Eklavya University

SESSION

2023-24

B.Sc. I SEMESTER

SYLLABUS

OF

ZOOLOGY

NEP

School of Basic and Applied Sciences

EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc I Semester (Major [illegible]nor)

School of Basic and Applied Sciences (Academic Session 2023-24)

Subject wise distribution of marks and corresponding credits

S. No.	Subject Name	Subject Code	Paper Name	Maximum Marks Allotted										Total Marks	Contact Periods Per week			Total Credits
				Theory Slot				Practical Slot										
				External Assesm	Internal Assesment Class test (Descriptive & Objective)/Assignment/Seminar/			Internal Assesment			External Assesment				L	T	P	
				FINAL EXAM	Internal Assesment I	Internal Assesment II	Assignment / ppt presention	Class test/ Interaction	Attendance	Assignment/ Presentation	VivaVoce	Sessional/ Practical Record	Lab Work					
1	Botany	23S1BOTA1T	Applied Botany	60	10	10	20							100	4	_	0	4
		23S1BOTA1P	Applied Botany Practical					10	10	20	10	10	40	100	_	_	2	2
2	Zoology	23S1ZOOL1T	Animal Diversity : Non-Chordata	60	10	10	20							100	4	_	0	4
		23S1ZOOL1P	Invertebrata					10	10	20	10	10	40	100	_	_	2	2
3	Physics	23S1PHYS1T	Thermodynamics and stastical Physics	60	10	10	20							100	4	_	0	4
		23S1PHYS1P	Thermodynamics and stastical Physics Lab					10	10	20	10	10	40	100	_	_	2	2
4	Mathematics	23S1MATH1T	Algebra, Vector analysis and Geometry	60	10	10	20							100	4	_	0	4
5	Chemistry	23S1CHEM1T	Fundamentals of Chemistry	60	10	10	20							100	4	_	0	4
		23S1CHEM1P	Qualitative & Quantitative Chemical Analysis					10	10	20	10	10	40	100	_	_	2	2
6	Computer Application	23S1COAP1T	Programming in C language	60	10	10	20							100	4	_	0	4
		23S1COAP1P	Programming in C language (Practical)					10	10	20	10	10	40	100	_	_	2	2
8	Industrial Microbiology	23S1INMB1T	Tools and Techniques in Industrial Microbiology	60	10	10	20							100	4	_	0	4
		23S1INMB1P	Techniques in Industrial Microbiology					10	10	20	10	10	40	100	_	_	2	2
9	Biotechnology	23S1BTEC1T	Cell Biology and Biochemistry	60	10	10	20							100	4	_	0	4
		23S1BTEC1P	Lab Work for Cell Biology and Biochemistry					10	10	20	10	10	40	100	_	_	2	2

30.5.2023 30/05/23 30/5/23 30/5/23 30/05/23

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class		**B.Sc. Zoology**
Semester		**I Semester**
Subject & Subject Code		**Zoology & 23S1ZOOL1T**
Paper	**English**	**Animal Diversity : Non-Chordata**
	हिन्दी	**जंतु विविधता : अकशेरूकी**
Max. Marks		**60 (ESE) + 40 (I) = 100**

Credit			**Total Credits**
L	**T**	**P**	**4**
4	0	0	

Course Objectives:

1. To study individual organism and populations, as well as their relationships to each other and to the environment, with the core foundation of evolution and ecology.
2. To comprehend the genetics, anatomy, physiology and behavior along with other specialized fields of interest.
3. To comprehend the basic phylogenetic relationships of the major groups of vertebrates.
4. To comprehend and analyze the adaptive changes that have occurred in invertebrates & vertebrates.
5. To comprehend and analyze the changes in homologous structures which accompanied the invasion of terrestrial habitats by vertebrates.
6. To recognize, describe, and point out the external and internal features that characterize the major groups of modern day vertebrate & invertebrates.
7. To gain an in-depth knowledge and practical skills in various aspects of animal biology.

Course Outcome:

At the end of the course, learners will be able to :

1. Learn basic concept of biosystematics and procedure in taxonomy.
2. Identifie the taxonomic status of the entire non-chordates up to annalids and discuss the evolutionary model of the group.
3. Describe the general biology of few selected non-chordates useful to mankind.
4. Know about some of the important and common protozoans, helminthes of parasitic nature causing diseases in human beings.
5. Understand the importance of metamerism in annelids.

