

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES

B.Sc., Zoology Hons (Major)

I & II SEMESTER OF 2025-2026 ADMITTED BATCH



Permanently Affiliated to Andhra University



PROCEEDINGS OF THE PRINCIPAL
SPACES DEGREE COLLEGE (Autonomous), PAYAKARAOPETA
BoS Meetings for the 2025-2026 AY

Procs. No : R.C. No:2 /SPACES/A.C/BOS

Date: 13-10-2025

Sub: SPACES Degree College (A), Payakaraopeta – Academic Council – Conduct of BOS Meetings for the Academic Year 2025-2026- Guidelines issued – Regarding.

ORDER: -

The autonomous colleges, in alignment with their vision, mission, stated objectives, and core values, are mandated to design and develop their own outcome-based curricula. This must be done with due consideration for societal, local, and global industry requirements, employability, and the development of industry-ready and transferable skills. Accordingly, every program shall prescribe Course Outcomes (COs), Program Outcomes (POs), and Program Specific Outcomes (PSOs) along with a suitable learning outcome assessment management system, supported by a robust and transparent evaluation mechanism to measure attainment levels among students.

Further, the A.P. State Council of Higher Education (APSCHE) has introduced a revised curricular framework effective from the Academic Year 2025-26, incorporating Skill Enhancement Courses, Multi-Disciplinary courses, the Indian Knowledge System and a revised credit structure.

In light of the above responsibilities prescribed by the institution's vision and mission, NEP-2020, and the APSCHE's revised and new UG curricular framework, it is imperative to customize, design, and re-orient our academic and research activities to meet the expectations of students, industries, and government stakeholders.

Accordingly, the Chairpersons of the U.G Boards of Studies (BoS) of various departments are hereby requested to make necessary arrangements to convene their BOS meetings before 25 October 2025.

The Chairpersons are further instructed to:

1. Prepare the curricula and extracurricular activities for the Academic Year 2025–26 in line with the institution's vision, mission, NEP-2020, and APSCHE norms.
2. Devise an appropriate evaluation system to ensure effective learning outcomes and holistic student development.
3. Ensure that the curriculum design includes 20% revision of the syllabus each year without deviating from the APSCHE prescribed syllabus.
4. If the syllabus is not prescribed by APSCHE/Affiliating University, then the syllabus is to be framed by the BOS committee concerned with duly following the mandate prescribed above.
5. Engage stakeholders viz employers, parents, and alumni, to obtain feedback on the existing curricula and to invite suggestions for improvements.
6. Invite the University nominee, subject experts, industry representatives, student representatives, well in advance. The meeting notice shall clearly specify the date, venue, and agenda, and a soft copy of the agenda and relevant documents shall be circulated for their perusal.
7. Ensure that the subject experts invited preferably hold a Doctorate with at least 10 years teaching experience and have relevant expertise in designing industry-related, market- and job-of oriented curricula.
8. Facilitate thorough deliberations on curriculum design, evaluation methods, incorporation of research components, measures to enhance learning experiences, and optimal utilization of existing human, physical, and ICT resources.
9. Conduct all BOS meetings in offline mode. Online participation shall be permitted only under exceptional circumstances.
10. Prescribe benchmarking and quality initiatives in pedagogy and learning, including strategies for curriculum design and teaching-learning processes, in collaboration with the IQAC Coordinator, prior to the BOS meeting.
11. Ensure that a minimum student attendance of 75% shall be required for eligibility to appear for I & II Mid-Term Examinations under the CIA component; this shall be formally approved in the BoS meeting.
12. Semester End theory examinations will be conducted for 70 marks and 30 marks will be allocated for internal marks. Practical exams will be conducted for 50 Marks

13. Approve any new Certificate courses/ Addon programs to be introduced for the Academic Year 2025–26, the number and frequency of certificate courses, and SWAYAM MOOCs courses.
14. Submit the approved BOS copies in the prescribed format, in quadruplicate (hard copies) to the Academic Cell for onward submission to the IQAC, Examination Cell, and Library, within three days of the meeting and upload the soft copy in their respective department web pages in the college website.
15. Ensure strict alignment of all recommendations and curriculum changes with the institution's vision and mission.
16. Submit a request to receive advance funds from the Examination cell through Principal for conducting BoS meetings.

Following contents shall be presented in the BOS document in the order

1. Proceedings of the Principal pertaining to BOS
2. Composition of BOS
5. Table showing the Allocation of Credits in the following table for both theory and Practical's in case of science subjects.
6. Resolutions adopted in the meeting with detailed discussion that took place during the meeting.
7. Each BOS Chairman shall, immediately after syllabus, tabulate the changes made in the syllabus/ paper along with justification.
8. Attendance of Members present with signatures in the tabular form.
9. List of Examiners & Paper setters
10. Syllabus for each course (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical) and allocation of CIA (50marks) for each course with structure.

CIA structure for Single Major system:

Allotment of Internal marks (30) is followed based on the criteria:

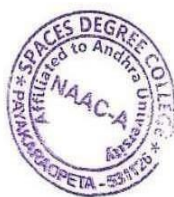
1. Two mid Examinations will be conducted per each semester. Each mid exam will be conducted per 50 marks and scaled down to 10 marks
2. 5 marks will be allotted for student seminar and assignment.

S. No	Examination	Marks	Scaled down
1	Mid -1	50	10
2	Mid -2	50	10
3	Seminar& Assignments	5	-
	Attendance	5	-

Mid examination to be conducted in offline mode in which the student should attempt 3 Essay Questions out of 6 Questions and 5 short answer questions out of 7 questions. Each essay question carries 10 marks and short answer question carries 4 marks. First mid exam will be conducted for first 2 units and second mid exam will be conducted for next 2 units.

Section	Category	Marks for each Question	Questions to be given	Questions to be answered	Total Marks
A	Essay Questions	10	6	3	30 M
B	Short Answer Questions	4	7	5	20
Total	-	-	13 Questions	7	50 M

The Chair persons of all Board of Studies are hereby instructed to comply with these directives in letter and spirit to ensure the highest standards of academic and administrative excellence.



A. R. G. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Copy to:

1. Dean
2. BOS Chairpersons of all the departments
3. IQAC Coordinator
4. Controller of Examinations
5. Office.

PROCEEDINGS OF THE PRINCIPAL, SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

R.C. NO:1 /A.C/BOS/Members Nomination Dated: 03-10-2025

Sub: SPACES Degree College (Autonomous), Payakaraopeta- UG Board of Studies (BOS)- Nomination of Members - Orders Issued.

