

Programme File

1.NAME OF THE PROGRAMME : B.Sc. Hons. Major Zoology

2.ELIGIBILITY

B.Sc. Hon. Major Zoology eligibility needs candidates to have minimum intermediate with Zoology as one of the group subjects.

3.ABOUT DEPARTMENT

3.1 History

The Department of Zoology has been functioning since 1940 in Maharajah's Autonomous College. Initially the department was started with two faculty members and thirty students. The department was led by Sri. Raghunadhachary as a lecturer and Head of the department of Biology. Zoology main was established in the year 1954 under the able leadership of Sri K. Suresh Kumar and he worked as the head of the Department since 1954 to 1986. Later the department was headed by stalwarts like Sri. B.V. Gopala chary, Dr. R. Sri Ramamurthy, Dr. M.P.Radha Krishna Rao, Dr. B. Narayana Rao, Mrs. Usha Mani Anand, Dr. G. Mani. Smt. M. Lalitha Kumari, T. Desi Raju and Miss A. Kamamma who joined initially as Demonstrators, became lecturers after venturing higher education. At present, Mr. D.S. Siva Ganesh is leading the department with the assistance of Mr. A. Gopal, Kum. K. Radha, Sri. S. Nagaraju. The Department has a well equipped library with more than 1000 books and a well maintained Museum with around 2500 specimens, 2 human skeletons, stuffed birds & 50 models. The well maintained and constantly updated two laboratories have facilities such as laminar flow chamber, Thermal Centrifuge, hot air oven, incubator, autoclave, electronic balance, pH meter, refrigerator, Ermroscope etc.

3.2 Vision and Mission

Vision

- Budding Students of today, who are aware of life's process shall live harmoniously in the web of life.

Mission

- To acquire knowledge on the taxonomic status of various animals and its relationship to man.
- To develop research aptitude and a scientific advancement.
- To develop overall personality of the students through value oriented counseling which will help them in facing the challenges of life.
- To inculcate a sense of social responsibility among the students by involving them in community service activities.
- To develop an aptitude for understanding nature and its rich biodiversity.

4. ABOUT THE PROGRAMME

4.1 About the Course

B.Sc. (Hons.) in Zoology is an undergraduate program designed to provide in-depth knowledge of animal biology, their structure, function, behavior, and interaction with the environment.

Here's a comprehensive

Overview:

Key Features of the Course

1. Duration:

Typically a 4-year program divided into 8 semesters.

2. Eligibility:

Completion of 10+2 (higher secondary) with Biology as a major subject, often with a minimum required percentage (varies by institution).

3. Focus Areas:

Study of animal anatomy, physiology, genetics, evolution, ecology, and their applications in various fields.

Core Subjects

Animal Diversity: Classification, structure, and functions of various animal groups.

Cell and Molecular Biology: Understanding the cellular structures and molecular mechanisms in animals.

Genetics: Principles of heredity and genetic variations.

Ecology and Environment: Interactions of organisms with their environment.

Physiology and Biochemistry: Study of life-sustaining processes and chemical basis of living organisms.

Evolution: Understanding the evolutionary processes and history of life on Earth.

Developmental Biology: Growth and development of organisms from embryo to adult.

Practical Training

- Laboratory experiments in histology, dissection, ecological surveys, genetic analysis, and biochemical tests.
- Fieldwork to study biodiversity and conservation in real-world settings.

Skills Developed

- Analytical and observational skills.
- Laboratory techniques and scientific research methods.
- Understanding of biodiversity, conservation, and sustainable development.

Career Prospects

1. Higher Studies:

- M.Sc. in Zoology or related fields like Biotechnology, Microbiology, Wildlife Biology, etc.
- Specialized research through M.Phil. or Ph.D.

2. Jobs in Diverse Sectors:

- **Academic and Research:** Becoming a professor, researcher, or academician.
 - **Healthcare:** Work in pathology labs, pharmacology, or as a medical writer.
1. **Environmental Conservation:** Roles in NGOs, wildlife conservation, and forestry services.
 2. **Biotechnology and Pharmaceuticals:** Opportunities in genetic research, drug discovery, and biotech firms.
 3. **Government Jobs:** Employment in zoological parks, fisheries, and public health departments.

Why Choose Zoology?

- Interest in studying animals, their behavior, and the natural world.
- Opportunities to contribute to conservation, healthcare, and scientific advancements.
- Foundation for careers in interdisciplinary fields like biotechnology and environmental sciences.

4.2 Programme Nature, Extent and Aims

The Zoology Programme is designed to provide a holistic understanding of animal biology, fostering knowledge, skills, and ethical perspectives for various professional and academic pathways. Here's a detailed explanation of the nature, extent, and aims of a Zoology program:

Nature of the Programme

1. Interdisciplinary Approach:

Zoology integrates knowledge from biology, genetics, physiology, ecology, and environmental sciences to understand animals' structure, function, and role in ecosystems.

2. Scientific Inquiry:

It emphasizes scientific principles, experimental methodologies, and critical thinking to explore animal life.

3. Application-Oriented:

The program is tailored to address real-world issues like biodiversity conservation, climate change, sustainable development, and public health.

4. Practical and Theoretical Balance:

Combines classroom teaching with hands-on laboratory work, field studies, and research projects.

Extent of the Programme

1. Core Areas of Study:

- **Taxonomy and Biodiversity:** Classification and diversity of animals.
- **Ecology and Conservation:** Study of ecosystems and strategies to preserve species and habitats.
- **Animal Physiology and Biochemistry:** Understanding biological processes and chemical reactions in animals.
- **Genetics and Molecular Biology:** Exploring heredity and molecular mechanisms.

- **Evolutionary Biology:** Tracing the development and adaptation of species over time.
 - **Developmental Biology:** Understanding embryonic growth and development in animals.
2. **Skill Development:**
 - Laboratory techniques (microscopy, dissection, DNA analysis).
 - Statistical tools for biological research.
 - Communication and writing skills for presenting research findings.
 3. **Integration with Emerging Areas:**
 - Biotechnology.
 - Genomics and proteomics.
 - Environmental impact assessment.

Aims of the Programme

1. **Knowledge Enhancement:**
 - Equip students with a deep understanding of the diversity, physiology, and ecological importance of animals.
 - Foster comprehension of the interconnectedness between animals and their environments.
2. **Skill Development:**
 - Cultivate scientific reasoning, analytical abilities, and research proficiency.
 - Train students in modern laboratory techniques and fieldwork methodologies.
3. **Professional Preparation:**
 - Prepare students for careers in teaching, research, wildlife conservation, healthcare, biotechnology, and government services.
 - Build awareness of ethical practices and sustainability in scientific work.
4. **Promotion of Lifelong Learning:**
 - Encourage a mindset of inquiry, innovation, and continual skill enhancement.
5. **Contributing to Societal Challenges:**
 - Address pressing issues like species extinction, habitat destruction, and climate change through research and applied knowledge.
 - This structured and multidisciplinary approach ensures that students are not only well-versed in theoretical aspects but also capable of applying their knowledge to address challenges in science, society, and the environment.

4.3 GRADUATE ATTRIBUTES (GAs)

The Graduate Attributes (GAs) reflect particular qualities and abilities of an individual learner including knowledge, application of knowledge, professional and life skills, attitudes and human values that are required to be acquired by the graduates of Maharajah's College. The graduate attributes include capabilities to strengthen one's professional abilities for widening current knowledge and industry-ready skills, undertaking future studies for global and local application, performing creatively and professionally, in a chosen career and ultimately playing a constructive role as a socially responsible global citizen. The Graduate Attributes define the characteristics of learners and describe a set of competencies that are beyond the study of a particular area and programme.