Student Learning Outcomes (SLO):

Students will:

1.Describe the variety of invertebrate organisms and explain their evolutionary origin and diversification.
2. Investigate invertebrates in laboratory and field conditions, and identify major taxonomic groups.
3.Describe general taxonomic rules on animal classification.
4.Classify Protista up to phylum using examples from parasitic adaptation.
5.Classify Phylum Porifera to Echinodermata with taxonomic keys.
6. Describe Phylum Nematoda and give examples of pathogenic Nematodes.

30.5.2023

30/5/23

30/05/23

Unit	Syllabus	Periods
UNIT - I	**Taxonomy:** 1. Elementary knowledge of Zoological Nomenclature and international Code 2. Classification of Animal Kingdom upto phylum of acoelomate and coelomate non-chordates according to parker and Haswell 7th edition **Phylogeny:** 1. Phylogeny definition and Examples. **Protozoa : 1.** Phylum Protozoa: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples Structure, life history and parthogenicity of malarial parasite (Plasmodium vivas) 2. Protozoa and disease. Concept of animal Diversity. **Keywords/Tags:** ICZN, Classification, Protozoa, Plasmodium.	15
	वर्गिकी, जातिवृत्त एवं प्रोटोजोआ **वर्गिकी** 1. प्राणीकीय नामकरण एवं अंतर्राष्ट्रीय कोड का सामान्य अध्ययन। 2. अगुहिक एवं गुहिक जंतु जगत का वर्गीकरण संघ तक, पार्कर एवं हेजवेल के सांतवे संस्करण अनुसार। **जातिवृत्त** – 1. परिभाषा एवं उदाहरण **प्रोटोजोआ** – 1. संघ प्रोटोजोआः संघ के सामान्य लक्षण, वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. मलेरिया परजीवी की संरचना, जीवन इतिहास एवं रोग जनकता 3. प्रोटोजोआ एवं रोग, जंतु विविधता की संकल्पना।	
UNIT - II	**Phylum porifera:** 1. General characters of the phylum and outline classification upto classes with distinctive characters and suitable examples 2. Type study of Sycon 3. Canal system of Sponges **Phylum Coelenterata:** 1. General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples 2. Type study of Obellia. 3. Corals and Coral reef formation. **Keywords/Tags:**Classification, Porifera, Sycon, Coelentreta, Obelia, Coral reefs.	15
	पोरीफेरा 1. संघ पोरीफेराः संघ के सामान्य लक्षण, वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. साईकान का प्रारूप अध्ययन। 3. सपंज में नाल तंत्र । सीलेन्ट्रेटा 1. संघ सीलेन्ट्रेटाः संघ के सामान्य लक्षण वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. ओबेलिया का प्रारूप अध्ययन। 3. कोरल्स एवं कोरल रीफ का निर्माण।	

30.5.2023 23/5/23 30/05/23

UNIT - III	**Phylum Platyhelminthes:** 1. General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples External morphology. 2. life history of liver fluke **Phylum Nemathelminthes:** 1. General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples 2. Pathogenic symptoms of Nematodes and diseases. **Phylum Annelida:** 1. General Characters of the phylum and outline classification up to classes with distinctive characters and suitable examples 2. Type study of Earthworm (Pheretima) 3. Structure and significance of Trochophore larva **Keywords/Tags:** Classification, Platyhelminthes, Liver Fluke, Nematode disease, Annelida, Pheretima, Trochophore.	15
	प्लेटीहेलमिनथीज 1. संघ प्लेटीहेलमिनथीजः संघ के सामान्य लक्षण, वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित । 2. यकृत कृमि की बाह्य अकारिकी एवं जीवन इतिहास। निमेथहेमिनथीज 1. संघ निमेथहेलमिनथीजः संघ के सामान्य लक्षण वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. निमेटोडस के रोग जनक लक्षण एवं बीमारियां। ऐनीलिडा। ऐनीलिडा 1. संघ ऐनेलिडः संघ के सामान्य लक्षण, वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. केचुएं का प्रारूप अध्ययन। 3. ट्रोकोफोर लार्वा की संरचना एवं महत्व	
UNIT - IV	**Phylum Arthropoda:** 1. General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples 2. Type study of Prawn 3. Larval forms of crustacean 4. Insects as a vector of human disease. **Phylum Mollusca:** 1. General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples Type study of Pila 2. Structure and significance of Glochidium larva. **Keywords/Tags:** Classification, Arthopoda, Prawn, Crustacea larva, Insects, Mollusca, Pila, Glochidium.	15
	आर्थोपोडा 1. संघ आर्थोपोडाः संघ के सामान्य लक्षण, वर्गीकरण वर्ग तक तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. झींगे का प्रारूप अध्ययन 3. क्रस्टेसिया के लार्वा प्रकार 4. मानव रोगा के वाहक कीट मोलस्का 1. संघ मोलस्काः संघ के सामान्य लक्षण वर्गीकरण वर्ग तथा उनके विशिष्ट लक्षण उदाहरण सहित। 2. घोघा का प्रारूप अध्ययन। 3. ग्लोचीडियम लार्वा की संरचना एवं महत्व।	