Ref: UG Guidelines for Autonomous Colleges (2018)

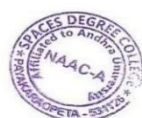
ORDER:

The Principal, SPACES Degree College (Autonomous), Payakaraopeta is pleased to constitute UG Board of studies in Zoology for Reviewing the syllabus in Zoology subject for I and II semesters duly following the norms of the UGC Autonomous guidelines

S.No	Category	Name	Designation
1	University Nominee	Prof. P Janakiram	Professor & Head Department of Zoology Andhra University
2	Subject Expert	Smt M. Vasantha Lakshmi	Lecturer in Zoology A.S.D. Govt Degree for Women (A) Kakinada
3	Subject Expert	Sri B. Chakravarthi	Lecturer & Head Dept of Zoology and Aquaculture PR Govt. College (A) Kakinada
4	Industry Expert	Dr Ravi Kiran S Yedidi	Founder & Principal Investigator TCABS-E, Visakhapatnam
5	Alumna	Ms. G. Chandraja	Jr. Lecturer Sri Prakash Synergy School Kakinada
6	Chairperson	Smt Ch. Mangathayaru	Lecturer and Head Department of Zoology SPACES Degree College (A)
7	Faculty Member	Mr. E. Pardha Saradhi Ayyangar	Lecturer Department of Zoology SPACES Degree College (A)

The above members are requested to attend the BoS meeting on 23rd October 2025 and share their valuable reviews, and suggestions on the following functionaries.

- Prepare and review the syllabi for the subject keeping in line of APSCHE and Affiliating University and interest of the stake holders for consideration and approval of the IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department.



A. R. G. R. S. S. S.
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES

AGENDA

DATE: 23-10-2025

TIME: 11 :00 AM

1. To Review the curriculum of I and II semesters of B.Sc. Zoology as prescribed by APSCHE with effect from academic year 2025-2026.
2. To discuss Whether changes are required in the syllabus.
3. To discuss and propose the criteria and pattern of internal assessment.
4. To discuss and propose the pattern of external assessment.
5. To discuss Model Question papers for The I and II Semesters including Theory and Practical.
6. To discuss about blueprint for Internal exams and Semester End Examinations.
7. To propose the names for Question paper setters and Examiners.
8. To discuss about remedial classes for Slow learners
9. To discuss about Organizing Guest lecturers
10. To discuss about implementation of certificate courses.
11. Any other matter according to the discretion of the Chair person.

RESOLUTIONS

Resolution 1

Resolved that the Department of Zoology adopts the Outcome-Based Education (OBE) framework for B. Sc (Honors) Zoology program under the autonomous structure aligning with national higher education standards.

Resolution 2

Ratified the Program Outcomes (POs), Program Specific Outcomes (PSOs), and Course Outcomes (COs) formulated and mapping of Course Outcomes (COs) to the respective POs and PSOs to ensure outcome alignment across the curriculum for the academic year 2025–26.

Resolution 3

Resolved that the department shall implement a systematic assessment and attainment process using both direct (tests, assignments, practical work) and indirect (feedback, surveys) methods to evaluate student learning outcomes and the findings shall be utilized for curriculum review and teaching-learning reforms to promote Continuous Quality Improvement (CQI).

Resolution 4

Resolved that the detailed syllabus of B.Sc., Zoology Major for Semester I and II including both theory and Practical components with changes, be approved aligning with Regulations and autonomous institution academic standards.

CHANGES IN SYLLABUS WITH JUSTIFICATIONS

SEMESTER I

Course Title: Animal Diversity I: Biology of Non-Chordates (Theory)

Unit	Type of Change	Description	Justification
3	Addition	Life Cycle and Pathogenicity of <i>Fasciola hepatica</i>	To include a representative case study from Platyhelminthes and enhance understanding of parasitic adaptations
		Importance of <i>Caenorhabditis elegans</i>	To introduce Nobel Prize winning model organism to the students and provide knowledge on recently recognized research animals.
4	Addition	Theory and Practice of Apiculture	To provide Knowledge to students on apiculture
5	Addition	Pearl Oysters Culture (Basics) and Artificial Production of Pearls	To impart Knowledge on pearl oyster culture and artificial pearl production.

Course Title: Animal Diversity I: Biology of Non-Chordates (Practical)

Type of Change	Description
Addition	<i>Trypanosoma gambiense.</i> , <i>Euplectella</i> , <i>Pinctada</i> and <i>Lamellidens</i> sps.

Course Title: Animal Diversity II: Biology of Chordates (Theory)

Unit	Type of Change	Description	Justification
1	Additional Input	Origin and Ancestry of Chordates	To Provide knowledge about the ancestry and evolution of Chordates
3	Addition	Reproductive System of <i>Rana hexadactyla</i>	To provide knowledge on the reproductive system of Rana along with other systems
4	Addition	Ratitae with examples	Existing Syllabus mentions only about Flying Birds but Flightless Birds are not mentioned.
5	Renaming	Aquatic Adaptations in Cetacea	Aquatic Adaptations in Cetacea is more apt rather than generalized Term Aquatic Adaptations in Mammals

Course Title: Animal Diversity II: Biology of Chordates (Practical)

Type of Change	Description
Addition	Larval Stages of Ascidian / <i>Herdmania</i> Macropus Types of Feathers <i>Scoliodon</i> Internal Ear Dissection

SEMESTER II

Course Title: Cell and Molecular Biology (Theory)

Unit	Type of Change	Description	Justification
1	Addition	Virions, Prions	To introduce acellular infectious agents and their biological significance.
	Renaming	Plasma Membrane Models: Lipid Bilayer Model, Sandwich Model, Unit Membrane (Trilamellar), Fluid Mosaic Models	To update and consolidate membrane models for conceptual clarity.
4	Addition	Structure and Forms of DNA	To enable proper understanding of replication, transcription, and translation by learning DNA structure and types beforehand ensuring logical learning progression for students.
5	Addition	Si RNA	To include the Nobel Prize winning discovery on RNA interference and recent research in molecular biology.

Course Title: Cell and Molecular Biology (Practical)

Type of Change	Description
Addition	Charts and Models of Plasma Membrane Mounting and Salivary Gland of Drosophila

Course Title: Embryology (Theory)

Unit	Type of Change	Description	Justification
5	Deletions	Comparative Gastrulations in Frog, Chick	To avoid repetition of topics covered under previous units

Course Title: Embryology (Practical)

Type of Change	Description
Addition	Window Preparation of Fertilized Chick Egg

Resolution 5

Resolved that the Internal and External Assessment schemes, along with the blueprint and model question papers be approved to ensure uniform evaluation standards and transparency in assessment.

