Department of Zoology
Rabindra Mahavidyalaya
Champadanga Hooghly

NOTICE

Date: 27th -November-2025

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

Payel Bhattacharjee

Head of Department
Department of Zoology
Rabindra Mahavidyalaya
Champadanga Hooghly

Syllabus wise distribution 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

Department of Zoology Mail Id: rabindramahavidyalayazoology@gmail.com

Semester V

Rabindra Mahavidyalaya Champadanga, Hooghly, West Bengal, India PIN-712401

Department of Zoology Mail Id: rabindramahavidyalayazoology@gmail.com

Major (4 Year & 3 Year)

Rabindra Mahavidyalaya Champadanga, Hooghly, West Bengal, India PIN-712401

Department Specific Course

Objectives of the Study:

To develop conceptual clarity of Mendelian principles of inheritance and other forms and patterns.

To introduce the concept of sex determination and its types sex-linked, sex-influence and sex-limited genes.

To develop an understanding of genetic variability within a population and learn as to how the changes take place.

Credits 5 (Theory:4, Practical: 1) Full Marks 75 (Theory: 40+Internal 15; Practical: 20) Number of Lectures: 60

Course Outcomes:

- Integrate the knowledge of principles of inheritance.
- Imbibe the concept of chromosomes, multiple alleles, linkage, crossing over, sex determination.
- Compare the structure and types of chromosomes, genetic disorder and cancer.

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (60)	Assign Teacher
ZOOL5011 [Major/DS Course (Core)] Genetics	1	Mendelism and its Deviation	Blending inheritance, particulate theory, pair factor rule, law of dominance, law of segregation, chromosomal theory of inheritance, chromosomal basis of segregation, independent assortment **Deviation of Mendelism**: Incomplete dominance, codominance, multiple alleles, epistasis and pleiotropy Sex-influenced genes, sex-limited genes and sex-linked genes (Examples from *Drosophila* and human)	15	Piyali Pakhira
	2	Linkage and Crossing Over	Linkage (complete, incomplete). Construction of linkage map by three-point test cross Coefficient of coincidence and interference Molecular basis of crossing over (Holliday Model, 1964)	10	Piyali Pakhira
	3	Sex Determination:	Mechanism of sex determination in Drosophila & Human. Dosage compensation in Drosophila & Human Parental imprinting in human.	7	Dr. Eureka Mondal
	4	Mutations	Types of gene mutations, detection of mutations in Drosophila: CLB method, attached X method **Mutagens:** Physical and chemical, molecular basis of spontaneous and induced mutations Chromosomal aberrations: Variations in number and structure	9	Piyali Pakhira
	5	Extra-chromosomal Inheritance	Comparison of nuclear and extra nuclear inheritance. **Maternal effects**: Kappa particle in *Paramoecium*, shell coiling in *Limnaea*.	05	Dr. Eureka Mondal

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (60)	Assign Teacher
	6	Transposable Genetic Elements	Transposons in bacteria Ac-Ds elements in maize and P elements in *Drosophila*, Transposons in humans (LINE, SINE, Alu).	5	Dr. Eureka Mondal
	7	Genetic basis of diseases	Concept of oncogene, activation of oncogene (mutation, gene amplification and chromosomal rearrangement) Tumour suppressor genes (Rb and p53 genes) Molecular diagnosis of genetic diseases (Cystic fibrosis, Sickle cell anaemia) Human karyotype and karyotyping; Banding techniques	9	Dr. Eureka Mondal

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL5011 [Major/DS Course (Core)] Genetics	1,2,4	Piyali Pakhira	8250576414, 7718534071 tukupakhira@gmail.com	2
	3,5,6,7	Dr. Eureka Mondal	8250656417, 9476440223 mondal.eureka87@gmail.com/ eurekaugb@gmail.com/	3
	Total			5

