		





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## SCHEME OF PRACTICAL EXAMINATION

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	10	Viva Voce on Practical	10
Attendance	10	Practical Record File	10
Assignments (Charts/Model/ Seminar/Rural Service/Technology Dissemination/ Report of Excursion/lab Visits/Survey/Industrial visit	20	<b>Table Work / Experiments</b>	<b>40</b>
		1. Slides of organ system (Spotting- Endocrine gland (03), Histological (03)	12
		2. Estimation of protein/ carbohydrates /fat in the given sample. (Any two).	06
		3. Detection of ammonia, urea, uric acid in the given sample	06
		4. Study of Enzyme Activity of salivary amylase/trypsin/lipase	06
5. Haematological experiments (Any two).	10		
<b>TOTAL</b>	<b>40</b>		<b>60</b>

*A. Saxena*

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*V. Anurag*

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