30/5/23

30/5/23

UNIT - V	**Phylum Echinodermata: 1.** General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples External features ans water vascular system of Starfish(Asterias) 2. Larval forms of Echinodermata **Phylum Hemichordata: 1.** General characters of the phylum hemichordate and relationship with non-chordates and chordates 2. Balanoglossus- External morphology 3. Structure and significance of Tornaria larva **Keywords/Tags:** Classification Echinodermata, Asterias, Echinodermata larvae, Hemichordata, Balanoglossus, Tornaria.	15
	इकाइनोडर्मेटा 1. संघ इकाइनोडर्मेटा: संघ के सामान्य लक्षण, वर्गीकरण वर्ग तथा उनके विशिषट लक्षण उदाहरण सहित। 2. तारा मछली के बाह्य लक्षण एवं जल संवहन तंत्र। 3. इकाइनोडर्मेटा के लर्वीय रूप हेमीकार्डेटा 1. संघ हेमीकार्डेटा के सामान्य लक्षण तथा अकशेरूकी एवं कशेरूकी संबंध सहित। 2. बेलेनोग्लोसस की बाह्य आकारिकी। 3. टारनेरिया लार्वा की संरचना एवं महत्व	

Text Books-

1. Parker, J. Haswell, WA, "A Text Book of Zoology" VII edition, Vol. I & II, Low Price Publications, Delhi, 1990.
2. Barnes, RD, "Ivertebrate Zoology" VII Edition, Cengage Learning, India, 2006.
3. RL Developmental Biology by Kotpal,.
4. Invertebrate Zoology a Functional Evolutionary Approach, 7th ed., 2004, Thomson Brools / Cole By Ruppert, E.E., Fox, R.S., and R.D. Barns,
5. Dictionary of Word Roots and Combining Forms by Borror, D.J., 1971. Mayfield Publishing Co. Palo Alto California.

Reference Books-

1. Freshwater Invertebrates (general) by Smith, D. G. 2001.
2. Pennak's Freshwater Invertebrates of the United States. Fourth Edition by John Wiley and Sons, Inc., New York.

Suggested equivalent online courses:

1. Swayam Online courses
   http://storage.googleapis.com/uniquecourses/online.html
2. National Digital Library
   http://ndl.iilkgp.ac.in/
3. e-PG Pathshala (MHRD) Portal
   http://epgp.inflibnet.ac.in/
4. Animal diversity
   http://Swayam.gov.in/courses/5686-zoology
5. Science Direct Open Access Content
   http://www.sciencecedirect.com/book/9781843342038/open-access

30/5/23 30/5/23 30/05/23

(04)

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class		**B.Sc. Zoology**
Semester		**I Semester**
Subject & Subject Code		**Zoology & 23S1ZOOL1P**
Paper	**English**	**Invertebrata**
	हिन्दी	
Max. Marks		**60 (E) + 40 (I) = 100**

Credit			**Total Credits**
L	**T**	**P**	**2**
0	0	2	

Course Outcome:

Upon completion of the couse students shuld be able understand :

1. Identify invertebrate animals of different phyla and their histology though study of museum specimens and slides.
2. Learn their different system through dissections.
3. Enhance collaborative learning and communication skills through practical sessions, team work, group discussons, assignments and projects.

