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 – Minor (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	4	40	60	**100**	**35**
Practical	2	40	60	**100**	**35**
Total	**6**				

Evaluation Scheme

	Marks	
	Internal	**External**
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exam (At the End of Semester)
Practical	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 Lecture
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 2.2 Water and Buffer System **3. Enzymes** 3.1 Definition and General Properties 3.2 Nomenclature and Classification and functions 3.3 Mechanism and Regulation of Enzyme action 3.4 Coenzyme 4. **Vitamins and Minerals** 4.1 Types and Sources 4.2 Biological importance 4.3 Deficiencies and Disorders **Keywords/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 wsr Gastroenteritis & Constipation. 5. Homeostasis and Basal Metabolic Rate (BMR) 6. Thermoregulation **Keywords/Tags: Proteins, Carbohydrates, Krebs cycle, Digestion, Homeotherms**	14
III	**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 Immunoglobulins 3.3 Antigen responses **Keywords/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 **Keywords/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

31/7/24

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

Text Books, Reference Books

1. Lehninger 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 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., 9th 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)

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

Practical Syllabus

Maximum Marks: 60

Total No. of Lectures: 30 hrs.

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	7
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	12
3.	Measurement of blood pressure using a sphygmomanometer. Principles and uses of instruments-Sphygmomanometer, Stethoscope, Biochemistry Analyzer	5
4.	Study of endocrine glands through histological slides of pituitary gland, adrenal gland, thyroid gland, pancreas, testis, ovary, spleen and thymus.	3
5.	Study of histological slides of organs. Systems of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, and kidney.	3
Keywords/Tags: Protein test, Haemoglobin, Blood Groups, Endocrine glands, Mammalian Systems		

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

Practical Syllabus

Total No. of Lectures: 30 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	7
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	12
3.	Measurement of blood pressure using a sphygmomanometer. Principles and uses of instruments-Sphygmomanometer, Stethoscope, Biochemistry Analyzer	5
4.	Study of endocrine glands through histological slides of pituitary gland, adrenal gland, thyroid gland, pancreas, testis, ovary, spleen and thymus.	3
5.	Study of histological slides of organs. Systems of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, and kidney.	3

Keywords/Tags: Protein test, Haemoglobin, Blood Groups, Endocrine glands, Mammalian Systems

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

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	**Table Work / Experiments** 1. Slides of organ system (Spotting- Endocrine gland (03), Histological (03), Instruments (02) 2. Estimation of protein/ carbohydrates /fat in the given sample. (Any two). 3. Detection of ammonia, urea, uric acid in the given sample 4. Study of Enzyme Activity of salivary amylase/trypsin/lipase 5. Haematological experiments (Any two).	**40** 16 06 06 04 08
TOTAL	**40**		**60**