Department of Zoology, Basirhat College

Session-2021-2022 (July-Dec)

Lesson Plan- For Odd Semesters

Semister- 1st SEM Honours

Lesson Plan for Course: NON-CHORDATES-I..Code: ZOOACOR01T…. Credit: 4….

1. Course coordinator:..**UDAY HOSSAIN**…
2. Course Outcome :
   - i) CO1: Understand the general characteristics of Protists, Parazoa, and Metazoan phyla up to nemathelminthes, and can classify them up to class.
   - ii) CO2: Critically analyse the organisation, special characteristics, and life cycle traits of some selected animals from phylum porifera to nemathelminthes.
   - iii) CO3: Understand the evolutionary significance of symmetry, segmentation of Metazoa and parasitism in helminths.
   - iv) CO4: Able to appreciate the importance of conservation through the study of formation and degradation of coral reefs around the world.
   - v) CO5: Can identify organisms of the above-mentioned taxa by inspecting through microscope or naked eye.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
OCT	**Unit 1: Protista, Parazoa and Metazoa**	**Uday Hossain**		
	General characteristics and Classification up to classes		4	Theoretical, PPT presentation, Google meet, animation from YouTube
	Study of *Euglena*, *Amoeba* and *Paramoecium*		3	Theoretical, PPT presentation , Google meet
	Life cycle and pathogenicity of *Giardia intestinalis*, *Leishmania donovani*, *Entamoeba histolytica* and *Plasmodium vivax*		3	Theoretical, PPT presentation, Google meet
	Locomotion and Reproduction in Protista		2	Theoretical, PPT presentation, Google meet
	Evolution of symmetry and segmentation of Metazoa		1	Theoretical, PPT presentation, Google meet
	Unit 2: Porifera	**Uday Hossain**		
	General characteristics and Classification up to classes		2	Theoretical, PPT presentation,

				Google meet, animation from YouTube
	Canal system and spicules in sponges		2	Theoretical, PPT presentation, Google meet, animation from YouTube
Nov	**Unit 3: Cnidaria**	**Uday Hossain**		
	General characteristics and Classification up to classes		2	Theoretical, PPT presentation, Google meet, notes in Google classroom
	Metagenesis in *Obelia*		3	Theoretical, PPT presentation, Google meet
	Polymorphism in Cnidaria		3	Theoretical, PPT presentation, Google meet
	Corals and coral reefs: types, formation, distribution, conservation significance		3	Theoretical, PPT presentation, Google meet
	Unit 4: Ctenophora	**Uday Hossain**		
	General characteristics		3	Theoretical, PPT presentation, Google meet, notes in Google classroom, animation from YouTube
Dec	**Class Test**		1	In Google classroom
	Unit 5: Platyhelminthes	**Uday Hossian**		
	General characteristics and Classification up to classes		3	Theoretical, PPT presentation, Google meet, animation from YouTube, notes in Google classroom
	Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium*		4	Theoretical, PPT presentation, Google meet, notes in Google classroom
	Mid-Term Internal exam			Online

	Unit 6: Nemathelminthes	**Uday Hossian**		
	General characteristics and Classification up to classes		2	Theoretical, PPT presentation, Google meet, notes in Google classroom
	Life cycle, and pathogenicity of *Ascaris lumbricoides, Ancylostoma duodenale and Wuchereria bancrofti*		4	Theoretical, PPT presentation, Google meet, notes in Google classroom
	Parasitic adaptations in helminths		2	Theoretical, PPT presentation, Google meet
	Origin and evolution of parasitic helminthes		2	Theoretical, PPT presentation, Google meet
	Class test		1	Google classroom
			Total- 50 hours	

Resources :

1. Books: Invertebrate Zoology (Jordan -Verma), Biology Of Non-Chordates (Fatik Baran Mondal), Non-chordate-I(Niranjan Routray)

2. Other resources : Youtube animation links, Wikipedia, some ebooks

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms)

