Department of Zoology
Rabindra Mahavidyalaya
Champadanga Hooghly

NOTICE

Date: 18th-January-2025

It is hereby informed to all the teachers and students that Syllabus distribution for Zoology Semester 3 classes will be as following.

Baisakhi Saha

Head of Department
Department of Zoology
Rabindra Mahavidyalaya
Champadanga Hooghly

Syllabus wise distribution of for 3-Year Degree/4-Year Honours in Zoology under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per NEP, 2020 with effect from 2023-2024

Semester - III

Major (4 Year & 3 Year)

Department Specific Course

OBJECTIVESOFTHESTUDY

The objective of this study is to foster enthusiasm among students for Biochemistry, highlighting its significance within the broader context of Zoology. Through this course, learners will gain an understanding of the fundamental chemistry that drives biological processes, enabling them to independently address challenges in both biology and chemistry. The curriculum covers the analysis of molecular structure and function, as well as the myriad chemical reactions occurring within living cells. It aims to ignite a sense of curiosity in students, encouraging them to explore the intricate mechanisms of various biomolecules and their interconnections. This program also seeks to motivate students to pursue advanced studies in Biochemistry and related interdisciplinary fields, thereby equipping them with the skills necessary for both salaried and entrepreneurial ventures.

Credits 5 (Theory: 4, Practical: 1)
Full Marks 75 (Theory: 40+Internal 15; Practical: 20) TOTAL NO. LECTURES (Theory: 50 + Practical: 10)

COURSE OUTCOMES:

- **This topic is designed to help learners to understand the objectives of studying Biochemistry.**
- **The learner will get a clear concept of the structures and reactions of different biomolecules in the living system.**
- **Learners will cope with the fast and far-reaching advancement of biological sciences in this century and be able to update themselves with the emerging concept of biochemistry.**
- **Students will develop a deep interest in this subject, which is very important for daily life and also for different competitive examinations.**

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (50)	Assign Teacher
ZOOL3031 [Major/DS Course (Core)] Biochemistry	1	Water:	Unique properties, weak interactions in aqueous systems, ionization of water, buffers, water as a reactant and fitness of the aqueous environment.	3	Souren Dutta
	2	Carbohydrates:	Structure and Biological importance of Carbohydrates: Monosaccharides, Disaccharides, Polysaccharides. Derivatives of Monosaccharides. Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis	10	Piyali Pakhira
	3	Protein:	General and Electrochemical properties of α-amino acids; Essential and nonessential amino acids and their physiological importance. Structures and classification ofproteins. Protein metabolism: Transamination, Deamination, Urea cycle.	15	Piyali Pakhira
	4	Lipid:	Structure and Significance of lipids: Physiologically important saturated and unsaturated fatty acids, Tri-acyl glycerol's, Phospholipids, Sphingolipid, Glycolipids, Steroids. Lipid metabolism: β-oxidation of fattyacids	10	Piyali Pakhira
	5	Nucleic acid:	Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids. Types of DNA and RNA, Complementarity of DNA, Hypo-Hyper chromaticity of DNA.	10	Souren Dutta

	6	Enzymes:	Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes. Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis Menten Equation, Lineweaver-Burk plot; Factors affecting rate of enzyme-catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their Factors affecting rate of enzyme catalyzed reactions.	10	Souren Dutta
	7	Oxidative Phosphorylation:	Redox systems; Overview of the mitochondrial respiratory chain, Mitochondrial Uncoupling.	2	Piyali Pakhira

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL3031 [Major/DS Course (Core)] Biochemistry	Water: Nucleic acid: Enzymes:	Souren Dutta	9475671886/7031282464 srndutta@gmail.com	2
	Carbohydrates: Protein: Lipid: Oxidative Phosphorylation:	Piyali Pakhira	8250576414/7718534071 tukupakhira@gmail.com	3
	Total			5

Paper Codeand Subject	Unit	Topics (Credits:5)	Total No. Lectures (10)	AssignTeacher
ZOOL3031 [Major/DS Course (Core)] Biochemistry	1	*a)* Qualitative tests of functional groups in carbohydrates (Benedict's test),	1	Souren Dutta
		b) Qualitative tests of functional groups in proteins (Biuret'stest)	1	Souren Dutta
		c) Qualitative tests of functional groups in lipids (Saponification number)	1	Souren Dutta
	2	To study the enzymatic activity of Salivary amylase.	2	Piyali Pakhira
	3	Quantitative estimation of protein by Lowry Method	3	Souren Dutta
	4	Paper chromatography of Amino acids. (hands-on/virtual)	1	Souren Dutta
	5	Demonstration of protein sample preparation and separation by SDS-PAGE (hands-on/virtual)	1	Souren Dutta

