



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. Anjana Verma

Dr. Kumari Pragati Nanda

Mr. Ankit

ACADEMIC SESSION: September 2023

YEAR: 2023

PROGRAM: FYUGP

SEMESTER: III

COURSE TYPE: Major

COURSE: CELL BIOLOGY AND BIostatISTICS

COURSE CODE: MJ 5 practical

TOTAL CREDIT: 04

Program Outcomes (POs):

Student should be able to,

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

PO2: Identify, hypothesize, and review available research literature, and analyse complex biological issues to reach substantiated conclusions using knowledge of biodiversity, environment, and biological functioning.

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

PO4: Decide on appropriate technology and tools to solve problems. Understand the availability of resources, their judicious use, and the execution of projects in a sustainable way.

PO5: Design solutions for complex scientific problems and design processes that meet 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 the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO7: Communicate effectively on complex scientific activities with the scientific community and society at large, including comprehending and writing effective reports and design documents, making effective presentations, and giving and receiving clear instructions.



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PO8: Demonstrate knowledge and understanding of 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 lifelong 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. Apply these 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 initiate entrepreneurial ventures 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: Demonstrate in-depth knowledge and understanding of the fundamental concepts, principles, and processes underlying the academic field of Zoology and its different subfields. These subfields include animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology, endocrinology, biochemistry, genetics, evolutionary biology, animal biotechnology, applied Zoology, aquatic biology, immunology, reproductive biology, parasitology, entomology, apiculture, aquarium fish keeping, medical diagnostics, and sericulture.

PSO2: Develop procedural knowledge and integrate it with advanced techniques to create various types of professionals in Zoology and related fields. These fields include Apiculture, Fisheries, Medical Diagnostics, Sericulture, Paleozoology, Ornithology, Herpetology, Forensics, Bioinformatics, and Arachnology.

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

COURSE OUTCOMES (COs):

1. **Course Outcome:** Students will be able to identify various stages of mitosis and meiosis from prepared temporary and permanent slides, and recognize cellular structures such as the Barr body in human female cells.
2. **Course Outcome:** Students will be able to describe the principles and procedures for preparing permanent slides to demonstrate the presence of DNA, RNA, mucopolysaccharides, and proteins in cells.



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- Course Outcome:** Students will be able to explain the statistical concepts and methods used in biological research, including mean, standard deviation, standard error, correlation coefficient values, and regression analysis.
- Course Outcome:** Students will be able to analyze biological data using Student's t-test (both dependent and independent) and ANOVA, performing both hand calculations and calculations using MS Excel.
- Course Outcome:** Students will be able to evaluate the results of biological experiments and statistical analyses to draw valid conclusions about the data, including assessing the probability and significance of their findings.

CORRELATION BETWEEN POs AND COs

POs → COs ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	2	-	-	-	-	-	-	3	2
CO2	2	2	2	-	3	2	-	-	-	-	-	-	3	3
CO3	3	3	2	-	3	2	-	-	2	-	-	-	3	3
CO4	3	3	3	3	3	3	1	2	3	1	2	-	3	3
CO5	3	3	3	3	3	3	2	3	3	1	2	2	3	3

1. Weak

2. Moderate

3. Strong

-. No correlation

Course teaching and learning activities

A. PEDAGOGY

- Whiteboard
- PPT
- Technology based learning
- Lab work

B. COURSE COMPLETION PLAN

UNIT {(Ecology and Biochemistry (each 1 unit))}	NO. OF RACTICALS	TEST	QUIZ	ASSIGNMENT
1	11	1	1	1
2	13			
3	12			
4	10			
5	14			



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SUGGESTED READINGS

1. Campbell, N. A., & Reece, J. B. (2005). *Biology* (7th ed.). Pearson Benjamin Cummings.
2. Tortora, G. J., & Derrickson, B. H. (2017). *Principles of Anatomy and Physiology* (15th ed.). John Wiley & Sons.
3. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2014). *Molecular Biology of the Cell* (6th ed.). Garland Science.
4. Karp, G. (2013). *Cell and Molecular Biology: Concepts and Experiments* (7th ed.). John Wiley & Sons.
5. Raven, P. H., Johnson, G. B., Mason, K. A., Losos, J. B., & Singer, S. R. (2020). *Biology* (12th ed.). McGraw-Hill Education.

WEB RESOURCES:-

1. <https://www.ncbi.nlm.nih.gov/>
2. <https://www.khanacademy.org/science/biology>
3. <https://www.nature.com/subjects/zoology>
4. <https://www.coursera.org/browse/life-sciences/zoology>
5. <https://www.cell.com/>

VIDEO LINKS

1. Mitosis - YouTube: <https://www.youtube.com/watch?v=L0k-enzoeOM>
2. Meiosis - YouTube: <https://www.youtube.com/watch?v=zrKdz93WIVk>
3. Introduction to DNA - Khan Academy:
<https://www.khanacademy.org/science/biology/her/tree-of-life/v/dna>
4. ANOVA (Analysis of Variance) - CrashCourse:
<https://www.youtube.com/watch?v=0jYfUPsF9ys>
5. Introduction to Ecology - CrashCourse:
<https://www.youtube.com/watch?v=izRvPaAWgyw>

E-RESOURCES:-

Ecology:

1. Ecology - Khan Academy:
 - <https://www.khanacademy.org/science/biology/ecology>
2. Ecology - MIT OpenCourseWare:
 - <https://ocw.mit.edu/courses/biology/7-014-introductory-biology-spring-2005/pages/ecology/>
3. Ecology - National Geographic:
 - <https://www.nationalgeographic.org/encyclopedia/ecology/>
4. The Ecological Society of America:
 - <https://www.esa.org/>
5. Ecology - OpenStax:
 - <https://openstax.org/books/biology-2e/pages/44-introduction>

Biochemistry:

1. Biochemistry - Khan Academy:
 - <https://www.khanacademy.org/science/biology/chemistry--of-life>
2. Biochemistry - MIT OpenCourseWare:
 - <https://ocw.mit.edu/courses/biology/7-05-introductory-biochemistry-spring-2021/>
3. Biochemistry - NCBI Bookshelf:
 - <https://www.ncbi.nlm.nih.gov/books/NBK21154/>
4. Biochemistry Free For All (Textbook):
 - <https://biochem.science.oregonstate.edu/content/biochemistry-free-and-easy>
5. Biochemical Journal - Portland Press:
 - <https://portlandpress.com/biochemj>