ST. ALOYSIUS' COLLEGE (AUTONOMOUS), JABALPUR

Reaccredited 'A++ 'Grade by NAAC(CGPA:3.58/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT

Theory Syllabus

Part A- Introduction				
Program: Diploma		Class: B. Sc.	Semester: IV	Session: 2025-26
Subject: Zoology				
1	Course Code	S2-ZOOL2T		
2	Course Title	Physiology and Biochemistry		
3	Course Type (Core	Core course-Major/Minor		
4	Pre-requisite (if any)	To study this course, a student must have had the Subject Zoology in class B.Sc.		
5	Course Learning outcomes (CLO)	Upon completion of the course, Students will be able to 1 How organs function at different levels i.e. from cellular to system levels. 2 Examine internal harmony of different body systems by learning inherent disorders and deficiencies, which is needed to maintain good health. 3 Understand functions of biomolecules & their role in metabolism by studying biochemistry. 4 Develop a strong foundation for research & employability skills 5 Improve the student's perspective of health biology through deep study of physiology.		
6	Credit Value	4		
7	Total Marks	Max. Marks: 40+60		

25/8/25

Part B — Content of the Course

Total No. of Lectures-Tutorials-Practical: (2 Hours per Week) L-T-P: No. of Lectures= 60

Unit	Topics	No. of Lectures
I	**Introduction and Historical background of Physiology and Biochemistry** **Biomolecules and Regulatory mechanism.** **1. Contribution of Indian Scientists** 1.1 Contribution of Charak 1.2 Contribution of Sushrut **2. Biomolecules** 2.1 Micro and Macro molecules 12 Water and Buffer System **3. Enzymes** 3.1 Definition and General Properties 3.2 Nomenclature and Classification and functions 3.4 Mechanism and Regulation of Enzyme action 3.5 Co-Enzyme **4. Vitamins and Minerals** 4.1 Types and Sources 4.2 Biological importance 4.3 Deficiencies and Disorders **Key words/Tags : Biomolecules, Buffer system, Enzymes, Vitamins,**	12
II	**Metabolism, Physiology and Regulation** **1. Protein** 1.1 Structure, Nomenclature, Classification and Biological importance. 1.2 Metabolism -Deamination, Decarboxylation, Transamination of amino acids and Ornithine cycle **2. Carbohydrates** 2.1 Structure, Nomenclature, Classification and Biological importance. 2.2 Metabolism -Glycogenesis, Gluconeogenesis, Glycogenolysis, Glycolysis, Citric Acid Cycle and Electron Transport Chain **3. Lipids** 3.1 Structure, Classification and Biological importance 3.2 Metabolism -Beta oxidation of fatty acids. 4. Physiology of Digestion, regulation and disorders 5. Homeostasis and Basal Metabolic Rate (BMR) 6. Thermoregulation **Key words/Tags: Proteins, Carbohydrates, Krebs cycle, Digestion, Homeotherms**	14

II	**Respiration, Excretion and Immune System** **1. Respiration** 1.1 Mechanism -Inspiration and Expiration 1.2 Physiology- Exchange and Transport of Gases (Oxygen and carbon dioxide), Chloride shift, role of Respiratory pigment. 1.3 Disorders - Apnea, Hypoxia, Asphyxia, Carbon monoxide poisoning, Bronchitis, Asthma **2. Excretion** 2.1 Physiology -Urea, Urine formation and Counter Current mechanism 2.2 Excretory products, disorders 2.3 Osmoregulation **3. Immunity** 3.1 Innate and acquired Immunity 3.2 Immune cells and Immuno Gobulinus 3.3 Antigen responses **Key words/Tags: Chloride shift, Excretion, Urea, Immunity, Antigen**	12
IV	**Neuromuscular Co-ordination** 1. Nerves 1.1 Structure and type of Neurons 1.2 Physiology of nerve impulse conduction 1.3 Neuromuscular disorders -Epilepsy, Alzheimer's and Parkinson's disease **2.Muscles** 2.1 Structure and type of muscles 2.2 Physiology of muscles contraction and its Biochemistry 2.3 Muscular disorders – Fatigue **Key words/Tags: Neuron, Impulse conduction, Muscle.**	10
V	**Hormones, Endocrine system and Reproductive Physiology** **1 Hormones** 1.1 Definition and Classification 1.2 Mechanism of hormone action **2 Endocrine system** 2.1 Structure, functions and disorders of Pituitary gland 2.2 Structure, functions and disorders of Thyroid and Parathyroid gland 2.3 Structure, functions and disorders of Adrenal gland 2.4 Structure, functions and disorders of Thymus gland, Pineal gland and Pancreas **3 Reproductive Physiology** 3.1 Physiology of reproduction 3.2 Sex Hormones **Key words/Tags: Hormone, Pituitary,** Thyroid gland, Adrenal, Sex Hormones	12

