



Yogoda Satsanga Mahavidyalaya

JAGANNATHPUR, DHURWA, RANCHI – 834004

Email address: ysmranchi4@gmail.com

(NAAC Accredited, Grade: B++, CGPA: 2.89)

Course plan

NAME OF THE DEPARTMENT: Zoology

NAME OF THE FACULTY: Dr. Indumati Thakur

Dr. Anjana Verma

Dr. Rakhee Lohia

ACADEMIC SESSION: August 2022

YEAR: 2022

PROGRAM: B. Sc.

SEMESTER: V

COURSE TYPE: Core

COURSE: MOLECULAR BIOLOGY

COURSE CODE: CC-11

TOTAL CREDIT: 6 = (4 Theory, 02 Practical)

Program Outcomes (POs):

Student should be able to,

PO1- Apply the knowledge and concepts of biology and its fundamental principles and to identify, analyze and find solutions to various biological problems.

PO2- Identify, hypothesize, and review available research literature, and analyze complex biological issues reaching substantiated conclusions using knowledge of biodiversity, environment, and biological functioning.

PO3- Develop scientific temperament, an ability to merge, interconnect and extrapolate information and knowledge across various streams.

PO4- Ability to decide appropriate technology and tools to solve problems. Understand the availability, of resources, their judicious use, and the execution of the project in sustainable way.

PO5- Design solutions for complex scientific problems and design processes that meet the specified needs with appropriate consideration for public health & safety, cultural, societal, legal, constitutional and environmental considerations.

PO6- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO7- Communicate effectively on complex scientific activities with the science community and with society at large, such as, being able to comprehend and write effective reports and design documents, make effective presentations, and give and receive clear instructions.



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PO8- Demonstrate knowledge and understanding of the scientific principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO9- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific developments, technological advancements and global changes.

PO10- Value and foster Physical, Physiological and Psychological well-being through personal practice and conduct. Ability to apply the learnings for a lifelong commitment to ethics in fulfilment of professional and social obligations.

PO11- Apply academic learning to promote higher studies, sustainable living through employment, and initiation of entrepreneurial advent to create opportunities and wealth for self and society.

PO12- Value and support social causes and rural development through service and philanthropic activities.

PROGRAM-SPECIFIC OUTCOMES (PSOs):

Student should be able to,

PSO1: An ability to demonstrate in-depth knowledge and understanding of the fundamental concepts, principles, and processes underlying the academic field of Zoology and its different subfields like animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology, endocrinology, biochemistry, genetics, and evolutionary biology, animal biotechnology, applied Zoology, aquatic biology, immunology, reproductive biology, parasitology, entomology, apiculture, aquarium fish keeping, medical diagnostics, and sericulture.

PSO2: Development of procedural knowledge and merging it with the advanced techniques available to create different types of professionals in the field of Zoology and related fields such as Apiculture, Fisheries, Medical Diagnostics, Sericulture, Paleozoology, Ornithology, Herpetology, Forensics, Bioinformatics, and Arachnology.

PSO3: Understand and appreciate the complexity of life processes, their molecular, cellular, and physiological processes, their genetics, evolution, and behavior, and their interrelationships with the environment.

COURSE OUTCOMES (COs):

CO1: Understanding the types of cells, different types of cellular organization, and their complexities.

CO2: Aware of cellular compartmentalization, its functions, and its biological significance.

CO3: Understanding of cell division and its role in maintaining a stable genetic constituency, associated disease in cancer.



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CO4: Ability to distinguish between different types of cellular cross-talk and their role in structural and functional coordination.

CO5: They develop an appreciation for the biological functions at the cellular level and gets aware of their role in their day-to-day lives.

CO6: Aware of the associated diseases due to impaired physiology and able to design a healthy lifestyle for themselves and their loved ones.

Correlation between POs and COs

POs → COs ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	2	-	1	-	-	-	-	3	3	-	-
CO2	3	2	2	2	-	1	-	-	-	3	3	3	-	-
CO3	3	3	3	3	-	2	1	-	2	2	3	3	3	1
CO4	3	2	2	2	-	2	-	2	-	3	1	2	1	-
CO5	-	-	-	-	-	2	-	-	-	3	-	2	2	-
CO6	2	-	-	-	-	-	-	-	3	3	-	2	2	2

1. Weak

2. Moderate

3. Strong

Course teaching and learning activities

A. PEDAGOGY

- Whiteboard
- Flipped Class
- PPT
- Debate
- Group Discussions

B. COURSE COMPLETION PLAN

UNIT	NO. OF LECTURES			TEST	QUIZ	ASSIGNMENT
	THEORY	PRACTICAL	TUTORIAL			
1	4	4	-	1	1	-
2	12	12	-	1	1	-
3	10	10	-	1	1	-
4	12	12	-	1	1	-
5	6	6	-	1	1	-
6	10	10	-	1	1	-
7	3	3	-	1	1	-
8	3	3				



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COURSE DELIVERY PLAN:

UNIT	TOPIC/SUBTOPIC	LECTURE REQUIRED	CO ADDRESSED	ASSIGNMENT /TEST/QUIZ
1	Nucleic Acids Salient features of DNA and RNA Watson and Crick model of DNA	4	CO 1	1
2	DNA Replication DNA Replication in prokaryotes and eukaryotes, mechanism of DNA replication, Semi-conservative, bidirectional and semi-discontinuous replication, RNA priming, Replication of circular and linear <i>ds</i> -DNA, replication of telomeres	12	CO 1, 2, 4, 5	2
3	Transcription RNA polymerase and transcription Unit, mechanism of transcription in prokaryotes and eukaryotes, synthesis of rRNA and mRNA, transcription factors	10	CO 2, 4, 5, 6	1
4	Translation Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Process of protein synthesis in prokaryotes: Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation	12	CO 5, 6	2
5	Post Transcriptional Modifications and Processing of Eukaryotic RNA Structure of globin mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, exon shuffling, and RNA editing, Processing of tRNA	6	CO 1, 2, 3	1
6.	Gene Regulation Transcription regulation in prokaryotes: Principles of transcriptional regulation with examples from <i>lac</i> operon and <i>trp</i> operon; Transcription regulation in eukaryotes: Activators, repressors, enhancers, silencer elements; Gene silencing, Genetic imprinting	10	CO 1, 2, 3	2
7.	DNA Repair Mechanisms Pyrimidine dimerization and mismatch repair	3	CO 3,4,5,6	4



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C. SUGGESTED READINGS

a. TEXT BOOKS

b. REFERENCE BOOKS

- i. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. (2009). The World of the Cell. VII Edition. Pearson Benjamin Cummings Publishing, San Francisco.
- ii. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter: Molecular Biology of the Cell, IV Edition.
- iii. Cooper G. M. and Robert E. Hausman R. E. The Cell: A Molecular Approach, V Edition, ASM Press and Sinauer Associates.
- iv. De Robertis, E.D.P. and De Robertis, E.M.F. (2006). Cell and Molecular Biology. VIII Edition. Lippincott Williams and Wilkins, Philadelphia.
- v. Karp, G. (2010) Cell and Molecular Biology: Concepts and Experiments. VI Edition. John Wiley and Sons. Inc.
- vi. Lewin B. (2008). Gene XI, Jones and Bartlett
- vii. McLennan A., Bates A., Turner, P. and White M. (2015). Molecular Biology IV Edition. GS, Taylor and Francis Group, New York and London.

c. VIDEO RESOURCE

d. WEB RESOURCES:-

e. E-RESOURCES