The GAs

- ❖ Continue life-long learning as an autonomous learner
- ❖ Continuously strive for excellence in education
- ❖ Apply and nurture critical and creative thinking
- ❖ Promote sustainable development practices
- ❖ Promote co-operation over competition
- ❖ Balance rights with responsibilities
- ❖ Understand and respect diversity & difference
- ❖ Not be prejudiced by gender, age, caste, religion, or nationality.
- ❖ Use education as a tool for emancipation and empowerment of humanity

5.PROGRAMME OUTCOMES (POs)

The overall aims of the programme may be achieved by addressing its various components that are incorporated into the curriculum as described below. Each of these components is designed to lead to specific outcomes that are desired after the successful completion of the programme.

PO No.	Component	Outcomes
PO1	Basic Knowledge	Capable of delivering basic disciplinary knowledge gained during the programme.
PO2	In-depth Knowledge	Capable of describing advanced knowledge gained during the programme.
PO3	Critical thinking and Problem-Solving abilities	Capable of analysing the results critically and applying acquired knowledge to solve the problems.
PO4	Creativity and innovation	Capable to identify, formulate, investigate and analyze the scientific problems and innovatively to design and create products and solutions to real life problems.
PO5	Research aptitude and global competency	Ability to develop a research aptitude and apply knowledge to find the solution of burning research problems in the concerned and associated fields at global level.
PO6	Holistic and Multi-disciplinary education	Ability to gain knowledge with the holistic and multi-disciplinary approach across the fields.
PO7	Skills enhancement	Learn specific sets of disciplinary or multidisciplinary skills and advanced techniques and apply them for betterment of mankind.
PO8	Leadership and Teamwork abilities	Ability to learn and work in a group and capable of leading a team even.
PO9	Ethical thinking and Social awareness	Inculcate the professional and ethical attitude and ability to relate with social problems. Learn important aspects associated with environmental and human health. Ability to develop eco-friendly technologies.
PO10	lifelong learning skills and Entrepreneurship	Ability to learn lifelong learning skills which are important to provide better opportunities and improve quality of life. Capable to establish independent start-up/innovation center etc.

6. PROGRAMME SPECIFIC OUTCOMES (PSOs)

The undergraduates shall be able to realise the following specific outcomes by the end of program studies:

PSO No.	Programme Specific Outcomes
PSO1	Gain in-depth knowledge of the structure, function, classification, and ecological roles of animals across diverse taxa.
PSO2	Develop skills in designing experiments, conducting research, and analyzing biological data using modern tools and techniques.
PSO3	Apply theoretical principles of Zoology to address real-world challenges in biodiversity conservation, public health, and sustainable development.
PSO4	Understand the integration of Zoology with related fields such as genetics, biochemistry, biotechnology, and environmental science.
PSO5	Acquire hands-on experience in laboratory techniques such as microscopy, dissection, molecular analysis, and fieldwork for ecological and biodiversity studies.
PSO6	Cultivate awareness of environmental issues and contribute to conservation efforts and sustainable practices.
PSO7	Establish a strong foundation for pursuing higher education (M.Sc., Ph.D.) and careers in teaching, research, healthcare, and conservation.
PSO8	Foster an understanding of ethical issues in biological research and a commitment to using knowledge for the benefit of society.
PSO9	Enhance critical thinking skills to evaluate scientific information and solve biological problems systematically.



7. MAPPING OF PROGRAMME OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

S. No.	PSOs	<u>PSO1</u>	<u>PSO2</u>	<u>PSO3</u>	<u>PSO4</u>	<u>PSO5</u>	<u>PSO6</u>	<u>PSO7</u>	<u>PSO8</u>	<u>PSO9</u>
	POs									
1.	<u>PO1</u>	✓		✓	✓					
2.	<u>PO2</u>	✓	✓	✓	✓					
3.	<u>PO3</u>			✓			✓			✓
4.	<u>PO4</u>		✓	✓		✓				
5.	<u>PO5</u>		✓				✓	✓		
6.	<u>PO6</u>				✓	✓				
7.	<u>PO7</u>		✓			✓	✓			
8.	<u>PO8</u>							✓		✓
9.	<u>PO9</u>						✓		✓	
10.	<u>PO10</u>							✓		✓

8.MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES

S.No.	PSOs	<u>PSO</u> <u>1</u>	<u>PSO</u> <u>2</u>	<u>PSO</u> <u>3</u>	<u>PSO</u> <u>4</u>	<u>PSO</u> <u>5</u>	<u>PSO</u> <u>6</u>	<u>PSO7</u>	<u>PSO8</u>	<u>PSO9</u>
	Name of the Course									
1	Introduction to Classical Biology (Major-1)	✓	✓	✓	✓		✓	✓	✓	
2	Introduction to Applied Biology (Major-2)	✓	✓		✓	✓	✓			✓
3	English (Language-1)	✓	✓			✓	✓	✓		✓
4	Telugu / Sanskrit (Language-2)	✓	✓			✓	✓	✓		✓
5	Analytical Skills (Skill Course-1)		✓	✓	✓	✓	✓	✓	✓	✓
6	Communication Skills (Skill Course-2)		✓	✓	✓	✓	✓	✓	✓	✓
7	Introduction to social work (Multi Disciplinary Course)		✓	✓	✓	✓	✓	✓	✓	✓
8	Animal Diversity-I Biology of Non-Chordates (Major-1)	✓	✓	✓	✓	✓	✓	✓		✓
9	Cell and Molecular Biology (Major-2)	✓	✓	✓	✓	✓		✓	✓	✓
10	Animal Diversity-I Biology of Non- Chordates (Minor-1)	✓	✓	✓	✓	✓	✓	✓		✓
11	English (Language-1)	✓	✓			✓	✓	✓		✓
12	Telugu / Sanskrit (Language-2)	✓	✓			✓	✓	✓		✓
13	Business Writing (Skill Course-1)		✓	✓	✓	✓	✓	✓	✓	✓
14	Digital Literacy (Skill Course-2)		✓	✓	✓	✓	✓	✓	✓	✓
15	Animal Diversity-II Biology of Chordate (Major-1)	✓		✓	✓	✓	✓			✓
16	Principles of Genetics (MAJOR-2)	✓	✓	✓	✓	✓	✓	✓	✓	✓

S.No.	PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
	  Name of the Course									
17	Animal Biotechnology (Major-3)	✓	✓	✓	✓	✓		✓	✓	
18	Evolution and Zoogeography (Major-4)	✓	✓	✓	✓	✓	✓	✓		✓
19	Animal Diversity-II Biology of Chordates (Minor-1)	✓		✓	✓	✓	✓			✓
20	Information and Communication Technology (Skill Course-1)	✓	✓			✓	✓	✓		✓
21	Introduction to Public Administration (Multi Disciplinary Course)		✓	✓	✓	✓	✓	✓	✓	✓
22	Embryology(Major-1)		✓	✓	✓	✓		✓		✓
23	Animal Physiology: Life Sustaining Systems (Major-2)	✓	✓	✓	✓	✓	✓			
24	Immunology(Major-3)	✓	✓	✓	✓		✓		✓	✓
25	Embryology (Minor-1)		✓	✓	✓	✓		✓		✓
26	Animal Physiology: Life Sustaining Systems (Minor-1)	✓	✓	✓	✓	✓	✓			
27	Indian Philosophy (Multi Disciplinary Course)	✓	✓			✓	✓	✓		✓
28	Cybersecurity (Skill Course-1)	✓	✓			✓	✓	✓		✓