Lesson Plan for Course:…ECOLOGY…… Code…ZOOACOR02T.. Credit……04…

- Course coordinator:……**Arpita Mondal**……
- Course Outcome
  - ✓ CO1: To understand the ecological term like population , community, ecosystem etc.
  - ✓ CO2: To analyse the mathamatical problems of natality and mortality rate with the net reproductive rate.
  - ✓ CO3: To learn the information about the human disease and their genetical aspects.
  - ✓ CO4: To understand the conservation methods and protection act.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
oct	Unit-1: INTRODUCTION TO ECOLOGY. 1. History of ecology 2. Autecology, Synecology. 3. Levels of organization.	AM	02	Online Lecture Method, PPT Presentation.
	4. Laws of limiting factors 5. The biosphere.	AM	01	Online Lecture Method, PPT Presentation.
	6. Physical factors.	AM	02	Online Lecture Method, PPT presentation.
	Unit-2: POPULATION 1. Life tables	AM	02	Online Lecture Method, PPT presentation.
Nov	2. Survivorship curves	AM	01	Online Lecture Method, PPT presentation.
	3. Exponential and Logistic growth.		01	Offline lecture method, PPT presentation.
	4. r and K strategies Population regulation. 5. Density dependent and independent factors.		02	Offline lecture method, PPT presentation.
	6. An examination held on Unit -1 and Unit-2.		01	An examination held in classroom.

	Unit-3: Community 1. Community characteristics: species diversity, abundance, dominance,richnes s.	AM	02	Offline Lecture Method, PPT presentation. .
Dec	2. Ecotone. 3. Ecological succession start..	AM	01	Offline Lecture Method, PPT presentation.
	4. Ecological succession and example of it.	AM	02	Offline Lecture Method, PPT Presentation.
	5. An examination held on the topic of Unit-	AM	01	An examination is held on the topic of Unit-3 classroom.
An internal examination is held on the topic of Unit-1, 2, 3 via online through GC.				
	Unit-4: Ecosystem 1. Food chains: Detritus and grazing food chain.	AM	02	Offline Lecture Method, PPT presentation.
	2. Food web, Energy flow through ecosystem.		02	Offline Lecture Method, PPT presentation.

Course planner

	3. Food web, Energy flow through the ecosystem.	AM	02	Offline Lecture Method, PPT Presentation.
	4. Ecological pyramids and ecological efficiencies.	AM	02	Offline Lecture Method, PPT Presentation.
Jan	5. An examination is held on the topic of Unit-4.	AM	01	Offline Lecture Method, PPT Presentation.

	Unit-5: Applied Ecology 1. Conservation(Ex-situ and In situ conservation).	AM	01	Offline Lecture Method, PPT Presentation.
	2. Wild life protection act(1972).	AM	01	Offline Lecture Method, PPT Presentation.
	3. An examination is held on the topic of Unit-5	AM	01	
	TOTAL CLASS	AM	29	
END SEM EXAMINATION START				

Resources :

Books: Fundamentals of ECOLOGY (English,Paperback,Dr.P.D.Sharma).

ELEMENTS OF ECOLOGY. (Thomas M. Smith)

Other resources : Internet sources such as Wikipedia.

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

Semister- 3rd SEM Honours

Lesson Plan for Course: Chordates……Code: ZOOACOR05T……Credit: 4

Course coordinator: **Chinmoy Ghosh**

Course Outcome

Upon completion of the course, the students will be able to:

CO1. Comprehend the the characteristics in different classes of chordates.

CO2. Recognize an animal as an individual of specific group or subgroup of chordates from itscharacteristics and distinguishing features.

CO3. Appreciate the course of evolution from the similarities and differences in lifeform andfunctions among various groups ofanimals in Phylum Chordata.

CO4. Elucidate specific way of living in different classes of chordates.

CO5. Understand the distribution of chordates in different continents and can explain the possiblereason of it.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	**Unit 1: Introduction to Chordates** General characteristics and outline classification of Phylum Chordata	CG	2	Online class, slide presentation
	Unit 2: Protochordata General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. Metamorphosis in Ascidia	CG	3	Online class, slide presentation
	Chordate Features and Feeding in Branchiostoma	CG	3	Online class, slide presentation
	Unit 3: Origin of Chordata Dipleurula concept and the Echinoderm theory of origin of chordates. Advanced features of vertebrates	CG	3	Online class, slide presentation, Assignments