Each theory subject will be evaluated for 100 marks divided as 70 marks through Theory Semester End Examination (External) and 30 marks through Internal Assessment (CIA)

Practical Examination will be conducted for 50 Marks

INTERNAL ASSESSMENT PATTERN

Component	Max Marks	Duration
Mid Examination 1	50 Marks (scaled to 10 Marks)	2 hours
Mid Examination 2	50 Marks (scaled to 10 Marks)	2 hours
Attendance	5 Marks	
Seminar & Assignment	5 Marks	
Total: 30 Marks		

Rubrics for Awarding Attendance marks

S. No.	Attendance Percentage	Marks allotted
1	=75%	1
2	76 – 80 %	2
3	81 – 85 %	3
4	86 – 90 %	4
5	91 to 100 %	5

Mid Examination

Max Marks 50

Duration: 2 hours

Question Type	Total Questions	Questions to Answer	Marks per Question	Total Marks
Short Questions	7	5	4	20
Essay Questions	6	3	10	30
Total	50 Marks			

EXTERNAL ASSESSMENT

Component	Marks	Duration
Theory Examination	70	3 Hours
Practical Examination	50	3 Hours

Semester End Examinations

Theory Examination

Total 70 Marks

Duration: 3 Hours

Question Type	Total Questions	Questions to Answer	Marks per Question	Total Marks
Short Questions	8	5	4	20
Essay Questions	10	5 (Internal Choice)	10	50
Total	70 Marks			

Semester End Examination: Practical Examination

Total 50 Marks

Duration: 3 Hours

Component	Duration	Format	Max Marks
Practical Exam	3 Hours	Experiment / Dissection/ Specimens / Slides Record Viva	50

Resolution 6

Resolved to integrate Information and Communication Technology (ICT) in teaching, learning to enhance student engagement and academic quality to complement traditional teaching methods.

Resolution 7

Resolved that the panel of question paper setters and examiners are approved.

COURSE STRUCTURE (for Semester I and II)

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Animal Diversity-I Biology of Non- Chordates	3	3
			Animal Diversity-I Biology of Non-Chordates-Practical	2	1
		2	Animal Diversity-II Biology of Chordates	3	3
			Animal Diversity-II Biology of Chordates-Practical	2	1
	II	3	Cell and Molecular Biology	3	3
			Cell and Molecular Biology-Practical	2	1
		4	Embryology	3	3
			Embryology-Practical	2	1

List of additions / deletions made in the syllabus - B.Sc., Zoology Hons.

Year	Semester	Course	Paper	Units	Additions	Deletions	Justification
1	I	1	Animal Diversity I Biology of Non Chordates	1	Nil	Nil	Nil
				2	Nil	Nil	Nil
				3	Life Cycle and Pathogenicity of <i>Fasciola hepatica</i>	Nil	To include a representative case study from Platyhelminthes and enhance understanding of parasitic adaptations
					Importance of <i>Caenorhabditis elegans</i>	Nil	To introduce Nobel Prize winning model organism to the students and provide knowledge on recently recognized research animals.
				4	Theory and Practice of Apiculture	Nil	To provide Knowledge to students on apiculture
				5	Pearl Oysters Culture (Basics) and Artificial Production of Pearls	Nil	To impart Knowledge on pearl oyster culture and artificial pearl production.
		2	Animal Diversity II Biology of Chordates	1	Nil	Nil	Nil
				2	Nil	Nil	Nil
				3	Reproductive System of <i>Rana hexadactyla</i>	Nil	To provide knowledge on the reproductive system of Rana along with other systems
				4	Ratitae with examples	Nil	Existing Syllabus mentions only about Flying Birds but Flightless Birds are not mentioned.
				5	Nil	Nil	Nil
			Cell and Molecular	1	Virions, Prions		To introduce acellular

	II	3	Biology				infectious agents and their biological significance.
				2	Nil	Nil	Nil
				3	Nil	Nil	Nil
				4	Structure and Forms of DNA		To enable proper understanding of replication, transcription, and translation by learning DNA structure and types beforehand ensuring logical learning progression for students.
				5	Si RNA		To include the Nobel Prize winning discovery on RNA interference and recent research in molecular biology.
			Embryology	1	Nil	Nil	Nil
				2	Nil	Nil	Nil
				3	Nil	Nil	Nil
				4	Nil	Nil	Nil
				5	Nil	Comparative Gastrulations in Frog, Chick	To avoid repetition of topics covered under previous units

SEMESTER-I

COURSE 1: ANIMAL DIVERSITY- I B I O L O G Y OF NON-CHORDATES

Theory

Credits: 3

3 hrs/week

LEARNING OUTCOMES:

By the completion of the course student will able to –

- Describe concept of animal kingdom classification and general characters of Protozoa
- Classify Porifera and Coelenterata with taxonomic keys
- Classify Phylum Platy & Nematelminthes using examples, parasitic adaptation
- Describe Phylum Annelida & Arthropoda using examples and economic importance of vermicomposting & economic importance of insects.
- Describe Mollusca, Echinodermata & Hemichordata with suitable examples in relation to the phylogeny

Course Outcomes (CO)

- CO1. To acquaint students with the diversity of invertebrates from protozoans to hemichordates
- CO2. To understand classification of animals using the six levels of classification.
- CO3. To understand the morphological and anatomical features of representative animal
- CO4. The students will be able to explain adaptations economic importance and special characters of invertebrates

SYLLABUS:

UNIT-I

- 1.1 Whittakers five kingdom concept and classification of Animal Kingdom.
- 1.2 Protozoa General Characters and classification up to classes with suitable examples
- 1.3 Protozoa Locomotion & nutrition
- 1.4 Protozoa reproduction

UNIT –II

- 2.1 Porifera General characters and classification up to classes with suitable examples
- 2.2 Canal system in sponges
- 2.3 Coelenterata General characters and classification up to classes with suitable examples
- 2.4 Polymorphism in coelenterates & Corals and coral reefs

UNIT – III

- 3.1 Platyhelminthes General characters and classification up to classes with suitable examples
- 3.2 Nematelminthes General characters and classification up to classes with suitable examples
- 3.3 Life cycle and pathogenicity of *Ascaris lumbricoides* and *Fasciola hepatica*
- 3.4 Importance of *Caenorhabditis elegans*
- 3.5 Parasitic Adaptations in helminths