S.No.	PSOs	<u>PSO1</u>	<u>PSO2</u>	<u>PSO3</u>	<u>PSO4</u>	<u>PSO5</u>	<u>PSO6</u>	<u>PSO7</u>	<u>PSO8</u>	<u>PSO9</u>
	  Name of the Course									
29	Poultry Management-I (Poultry Farming) (Major-1)	✓	✓	✓	✓	✓	✓	✓	✓	✓
30.	Poultry Management-II (Poultry Production and Management) (Major-2)	✓	✓	✓	✓	✓		✓	✓	✓
31.	Sustainable Aquaculture Management	✓	✓	✓	✓	✓	✓	✓	✓	✓
32.	Post Harvest Technology of Fish and Fisheries		✓	✓	✓	✓	✓	✓	✓	✓
33.	Course-5 Poultry Management-I (Poultry Farming) (Minor-1)	✓	✓	✓	✓	✓	✓	✓	✓	✓
34.	Course – 6 Poultry Management-II (Poultry Production and Management) (Minor-2)	✓	✓	✓	✓	✓		✓	✓	✓
35.	Environmental Education									

9. Teaching and Learning Process

Learning and Teaching

Pedagogical Approaches

Teaching learning techniques include

- (a) Lecture based teaching-learning
- (b) Group- teaching and learning
- (c) Individual learning/ self-study
- (d) Inquiry based learning;
- (e) Kinaesthetic learning
- (f) Game Based learning
- (g) Expeditionary learning
- (h) Technology based learning
- (i) Peer teaching
- (j) Learning through problem-solving
- (k) Blended Learning
- (l) Flipped Classroom

- a) **Lecture based teaching-learning:** It is a traditional method involving direct instruction from a teacher to students.
- b) **Group teaching and learning:** Students are divided into small groups to work together on learning activities.
- c) **Individual learning/self-study:** It involves self-paced learning where students use resources like text books, online materials etc.
- d) **Inquiry-based learning:** This is a studentcentered teaching approach where learners ask questions, conduct investigations, and develop their own understanding of concepts. It emphasizes critical thinking.
- e) **Kinesthetic learning:** Kinaesthetic learning, or tactile learning is a learning that involves physical activity.
- f) **Game-based learning (GBL):** Game-based learning is a type of game play that has defined learning outcomes.
- g) **Expeditionary Learning:** Expeditionary Learning is an educational approach that combines active learning, character growth, and teamwork for holistic development.

- h) **Technology based learning:** Technology-based learning can be implemented in a wide array of forms including through blended learning, distance education, instructor-led classes, or just-in-time training.
- i) **Peer teaching:** Students teach each other under the guidance of an instructor.
- j) **Learning through problem solving:** It emphasizes critical thinking, creativity, and the application of knowledge to find solutions.
- k) **Blended Learning:** Combining traditional face-to-face teaching with online resources for a holistic approach.
- l) **Flipped Classroom:** Students review materials beforehand and class room time is used for interactive problem solving.

10. Assessment Process

DISTRIBUTION AND WEIGHTAGE OF MARKS:

a). Theory:

All Theory courses will have 5 units and assessed for 100 marks, of which, 40 marks for internal assessment and 60 marks for semester end examination.

Internal Assessment:

Internal Assessment - 30 Marks

Assignments - 10Marks

- Two Internal Assessment shall be conducted. One on first 50% of the syllabus and second on remaining 50% of the syllabus.
- Each Internal Assessment consists Subjective test
- Each subjective test shall be conducted for 60 Minutes and assessed for 30 marks
- Assignments shall be assessed for 10 marks
- Final Internal Assessment marks can be calculated from the average of the two Internal Assessments.

Semester End Examinations:

- External examination is for 60 marks (180 min). Question paper contains Essay questions and short answer questions.

i) Assignments: The student has to submit 5 assignments (1 for each unit) and assessed for 10 marks. Each assignment shall consist of 4 questions (4X10 = 40 marks) and the same shall be scaled down to 10 marks. Average of 4 assignments shall be considered as final assignment marks.

ii) Semester End Practical:

All Laboratory courses are assessed for 50 marks.

- Semester end practical examination shall include assessment of the student on
 - a) Knowledge of principles/concepts involved
 - b) Experimental design
 - c) Result interpretation and analysis
 - d) Experimental report
- Semester end examination is for 50 marks (150 min) conducted and assessed by both external and internal examiners.

ATTENDANCE REGULATIONS:

- I. A student shall be eligible to appear for end semester examinations, if he or she acquires a minimum of 75% of attendance in aggregate of all the subjects (Theory & Lab.) for the semester.
- II. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the college academic committee.
- III. Shortage of attendance below 65% in aggregate of all the subjects (Theory & Lab) for the semester shall not be Condoned.
- IV. Detained student shall seek re- admission for that semester when offered within 4 weeks from the date of commencement of class work.

PROMOTIONRULE (Based on attendance):

- A Student shall be promoted to the next semester on fulfillment of minimum attendance requirement (75%) of current semester
- A Student shall be pay examination fee for one of semesters out two Semesters(one academic year)

MINIMUM ACADEMIC REQUIREMENTS (Theory/ Practical):

A student is deemed to have satisfied the minimum academic requirements for a course on securing minimum 40% of marks in the semester end exam and minimum 40% of marks in the sum total of the internal marks and semester end marks.

GRADING SYSTEM:

Semester Grade Point Average (SGPA) for the current semester which is calculated on the basis of grade points obtained in all courses.

$$\text{SGPA} = \frac{\Sigma (\text{course credits earned} \times \text{Grade points})}{\Sigma (\text{Total course credits in the semester})}$$

Σ (Total course credits in the semester.

$$\text{CGPA} = \frac{\Sigma (\text{course credits earned} \times \text{Grade points}) \text{ up to successfully completed semesters}}{\Sigma (\text{Total course credits up to successfully completed})}$$

The UGC recommends a 10-point grading system with the following letter grades as given below:

O	10
A	9
B	8
C	7
D	6
E	5
F	0

iii. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

Marks Range (Max – 100)	Letter Grade	Grade Point
85 and Above	0	10
75-84	A	9
66-74	B	8
57-65	C	7
47-56	D	6
40-46	E	5
Below 40	F	0

Illustration of Computation of SGPA and CGPA and Format for Transcripts

Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade Letter	Grade point	Credit Point (Credit x Grade)
Course 1	3	A	9	3 X 9 = 27
Course 2	3	B	8	3X 8 = 24
Course 3	2	D	6	2X 6 = 12
Course 4	2	O	10	2 X10 = 20
Course 5	5	C	7	5X 7 =35
Course 6	5	E	5	5X 5 =25
Course 7	5	C	7	5X 5 =25
				Total =178

Thus, $SGPA = 178/25 = 7.12$

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credits: 25	Credits: 31	Credits: 27	Credits: 36	Credits: 30	Credits: 12
SGPA: 7.9	SGPA: 7.8	SGPA: 7.6	SGPA: 8.0	SGPA: 8.3	SGPA: 8.6

Thus,

$$CGPA = \frac{25 \times 7.9 + 27 \times 7.8 + 27 \times 7.6 + 32 \times 8.0 + 30 \times 8.3 + 12 \times 8.6}{159} = 8.07$$

4. ELIGIBILITY FOR AWARD OF DEGREE:

A student shall be eligible for award of the degree if he/she fulfills the following conditions:

- 1) Successfully completes all the courses prescribed for the Program.
- 2) CGPA greater than or equal to 5.0 (Minimum requirement for Pass),

5. AWARD OF CLASS:

Eligible Candidates for the award of Degree shall be placed in one of the following Classes based on CGPA.