	overProtochordata.			
	Unit 4: Agnatha General characteristics and classification of cyclostomes up to order	CG	2	Online class, slide presentation, Video presentaion
	Assesment test		1	Online quiz
Oct	**Unit 5: Pisces** General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses.	CG	3	Online class, slide presentation
	Migration and parental care in fishes	CG	3	Online class, slide presentation
	Accessory respiratory organ, Swim bladder in fishes.	CG	2	Online class, slide presentation
	Unit 6: Amphibia General characteristics and classification up to living Orders.Metamorphosis in amphibia.	CG	3	Online class, slide presentation
Nov	Parental care in Amphibia	CG	2	Online class, slide presentation
	Unit 7: Reptilia General characteristics and classification up to living Orders Poison apparatus and Biting mechanism in Snake	CG	3	Online class, slide presentation, video presentation
	Unit 8: Aves General characteristics and classification up to Sub-Classes. Exoskeleton in birds.	CG	2	Peer study, Group discussion
	Mid term examination		0	Online Assignment
Dec	**Unit 9: Mammals** General characters and classification up to living orders. Phylogenetic significance of Prototheria	CG	2	Online class, slide presentation
	Exoskeleton derivatives of mammals Adaptive radiation in mammals with reference to locomotory appendages. Echolocation in Microchiropterans and Cetaceans	CG	3	Online class, slide presentation
	Unit 10: Zoogeography Zoogeographical realms, Plate tectonic and Continental drift theory,Distribution of birds and mammals in different realms	CG	3	Online class, slide presentation
	End term exam		0	

	Total Class Hour		42	

Resources :

Recommended Online resources:

- Online Study material given in Google Classroom
- Referred You tube videos as advised in Google classroom

Text Book:

- Kardong, K. V. (2002). Vertebrates: Comparative anatomy, function evolution. McGraw Hill4th Ed.2005.
- Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford university press.
- Pough H. Vertebrate life, VIII Edition, Pearson International.

References:

- Students are encouraged to explore authentic websites (for e.g. wikipedia, different universitywebsites and OCWs) at internet for reading / audio-visual materials on a particulartopic if they don'tfind enough in the text books or otherwise)
- Comparative Anatomy of the Vertebrates 9th Ed (2015) by Kent; McGrew-Hill
- Elements of Chordate Anatomy by Weichert and Presch, 2017, Amazon.in
- Biology of Animals; Sinha, Ganguli, Adhikari

Lesson Plan for Course: Physiology……Code: ZOOACOR06T……Credit: 4

- Course coordinator:…**RAJASHREE MALLICK**……
- Course Outcome
  - ✓ CO1: Understand the cell, tissue, organ, system and organisms.
  - ✓ CO2: Understanding of the nerve impulses conducted at myelinated and nonmyelinated nerve fibre
  - ✓ CO3: To gain the knowledge of the different endocrine glands, its structure and function

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Unit 1: Tissues Structure,	Rajashree Mallick		Online using google meet
	locations,	Rajashree Mallick		Online using google meet
	UNIT 2: Bone Havarsian , Bone devlopment	Rajashree Mallick		Online using google meet
	Epithelial and connective tissues Muscle tissue	Rajashree Mallick		Online using google meet
	Unit 3 : Neuron structure ,Synaps Neurotransmission	Rajashree Mallick		Online using google meet
	Reflex	Rajashree Mallick		Online using google meet
Oct	UNIT 4: Muscle structure Types of muscle	Rajashree Mallick		Online using google meet
	Ultra structure of skeletal muscle	Rajashree Mallick		Online using google meet
	practical	Rajashree Mallick		Online using google meet
	Molecular and chemical basis of muscle contraction	Rajashree Mallick		Online using google meet
	pracical	Rajashree Mallick		Online using google meet
Nov	Unit 6: Endocrine System Histology of pituitary, Function of	Rajashree Mallick		Online short test using google classroom

	pituitary			
	Characteristics of muscle fiber	Rajashree Mallick		Online demonstration using google meet
	Unit 5: Reproductive System	Rajashree Mallick		Online using google meet
Dec	Histology of testis	Rajashree Mallick		Online using google meet
	Practical	Rajashree Mallick		Online using google meet
	Physiology of reproduction	Rajashree Mallick		Online using google meet
			Total 18	

Resources:

1. Books: Ganong's Review of Medical Physiology by Barret; 25th Ed, McGrew-Hill, 2016

   Ross MH, Pawlina W. 2010. Histology: A Text and Atlas. Sixth Edition. Lippincott Williams &Wilkins

2. Other resources :Internet ,WIKIPEDIA, Youtube video, Doc material notes

Lesson Plan for Course: Biochemistry……. Code: ZOOACOR07T…. Credit: 4….