Internal

Paper	Syllabus (Unit number Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL3031 [Major/DS Course (Core)] Biochemistry	1,3,4,5	Souren Dutta	9475671886/7031282464 srndutta@gmail.com	3
	2	Piyali Pakhira	8250576414/7718534071 tukupakhira@gmail.com	2
	Total			5

OBJECTIVES OF THE STUDY

To give an idea of the different structures involved in cellular organization, both within and outside the cell; outline knowledge of division and signaling at cellular level and a detailed idea of the important subcellular components that are involved in the process of transportation of molecules to and from the cell, as well as synthesis of various proteins and ATP.

Credits 5 (Theory: 4, Practical: 1)
Full Marks 75 (Theory: 40+Internal 15; Practical: 20) TOTAL NO. LECTURES (Theory: 50 + Practical: 10)

COURSE OUTCOMES:

- **The students will learn about the different subcellular components-their structure, function and biochemical properties, organization at cellular level with respect to extracellular matrix, cytoskeleton, cell junction, cell signaling and cell division.**
- **They will also have an outline knowledge of cancer cells and apoptosis.**

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (60)	Asign Teacher
ZOOL3031 [Major/DS Course (Core)] Cell Biology	1	Plasma Membrane:	Membrane Lipids and Proteins. Architecture of Plasma membrane on the basis of Fluid Mosaic Model (Singer and Nicolson,1972, Nicolson 2014). Transport across membrane: LDL Receptor mediated Endocytosis, Simple diffusion (O_2 and CO_2 transport), Facilitated diffusion (Glucose transportation, Na^+ and K^+ transportation), primary active transport (Na^+-K^+ anti-transportation) and secondary active transports (Na^+ - glucose co-transportation)	12	Palas Kanti Manna
	2	Cellular Organization:	Extracellular Matrix: Components and their role. Cytoskeleton: Basic structure and dynamics of Actin, Microtubule, and Lamin. Microtubule associated motor proteins. Cell junctions: Occluding junction (tight junction and septate junction), anchoring junction (cell-cell and cell-matrix) and communicating junction (gap junction)	10	Palas Kanti Manna
	3	Cytoplasmic Organelles- I:	**Endoplasmic Reticulum:** Structure and Function (Co-translational translocation of proteins through ER membrane, Glycosylation and Chaperone mediated folding of protein).	12	Dr. Eureka Mondal
			Golgi Apparatus: Structure and functions of individual compartments, vesicular transport and cisternal maturation model of Golgi.		
			Lysosome: Structure and functions.		
			Protein sorting and mechanisms of vesicular transport.		

	4	Cytoplasmic Organelles -II:	**Mitochondria:** Outline structure, Mitochondrial respiratory chain, and generation of proton motive force. Structure of F_oF_1 complex, chemiosmotic and Binding-change hypotheses of ATP Synthesis. **Nucleus:** Nuclear pore complex and transportation of mRNA through nuclear pore complex. Nucleosome, solenoid, and zigzag model of DNA packaging, nucleolus	10	Dr. Eureka Mondal
	5	Cell Division:	Cell cycle and its regulation in vertebrates; role of cyclins. Mitotic and Meiotic Cell divisions. Types and basic process; MTOC and its role in chromosome movement. Cancer: Properties of cancer cells in brief.	10	Dr. Baisakhi Saha
	6	Cell Signaling:	Overview of cell signaling transduction pathways; Types of signaling molecules and receptors (Classification and examples only). Basic concept of Apoptosis, cytological features of an apoptic cell.	6	Dr. Baisakhi Saha

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉
ZOOL3031 [Major/DS Course (Core)] Cell Biology	Plasma Membrane: Cellular Organization:	Palas Kanti Manna	9732381772, 9382113782 palasmanna84@gmail.com
	Cytoplasmic Organelles- I: Cytoplasmic Organelles -II:	Dr. Eureka Mondal	8250656417, 9476440223 mondal.eureka87@gmail.com/ eurekaugb@gmail.com/
	Cell Division: Cell Signaling	Dr. Baisakhi Saha	9433315086, 9477549801 baisakhisaha008@gmail.com, baisakhisaha08@gmail.com
	Total internal marks 5		