UNIT – IV

- 4.1 Annelida General characters and classification up to classes with suitable examples
- 4.2 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost
- 4.3 Arthropoda General characters and classification up to classes with suitable examples
- 4.4 Theory and Practice of Apiculture
- 4.5 *Peripatus* - Structure and affinities

UNIT – V

- 5.1 Mollusca: General characters and classification up to classes with suitable examples
- 5.2 Pearl Oysters Culture (Basics) and Artificial Production of Pearls
- 5.3 Echinodermata General characters and classification up to classes with suitable examples
Water vascular system in star fish
- 5.4 Hemichordata General characters and classification up to classes with suitable examples
Balanoglossus - Structure and affinities

CO-CURRICULAR ACTIVITIES:

- Preparation of chart/model of phylogenetic tree of life, 5-kingdom classification
- Visit to Zoology Museum or Coral Island as part of Zoological tour
- Charts on polymorphism
- Clay models of canal system in sponges
- Plaster-of-paris model of *Peripatus*
- Construction of a vermicompost in each college, manufacture of manure by students and donating to local farmers
- Chart on pearl forming layers using clay
- Visit to a pearl culture rearing industry/institute
- Live model of water vascular system
- Observation of *Balanoglossus* for its tubicolous habit

REFERENCE BOOKS:

- L.H. Hyman „*The Invertebrates*’ Vol I, II and V. – M.C. Graw Hill Company Ltd.
- Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
- E.L. Jordan and P.S. Verma „*Invertebrate Zoology*’ S. Chand and Company.
- R.D. Barnes „*Invertebrate Zoology*’ by: W.B. Saunders CO., 1986.
- Barrington. E.J.W., „*Invertebrate structure and Function*’ by ELBS.
- P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
- Parker, T.J. and Haswell “*A text book of Zoology*’ by, W.A., Mac Millan Co. London.
- Barnes, R.D. (1982). *Invertebrate Zoology*, V Edition”

SEMESTER-I

COURSE 1: ANIMAL DIVERSITY-I B I O L O G Y OF NON-CHORDATES

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES:

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labelled record of identified museum specimens

SYLLABUS:

Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Protozoa:** *Amoeba*, *Entamoeba histolytica*, *Paramoecium*, *Paramecium* Binary fission and Conjugation, *Vorticella*, *Trypanosoma*, *Plasmodium* sps.,
2. **Porifera:** *Sycon*, *Sycon* - T.S. and L.S. , Spicules, Gemmule, *Spongilla*, *Euspongia*, *Euplectella*
3. **Coelenterata:** *Obelia* (Colony), *Obelia* (Medusa), *Physalia*, *Velella*, *Aurelia*, *Pennatula*, *Gorgonia*, *Corallium*
4. **Platyhelminthes:** *Planaria*, *Fasciola hepatica*, *Fasciola* larval forms – *Miracidium*, *Redia*, *Cercaria*, *Schistosoma haematobium*, *Taenia solium*, *Echinococcus granulosus*
5. **Nemathelminths:** *Ascaris* (Male), *Ascaris* (Female), *Ancylostoma*, *Wuchereria*, *Dracunculus*
6. **Annelida:** *Nereis*, *Aphrodite*, *Chaetopterus*, *Hirudinaria*, Trochophore larva
7. **Arthropoda:** *Peripatus*, *Limulus*, *Cancer*, *Palaemon*, *Sacculina*, *Scolopendra*, *Scorpion*
8. **Larvae** - Nauplius, Mysis, Zoea, Mouthparts of male *Anopheles*, Mouthparts of female *Anopheles*, Mouthparts of *Culex*, Mouthparts of Housefly, Mouthparts of Butterfly
9. **Mollusca:** *Chiton*, *Pila*, *Murex*, *Pterodo*, *Unio*, *Pinctada* / *Lamellidens*, *Glochidium* larva, *Nautilus*, *Sepia*, *Loligo*, *Octopus*
10. **Echinodermata:** *Bipinnaria* larva, *Antedon*, *Asterias*, *Ophiothrix*, *Echinus*, *Clypeaster*, *Cucumaria*
11. **Hemichordata:** *Tornaria* larva, *Balanoglossus*

Dissections:

Computer - aided techniques should be adopted or show virtual dissections Dissection of edible (Prawn/Pila) invertebrate as per UGC guidelines

An “Animal album” containing photographs, cut outs, with appropriate write up about the above- mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose

REFERENCE WEB LINKS:

- <https://virtualmicroscopy.peabody.yale.edu/>
- <https://tnhm.in/category/assorted-gallery-for-vertebrates-and-invertebrates/invertebrates/>
- <http://www.nhc.ed.ac.uk/index.php?page=24.25.312>
- <https://biologyjunction.com/invertebrate-notes/>
- <https://lanwebs.lander.edu/faculty/rsfox/invertebrates/>
- <https://www.youtube.com/watch?v=iqrVmz625WA>
- <https://www.youtube.com/watch?v=5VlJ59oX7G0>
- <https://www.youtube.com/watch?v=sMutOON6zHE>
- <https://www.youtube.com/watch?v=zSTYRtliac0>

SEMESTER-I

COURSE 2: ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Theory

Credits: 3

3 hrs/week

LEARNING OUTCOMES:

By the completion of the course student will be able to –

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalia with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Protochordata to Mammalia.

Course Outcomes (CO)

CO1. To acquaint students with the diversity of chordates from urochordata to mammalia

CO2. To understand classification of animals using the six levels of classification.