- Course coordinator:..**UDAY HOSSAIN**…
- **Course Outcome**

i) CO1. Understand the structure and biological importance of protein, carbohydrate, lipid and nucleic acids.

ii) CO2. Attain knowledge about fundamentals of biochemical reactions and their catalysis by enzymes.

iii) CO3. Explain different biochemical pathways for synthesize, transformation and metabolism of biomolecules.

iv) CO3. Explain different biochemical pathways for synthesize, transformation and metabolism of biomolecules.

v) CO4. Can perform classical laboratory techniques for identification of different functional groups of biomolecules.

vi) CO5. Can isolate and separate different amino acids and proteins by laboratory procedures.

vii) CO6. Be knowledgeable in proper procedures and regulations in handling and disposal of chemicals.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sep	**Unit 1: Fundamentals of biochemical reactions and metabolism**	Uday Hossain		
	Ionization of water, weak acids and bases		3	Theoretical, PPT presentation
	Buffering and pH changes in living systems,		2	Theoretical, PPT presentation
	Metabolism: Catabolism and Anabolism, Compartmentalization of metabolic pathways.		2	Theoretical, PPT presentation, animation from YouTube
	Shuttle systems and membrane transporters;		2	Theoretical, PPT presentation, animation from YouTube, notes in Google classroom
	ATP as "Energy Currency of cell";coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms		2	Theoretical, PPT presentation, notes in Google classroom
	Class test		1	MCQ in Google classroom
	Unit 2: Carbohydrates	Uday		

		Hossain		
	Structure and Biological importance: Monosaccharides		2	Theoretical, PPT presentation, notes in Google classroom
	Disaccharides, Polysaccharides, Derivatives of Monosachharides		2	Theoretical, PPT presentation, notes in Google classroom
	Glycolysis		2	Theoretical, PPT presentation, notes in Google classroom
	Citric acid cycle		2	Theoretical, PPT presentation, notes in Google classroom, YouTube video
	Pentose phosphate pathway, Gluconeogenesis		2	Theoretical, PPT presentation, notes in Google classroom
	Class Test		1	In Google classroom
	Unit 3: Lipids	Uday Hossain		
	Physiologically important saturated and unsaturated fatty acids		2	Theoretical, PPT presentation, notes in Google classroom
	Triacylglycerols, Phospholipids		2	Theoretical, PPT presentation, notes in Google classroom
	Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids		2	Theoretical, PPT presentation, notes in Google classroom
OCT	β-oxidation of fatty acids		2	Theoretical, PPT presentation, notes in Google classroom, YouTube video

	Fatty acid biosynthesis		2	Theoretical, PPT presentation, notes in Google classroom
	Class test		1	Quiz on Google classroom
	Unit 4: Proteins	Uday Hossain		
	Amino acids Structure, Classification of amino acids		3	Theoretical, PPT presentation, notes in Google classroom
	General and Electro chemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids		2	Theoretical, PPT presentation, notes in Google classroom
	Proteins Bonds stabilizing protein structure; Levels of organization		3	Theoretical, PPT presentation, notes in Google classroom
	Transamination, Deamination		2	Theoretical, PPT presentation, notes in Google classroom
	Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids		2	Theoretical, PPT presentation, notes in Google classroom
	Class test		1	Quiz in Google classroom
NOV	**Unit 5: Nucleic Acids**	Uday Hossain		
	Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids		3	Theoretical, PPT presentation, notes in Google classroom
	Types of DNA and RNA		1	Theoretical, PPT presentation, notes in Google classroom
	Complementarity of DNA, Hypo-Hyperchromaticity of DNA		2	Theoretical, PPT presentation, notes in Google