CLASS	CGPA
First Class	≥ 6.5
Second Class	≥ 5.5 to < 6.5
Pass Class	≥ 5.0 to < 5.5

6. INSTRUCTION DAYS:

- A semester shall have a minimum of 90 clear instruction days (including internal examinations).

7. SUPPLEMENTARY EXAMINATIONS:

- Supplementary examinations shall be conducted for final year students of Vth & VIth semesters within 4 weeks from the date of announcement of results of regular examinations.

8. WITH HOLDING OF RESULTS: The result of a student shall be withheld

- If any case of pending disciplinary action.
- Involvement in any sort of malpractices etc.
- Involvement in ragging.

11. STRUCTURE OF THE PROGRAMME (INSTRUCTION & EXAMINATION)**&****12.DETAILED COURSES****SEMESTER-I**

S. No	COURSE TITLE	COURSE CODE	Course type	Instructions periods per Week	External Marks	Internal Marks	Total Marks	Credits
1	Major-1 Introduction to Classical Biology	R23FNDDT113	Theory	5	60	40	100	4
2	Major-2 Introduction to Applied Biology	R23FNDDT114	Theory	5	60	40	100	4
3	Language-1 Communication skills and Soft skills	R23ENGT151	Theory	4	30	20	50	3
4	Language-2 Sahiti Sourabham/ Poetry, Prose and Grammar-1	R23TELT131 R23SKTT131	Theory	4	30	20	50	3
5	Skill course-1 Analytical Skills	R23MATT151	Theory	2	30	20	50	2
6	Skill course-2 Communication Skills	R23ENGT151	Theory	2	30	20	50	2
7	Multi Disciplinary Course Introduction to social work	R23SOWT141	Theory	2	30	20	50	2
TOTAL				24	270	180	450	20

R23	SEMESTER 1 MAJOR-1	L	T	P	C
	INTRODUCTION TO CLASSICAL BIOLOGY	5	-	-	4
	Total contact hours:70				

Course objectives

- ☑ To understand the concept of Taxonomy, biodiversity, and climate change.
- ☑ To Understand the structure of flower, mushroom cultivation and classification of plant kingdom
- ☑ To understand the classification of animalia, developmental biology and economic Zoology.
- ☑ To understand the central Dogma of Molecular Biology, difference between prokaryotic and eukaryotic cell and origin of life.
- ☑ To understand the branches of chemistry and chemical bonds

SYLLABUS

UNIT 1. Introduction to systematics, taxonomy and ecology. [14 Hours]

- 1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.
- 1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.
- 1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.
- 1.4. Pollution and climate change.

UNIT 2: ESSENTIALS OF BOTANY. [14 Hours]

- 2.1. The classification of plant kingdom.
- 2.2 Plantphysiological processes (Photosynthesis,Respiration,Transpiration,phytohormones).
- 2.3 Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.
- 2.4 Mushroom cultivation, floriculture and landscaping.

UNIT 3: ESSENTIALS OF ZOOLOGY [14 Hours]

- 3.1. The classification of Kingdom Animalia and Chordata.
- 3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders
- 3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization,Cleavage and Organogenesis)
- 3.4 Economic Zoology – Sericulture, Apiculture, aquaculture

UNIT 4: CELL BIOLOGY, GENETICS AND EVOLUTION [14 Hours]

- 4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.
- 4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.
- 4.3. Central Dogma of Molecular Biology.
- 4.4. Origin of life

UNIT 5: ESSENTIALS OF CHEMISTRY [14 Hours]

- 5.1. Definition and scope of chemistry, applications of chemistry in daily life.
- 5.2. Branches of chemistry
- 5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.
- 5.4. Green chemistry

Course Outcomes

The overall course outcome is that the student shall develop deeper applying and analyzing of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Evolution and zoogeography, by the completion of the course the graduate will be able to–

CO1: Apply different theories of the origin of life to explain how early life forms evolved under primitive Earth conditions. **(Applying - L3)**

CO2: Compare and contrast homologous, analogous, and vestigial structures to understand their evolutionary significance. **(Analyzing - L4)**

CO3:Analyze the differences between Darwin's and Lamarck's theories of evolution. **(Analyzing - L4)**

CO4:Apply genetic principles to explain how mutations contribute to evolution. **(Applying - L3)**

CO5:Use geographical maps to identify and locate major faunal regions and their characteristic species. **(Applying - L3)**

REFERENCES

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LMS link

<https://archive.nptel.ac.in/content/storage2/courses/122103039/pdf/mod1.pdf>

- a) Lamarck b) Russel c) Darwin d) Aristotle
20. Which international agreement aims to address climate change by reducing greenhouse gas emissions ()
 a) Kyoto Protocol b) Paris Agreement c) Copenhagen Accord d) Montreal Protocol
21. Which of the following is **not** a part of the plant kingdom? ()
 a) Angiosperms b) Gymnosperms c) Bryophytes d) Viruses
22. The correct sequence of cell stages in spermatogenesis is _____ ()
 a) Spermatocytes – Spermatids – Spermatogonia – Spermatozoa
 b) Spermatogonia – Spermatids – Spermatocytes – Spermatozoa
 c) Spermatocytes – Spermatogonia – Spermatids – Spermatozoa
 d) Spermatogonia – Spermatocytes – Spermatids – Spermatozoa
23. Which of the following is a product of the light-dependent reactions of photosynthesis? ()
 a) Glucose b) Oxygen c) Carbon dioxide d) Water
24. Anaerobic respiration in the absence of oxygen often leads to the production of: ()
 a) Lactic acid or ethanol b) Glucose c) Water d) Oxygen
25. What is the primary function of transpiration in plants? ()
 a) To provide structural support to the plant b) To transport sugars from leaves to roots
 c) To cool the plant and facilitate nutrient uptake d) To facilitate the movement of water and nutrients from roots to leaves
26. Which plant hormone is responsible for the inhibition of lateral bud growth, promoting apical dominance? ()
 a) Cytokinin b) Gibberellin c) Ethylene d) Auxin
27. The silkworm is a ()
 (a) Caterpillar (b) Larva (c) Cocoon (d) Both (a) and (b)
28. During megasporogenesis, a megaspore mother cell undergoes meiosis to produce: ()
 a) A diploid spore b) Two haploid megaspores c) Four haploid megaspores d) A zygote
29. The male gametes in plants are found in: ()
 a) Pollen grains b) The ovules c) The pistil d) The fruit
30. Which of the following is the greenest solvent? ()
 a) Formaldehyde b) Benzene c) Ethanol d) Water

II. Fill in the Blanks.

5×1=5M

31. The Red List maintained by the International Union for Conservation of Nature (IUCN) lists _____ species.
32. Most transpiration occurs through small openings called _____ found on the surface of plant leaves.
33. _____ is known as "birdman of India".
34. The theory of natural selection was given by _____
35. Risk = Hazard x _____

III. Very Short answer questions.

5×1=5M

36. What is Tautonym?
37. What is Photosynthesis?
38. What is pisciculture?
39. How does the central dogma relate to genetic disorders?
40. What is a hydrophobic bond?

IV. Match the following.

10×1=10M

A.

- | | |
|--|---------------------------------------|
| 41. Trinomial nomenclature | () a) A P de Candolle |
| 42. Taxonomy term | () b) Chipko movement |
| 43. First trophic level | () c) Acid rains |
| 44. Sunderlal Bahuguna | () d) Genus, species and sub species |
| 45. Sulfur dioxide and nitrogen oxides | () e) Producers |

B.