CO3. To understand the morphological and anatomical features of representative animal

CO4. The students will be able to explain adaptations and special characters of chordates

SYLLABUS:

UNIT - I

- 1.1 General characters and classification of Chordata up to classes
- 1.2 Salient features of Cephalochordata, Salient features of Urochordata
- 1.3 Structure and life history of *Herdmania*, Retrogressive metamorphosis – Process and Significance
- 1.4 Cyclostomata, General characters, Comparison of Petromyzon and Myxine

UNIT - II

- 2.1 General characters of Fishes
- 2.2 *Scoliodon*: External features, Digestive system, Respiratory system
- 2.3 *Scoliodon* Structure and function of Heart, Structure and functions of the Brain.
- 2.4 Dipnoi, Migration in Fishes, Types of Scales

UNIT - III

- 3.1 General characters of Amphibia,
- 3.2 *Rana hexadactyla*: External features, Respiratory system, Reproductive System, Structure and function of Heart
- 3.3 *Rana hexadactyla* structure and functions of the Brain
- 3.4 General characters of Reptilia
- 3.5 *Calotes*: External features, Digestive system, structure and function of Brain
- 3.6 Identification of Poisonous snakes

UNIT - IV

- 4.1 General characters of Aves
- 4.2 *Columba livia*: External features, Digestive system, Respiratory system
- 4.3 *Columba livia*: Structure and function of Heart, structure and function of Brain
- 4.4 Migration in Birds, Flight adaptation in birds, Ratitae with examples

UNIT - V

- 5.1 General characters of Mammalia
- 5.2 Classification of Mammalia up to sub - classes with examples
- 5.3 Comparison of Prototherians, Metatherians and Eutherians
- 5.4 Dentition in mammals, Aquatic Adaptations in Cetacea

Additional Input: Origin and Ancestry of Chordates [Not Considered for Assessment]

CO-CURRICULAR ACTIVITIES

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology Museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

REFERENCE BOOKS:

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
- Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
- Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols.,
1573 pp., tables, figs.
- A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
- R.L. Kotpal, 2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
- E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
- G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
- Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

SEMESTER-I

COURSE 2: ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES:

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labeled record of identified museum specimens

SYLLABUS:

1. **Protochordata:** Larval stages of Ascidian / Herdmania, Herdmania, Amphioxus, Amphioxus T.S. through pharynx
2. **Cyclostomes:** *Petromyzon and Myxine.*
3. **Pisces:** *Pristis, Torpedo, Hippocampus, Exocoetus, Echeneis, Anguilla, Channa, Labeo, Catla, Clarius*
4. **Amphibia:** *Ichthyophis, Ambystoma, Axolotl larva, Hyla,*
5. **Reptilia:** *Testudo, Trionyx, Crocodile, Uromastix, Draco, Chamaeleon, Naja, Russel's viper, Krait, Hydrophis*
6. **Aves:** *Psittacula, Eudynamis, Bubo, Alcedo, Types of Feathers*
7. **Mammalia:** *Ornithorhynchus, Macropus, Pteropus, Funambulus.*
8. **Dissections-**As per UGC guidelines
Scoliodon IX and X Cranial nerves,
Scoliodon Internal Ear, Brain
Mounting of fish scales

REFERENCE WEB LINKS:

- <https://nt7-mhe-complex-assets.mheducation.com/nt7-mhe-complex-assets/Upload-20190715/InspireScience6-8CA/LS15/index.html>
- <https://themammallab.com/>
- <http://abacus.bates.edu/acad/depts/biobook/LabConCh.htm>
- <https://virtualzoology.wordpress.com/scoliodon/>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

SEMESTER-II

COURSE 3: CELL & MOLECULAR BIOLOGY

Theory Credits: 3 3 hrs/week

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Cell and molecular biology by the completion of the course student will be able to –

- Understand the basic UNIT of the living organisms and to differentiate the organisms by their cell structure.
- Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.
- Explain the cell cycle and bioenergetics of the cell
- Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins
- Understand the gene expression phenomenon and biological importance of biomolecules

Course Outcomes (CO)

CO1: Distinguish between prokaryotic and eukaryotic cells and explain the structure and nature of viruses, virions, prions and mycoplasma.

CO2: Describe the ultrastructure and functions of cell organelles including plasma membrane, endoplasmic reticulum, Golgi complex, mitochondria, nucleus, and ribosomes.

CO3: Explain the mechanisms of cellular transport, cell division, and the stages of the cell cycle including its regulation and checkpoints.

CO4: Analyze the bioenergetics of cells by describing glycolysis, the Krebs cycle, and the electron transport system.

CO5: Describe the central dogma of molecular biology and compare the processes of DNA replication, transcription, and translation in prokaryotes and eukaryotes.

CO6: Explain gene regulation mechanisms in prokaryotes and eukaryotes and interpret the function and biological significance of carbohydrates, proteins, and lipids.

SYLLABUS:

UNIT- I Cell Biology-I

- 1.1 Definition, history, prokaryotic and eukaryotic cells, virus, virions, prions and mycoplasma
- 1.2 Electron microscopic structure of animal cell.
- 1.3 Plasma membrane – Lipid Bilayer Model, Sandwich Model, Unit Membrane (Trilamellar), Fluid Mosaic Models
- 1.4 Transport functions of plasma membrane-Active – passive- facilitated.

UNIT -II Cell Biology-II

- 2.1 Structure and functions of Golgi complex & Endoplasmic Reticulum
- 2.2 Structure and functions of Lysosomes & Ribosomes
- 2.3 Structure and functions of Mitochondria & Centriole
- 2.4 Structure and functions of Nucleus & Chromosomes

UNIT – III: Cell Biology-III

- 3.1 Cell Division- mitosis, meiosis
- 3.2 Cell cycle – stages- check points- regulation
- 3.3 Abnormal cell growth- cancer- apoptosis
- 3.4 Bio energetics- Glycolysis-Krebs cycle-ETS

UNIT -IV: Molecular Biology-I

- 4.1 Central Dogma of Molecular Biology
- 4.2 Structure and Forms of DNA
- 4.3 Basic concepts of - DNA replication – Overview (Semi-conservative mechanism, Semi- discontinuous mode, Origin & Propagation of replication fork)
- 4.4 Transcription in prokaryotes – Initiation, Elongation and Termination, Post-transcriptional modifications (basics)
- 4.5 Translation – Initiation, Elongation and Termination

UNIT -V: Molecular Biology-II

- 5.1 Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes, siRNA
- 5.2 Biomolecules- Carbohydrates (Glucose- structure-properties- biological importance only)
- 5.3 Biomolecules- Amino acid, Protein (structure- properties- biological importance only)
- 5.4 Biomolecules- Lipids (Fatty acid- structure - properties- biological importance only)

CO-CURRICULAR ACTIVITIES:

- Model of animal cell
- Working model of mitochondria to encourage creativity among students
- Photo album of scientists of cell biology
- Charts on plasma membrane models/cell organelles
- Charts on central dogma/lac operon/genetic code
- Model of semi-conservative model of DNA replication
- Power point presentation of any of the above topics by students

REFERENCE BOOKS:

- Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell, Molecular Cell Biology. Freeman and company New York. * Cell Biology by De Robertis
- Bruce Alberts, Molecular Biology of the Cell * Rastogi, Cytology *Varma & Aggarwal, Cell Biology *C.B. Pawar, Cell Biology * Molecular Biology by Frei fielder
- Instant Notes in Molecular Biology by Bios scientific publishers and Viva Books Private Limited * James D. Watson, Nancy H. Hopkins „Molecular Biology of the Gene“

SEMESTER-II

COURSE 3: CELL & MOLECULAR BIOLOGY

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES:

- Acquainting and skill enhancement in the usage of laboratory microscope
- Hands-on experience of different phases of cell division by experimentation
- Develop skills on human karyotyping and identification of chromosomal disorders
- To apply the basic concept of inheritance for applied research
- To get familiar with phylogeny and geological history of origin & evolution of animals

SYLLABUS:

1. Charts and Models of Plasma Membrane
2. Preparation of temporary slides of Mitotic divisions with onion root tips
3. Observation of various stages of Mitosis with prepared slides
4. Observation of various stages of Meiosis with prepared slides
5. Mounting of salivary gland chromosomes of Chironomus / Drosophila
6. Test for carbohydrate in given sample (Benedicts test)
7. Test for Protein in given sample (Nitric acid test -white ring)
8. Test for lipid in the given sample (Saponification test)

REFERENCE WEB LINKS:

- <https://cbi-au.vlabs.ac.in/>
- <https://www.youtube.com/watch?v=xhnUZAyNdQk>
- https://www.youtube.com/watch?v=l8LXQq5_VL0
- <https://www.labster.com/simulations>
- <https://www.sciencecourseware.org/BiologyLabsOnline/protected/TranslationLab/index.php>
- <https://virtual-labs.github.io/exp-analysis-of-carbohydrates-au/procedure.html>
- https://www.labxchange.org/library/items/lb:LabXchange:f10fd7ad:lx_simulation:1
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

SEMESTER-II

COURSE 4: EMBRYOLOGY

Theory

Credits: 3

3 hrs/week

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of concepts of embryology. This course will provide students with a deep knowledge in embryology, by completion of the course student will able to –

- Understand the historical perspective and concepts of embryology
- Acquire knowledge on gametogenesis, fertilization and cleavage patterns
- Understand the fate of germinal layers and extraembryonic membranes
- Explain the process of regeneration in certain animals
- Examine the process of organogenesis

Course Outcomes (CO)

CO1: Describe the historical developments in embryology and explain the basic concepts such as phases of development, pattern formation, and cell differentiation.

CO2: Analyze the processes involved in gametogenesis, fertilization, cleavage patterns, and early embryonic development in frog and chick.

CO3: Explain the formation and significance of germ layers, extra-embryonic membranes, placenta, and procedures like amniocentesis in embryonic development.

CO4: Interpret the processes of metamorphosis, regeneration, aging, and the effects of teratogenic agents on embryonic development.

CO5: Compare gastrulation in frog, chick, and mammal and illustrate the process of induction, embryonic organizers, and organogenesis of the skin and circulatory system in humans.

SYLLABUS:

UNIT-I:

- 1.1 Historical perspective and basic concepts: Phases of development
- 1.2 Cell-Cell interaction, Pattern formation, Differentiation and growth
- 1.3 Differential gene expression,
- 1.4 Cytoplasmic determinants and asymmetric cell division

UNIT-II:

- 2.1 Gametogenesis: Spermatogenesis, Oogenesis;
- 2.2 Types of eggs, Egg membranes; Fertilization (External and Internal)
- 2.3 Planes and patterns of cleavage; Types of Blastulae; Fate maps
- 2.4 Early development of frog and chick up to gastrulation

UNIT-III:

- 3.1 Fate of Germ Layers
- 3.2 Extra-embryonic membranes
- 3.3 Placenta (Structure, types and functions of placenta)
- 3.4 Amniocentesis

UNIT-IV:

- 4.1 Metamorphosis: Changes, hormonal regulations in amphibians
- 4.2 Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (in Turbellarians)
- 4.3 Ageing: Concepts and Theories
- 4.4 Teratogenic agents and their effects on embryonic development

UNIT-V:

- 5.1 Gastrulation in Mammals
- 5.2 Induction and embryonic organizers (Spemann's experiment)
- 5.3 Organogenesis of Skin
- 5.4 Organogenesis of Circulatory system
(* Organogenesis in Human need to be explained)

CO-CURRICULAR ACTIVITIES:

- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.
- Chart on the organogenesis
- RBPT on the Placenta
- Model of extra embryonic membrane
- Laboratory observation of chick embryonic development

REFERENCES BOOKS:

- Developmental Biology by Balinsky
- Developmental Biology by Gerard Karp
- Chordate embryology by Varma and Agarwal

- Embryology by V.B. Rastogi
- Austen CR and Short RV. 1980. *Reproduction in Mammals*. Cambridge University Press.
- Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer Associates Inc., Publishers, Sunderland, USA.
- Longo FJ. 1987. *Fertilization*. Chapman & Hall, London.
- Rastogi VB and Jayaraj MS. 1989. *Developmental Biology*. Kedar Anath Ram Nath Publishers, Meerut, Uttar Pradesh.
- Schatten H and Schatten G. 1989. *Molecular Biology of Fertilization*. Academic Press, New York.

SEMESTER-II
COURSE 4: EMBRYOLOGY

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES:

- The objective of this course is to provide a comprehensive practical knowledge on the embryology
- Must develop a critical understanding of the early embryological events
- Acquire knowledge on the developmental stages of chick
- Understand the histology of placenta

SYLLABUS:

1. Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages)
2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak 13, 18, 28, 33, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages)
3. Study of different sections of placenta (photomicrograph/ slides)
4. Project report on chick embryo development
5. Window Preparation of Fertilized Chick Egg

REFERENCE WEB LINKS:

- <https://praxilabs.com/en/3d-simulations/cultivation-and-preparation-of-the-virus-in-chick-embryo-virtual-lab>
- <https://vlab.amrita.edu/>
- <https://www.vlab.co.in/>
- https://www.youtube.com/watch?v=p_tx88He8Pk
- <https://core.ac.uk/download/143957972.pdf>
- <https://egyankosh.ac.in/bitstream/123456789/57549/1/Exercise%207%20Chick%20Embryo.pdf>
- http://www.macollege.in/app/webroot/uploads/departement_materials/doc_501.pdf
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b4_5.pdf