Unit	Syllabus	Periods
1	Study of museum specimens and slides relevant to the invertebrates.	15
	सैद्धांतिक पाठ्यक्रमानुसार अकशेरूकी जंतुओं का म्यूजियम स्पेसिमन्स एवं स्लाईड के माध्यम से अध्यन।	
2	Dissection (Demonstration Only - Through You Tube Video or Models or Charts) a. Earthworm- Digestive system, Nervous system, Reproductive system. b. Prawn - Nervous system and appendages. c. Pila- Nervous System. d. Cockroach- Digestive System, Nervous System (Easily available animal in residential areas whoch can be used for dissection and mounting)	15
	विच्छेदन : अ. केचुआः पाचन तंत्र, तंत्रिका तंत्र जनन तंत्र ब. झीगाः तंत्रिका तंत्र एवं उपांग स. घोघाः तंत्रिका तंत्र द. काकरोचः पाचनतंत्र, तंत्रिका तंत्र	
3	**Mounting:** a. Locally available small non-chordates, their larvae. b. Mouth parts of Insect.	15

30/05/23 30/5/23 30/5/23 30/05/23

	माउटिंग : अ. स्थानीय उपलब्ध छोटे अकशेरूकी जंतु एवं उनके लार्वा। ब. कीटो के मुखांग।	
4	Examination of pond water for study of different kinds of microscopic non-chordate organisms.	15
	तालाब के पानी द्वारा विभिन्न सूक्ष्मदर्शी अकशेरूकी जंतुओं का परीक्षण।	
5	Phylum Echinodermata: Economic Importance of any two Insects. Parasitic Adaptation of any one parasite.	15
	आर्थिक महत्व के दो कीट। किसी एक परजीवी में परजीवी अनुकूलन	

Reference Books-

1 Arumuam, N.Nair, NC, Leevavathy, S, Pandian, NS, Murugan, T, Jayasurya, "Practical Zoology-Invertebrata", Volume-I, Saras Publication, 2013

2 Lal, SS, "A Text Book of Practical Zoology-Invertebrates" Rastogi pulications, 2016.

3 Prakash, M, and Arora, CK, "Laboratory Animals" Anmol Publications, New Delhi,1998.

30/05/23

30/5/23

30/05/23

Nidhi

Assessment and Evaluation			
Suggested Continous Evaluation Methods:			
Internal Assessment	**Marks**	**External Assesssment**	**Marks**
Class Interaction/Quiz	10	Viva Voce on Practical	10
Attendance	10	Practical Record File	10
Assignment (Charts/Model Seminar/Rural Service/ Technology Dissemination/ Report of Excursion/Lab Visits/ Survey/ Industrial Visit)	20	Table Work/Experiments a. Spotting b. Dissction c. Mounting d. Examination of Pond Water e. Economic Importance of Insects f. Parasitic Adaptations	40 10 7 3 10 5 5
Total	**40**		60

30.5.2023

30/05/23

30/5/23

30/05/23

N.d.W

Eklavya University

SESSION

2023-24

B.Sc. II SEMESTER

SYLLABUS

OF

ZOOLOGY

NEP

School of Basic and Applied Sciences

EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc II Semester (Major/Minor)

School of Basic and Applied Sciences (Academic Session 2023-24)

Subject wise distribution of marks and corresponding credits

S. No.	Subject Name	Subject Code	Paper Name	Theory Slot				Practical Slot						Total Marks	Contact Periods Per week			Total Credits
				External Assesment (End	Internal Assesment Class test (Descriptive & Objective)/Assignment/Seminar/			Internal Assesment			External Assesment							
				FINAL EXAM	Internal Assesment I	Internal Assesment II	Internal Assesment III	Class test/ Interaction	Attendance	Assignment/ Presentation	VivaVoce	Practical Record	Lab Work/ Sessional		L	T	P	
1	Botany	23S1BOTA2T	Basic Botany	60	10	10	20							100	4	_	0	4
		23S1BOTA2P	Basic Botany Practical					10	10	20	10	10	40	100	_	_	2	2
2	Zoology	23S1ZOOL2T	Cell Biology, Reproductive Biology and Developmental Biology	60	10	10	20							100	4	_	0	4
		23S1ZOOL2P	Cytology, Reproductive Biology and Embryology					10	10	20	10	10	40	100	_	_	2	2
3	Physics	23S1PHYS2T	Mechanics and General Properties of Matter	60	10	10	20							100	4	_	0	4
		23S1PHYS2P	Mechanics and General Properties of Matter Lab					10	10	20	10	10	40	100	_	_	2	2
4	Mathematics	23S1MATH2T	Calculus and Differential Equations	60	10	10	20							100	4	_	0	4
5	Chemistry	23S1CHEM2T	Analytical Chemistry	60	10	10	20							100	4	_	0	4
		23S1CHEM2P	Analytical Process and Techniques					10	10	20	10	10	40	100	_	_	2	2
6	Computer Application	23S1COAP2T	Data Processing Software	60	10	10	20							100	4	_	0	4
		23S1COAP2P	Data Processing Software (Practical)					10	10	20	10	10	40	100	_	_	2	2
7	Industrial Microbiology	23S1INMB2T	Fundamentals of Industrial Microbiology	60	10	10	20							100	4	_	0	4
		23S1INMB2P	Basic Exercises in Industrial Microbiology					10	10	20	10	10	40	100	_	_	2	2
8	Biotechnology	23S1BTEC2T	Microbiology and Immunology	60	10	10	20							100	4	_	0	4
		23S1BTEC2P	Lab on Microbiology and Immunology					10	10	20	10	10	40	100	_	_	2	2