Paper Codeand Subject	Unit	Topics (Credits:5)	Total No. Lectures (10)	Assign Teacher
ZOOL5011 [Major/DS Course (Core)] Genetics	1	Chi-square Analysis: Test for Goodness of Fit. Mendelian monohybrid and dihybrid ratios	2	Piyali Pakhira
	2	Problems of Linkage maps of Drosophila.	2	Piyali Pakhira
	3	Identification of Chromosomal aberration in Drosophila - inversion (paracentric & pericentric), ring chromosome (from photographs/prepared slides)	2	Piyali Pakhira
	4	Study of Human karyotype, normal and abnormal (Down, Klinefelter, Turner's, Cri-du-Chat, C M L Karyotype) (from Photograph)	2	Piyali Pakhira
	5	Pedigree analysis of some human inherited traits (autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive, Y-linked).	2	Piyali Pakhira

Internal

Paper	Syllabus (Unit number Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL5011 [Major/DS Course (Core)] Genetics	1,2,3,4,5	Piyali Pakhira	8250576414, 7718534071 tukupakhira@gmail.com	5
	Total			5

OBJECTIVES OF THE STUDY

• To give an idea of the relationship between DNA, RNA and protein synthesis, to study the interaction of different factors regulating these processes and the different processes of DNA repair.

Credits 5 (Theory:4, Practical: 1) Full Marks 75 (Theory: 40+Internal 15; Practical: 20) Number of Lectures: 60

COURSE OUTCOMES:

The students will be able to understand the molecular basis of various biological processes and the diverse mechanisms of gene regulation.

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (60)	Assign Teacher
ZOOL5012 [Major/DS Course (Core)] Molecular Biology	1	DNA Replication	Enzyme and protein factors associated with replication; mechanism of replication in prokaryotes Replication and maintenance of telomeres	10	Palas Kanti Manna
	2	Transcription	Fine structure of gene **Transcription**: RNA polymerases, transcription factors, initiation, elongation and termination of transcription in prokaryotes Promoters and factors of class I, class II and class III genes of eukaryotes	10	Palas Kanti Manna
	3	Modification and Processing of Primary Transcripts	Capping and Poly A tail formation in mRNA. Spliceosome-mediated splicing of RNA, self-splicing of group I and group II introns RNA editing (gRNA-mediated)	10	Palas Kanti Manna
	4	Translation	Genetic code: Degeneracy and Wobble hypothesis Role of aminoacyl-tRNA synthetase in proofreading and editing Mechanism of translation in prokaryotes	10	Palas Kanti Manna
	5	Posttranslational Modification	Methylation, acetylation, phosphorylation, hydroxylation, glycosylation	03	Souren Dutta
	6	Gene Regulation	Regulation of DNA replication in prokaryotes: DNA methylation Regulation of transcription in prokaryotes: lac-operon and trp-operon (attenuation) Regulation of transcription in eukaryotes: Activator, silencer, enhancer and repressor Gene silencing (siRNA and miRNA-mediated)	10	Souren Dutta

Paper Code and Subject	Unit	TOPICS (Credits: 5)		TOTAL NO. LECTURES (60)	Assign Teacher
	7	DNA Repair Mechanism	Molecular basis of: Photoreactivation repair, Nucleotide and base excision repair, SOS repair, Rec BCD model of repair in prokaryotes	7	Souren Dutta

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL5012 [Major/DS Course (Core)] Molecular Biology	1, 2, 3,4,5	Palas Kanti Manna	9732381772, 9382113782 palasmanna84@gmail.com	4
	6, 7	Souren Dutta	7031282464, 9475671886 srndutta@yahoo.com	1
	Total internal marks			5

Paper Code and Subject	Unit	Topics(Credits:3)	Total No. Lectures (10)	Assigned Teacher
ZOOL5012 [Major/DS Course (Core)] Molecular Biology	1	Demonstration of agarose gel electrophoresis for DNA	2	Dr Payel Bhattacharjee
	2	Isolation of genomic DNA from any suitable source.	2	Dr Payel Bhattacharjee
	3.	Quantification of DNA by Diphenylamine (DPA) method	2	Dr Payel Bhattacharjee
	4.	Study and interpretation of electron micrographs/ photographs showing: DNA replication; Transcription; Split genes	2	Dr Payel Bhattacharjee
	5.	Visit to a Molecular Biology Lab	2	Dr Payel Bhattacharjee