**Evaluation
pattern**

S. No	Theory / Practical	Marks
1	Theory Component	100
2	Practical Component (B.Sc., Zoology Hons.)	50

Internal & External Assessment

S. No	Assessment	Marks
1	Internal Assessment	30
2	Semester End Examination	70

Assessment and Qualifying Marks

S. No	Assessment	Total Marks	Qualifying Marks
1	Internal Assessment	30	12
2	Semester End Exam - Theory	70	28
3	Semester End Exam- Lab	50	20

Internal Assessment Breakup

S. No	Activity	Marks Allotted
1	Mid -term Examination 1	10
2	Mid -term Examination 2	10
3	Student Seminars & Assignments	05
4	Attendance	05

Rubrics for Awarding Attendance marks

S. No	Attendance Percentage	Marks allotted
1	75%	1
2	76 – 80 %	2
3	81 – 85 %	3
4	86 – 90 %	4
5	90.01 to 100 %	5

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc., Zoology Hons. Semester -I

PAPER – 1

w.e.f 2025- 2026 Admitted Batch

Blue Print for Internal Examinations – Mid-term Exams

Time: 2 Hrs.

Max. Marks: 50

Section	Category	Marks for Each Question	Question to be given	Questions to be Answered	Marks
A	Essay Questions	10	6 Questions	3 Questions	3 x10 = 30M
B	Short Answer Questions	4	7 Questions	5 Questions	5 x 4 = 20M
Total	-	-	13 Questions	8 Questions	50 M

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc., Zoology Hons. Semester -I

PAPER – 1

W.e.f 2025- 2026 Admitted Batch

Blue Print for Semester End Examinations – Theory Paper

Time: 3 Hrs

Max. Marks: 70

Section	Category	Marks for Each Question	Question to be given	Questions to be Answered	Marks
A	Essay Questions	10	10 Questions	5 Questions	5 x10 = 50M
B	Short Answer Questions	4	8 Questions	5 Questions	5 x 4 =20M
Total	-	-	18 Questions	10 Questions	70 M

Distribution Pattern of Essay and Short Answer Questions among the 5 Units

Unit	Essay Questions to be Given	Essay Questions to be answered	Short Answer Questions to be given	Short Answer questions to be answered
1	2	1	2	5 Questions
2	2	1	2	
3	2	1	2	
4	2	1	1	
5	2	1	1	

I B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER – THEORY EXAMINATION
ANIMAL DIVERSITY - I: BIOLOGY OF NON-CHORDATES
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 70 marks

SECTION A

5x4=20 marks

Answer any FIVE from the following Eight questions.

1. Whittaker's Five Kingdom Classification.
2. Reproduction in Protozoa.
3. Canal System in Sponges.
4. Corals and Coral Reefs.
5. Importance of *Caenorhabditis elegans*.
6. Parasitic Adaptations in Helminths
7. Theory and Practice of Apiculture.
8. Water Vascular System in Starfish.

SECTION B

5×10=50 marks

Answer ALL. the following questions.

9. (a) Explain the Classification of Protozoa upto Classes and suitable examples.
Or
(b) Discuss about the Locomotion and Reproduction in Protozoa.
10. (a) Describe the General Characters of Porifera and Classification upto classes.
Or
(b) Write an essay on Polymorphism in Coelenterates.
11. (a) Give an account on the Life Cycle and Pathogenicity of *Fasciola Hepatica*.
Or
(b) Explain in detail about the General Characters and Classification of Nematyelmiths.
12. (a) Write an account on the Scope, Vermiculture, Preparation and economic importance of vermicompost.
Or
(b) Discuss the structure and affinities of *Peripatus*.
13. (a) Give a comparative account between Prototherians and Metatherians.
Or
(b) Discuss the adaptations of aquatic mammals.

I B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER - PRACTICAL EXAMINATION
ANIMAL DIVERSITY - I: BIOLOGY OF NON-CHORDATES
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 50 marks

I)	Identify the Below Slides and Describe the Characteristics.	3 x 5 = 15 Marks
	A) B) C)	
II)	Identify the Specimen and Describe the Characteristics	3 x 5 = 15 Marks
	A) B) C)	
III)	Dissection of Edible Prawn	1 x 10 = 10 Marks
IV)	Record	5 Marks
V)	Viva	5 Marks
	Total	50 Marks

B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER - THEORY EXAMINATION
ANIMAL DIVERSITY- II: BIOLOGY OF CHORDATES
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 70 marks

SECTION A

5x4=20 marks

Answer any FIVE from the following Eight questions.

1. Salient features of Cephalochordata.
2. Myxine.
3. Dipnoi.
4. Anadromous migration.
5. Important characters of Poisonous Snakes.
6. Flight adaptations in birds.
7. Types of feathers in *Columba livia*.
8. Types of dentitions in mammals.

SECTION B

5×10=50 marks

Answer ALL. the following questions.

9. (a) What is retrogressive metamorphosis? Explain the process and significance.
Or
(b) Describe the general characters of cyclostomata.
10. (a) Discuss the structure and function of brain in *Scoliodon*.
Or
(b) Write an essay on different types of scales in fishes.
11. (a) Give an account on the structure and function of heart in *Rana hexadactyla*.
Or
(b) Describe the digestive system of *Calotes*.
12. (a) Write an account on the respiratory system of *Columba livia*.
Or
(b) Discuss the migration process in birds.
13. (a) Give a comparative account between Prototherians and Metatherians.
Or
(b) Discuss the adaptations of aquatic mammals.

B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER - PRACTICAL EXAMINATION
ANIMAL DIVERSITY- II: BIOLOGY OF CHORDATES
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 50 marks

I)	Identify the Below Slides and Describe the Characteristics.	2 x 5 = 10 Marks
	A)	
	B)	
II)	Identify the Specimen and Describe the Characteristics	2 x 5 = 10 Marks
	A)	
	B)	
III)	Dissection of <i>Scoliodon</i> Brain, IX and X Cranial nerves	1 x 10 = 10 Marks
IV)	Mounting of Fish Scales	1 x 10 = 10 Marks
V)	Record	5 Marks
VI)	Viva	5 Marks
Total		50 Marks

B.Sc. (Honors) DEGREE EXAMINATION
2nd Semester Zoology (Major)
MODEL PAPER – THEORY EXAMINATION
CELL AND MOLECULAR BIOLOGY
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 70 marks

SECTION A

5x4=20 marks

Answer any FIVE from the following Eight questions.