- | | |
|---|------------------------|
| 46. Gold | () a) 1981 |
| 47. Methylmercury (MeHg) | () b) Minamata |
| 48. Air (Prevention and Control of Pollution) Act | () c) Au |
| 49. Methane | () d) Water liking |
| 50. Hydrophilic bond | () e) CH ₄ |

IV. State True or False(T/F)

10×1=10M

- | | |
|---|-----|
| 51. An ecosystem consists only of living organisms in a particular area without considering the physical environment. | [] |
| 52. Land pollution is associated with the excessive use of synthetic fertilizers in agriculture. | [] |
| 53. Anaerobic respiration always produces lactic acid as a byproduct. | [] |
| 54. Transpiration helps cool the plant by releasing heat during the water vaporization process. | [] |
| 55. The actual genetic section of sperm is its tail. | [] |
| 56. Flame cells play a major role in osmoregulation. | [] |
| 57. Dicotyledon plants usually have larger chromosomes than the Monocotyledon plants. | [] |
| 58. In G1 phase of cell cycle Protein and RNA are synthesised | [] |
| 59. Green chemistry is more expensive than traditional chemistry. | [] |
| 60. Hydrogen bond is classified into two types. | [] |

R23	SEMESTER 1 MAJOR-II	L	T	P	C
	INTRODUCTION TO APPLIED BIOLOGY	5	-	-	4
	Total contact hours:70				

Course objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Unit 1: Essentials of Microbiology and Immunology [14 Hours]

- 1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch and Joseph Lister.
- 1.2. Groups of Microorganisms – Structure and characteristics of Bacteria, Fungi, Archaea and Virus.
- 1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.
- 1.4. Immune system – Immunity, types of immunity, cells and organs of immune system.

Unit 2: Essentials of Biochemistry [14 Hours]

- 2.1. Biomolecules I – Carbohydrates, Lipids.
- 2.2. Biomolecules II – Amino acids & Proteins.
- 2.3. Biomolecules III – Nucleic acids -DNA and RNA.
- 2.4. Basics of Metabolism – Anabolism and catabolism.

Unit 3: Essentials of Biotechnology [14 Hours]

- 3.1. History, scope, and significance of biotechnology. Applications of biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.
- 3.2. Environmental Biotechnology – Bioremediation and Biofuels, Biofertilizers and Biopesticides.
- 3.3. Genetic engineering – Gene manipulation using restriction enzymes and cloning vectors; Physical, chemical, and biological methods of gene transfer.
- 3.4. Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal and disease models.

Unit 4: Analytical Tools and techniques in biology – Applications [14 Hours]

- 4.1. Applications in forensics – PCR and DNA fingerprinting
- 4.2. Immunological techniques – Immunoblotting and ELISA.
- 4.3. Monoclonal antibodies – Applications in diagnosis and therapy.
- 4.4. Eugenics and Gene therapy

Unit 5: Biostatistics and Bioinformatics

[14 Hours]

- 5.1. Data collection and sampling. Measures of central tendency – Mean, Median, Mode.
- 5.2. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance.
- 5.3. Introduction, Genomics, Proteomics, types of Biological data, biological databases- NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment
- 5.4. Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench

- Course outcomes**
1. Learn the history, ultrastructure, diversity and importance of microorganisms.
 2. Understand the structure and functions of macromolecules.
 3. Knowledge on biotechnology principles and its applications in food and medicine.
 4. Outline the techniques, tools and their uses in diagnosis and therapy.
 5. Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

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3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.

LMS Link

<https://www.studocu.com/en-au/document/university-of-tasmania/applied-biology/applied-biology-lecture-notes-1/16865967>

SEMESTER-1 MAJOR-2 QUESTION PAPER
PAPER-II INTRODUCTION OF APPLIED BIOLOGY

Max. Marks: 60

Times: 3 Hours

Multiple Choice Questions

(30 × 1 = 30M)

1. Choose one of the method is used to preserve the milk? ()
A) Sterilization B) Canning C) Pasteurization D) Fermentation
2. Which of these cocci occurring in pairs ()
A) Diplococci B) Streptococci C) Monococci D) None of the above
3. Who first cured smallpox? ()
A) Edward Jenner B) Louis Pasteur C) Alexander Flemming D) Beijerinck
4. They are composed of individual cells and collectively form the mycelium ()
A) Enzyme B) Biotechnology C) Hyphae D) Nutrition
5. What is the outer sugar coat that surrounds the cell wall ()
A) Plasma membrane B) Cytoplasm C) Glycocalyx D) Ribosomes
6. A specialized white blood cells that engulf and destroy pathogens ()
A) B-Cells B) Phagocytes C) T-Cells D) Cell - Mediated
7. A homopolysaccharide of N-acetyl glucosamine and found in the exoskeleton of arthropods cell wall ()
A) Chitin B) Lignin C) Hemicellulose D) Murein
8. The backbone of nucleic acid structure is constructed by ()
A) Peptide bonds B) Glycosidic bonds C) Phosphodiester Bridges D) All of them
9. Proteins that are produced by white blood cells & are used by the immune system to identity bacteria ()
A) Antigens B) Antibodies C) DNA D) RNA
10. Which of the following nitrogenous bases is unique to RNA and not found in DNA? ()
A). Adenine B). Guanine C). Uracil D). Thymine
11. What is the term for the process by which proteins lose their structure and function due to heat or other factors? ()
A). condensation B). Hydrolysis C). Polymerization D). denaturation
12. During which metabolic process, complex molecules are broken down into simpler ones, releasing energy? ()
A) Anabolism B) Catabolism C) Respiration D) Photosynthesis

- 13 Which enzyme used in food, detergent, Pharmaceutical leather, textile, cosmetic & paper industries ()
 A) Protease B) Lipase C) Peroxidase D) catalase
14. A simple yet powerful tool for editing genomes ()
 A) Biotechnology B) Physiology C) CRISPR Technology D) Bt cotton
15. Find out the microorganisms; they are commonly used in bioremediation processes? ()
 A). Fungi B). Viruses C). Bacteria D) All of them
16. What are biofertilizers? ()
 A. Synthetic fertilizers B. Fertilizers derived from living organisms
 C. Chemical pesticides D. Chemical fertilizers
17. Restriction enzymes were discovered by ()
 A. Nathan B. Arber C. Smith D. All of the above
18. Identify the role of ligase in gene manipulation? ()
 A. Cutting DNA at specific sites B. Amplifying DNA
 C. Recognizing specific DNA sequences D. Joining DNA fragments together
19. What is a powerful laboratory technique used to detect and analyze specific proteins ()
 (A) Western blotting (B) Northern blotting (C) Eastern blotting (D) Southern blotting
20. PCR stands for ()
 A. Polymerase chain reactor B. Polymerization chain reactor
 C. Polymerase chain reaction D. Polyhedral chain reaction
21. Which scientist pioneered the technique of DNA finger printing ()
 A). James Watson B). Francis crick C). Alec Jeffrey D). Rosalind Franklin
22. Which of the following technique used in DNA fingerprinting ()
 A) Southern Blotting B) Northern Blotting C)Western Blotting D)Eastern Blotting
23. What is the primary goal of eugenics? ()
 A) To promote diversity B) To enhance desirable traits in the human population
 C) To discourage genetic research D) To eliminate certain ethnic groups
24. ELISA full form_____ ()
 A) Enzyme Linked Immuno Sorbent Assay B) Enzyme Limited Immuno Sorgent Assay
 C) Enzyme Linker Immuno Sorbent Assay D) Enzyme Linked Immune Sorbent Assay
25. The observation which occurs most frequently in a sample is the ()
 (A) Mode (B) Mean deviation (C) Standard deviation (D) Median
26. What is the median of the sample 5, 5, 11, 9, 8, 5, 8 ? ()
 (A) 5 (B) 6 (C) 8 (D) 9

27. Find the mode in 1,8,5,7,2,8,7,5,4,5,1. ()
A) 8 B)7 C)4 D)5

28. Find the mode in 4,8,5,7,4,8,7,5,4. ()
A) 8 B)7 C)4 D)5

29. What is the primary focus of genomics? ()
(A) Studying individual genes (B) Analyzing entire sets of genes and their functions
(C) Investigating protein 3D structures (D) Examining cellular metabolism

30. Which of the following are methods under measures of dispersion? ()
A). Standard deviation B). Mean deviation C). Range D). All of the above

II. Fill in the Blanks

5×1=5M

31. The outer covering that protects the bacterial cell & give it shape_____

32. Nucleotide is composed of_____

33. _____ is used to produce products like alcohol, enzymes and organic acids.