				classroom
	Outlines of nucleotide metabolism		2	Theoretical, PPT presentation, notes in Google classroom
	Class Test		1	Quiz in Google classroom
	Unit 6: Enzymes	Uday Hossain		
	Nomenclature and classification of enzymes		3	Theoretical, PPT presentation, notes in Google classroom
	Cofactors; Specificity of enzyme action, Isozymes, Mechanism of enzyme action		2	Theoretical, PPT presentation, notes in Google classroom
	Assessment: Mid-term Test			ONLINE
DEC	Enzyme kinetics; Derivation of Michaelis-Menten equation		2	Theoretical, PPT presentation, notes in Google classroom,
	Lineweaver-Burk plot; Factors affecting rate of enzyme-catalyzed reactions		2	Theoretical, PPT presentation, notes in Google classroom
	Enzyme inhibition; Allosteric enzymes and their kinetics		2	Theoretical, PPT presentation, notes in Google classroom
	Strategy of enzyme action- Catalytic and Regulatory (Basic concept with one example each)		3	Theoretical, PPT presentation, notes in Google classroom
	Class test		1	Quiz in Google classroom
	Unit 7: Oxidative Phosphorylation	Uday Hossain		
	Redox systems		1	Theoretical, PPT presentation, notes in Google classroom

	Review of mitochondrial respiratory chain		3	Theoretical, PPT presentation, notes in Google classroom, Youtube animation
	Inhibitors and un-couplers of Electron Transport System		2	Theoretical, PPT presentation, notes in Google classroom
	Class Test		1	Quiz
			Total:80 Hrs	

Resources :

3. Books: Principal of Biochemistry 6th edition(Lehninger), Biochemisrty 4th edition(Voet and Voet)
4. Other resources : Youtube animation links, Wikipedia, some ebooks

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

Semister- 5th SEM Honours

Lesson Plan for Course: Molecular Biology……. Code: ZOOACOR11T……Credit: 4

Course coordinator: Chinmoy Ghosh

Course Outcome

After successful completion of the course students can:

1. *Describe and explain* the basic mechanism of core molecular biological process ofinformation transfer in a cell i.e. replication, transcription and translation.
2. *Compare* the process of replication, transcription and translation in prokaryotic andeukaryotic system.
3. Elucidate post transcriptional processing and modification of RNAs which includes capping,polyadenilation, splicing and editing.
4. Recognize the roll of RNA and other proteins in prokaryotic regulation of gene expression.
5. Describe different repair mechanism of DNA and can link it to the other cellular process
6. Understand the underlying principle of molecular biological techniques for amplifying,identifying and sequencing nucleic acids.
7. Apply the knowledge to decode genetic sequence to corresponding amino acid sequence
8. Appreciate the underlying uniformity of molecular biological system throughout animalworld.

Online Platform Used: Google Classroom

Google Classroom joining code: *5jkwgr4*

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	Salient features of DNA and RNA Watson and Crick Model of DNA	CG	2	Online class, slide presentation
	DNA replication: Semi-conservative, bidirectional and discontinuous Replication	CG	3	Online class, slide presentation
	Mechanism of DNA Replication in Prokaryotes, RNA priming, Replication of telomeres	CG	3	Online class, slidepresentation
	Mechanism of Transcription in prokaryotes: Initiation, elongation, termination. Mechanism of Transcription in eukaryotes.	CG	3	Online class, slidepresentation, Assignments
	Mechanism of Transcription in eukaryotes… contd. Transcription factors, Difference betweenprokaryotic and eukaryotic transcription.	CG	2	Online class, slide presentation, Video presentaion

Month	Course Topic	Teacher	Class-hour	Remarks*
	Assesment test		1	Self-grading online quiz
Oct	Genetic code, Degeneracy of the genetic code and WobbleHypothesis;Ribosome structure and assembly in prokaryotes, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation of translation.	CG	3	Online class, slide presentation
	Elongation and termination of polypeptide chain; fidelity ofprotein synthesis, Difference between prokaryotic and eukaryotic translation, Inhibitors of protein synthesis;	CG	3	Online class, slide presentation
	Capping and Poly A tail formation in mRNA; Split genes: concept of introns and exons, splicingmechanism,	CG	2	Online class, slide presentation
	Alternative splicing, exon shuffling, and RNA editing, Processing of tRNA	CG	3	Online class, slide presentation
Nov	Regulation of Transcription in prokaryotes: lac operon and trp operon;	CG	2	Online class, slide presentation
	Regulation of Transcription in eukaryotes: Activators, enhancers, silencer, repressors, miRNA mediated gene silencing, Genetic imprinting	CG	3	Online class, slide presentation, video presentation
	Doubt Clearing class.	CG	2	Peer study, Group discussion
	Mid term examination		0	Online Assignment
Dec	Recapitulation of previous topics. Types of DNA repair mechanisms,	CG	1	Online class, slide presentation
	RecBCD model in prokaryotes,	CG	1	Online class, slide presentation
	Nucleotide and base excision repair, SOS repair	CG	2	Online class, slide presentation
	PCR, Western and Southern blot, Northern Blot,	CG	3	Online class, slide presentation
	Sanger DNA sequencing , cDNA technology	CG	3	Online class, slide presentation
	Winter recess		0	
	Total Class Hour		42	