30.5.2023 30/05/23 30/5/23 30/5/23 30/05/23

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class				**B.Sc. Zoology**
Semester				**II Semester**
Subject & Subject Code				**Zoology & 23S2ZOOL2T**
Paper			**English**	**Cell Biology, Reproductive biology and Developmental Biology**
			हिन्दी	**कोशिका विज्ञान प्रजनन विज्ञान एवं परिवर्धन जैविकी**
Max. Marks				**60 (ESE) + 40 (I) = 100**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
4	0	0		

Course Objectives:

1. Students will understand the structures and purpose of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membrane, and organelles .
2. Students will understand how these cellular components are used to generate and utilize energy in cells .
3. Students will understand the cellular components underlying Mitotic cell division.Students will apply their Knowledge of cell biology to selected examples of changes orlosses in cell function.
4. The objective of this course is to provide a comprehensive understanding of the concepts of early animal development.
5. Students taking this course must develop a critical appreciation of methodologies specifically used to study the process of embryonic development in animals.

Course Outcome:

At the end of the course, learners will be able to:

1. Understand the structure of cells and cell organelles in relation to the functional aspects and understanding of the working principles and applications of microscopes.
2. Describe the composition of prokaryotic and eukaryotic cells.
3. Understand the structure and functions of chromosome; mitotic and meiotic cell divisions and their significance.
4. Understand the process of development of animals.
5. Understand the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta.
6. Know the inducer and inductor role in embryogenesis and knowledge about metamorphosis and the process of regeneration.

Student Learning Outcomes (SLO):

Students will:

1. Observe chromosomal arrangements during cell division
2. Distinguish different chromosomal aberrations in man
3. Familiarise knowledge of conventional biotechnological procedures
4. Perform routine blood analysis.
5. Familiar with various stages involved in the developing embryo
6. Apply the knowledge to collect various Biological data
7. Explain various Prenatal Diagnosis
8. Familiarise with the principle of developmental biology

30/5/23 30/5/23 30/05/23

(03) (01)