34. _____ enzyme is commonly used in ELISA to produce her measurable signal

35. _____ is the study of an organism's complete set of genetic information

III. Very Short Questions

5X1=5M

36. Define archaea

37. Define anabolism

38. Define is biotechnology?

39. What are the functions of PCR?

40. What are measures of central tendency?

V. Match the Following

10×1=10M

- | | | |
|----------------------------|-----|---|
| 41. Edward Jenner | () | A. transfer RNA, bring amino acids |
| 42. Louis Pasteur | () | B. Father of immunology |
| 43. mRNA | () | C. DNA transcribed into RNA |
| 44. tRNA | () | D. Messenger RNA, consisting the codons |
| 45. rRNA | () | E. Ribosomal RNA |
| 46. Transcription | () | F. Father of medical microbiology |
| 47. Translation | () | G. James Alwine, David Kemp, and George Stark |
| 48. Insect resistant crops | () | H. Edwin Southern |
| 49. Northern Blotting | () | I. BT potato/cotton |
| 50. Southern Blotting | () | J. mRNA directs the protein synthesis |

IV. State True or False

10×1=10M

51. Viruses are obligate intracellular parasites []
52. Immunity present in an individual at birth time is called acquired immunity []
53. Monosaccharides are the simplest carbohydrates and include glucose, fructose etc., []
54. Proteins are the polymers of – L α -Amino Acids []
55. Plasmids are gene carrying circular DNA structure present in Ribosomes []
56. Biofertilizers can contribute to the improvement of soil fertility and structure []
57. DNA fingerprinting is commonly used in forensic investigation to identify victims []
58. Monoclonal antibodies are bound with different epitopes []
59. Proteomic data involves the study of the structure and function of proteins. []
60. Mean is also known as middle quartile. []

R 23	Semester-I <u>English Language Course-I</u>	L	P	T	C
	“A COURSE IN COMMUNICATION AND SOFT SKILLS”	4	00	00	4
TOTAL CONTACT HOURS – 60					

COURSE OBJECTIVES:

The objectives of this course is to make the students:

- Grasp the importance of listening and its types.
- Acquire the knowledge on phonetics with reference to sounds, accent, intonation and rhythm.
- Learn the grammar topics i.e., concord, tenses, articles, prepositions and question tags.
- Enhance speaking skills with the help of Obama`s speech `Yes, We Can` and Kalam`s `A Leader Should Know How to Manage Failure`.
- To get an overview about soft skills i.e., attitude, E.I, T.E. and Interpersonal Skills.

SYLLABUS:

UNIT - I: Listening Skills

- a. Importance of Listening.
- b. Types of Listening.
- c. Barriers to Listening.
- d. Effective Listening.

UNIT - II: Speaking Skills

- a. Sounds of English: Vowels and Consonants.
- b. Syllable
- c. Word Stress
- d. Intonation

UNIT - III: Grammar

- a. Concord.
- b. Articles
- c. Prepositions
- d. Tenses
- e. Question Tags

UNIT - IV: Writing

- a. Greetings & Introduction
- b. Asking & Giving Information

- c. Yes, We Can – Barack Obama
- d. Agreeing & Disagreeing
- e. A Leader Should Know How to Manage Failure – Dr.A. P. J. Abdul Kalam

UNIT - V: *Soft Skills*

- a. SWOC.
- b. Attitude.
- c. EmotionalIntelligence.
- d. TelephoneEtiquette.
- e. InterpersonalSkills.

CO-CURRICULAR ACTIVITIES:

- Class Room Seminars.
- Group Discussions.
- Role Play.
- Assignments.

TEXT BOOKS:

- EnglishPraxisCourse-I by Maruthi Publications.
- English Praxis Course-I by A Course on Communication and Soft skills ---Vivanta Press.

REFERENCE BOOKS:

- A text book of English Phonetics for Indian Students by T.Balasubramanian.
- Essentials of English Grammer by Raymond Murphy.
- Soft Skills Training – A work book to develop Skills for employment by Frederick H. Wentz

1. Duolingo (<https://www.duolingo.com/>) - This is a language-learning platform that offers a fun and interactive way to learn English through games, exercises, and quizzes.
2. BBC Learning English (<https://www.bbc.co.uk/learningenglish/>) - The BBC offers a comprehensive range of resources for learners of English, including grammar, vocabulary, and pronunciation.
3. English Central (<https://www.englishcentral.com/>) - This website provides a platform for practicing your English listening and speaking skills through video lessons and interactive activities.
4. Busuu (<https://www.busuu.com/>) - Busuu is a language-learning platform that offers lessons in English grammar, vocabulary, and conversation practice.

Activities :

- Make the students to news excerpts.
- Watch interviews and speeches on You Tube.
- Role plays on formal and informal covesations.

COURSE OUTCOMES:

by the end of the course the learner will be able to:

- ☑ Understand the importance listening and practice effective listening.
- ☑ Use grammar effectively for accuracy in writing and speaking.
- ☑ Demonstrate the use of good vocabulary.
- ☑ Acquire ability to use Soft Skills in professional and daily life.
- ☑ Confidently use the tools of communication skills.

Model Question Paper
ENGLISH

Max. Time: 3Hrs.

Max. Marks: 60M

PART - A
5X2 =10M

I. Answer any FIVE of the following questions:

1. What are the differences between Hearing and Listening?
2. What is syllable ? Give two any two examples.
3. Define Concord with an example.
4. Define asking for information and giving for information with one example each.
5. What is SWOT Analysis?
6. What is the difference between formal greetings and informal greetings?
7. Write a note on Diphthongs with examples.
8. You are invited your best friend to your birthday party. Develop a dialogue on agreeing or disagreeing to your Invitation. (Five Exchanges)

PART - B

II. Answer the following questions :

5X10=50M

9. a] What is the importance of listening of and write a note on different types of listening?

OR

- b] What factors act as barriers to Listening ?

10. a] Write a note on Vowel Sounds, Diphthongs and Consonant sounds in brief?

OR

- b] What is Intonation ? Write a note on Rising Tone and Falling Tone and Rhythm in English Language.

11. Answer the following:

- A. Fill in the blanks with suitable articles :

- a. I met -----on eyed beggar.
- b. My brother is -----M.L.A.

- B. Fill in the blanks with suitable prepositions:

- a. She died ----- Cancer.
- b. Mr., Sastri knows English ----- Telugu.

- C. Supply the appropriate question tags to the following statements :

- a. She cooked very well.
- b. It will not rain tomorrow.

- D. Fill in the blanks in the following sentences with suitable form of the verb given in the brackets :

- a. The boys ----- (play) cricket since 11`o clock.
- b. When we reached home, Rani ----- (Sweep) the floor.
- c. Children ----- (like) chocolates.
- d. My friend ----- (read) the novel yesterday.

b

- B]. What is the best way to manage failure according to Abdul Kalam?