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Paper	Syllabus (Unit Wise)	Assign Teacher	✆ & ✉	Marks Weightage
ZOOL5012 [Major/DS Course (Core)] Evolutionary Biology & Ethology	1,2,3,4,5	Dr Payel Bhattacharjee	9477159440/9051141362/payel.iicb@gmail.com/ drpayelb.rmz@gmail.com	5
	Total internal marks 5			

Objectives of the Course

- To understand Biotechnology, which is a major tool in modern research, especially in biological sciences, medical sciences, forensic science, and environmental science
- To know the various techniques for research work
- It is truly regarded as the scientific technology of the twenty-first century

Credits 5 (Theory: 4, Practical: 1)
Full Marks 50 (Theory: 40+Internal cum Practical: 10) TOTAL NO. LECTURES 60

Course Outcomes:

At the end of the course, the students will be able to develop the skill of modern techniques of biological tools at the molecular level of research; enhance basic laboratory skills like keen observation, analysis, and discussion; learn the functional attributes (molecular level) of different cell type and disorder of the various cell and help in diagnosis of the different disorders.

Paper Code and Subject	Unit		TOPICS (Credits: 5)	TOTAL NO. LECTURES (60)	Assign Teacher
ZOOL5013 [Major/DS Course (Core)] Animal Biotechnology	1	Overview	Aims and scope, applications in biotechnology	5	Dr. Baisakhi Saha
	2	Principles of Gene Manipulation	Cloning vectors: Plasmids, cosmids, phagemids, lambda bacteriophage, M13, BAC, YAC, MAC, and expression vectors (characteristics) Restriction enzymes and their types, DNA modifying enzymes	10	Dr. Baisakhi Saha
	3	Recombinant DNA Technology	Insertion of foreign DNA into vector, introduction of vector into host, selection (antibiotic selection and blue-white selection) Construction of genomic and cDNA libraries and screening by colony and plaque hybridisation Polymerase Chain Reaction, DNA fingerprinting, and DNA microarray DNA sequencing: Sanger method	15	Dr Payel Bhattacharjee
	4	Applications of Genetic Engineering	Production of cloned and transgenic animals: Nuclear transplantation, retroviral method, DNA microinjection Applications of transgenesis: Production of molecular pharming, production of donor organs, knockout mice Blotting techniques: Southern, Northern and Western	20	Dr Payel Bhattacharjee
	5	Culture Techniques and Applications	Type of animal cell cultures, cryopreservation, and animal cell culture for vaccine development	10	Dr Payel Bhattacharjee

Internal

Paper	Syllabus (Unit Wise)	Assigned Teacher	✆ & ✉	Marks Weightage
ZOOL5013 [Major/DS Course (Core)] Animal Biotechnology	1, 2	Dr. Baisakhi Saha	9433315086, 9477549801 baisakhisaha008@gmail.com, baisakhisaha08@gmail.com	2
	3,4,5	Dr Payel Bhattacharjee	9477159440/9051141362/payel.iicb@gmail.com/ drpayelb.rmz@gmail.com	3
	Total internal marks			5

Paper Code and Subject	Unit	Topics(Credits:3)	Total No. Lectures (15)	Assigned Teacher
ZOOL5013 [Major/DS Course (Core)] Animal Biotechnology	1	Construction of linear restriction map from the data provided	5	Dr. Baisakhi Saha
	2	Calculation of transformation efficiency from the data provided	4	Dr Payel Bhattacharjee
	3.	Study and identification of the following techniques through photographs i. Southern Blotting ii. Northern Blotting iii. Western Blotting iv. DNA Sequencing (Sanger method) v. PCR vi. DNA fingerprinting	8	Dr Payel Bhattacharjee
	4.	Review of a scientific research paper on Animal Biotechnology	-	Dr Payel Bhattacharjee

Internal

Paper	Syllabus (Unit Wise)	Assign Teacher	✆ & ✉
ZOOL5013 [Major/DS Course (Core)] Animal Biotechnology	1,2	Dr. Baisakhi Saha	9433315086, 9477549801 baisakhisaha008@gmail.com, baisakhisaha08@gmail.com
	3,4	Dr Payel Bhattacharjee	9477159440/9051141362/payel.iicb@gmail.com/ drpayelb.rmz@gmail.com
	Total internal marks 5		