Unit	Syllabus	Periods
UNIT - I	**Cell Biology :- 1.** Concept of Prokaryotic and Eukaryotic Cells, difference between Prokaryotic and Eukaryotics Cells 2. Structure and functions of Plasma Membrane. 3. Structure functions of Golgi body, Mitochondria, Endoplasmic reticulum, Ribosome and Lysosome 4. Structure and functions of Nucleus. 5. Structure of DNA replication. 6. Structure and functions of Chromosome and special type of chromosomes- Lampbrush and Polytene chromosome 7. Cell cycle, Mitotic and meiotic cell division and their significance. **Keyword/Tag:** Prokaryote, Eukaryote, Cell organalles, Chromosomes, Cell Cycle.	15
	कोशिका विज्ञान 1. प्रोकैरियोटिक एवं यूकैरियोटिक कोशिकाओं की अवधारणा प्रोकैरियोटिक एवं यूकैरियोटिक कोशिकाओं में अंतर 2. प्लाज्मा झिल्ली की संरचना एवं कार्य 3. गाल्जीकाय, माइट्रोकान्ड्रिया, एन्डोप्लाज्मिक रेटीकुलन, राइवोसोम तथा लाइसोसोम की संरचना और कार्य। 4. केन्द्रक की संरचना और कार्य 5. डी.एन.एन प्रतिकृति। 6. गुणसूत्र की संरचना और कार्य, विशेष प्रकार के गुणसूत्र–लेम्प ब्रश तथा पोलीटीन गुणसूत्र। 7. कोशिका चक्र, समसूत्री एवं अर्द्धसूत्री कोशिका विभाजन तथा उनका महत्व।	
UNIT - II	**Reproductive Biology :-** 1. Structure of Male reproductive system of Lepus 2. Structure of Female reproductive system of Lepus 3. Histology of Testis, and Ovary of Lepus 4. Gametogenesis- Spermatogenesis and oogenesis, difference between spermatogenesis and oogenesis 5. Types of Eggs- based on amount and distribution of olk with examples.	15
	प्रजनन विज्ञान 1. खरहा के नर जनन तंत्र की संरचना। 2. खरहा के मादा जनन तंत्र की संरचना। 3. खरहा के वृष्ण तथा अंडाशय की औतिकी अंडाणु जनन में अंतर। 4. युग्मक जनन– शुक्राणु जनन तथा अंडाणु जनन, शुक्राणु जनन एवं अंडाणु जनन में अंतर 5. अंडो के प्रकार– योक की मात्रा एवं उनके वितरण के आधार पर तथा उनके उदाहरण।	
UNIT - III	**Recent Assisted Reproductive Techniques (ART)** 1. Stem cell- Types and their uses 2. Gene bank, Sperm bank, Superovalation, Cryopreservation 3. In Vitro Fertilization(IVF) and Embryo Transfer(ET), Zygote Itra Fallopian Transfer (ZIFT), Intracytoplasmic Sperm Injection (ICSI) 4. Placentation- Types, examples and functions 5. Placenta Banking- Placenta preservation benefits **Keyword/Tag:** Gene bank, Sperm bank, Superovulation, IVF, ET, ZIFT, ICSI, Placenta banking.	15

30/5/23

30/5/23

	आधुनिक सहायक प्रजनन तकनीक 1. स्टेम कोशिका– प्रकार एवं उनके उपयोग। 2. जीन बैंक, शुक्राणु बैंक, सुपर आव्यूलेशन, क्रायोप्रिजरवेशन 3. इन विट्रो निषेचन (आई व्ही एफ) तथा भ्रूण स्थानांतरण जाइगोट इंट्रा फैलोपियन ट्रांसफर इन्ट्रा साइटोप्लाजमिक स्पर्म इंजेक्शन 4. अपरान्यास–प्रकार, उदाहरण तथा कार्य 5. प्लेसेन्टा बैकिंग – अपरा संरक्षण लाभ।	
UNIT - IV	**Developmental Biology:-** 1. Fertilization 2. Embryonic development of frog up to the formation of three germinal layers 3. Fate map construction in frog 4. Metamorphosis of Tadpole Larva 5. Parthenogenesis. **Keyword/Tag:** Fertilization, Frog embryology, Tadpole metamorphosis, Parthenogenesis.	
	परिवर्धन जैविकी 1. निषेचन 2. मेढ़क का भ्रूणीय परिवर्धन: तीन जर्म लेयर के बनने तक 3. मेढ़क का नियती मानचित्र 4. टेडपोल लार्वा का कायान्तरण 5. अनिषेक जनन	
UNIT - V	**Embryonic Development of Chick :-** 1. Structure of hen's egg 2. Embryonic Development of chick embryo up to the formation of primitive streak 3. Fate map construction in chick 4. Extra embryonic membranes of chick: Formation and functions. **Keyword/Tag:** Hen's egg, Chick embryology, Fate map, Chick embryo membranes.	15
	चिक का भ्रूणिकी परिवर्धन 1. मुर्गी के अंडे की संरचना 2. आदि रेखा बनने तक चूजे का भ्रूणीय विकास 3. चूजे का नियति मानचित्र का निर्माण 4. चूजे की बाह्य गर्भ झिल्लियों का निर्माण एवं कार्य।	

Text Books-

1 Cell and Molecular Biology,1987 by Sheelar & Bianchi .

2 Karp Cell and Molecular Biology,1979.

3 Introducation to Cytology by Rastogi V.B.

4 Cell and Molecular Biology,1980 by De-Robertis.

5 Cell Biology,1991 by Powar,C.B ,.

6 Cell Biology, Genetics, Biology Evolution by Varma P.S. & Agrawal V.K.

Reference Books-

1 Molecular Cell Biology" by Darnell J.

2 Cell Biology" by Kimball T W

3 Developmental Biology: A Very Short Introduction (Very Short Introductions)" by Lewis Wolpert.

suggested equivalent online courses:

1 Swayam Online courses
http://storage.googleapis.com/uniquecourses/online.html

2 National Digital Library

30/05/23 30/05/23 30/5/23

(03) (10)

http://ndl.iitkgp.ac.in/

3 e-PG Pathshala (MHRD) Portal
http://epgp.inflibnet.ac.in/

4 Science Direct Open Access Content
http://www.sciencecedirect.com/book/9781843342038/open-access

30.5.2023 23/5/23 30/05/23

0

(04)

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class		**B.Sc. Zoology**
Semester		**II Semester**
Subject & Subject Code		**Zoology &2352 ZOOL2P**
Paper	**English**	**Cytology, Reproductive biology and Embryology, Developmental Biology**
	हिन्दी	**कोशिका विज्ञान प्रजनन विज्ञान एवं परिवर्धन जैविकी**
Max. Marks		**60 (E) + 40 (I) = 100**

Credit			**Total Credits**
L	**T**	**P**	**2**
0	0	2	

Course Outcome:

Upon competion of the course students should be able to understand:

1. The different stages of mitotic and meiotic cell division and speical types of chromosomes.
2. Different stages of embryology.
3. Through squash preparations understand the stages of cell division and sytructure of polytene chromosome.
4. Enhance collaborative learning and commuinication skills through practical sessions, team work group discussion, assignments and project.

Unit	Syllabus	Periods
1	Spotting related to the cytology a. Prokaryote and Eukaryote Cell b. Stages of Mitotic cell division c. Stages of Meiotic cell division d. Lamp brush Chromosome	13
	कोशिका विज्ञान से संबंधित स्पॉटिंग अ. प्रोकैरियोटिक तथा यूकैरियोटिक कोशिका ब. समसूत्री कोशिका विभाजन की विस्थाएं स. अर्द्धसूत्री कोशिका विभाजन की विस्थाएं द. लेम्पब्रश गुणसूत्र।	
2	Spotting related to Reproductive biology and Embryology a. T.S. Testis of Mammal b. T.S. Ovary of Mammal c. Developmental stages of Frog embryology d. Developmental stages of Chick embryology	13
	प्रजनन विज्ञान और भ्रूण विज्ञान से संबंधित स्पॉटिंग अ. स्तनधारी के वृषण का अनुप्रस्थ काट ब. स्तनधारी के अंडाशय का अनुप्रस्थ काट स. मेढ़क के भ्रूणीय विकास की अवस्थाएं द. चूजे के भ्रूणीय विकास की अवस्थाएं	

Nidhi 30.5.2023 30/5/23 30/05/23

3	Squash preparation of onion root tip to understand the stages of mitosis	8
	समसूत्री विभाजन की अवस्थाओं को समझने के लिए प्याज के मूलाग्र का स्कवेश बनाना	
4	Squash Preparation of Grasshopper testis to understand the stages of meiosis	9
	अर्द्धसूत्री विभाजन की अवस्थाओं को समझने के लिए टिड्डे की वृषण का स्कवेश बनाना।	
5	Trypan Blue exclusion test of cell viability Chironomus larva/Drosophila	8
	सेल व्यवहार्यता का ट्राईपेन ब्लू अपवर्जन परीक्षण	
6	Squash preparation of salivary gland chromosome from Chironomous larva/Drosophila	9
	कायरोनोमस लार्वा/डोसेफिला की लार ग्रंथि गुणसूत्र का स्कवेश बनाना।	

30.5.2023 30/05/23 30/5/23 30/5/23 30/05/23

(06)

(13)

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class	B.Sc. Zoology

Assessment and Evaluation

Suggested Continous Evaluation Methods:

Internal Assessment	Marks	External Assesssment	Marks
Class Interaction/Quiz	10	Viva Voce on Practical	10
Attendance	10	Practical Record File	10
Assignment (Charts/Model Seminar/Rural Service/ Technology Dissemination/ Report of Excursion/Lab Visits/ Survey/ Industrial Visit)	20	Table Work/Experiments a. Spotting b. Dissection c. Mounting d. Examination of Pond Water e. Economic Importance of Insects f. Parasitic Adaptations	40 10 7 3 10 5 5
Total	**40**		60

30.5.2023 30/5/23 30/5/23 30/05/23 30/5/23

(14) (07)