Resources :

Recommended Online resources:

Online Study material given in Google Classroom
Referred You tube videos as advised in Google classroom

e-pgPathsala: https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=2

For CBCS

- iBiology online resources: https://www.ibiology.org/research-talks/genetics-and-gene-regulation/
- **Text Book:**

  1. Campbell's Biology, 11th Edition by Lisa A. Urry, Michael L. Cain, Steven A. Wasserman,Peter V.
  Minorsky, Jane B. Reece , Published by Pearson Copyright © 2017.
  Molecular Biology of The Gene by Watson. 7th Edition. Pearson.

- **Reference Books:**

  Molecular Cell Biology by Harvey Lodish. 7th Edition. W.H. Freeman.

  iGenetics: A Molecular Approach by Peter. J. Russell. 3rd edition. Pearson BenjaminCummings.
  Principles and Techniques of Biochemistry and Molecular Biology by Keith Wilson and John Walker, Cambridge Univ. Press, Paperback

Lesson Plan for Course:…GENETICS…… Code…ZOOACOR12T…….. Credit……04……

- Course coordinator:……**Arpita Mondal**……
- Course Outcome
  - ✓ CO1: To understand the gene, allele, chromosomes composition in living organism and their genetical analysis.
  - ✓ CO2: To analyse the mathamatical problems of genetics and gene distance of chromosomes.
  - ✓ CO3: To learn the information about the human disease and their genetical aspects.
  - ✓ CO4: To understand the mutagens and their effect and the important element of living organism.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
Sep	Unit-1: MENDELIAN GENETICS and its EXTENSION 7. Background of Mendel's Experiments.	AM	02	Online Lecture Method, PPT Presentation.
	8. Principles of Mendelian Inheritance.	AM	01	Online Lecture Method, PPT Presentation. You Tube animation. https://youtu.be/ADnlPrFJccA
	Unit-1: 9. Incomplete Dominance and Codominance, Multiple alleles.	AM	01	Online Lecture Method, PPT presentation, You Tube Animation. https://youtu.be/BAodvx5wOfU
	10. Epistasis, Lethal alleles, Pleiotropy.	AM	02	Online Lecture Method, PPT presentation. You Tube animation https://youtu.be/EP8ZytVnU3Q .
	11. Sex- linked, Sex-influenced and Sex-limited inheritance, Polygenic inheritance.	AM	01	Online Lecture Method, PPT presentation, A question answer section will be held on Unit1 in Meet.
	Unit-2:LINKAGE CROSSING OVER and CHROMOSOMAL MAPPING: 6. Linkage and Crossing over.	AM	01	Online Lecture Method, PPT Presentation.
	7. Molecular basis of Crossing Over.	AM	02	Online Lecture Method, PPT presentation, You Tube Animation. https://youtu.be/Y9vDb0QoD9o
	8. Measuring Recombination frequency and Linkage intensity using three factor Crosses.	AM	02	Online Lecture Method, PPT Presentation. Problem solution.
	9. Interference and	AM	01	Online Lecture Method, PPT

	Codominance.			Presentation. Math Problem solution in video conference by meet app.
Oct	Unit-3: MUTATION 1. Types of Gene Mutation (Classification), Types of Chromosomal aberrations (Classification with one suitable example of each). Chromosomal aberration.	AM	02	Study through e-book (pdf format). PPT presentation. Lecture Method.
		AM	01	A question answer section will be held in Meet app.
	2. Gene Mutation and Human diseases (Down's, Klienfilter's, Turner;s– only genetical aspects here, details of physiological consequences not required).	AM	02	Lecture Method. PPT presentation. You Tube Animation. https://youtu.be/LOX_59RSF68
		AM	02	A question answer section will be held in meet app on Human disease.
Nov	3. Sex chromosomes and Sex-linked inheritance.	AM	01	Lecture method. PPT presentation.
	EXAM ON UNIT-3	AM	01	. An Exam was held on Unit2 in Google Classroom.
	Unit- 4: SEX DETERMINATION 1. Mechanisms of sex determination and Drosophila with reference to alternative splicing.	AM	01	Lecture Method. PPT presentation. You Tube Animation. https://youtu.be/uBzz9s0_ixc
	2. Sex determination in Mammals	AM	01	Offline Lecture Method. PPT presentation. You Tube Animation. https://youtu.be/uBzz9s0_ixc
Dec	Unit-6: Recombination in Bacteria and Viruses 1. Conjugation, Transformation, Transduction.	AM	03	Offline Lecture Method. PPT presentation. You Tube Animation. https://youtu.be/iJGY1boNOdg
	EXAM ON RECOMBINATION	AM	01	An Exam was held in classroom on unit-6.