Paper Code and Subject	Unit	Topics(Credits:3)	Total No. Lectures (10)	Assigned Teacher
ZOOL3031 [Major/DS Course (Core)] Cell Biology	1	Basic idea of light and dark field of microscopy (demonstration).	1	Dr. Baisakhi Saha
	2	Preparation of squamous epithelial cell (fixation and staining).	1	Dr. Baisakhi Saha
	3.	Standardization of ocular and stage micrometer and measurement of any cell.	3	Dr. Baisakhi Saha
	4.	Preparation of temporary stained squash of onion root tip to study various stages of mitosis.	1	Palas Kanti Manna
	5	Squash preparation of grasshopper testis and study of the various stages of meiosis.	2	Dr. Eureka Mondal
	6	Study of Mitotic index from onion root tip cells	1	Palas Kanti Manna

Internal

Paper	Syllabus (Unit Wise)	Assign Teacher	✆& ✉
DSC-2011 CHORDATE [Practical]	One question on squash preparation (from unit No. 4, 5 and 6) Preparation of slide/ measurement (From unit 2and 3) Identification of stages of mitosis and meiosis cell division (2X4) Laboratory Notebook- Total	Palas Kanti Manna Dr. Eureka Mondal Dr. Baisakhi Saha	9732381772, 9382113782 palasmanna84@gmail.com, 8250656417, 9476440223 mondal.eureka87@gmail.com/ eurekaugb@gmail.com/ 9433315086, 9477549801 baisakhisaha008@gmail.com, baisakhisaha08@gmail.com

Skill Enhancement Course

Objectives of the Course

This Skill Enhancement Course aims to enlighten students on the health status of patients with simple diagnostic tests and evaluations. This course will help to make students self-sufficient in future. They are expected to be adept in laboratory techniques.

Credits 5 (Theory: 4, Practical: 1)
Full Marks 50 (Theory: 40+Internal cum Practical: 10) TOTAL NO. LECTURES (Theory: 45 including Practical)

Course Outcomes:

After completion of course, students will be able to:

1. Learn basic understanding of the structure of the human body.
2. Learn aspects related to medical diagnosis.
3. Learn to perform tests which help in the diagnosis and treatment of diseases.
4. Handle laboratory instruments.
5. Students are expected to be economically self-sufficient.

Paper Code and Subject	Unit	TOPICS(Credits:3)	TOTALNO. LECTURES (45)	Assign Teacher
ZOOL3051 [Skill Enhancement Course (SEC)] Medical Diagnostics	1	Introduction to Medical Diagnostics and its Importance	3	Dr. Payel Bhattacharjee
	2	Diagnostics Methods Used for Analysis of Blood: Blood composition, Preparation of blood smear and Differential Leucocyte Count (D.L.C) using Leishman's stain. Platelet count using hemocytometer, Erythrocyte Sedimentary Rate (E.S.R), Packed Cell Volume (P.C.V.)	10	Dr. Payel Bhattacharjee
	3	Diagnostic Methods Used for Urine Analysis: Urine Analysis: Physical characteristics; Abnormal constituents	4	Dr. Payel Bhattacharjee
	4	Non-infectious Diseases: Causes, types, symptoms, complications, diagnosis and prevention of Diabetes (Type I and Type II), Hypertension (Primary and secondary),Testing of blood glucose using Glucometer/Kit	6	Dr. Payel Bhattacharjee
	5	Infectious Diseases: Causes, types, symptoms, diagnosis and prevention of Tuberculosis and Hepatitis, Malarial parasite; Microscope based, and ELISA based)	6	Dr. Baisakhi Saha
	6	Clinical Biochemistry: LFT, Lipid profiling	3	Dr. Payel Bhattacharjee
	7	Clinical Microbiology: Antibiotic Sensitivity Test	3	Dr. Payel Bhattacharjee
	8	Tumors: Types (Benign/Malignant), Detection and metastasis. Medical imaging: X-Ray of Bone fracture, PET, MRI, and CT scan (using photographs).	6	Dr. Payel Bhattacharjee
	9	Visit to Pathological Laboratory and Submission of Project (Internal assessment) *	4	Dr. Payel Bhattacharjee

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉
ZOOL3051 [Skill Enhancement Course (SEC)] Medical Diagnostics	1,2,3,4,6,7,8,9	Dr Payel Bhattachrjee	9477159440/9051141362/payel.iicb@gmail.com/ drpayelb.rmz@gmail.com
	5	Dr. Baisakhi Saha	9433315086, 9477549801 baisakhisaha008@gmail.com, baisakhisaha08@gmail.com
	Total internal marks 5		