1. Structure of Plasma Membrane
2. Differences between Prokaryotic and Eukaryotic Cell.
3. Structure and Functions of Lysosomes.
4. Structure and functions of Nucleus & Chromosomes.
5. Mitosis and Stages of Mitosis.
6. Check points of Mitosis.
7. Central Dogma of Molecular Biology.
8. Lipids.

SECTION B

5×10=50 marks

Answer ALL. the following questions.

9. (a) Describe the Different Models of Plasma Membrane (Lipid Bilayer Model, Sandwich Model, Unit Membrane (Trilamellar), Fluid Mosaic Model).
Or
(b) Write an account on Transport functions of plasma membrane.
10. (a) Discuss the structure and function of Golgi Complex and Ribosomes.
Or
(b) Write an essay on structure and function of Endoplasmic Reticulum and Mitochondria.
11. (a) Give an account on the Glycolysis.
Or
(b) Describe the Krebs Cycle.
12. (a) Write an account on the Transcription in Eukaryotes.
Or
(b) Discuss in detail about Replication of DNA
13. (a) Write a note on Gene Expression in Prokaryotes LAC operon.
Or
(b) Describe the Structure, Classification and Functions of Carbohydrates

B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER - PRACTICAL EXAMINATION
CELL AND MOLECULAR BIOLOGY
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 50 marks

I)	Preparation of temporary slides of Mitotic divisions with onion root tips	15 Marks
II)	Test for carbohydrate in given sample	15 Marks
III)	Test for lipid in the given sample	10 Marks
IV)	Record	5 Marks
V)	Viva	5 Marks

Total	50 Marks
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B.Sc. (Honors) DEGREE EXAMINATION
2nd Semester Zoology (Major)
MODEL PAPER – THEORY EXAMINATION
EMBRYOLOGY
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 70 marks

SECTION A

5x4=20 marks

Answer any FIVE from the following Eight questions.

1. Cell-Cell interaction.
2. Phases of Development.
3. Differences between blastula and Gastrula.
4. Spermatogenesis.
5. Functions of placenta.
- 6 . Compensatory regeneration in Turbellarians
7. Derivatives of Ecto and Endoderms.
8. Organogenesis of Eye.

SECTION B

5×10=50 marks

Answer ALL. the following questions.

9. (a) Describe historical perspective and basic concepts of Embryology
Or
(b) Write an essay on differential gene expression.
- 10.(a). With neat labelled flow chart explain spermatogenesis.
Or
(b) Write an essay on mechanism of fertilization.
11. (a) Explain briefly about extra-embryonic membranes.
Or
(b) Give an account on structure and different types of placentae
- 12.(a) What is metamorphosis? Explain about hormonal regulation of metamorphosis in amphibians.
Or
(b) Discuss and describe briefly about Teratogenic agents and their effects on embryonic development.
13. (a) What organogenesis? Explain organogenesis of central nervous system.
Or
(b) Write an essay on organogenesis of skin.

B.Sc. (Honors) DEGREE EXAMINATION
1st Semester Zoology (Major)
MODEL PAPER - PRACTICAL EXAMINATION
EMBRYOLOGY
w.e.f 2025- 2026 Admitted Batch

Time: 3 hours

Maximum: 50 marks

I)	Identify the Stages of Cleavages from the Given Slides	15 Marks
II)	Identify the developmental stages of chick	15 Marks
III)	Identify different sections of placenta	10 Marks
IV)	Record	5 Marks
V)	Viva	5 Marks

Total	50 Marks
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SPACES Degree College (A), Payakaraopeta
Department of Zoology
PANEL OF QUESTION PAPER SETTERS & EXAMINERS

S.No.	Name Of the Examiners	Mobile No.	Name Of the College
1.	Dr. P John Kiran	7799161783	GDC, Nakkapalli
2.	Dr. K. Usha Rani	9441447283	DNR College (A), Bhimavaram
3.	Sri K Babu	9959179928	Govt. Arts College (A), R j y
4.	Smt. M. Vijayashanthi	7702467386	Govt. Arts College (A) ,Rjy
5.	Sri B Chakravarthy	949229446	PR Govt College(A), Kakinada
6.	Smt. M Vasantha Lakshmi	98660 23398	ASD Govt Degree College for Women Kakinada
7.	Dr. K. Lakshmi Kanth	7893558177	S.V.K.P & Dr.K. S Raju Arts and Science College (A), Penogonda.
8.	Dr. K. Sudhakar	8985685227	SRR Government Degree College Vijayawada
9.	Dr. P. Jaya	7799161785	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
10.	Sri K. Rama Rao	9910705687	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
11.	Sri Vijaya Pratap	9849611243	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
12.	Ms. P R Vani	9866886992	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
13.	Dr. Y. Shanti Prabha	9441269003	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
14.	Sri Bhushan	9440963455	Dr V. S. Krishna Government Degree College (A), Visakhapatnam
15.	Dr. S. Pratima Kumari	7989696632	St.Theressa College (A), Eluru
16.	Dr. R. Indira	8331904407	St.Theressa College (A), Eluru
17.	Mrs. N.laxmi prasanna	9010097637	St.Theressa College (A), Eluru
18.	Dr. M. Vijaya Kumar	9490086886	GDC Kaikaluru
19.	V. Sandhya	9666033618	GDC, Kaikaluru
20.	Dr. R. P. Dattu	9441348194	GDC Tiruvuru
21.	Dr. Chakrapani	8500088788	GDC Vidavaluru
23.	G. Vani	9491724533	GDC Tadepalligudem

**SPACES DEGREE COLLEGE (AUTONOMOUS),
PAYAKARAOPETA DEPARTMENT OF ZOOLOGY
BOARD OF STUDIES MEETING**

Date: 23-10-2025

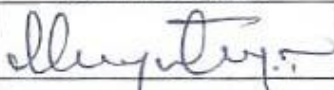
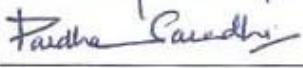
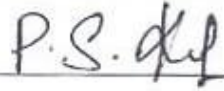
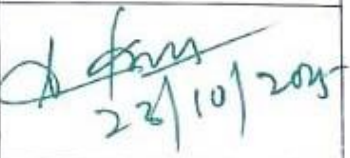
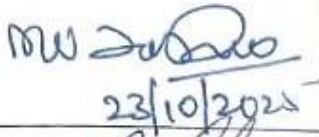
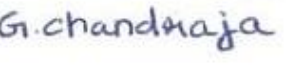
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**SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA
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	Ms. P Surya Kumari Lab Assistant	
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