- 12 a] How does Barack Obama say about his victory in the American Presidential election?

OR

- b] What are the challenges ahead of America and Obama in the event of his victory?

13. a] What is positive thinking and how to develop positive thinking?

OR

- b] What is the importance of emotional intelligence and write a note on enhancement of emotional intelligence in one`s career?

R 23	Semester-I	Language-II	L	P	T	C
	Telugu			4	---	---
TOTAL CONTACT HOURS – 60						

Course Objectives (అభ్యాసన లక్ష్యాలు):

1. Develop proficiency in reading, writing, and speaking skills
2. Introduce students to classical Telugu literature, including epics, poetry, drama, and philosophical texts.
3. Enhance knowledge of Telugu grammar (Vyakaranam).
4. Provide insights into Indian culture, philosophy, and heritage as reflected in Telugu texts.
5. Encourage the use of Telugu in modern contexts, including employability in education, research, and technology.

Course Outcomes (అభ్యాసన ఫలితాలు):

1. Demonstrate proficiency in Telugu through effective communication, both oral and written.
2. Analyze and interpret classical texts and apply their teachings to contemporary life.
3. Exhibit a clear understanding of Telugu grammar and its application in constructing verses and prose.
4. Develop skills for translation and interpretation of Telugu texts into modern languages.
5. Identify career opportunities in areas like teaching, translation, research, and cultural tourism.

పాఠ్య ప్రణాళిక

యూనిట్ 1 - ప్రాచీన కవిత్వం :

రాజనీతి - నన్నయ్య ఆంధ్ర మహాభారతం - సభాపర్వము - ప్రథమ శ్వాసం (26 -57 పద్యాలు)

1. నన్నయ్య కవి పరిచయం
2. ప్రజా పాలన నాడు - నేడు
3. రాజనీతి పాఠ్యమున ఇతివృత్తం
4. రాజనీతి పాఠ్యాంశ సందేశం

యూనిట్ -II (ఆధునిక కవిత్వం)

గబ్బిలం -జాషువా -ప్రథమ భాగం (1-40 పద్యాలు వరకు)

- గురాం జాషువా - కవి పరిచయం కవితయ శైలి
- కావ్య రచన నేపథ్యం
- గబ్బిలం పాఠ్యాంశ ఇతివృత్తం
- పాఠ్యాంశ సందేశం

యూనిట్ -III (కథానిక)

అలరాస పుట్టిల్లు - కళ్యాణ సుందరి జగన్నాథ్

- రచయిత్రి పరిచయం
- కథ నేపథ్యం సందేశం
- కథయంశం
- పాత్ర చిత్రణ

యూనిట్ -IV (నవల)

అసమర్థుని జీవయాత్ర - గోపి చంద్

- గోపి చంద్ - రచయిత పరిచయం
- నవల నేపథ్యం
- నవల ఇతివృత్తం, పాత్ర చిత్రణ
- నవల సందేశం

యూనిట్ -V (జీవిత చరిత్ర)

మూడు వాఙ్మయ శిఖ్రాలు -తిరుమల రామచంద్ర

- తిరుమల రామచంద్ర - కవి పరిచయం
- వేటూరి ప్రభాకర శాస్త్రి

▪ నిడదొడ్డిలు వేంకట్ రావు

▪ మానవల్లి రామకృష్ణ కవి

వ్యాకరణం

సంధులు: అత్వ, ఇత్వ, ఉత్వ, త్రిక,
సరళాదేశ, గసడదవాదేశ, ద్విరుక్త టకార,
సవర్ణ దీర్ఘ, గుణ, యణాదేశ,
వృద్ధి సంధులు.

సమాసాలు: అవ్యయీభావ, తత్పురుష,
కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి.

అర్థాలంకారాలు : ఉపమ, ఉత్ప్రేక్ష, రూపక,
స్వభావోక్తి, అర్థాంతర వ్యాస, అతిశయోక్తి, శ్లేష.

శబ్దాలంకారాలు: వృత్తనుప్రాస, ఛేకానుప్రాస,
లాటానుప్రాస, అంత్యానుప్రాస

వృత్తాలు: ఉత్పలమాల, చంపకమాల,
శార్దూలము, మత్తేభము

జాతులు : కందం, ద్విపద

ఉపజాతులు : ఆటవెలది, తేటగీతి, సీసం

ముత్యాలసరాలు

ఆధార గ్రంథాలు:

1. శ్రీమదాంధ్ర మహాభారతము - సభాపర్యము-
తిరుమల తిరుపతి దేవస్థానం ప్రచురణ
2. గబ్బిలం - జాషువా
3. అలరాస పుట్టిళ్లు - కళ్యాణ సుందరీ జగన్నాథ్
4. అసమర్థుని జీవయాత్ర - త్రిపురనేని గోపీచంద్
5. మూడు వాఙ్మయ శిఖరాలు - తిరుమల
రామచంద్ర

సూచించబడిన సహపాఠ్య కార్యక్రమాలు:

1. నన్నయ్య, తిక్కన, ఎఱ్ఱన మొదలైన ప్రసిద్ధ
కవుల పాఠ్యాంశేతర పద్యాలను ఇచ్చి,
విద్యార్థులచేత సమీక్షలు రాయించడం; ఆయా
పద్యాల్లోని యతిప్రాసాది ఛందోవిశేషాలను
గుర్తింపజేయడం.

2. విద్యార్థులచేత పాఠ్యాంశాలకు సంబంధించిన వ్యాసాలు రాయించడం (సెమినార్/అసైన్మెంట్)
3. ప్రాచీన పాఠ్యాంశాలలోని సమకాలీనతను గూర్చిన బృంద చర్చ, ప్రాచీన సాహిత్యాన్ని నేటి సామాజిక దృష్టితో పునర్మూల్యాంకనం చేయించడం.
4. చారిత్రక, సాంస్కృతిక అంశాలకు సంబంధించిన పర్యాటక ప్రదేశాలను సందర్శించడం.
5. వ్యక్తిగత/బృంద ప్రాజెక్టులు చేయించడం.

▪ అభ్యసన ఫలితాలు

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. తెలుగు సాహిత్యం యొక్క ప్రాచీనతను, విశిష్టతను గుర్తిస్తారు. ఆదికవి నన్నయ కాలనాటి భాషాసంస్కృతులను, ఇతిహాసకాలం నాటి రాజనీతి విషయాలపట్ల పరిజ్ఞానాన్ని సంపాదించగలరు. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషాసామర్థ్యాన్ని, రచనలు మెళకువలను గ్రహించగలరు.
2. జాషువా కాలనాటి మతపరిస్థితులను, గబ్బిలం కావ్య విశేషాలను గ్రహిస్తారు. తెలుగు నుడికారం,

సామెతలు, లోకోక్తులు మొదలైన భాషాంశాల పట్ల పరిజ్ఞానాన్ని పొందగలరు.

3. అలరాస పుట్టిళ్లు కథా సేపథ్యాన్ని, సంపన్న కుటుంబాలలోని పరిస్థితులను, ప్రేమ, పరువు వంటివి మనిషిని ఎలా నడిపిస్తాయో అవగాహన చేసుకోవడంతో పాటు కథా రచన ఎలా చేయాలో తెలుసుకుంటారు.