INTERNAL EXAMINATION START				
	2. Complementation test in Bacteriophage		02	Offline Lecture Method. PPT presentation. You Tube Animation. https://youtu.be/_aVUuMi3i_I
Jan	Unit-7: TRANSPOSABLE GENETIC ELEMENT 1. Transposons in Bacteria.		02	OfflineLecture Method. PPT presentation. Study through e-book.
	2. Ac-Ds elements in Maize and P elements in Drosophila.		02	Offline Lecture Method. PPT presentation. A question answer section will be held in MEET app.
	3. LINE, SINE, ALU elements in humans.		01	Offline Lecture Method. PPT presentation. You Tube animation. https://youtu.be/PErzQijx0ds
	EXAM ON UNIT-7		01	An Exam was held in classroom on Unit 7
	Assessment: End-term Test		Total: 35Hrs	

Resources :

Books: iGenetics (A Molecular Approach Third Edition) Peter J. Russel
GENETICS (Principles and Analysis Fourth Edition).
Principles of GENETICS SIXTH EDITION (SNUSTAD . SIMMONS).

Other resources : Internet sources such as Wikipedia. Some links like ocw.mit.edu
*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quiz etc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).

Lesson Plan for Course: Animal Behaviour and Chronobiology ..Code…… ZOOADSE01T … Credit……4

- Course coordinator:……**RAJASHREE MALLICK**…….
- Course Outcome
  - ✓ CO1:Upon completion the course the students will learn different types of animal behavior and its application
  - ✓ CO2: Undarstand prosses of chronobiology in animal world
  - ✓ CO3: Learn about biological rythem.
  - ✓ CO4 : Enhancing their observation power and analyzation ability.

Course planner

Month	Course Topic	Teacher	Class-hour	Remarks*
SEPTEMBER				
	Unit 1: Introduction to Animal Behaviour	RAJASHREE MALLICK	**1**	Online using google meet
	A brief history of animal behaviour studies including the works of Fabre, Darwin, Von Frisch, Lorenz, Tinbergen,	RM	2	Online using google meet
	A brief history of animal behaviour studies including Jane Goodal, Biruté Galdikas, Dian Fossey, Salim Ali, Gopal Bhattacharyya, M. K. Chandrashekhar, Raghavendra Gadagkar	RM	2	Online using google meet
	The objectives of modern animal behaviour studies: Tinbergen's four questions	RM	1	Online using google meet
	Methods of studying behaviours: Observation vs Watching	RM	1	Online using google meet
October	Ad libitum observations, Focal animal studies, Instantaneous scan, etc.	RM	1	Online using google meet
	Branches of Animal Behaviour Studies	RM	1	Online using google meet
	Unit 2: Behaviours of Individuals	RM	**1**	Online using google meet
	Practical	RM	1	Making a project with online small group
	Reflexes and Orientations	RM	1	Online using google meet
	Unit 5: Biological Rhythm Types and characteristics of biological rhythms Short- and Long- term rhythms; Circadian rhythms; Tidal rhythms and Lunar	RM	2	Online using google meet

	rhythms			
November	Learning: Imprinting and other Programmed Learning	RM	1	Online using google meet
	Habituation, Innovations Cultural Transmission / Social Learning	RM	2	Online using google meet
	Practical Sexual Behaviour: Asymmetry of sex, Sexual dimorphism, Mate choice, Intra-sexual selection	RM	2	Online demonstration using google meet
	Unit 3: Social and Sexual Behaviour Concept of Sociality, Types of animal Society with examples Altruism	RM	**1**	Online using google meet
December	Concept of Sociality, Types of animal Society with examples	RM	1	Online using google meet
	Altruism Communications in animals- different types Insects' society with Honey bee as example	RM	2	Online using google meet
			Total 23	

Resources :

5. Books: An Introduction to Animal Behaviour by Manning and Dawkins; 5th Ed. Cambridge Univ. Press
6. Animal Behavior_ An Introduction to Behavioral Mechanisms, Development, and Ecology
7. Other resources : Wikipedia
8. PPT.