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Part C-Learning Resources

Text Books, Reference books Other resources

Suggested Readings:

1. Lehnniger A.L., Cox. M.M. and Nelson, D.L. "Principles of Biochemistry". Edition W.H. Freeman and Co., New York. (2008)
2. Berg. J.M., Tymoczko, J.L. and Stryer, L." Biochemistry", VI Edition W.H. Freeman and Co., New York. (2007)"
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 basig of Medical Practice" Wilkins Co (1990).
6. Guyton, A.C. & Hall, J.E., "Textbook of Medical Physiology", XI Edition Hercourt Asia PET 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. Erosehenko, 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^{111} 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)

23/08/25

Practical Syllabus

Part A Introduction				
Program : Diploma		Class:B.Sc.	Semester: IV	Session: 202-24
Subject: Zoology				
1	Course Code	S2-ZOOL2P		
2	Course Title	System Physiology and Biochemistry		
3	Course Type (Core Course/Elective	Core course		
4	Pre-requisite (if any)	To study this course, a student must have had the Subject Zoology in class B.Sc IV Sem		
5	Course Learning outcomes (CLO)	Upon completion of this course , students will be able to understand — I The effect of temperature and pH on enzyme activity. 2 Qualitative estimation of bimolecules and gain knowledge of their role in our body. 3 Various parameters of hematology and know importance of it for our healthy life. 4 The principle and working of instruments required for performing exercises in laboratory. 5 Collaborative learning and communication skills through practical sessions in laboratory. 6 Assignment and project writing process which will give them a flow o 7 f research and writing skills.		
6	Credit Value	2		
7	Total Marks	Max. Marks: 40+60	Min. Passing Marks : 35	

Part B — Content of the Course		
Total No. of Lectures-Tutorials-Practical : (2 Hours per Week) L-T-P : No. of Lectures= 30		
Unit	Topics	No. of Lectures
I	1. Qualitative estimations of Protein, Carbohydrates and Lipids. 2. Study of effect of temperature and pH on salivary amylase activity. 3. Study of enzymatic activity of Trypsin and Lipase. 4. Detection of ammonia, urea and uric acid	7
II	5. Estimation of hemoglobin using haemometer. 6. Preparation of haemin crystals. 7. Preparation of blood smear, study and identification of blood cells. 8. Determination of ABO blood groups. RBC, WBC counting	12
III	9. Measurement of blood pressure using sphygmomanometer. 10. Principles and uses of instruments-Sphygmomanometer, Stethoscope, iochemistry analyzer	5
Iv	11. Study of endocrine glands through histological slides of pituitary gland, adrenal gland, thyroid gland, pancreas, testis, ovary, spleen and thymus. 12. Study of histological slides of organ. systems of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, and kidney.	6
	Key word/Tags: Protein test, Haemoglobin, Blood Groups, Endocrine glands, Mammalian Systems.	

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Suggested Continuous Evaluation Methods:

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	Table work / Experiments 1. slides of organ system (Spotting- Histological slides, of endocrine glands (03), Histological 03), instruments 02 — 16 2. Estimation of protein/ carbohydrates /fat in 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 — 4 5. Haematological experiment -(any two) — 08	
Total	40	Total	60
Any Remark/Suggestions:			

03/08/25

A Saxena