Lesson Plan for Course: Endocrinology…….. Code: ZOOADSE03T…… Credit: 04

Course coordinator: **Subharaj Paul**

Course Outcome:

- **CO1**:The basic objective of this DSE is to deliver the information to new comers on endocrine system with emphasis on the chemical structure of hormone, mechanism of hormone action, endocrine glands and their disorders.
- **CO2**:To understand the structure of hypothalamus and anterior pituitary and the associated hormones and the related disorders will be explained.
- **CO3**: Students learn the concepts of endocrine systems and homeostasis and 2 bioassay methods.
- **CO4**: Students also learn about the reproductive cycle of primates and non-primate mammals.

Course planner:

Month	Course Topic	Teacher	Class-hour	Remarks*
Sept	**Unit**1: General idea of Endocrine systems, Classification, Characteristic and Transport of Hormones.	SP	01	Online classroommethod and PPT presentation, youtube video- https://www.youtube.com/watch?v=KSclrkk_Ako
	Neurosecretions, and Neurohormones	SP	01	
	Unit 2: Structure of pineal gland, Secretions and their functions in biological rhythms and reproduction.	SP	03	
	Schedule for class exam on 28th Aug on **Unit**-1 in Google classroom.		01	Qu- Answer method.
	Structure and functions of hypothalamus and Hypothalamic nuclei.	SP	02	Study through E-Book (pdf format)
	Regulation of neuroendocrine glands, Feedback mechanisms; Structure of pituitary gland.	SP	04	Online Lecture method and PPT presentation.

For CBCS

	Pituitary Hormones and their functions, Hypothalamo-hypophysial-portal system. Disorders of pituitary gland.	SP	03	
Oct	**Unit** 3: Peripheral Endocrine Glands: Structure, Hormones, Functions and Regulation of Thyroid gland,	SP	03	
	Parathyroid	SP	02	Study through E-Book (pdf format)
	Pancreas,	SP	02	Lecture method and PPT presentation.
	Schedule for class exam on 25thSept on **Unit**-2 in Google classroom.		01	Qu- Answer method.
	Adrenal.	SP	03	
	Assessment: Mid-term Test			
Nov	Ovary and Testis;	SP	03	
	Hormones in homeostasis, Disorders of endocrine glands.	SP	02	
	Schedule for class exam on 19thOct on **Unit**-3 in Google classroom.		01	Qu- Answer method.
	Unit 4: Mechanism of action of steroidal hormone		01	https://www.youtube.com/watch?v=m9jOXiYdMeY
Dec	**Unit** 4: Mechanism of action of non-steroidal hormones with receptors.	SP	02	Study through E-Book (pdf format)- https://www.youtube.com/watch?v=Nt2r5R0ZO5U
	Bioassays of hormones using RIA.	SP	01	Online lecture method and PPT presentation.*Book-immunology by Kuby* https://www.youtube.com/watch?v=hJ8AYS5rpyU
	Bioassays of hormones using ELISA.	SP	01	

	Estrous cycle in rat and menstrual cycle in human;	SP	04	
	Multifaceted role of Vasopressin & Oxytocin; Hormonal regulation of parturition	SP	02	
	Schedule for class exam on 21st Dec on **Unit**-4 in Google classroom.		01	Qu- Answer method.
	Assessment: End-term Test		**Total: 43Hrs**	

Resources :

9. Books:Guyton 11th edition, Ganong W. - Review of medical physiology, Kronenberg_-_Williams_Textbook_of_Endocrinology_11e, endocrinology by Hadley, mammalian endocrinology by Ashoke Kr. Boral.
10. Other resources:internet source such as- Wikipidia, www.britannica.com, youtube.com

*Remarks will specify

- The nature of the class-topic (viz. Theoretical, Practical, and Tutorial).
- Methodology of teaching (whether using ICT, engaging students in group discussion, quizetc. etc.)
- Different modes of assessment. (Please check UGC evaluation reforms).