4. అసమర్థుని జీవయాత్ర రచనలో అప్పటి మన పల్లెటూళ్లు, మానవ సంబంధాలు, ఆస్తి అంతస్తులు వికృత రూపంలో ఎలా సాక్షాత్కరిస్తాయో, జమీందారీ వ్యవస్థ ఎలా బీటలు వారుతుందో, మన సమాజంలో పెట్టుబడిదారీ బీజాలు ఎలా నాటుకున్నాయో విద్యార్థి తెలుసుకుంటాడు. ఒక తరం జీవితాన్ని కళ్లకు కట్టే మనోవైజ్ఞానిక నవలగా పేరు పొందిన అసమర్థుని జీవయాత్ర విద్యార్థి వ్యక్తిత్వ వికాసానికి దోహదం చేస్తుంది.

5. వేటూరి ప్రభాకర శాస్త్రి, నిడదవోలు వేంకటరావు, మానవల్లి రామకృష్ణ కవి వంటి ప్రముఖుల జీవిత చరిత్రలను తిరుమల రామచంద్ర ఎలా రాశారో అధ్యయనం చేయడంతోపాటు జీవిత చరిత్ర ప్రక్రియను ఎలా రచించాలో తెలుసుకుంటారు.

6. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషాసామర్థ్యం పెంపొందుతుంది.

Course Outcomes (అభ్యాసన ఫలితాలు):

1. Demonstrate proficiency in Telugu through effective communication, both oral and written.
2. Analyze and interpret classical texts and apply their teachings to contemporary life.
3. Exhibit a clear understanding of Telugu grammar and its application in constructing verses and prose.
4. Develop skills for translation and interpretation of Telugu texts into modern languages.
5. Identify career opportunities in areas like teaching, translation, research, and cultural tourism.

మోడల్ పేపర్
తెలుగు
(పేపరు : సాహితీ సౌరభం)

Time : 2 ½ Hours (2 P.M. To 4-30 P.M.)

Date:

Max. Marks : 60

సెక్షన్ - ఎ

- (1) ఈ క్రింది వాటిలో ఐదంటికి (5) సంక్షిప్త సమాధానాలు వ్రాయండి. (5 × 2 = 10)
- ఎ) కృతము దలంచి ప్రాణములు విడుతురనిన్ -
ఈ వాక్యానికి సందర్భ వాక్యం, కవి, పాఠం పేరు ఎవరు ఎవరితో అన్నారు?
 - బి) ఉత్త్రేక్ష అలంకారము సోదాహరణంగా వివరించండి.
 - సి) సీతారామ రావు వంశ విశేషాలు వ్రాయండి.
 - డి) జర్నలిజం అంటే ఏమిటి?
 - ఇ) ప్రతిమల పెండ్లి సేయుటకు వందలు వేలు వ్యయించుఁగాని దుః -
గణ విభజన చేసి ఏ పద్యపదమో తెల్పండి.
 - ఎఫ్) ఉలికిపడు జబ్బు కలదు వీడున్న చోట -
ఈ వాక్యానికి సందర్భ వాక్యం, కవి, పాఠం పేరు ఎవరు ఎవరితో అన్నారు?
 - జి) సంపాదకుడు గురించి రెండు వాక్యాలలో తెల్పండి.
 - హచ్) “అలరాస పుట్టిల్లు” కథా నేపథ్యం వివరించండి.

సెక్షన్ - బి

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయండి. (5 × 10 = 50)

2. క్రింది పద్యాలలో ఒక దానికి ప్రతిపదార్థ తాత్పర్యం వ్రాయండి.
 - ఎ) ఉత్తమమధ్యమాధ్యమనియోగ్యత బుద్ధి నెఱింగి వారి న
యుత్తమమధ్యమాధ్యమనియోగములన్ నియమించితే నరేం
ద్రోత్తమ! భృత్యుకోటికి ననూనముగాఁ దగు జీవితంబు లా
యత్తమ సేసి యితై దయ నయ్యయి కాలము దప్పకుండగన్
(లేదా)
 - బి) చిక్కిన కాసుచేఁ దనివిఁ జెందు నమాయకుఁ డెల్ల కష్టముల్
బొక్కెడు బువ్వతో మరచిపోవు క్షుధానల దగ్ధమూర్తి న
ల్లిక్కులుఁ గల్గు లోకమున దిక్కరియున్న యరుంధతీ సుతుం
డొక్కఁడు జన్మమెత్తె భరతోర్వరకుం బిడ్డఁడై
3. ఎ) ఉద్యోగుల నియామకంలో రాజులు ఎటువంటి జాగ్రతలు తీసుకోవాలి?
(లేదా)
 - బి) పంచముని దుస్థితిని జాషువా “గబ్బిలం” కావ్యంలో వర్ణించిన విధమెట్టిది?
4. ఎ) “అలరాస పుట్టిల్లు” కథను సంగ్రహంగా తెల్పండి.
(లేదా)
 - బి) పాత్రికేయ విద్య మరియు విలేఖరి గూర్చి రాయండి.
(లేదా)
5. ఎ) అసమర్థుడు సీతారామారావు నిరూపించండి.
(లేదా)
 - బి) అసమర్థుని జీవయాత్రలో ప్రతిఫలించిన మానవ సంబంధాలను ఆవిష్కరించండి.
6. ఎ) గురజాడ రచనలు, సంస్కరణలు, ఉద్యమాలను వివరించండి.
(లేదా)
 - బి) కందుకూరి వీరేశలింగం పంతులు సంస్కరణ, ఉద్యమాల గురించి వివరించండి.

❖ ❖ ❖

R 23	Semester-I	Language-II	L	P	T	C
	SANSKRIT			4	---	---
TOTAL CONTACT HOURS – 60						

Course 1: POETRY, PROSE & GRAMMER -I

I Learning Outcomes:

1. ढीचीन संडे कृ तसाँ ह× य ढेवँ प पॉ रऱ ानम ुभवित ।
2. आधुनिक संडे कृ तसाँ ह× य ढेवँ प पॉ रऱ ानम ुभवित ।
3. ढौलिक ँयाकरण पॉ रचयः भवित ।

II Syllabus: (Teaching Hours: 45)

Unit - 1: ढीचीन पँ साँ ह× यम (9h) ु

1. धनुभो[गः - ढीमं ामायणे बालकाँ डे 67 सगः [
2. शरणागतरु णम - ु ढीमहाभारते अनुशासनपवँ[ण 32 अँ यायः

.Unit - 2: आधुनिक पँ साँ ह× यम (9h) ु

1. महोदयः - मुँ ळपूँड नारयणशाँड णः पुँसंजीवन काँ ये 2 सगः [
2. रामकाँ ितः [- स× यॉ तशाँड णः ढीरामकाँ ित महाका [ँ ये 1 सगः [

Unit - 3: गँ साँ ह× यम (9h) ु

1. खलोँः - ढहतोपदेशे सँँ ध पॉ री छेदात्
2. लोकमाँ यः - ढीरामनाथशाँड कृ तः िनबँ धः

Unit - 4: ँयाकरणम (9h) ु

1. अजँ त शः दाः (देव, कँ व, भानु, धातृ, ढपतृ, गो, रमा, मित)
2. धातवः (भू, गम, े था, ँशिर, ु लाभ, ुमुहु, अस, ुभाष)ु

Unit - 5: ँयाकरणम (9h) ु

1. सँ धयः (अच ु- हल ुसँ धयः)
2. समासाः (TँT, त× पुँष, कमधारय [, ढँगु)

III Skill Outcomes:

On successful completion of this course, student shall be able to:

1. साँ ह× यकार, ऋँ ष, कँ व ढदय ढवेचनम ुभवित ।
2. मानवीयढूँयसँ पदनाँभलाषः भवित ।
3. ढौलिकँ याकरणँ ानेन ढयोगे अथात[ुपठन लेखन वेलासु भाषाशुँँ ये ढयः ुः भवित ।

IV References:

1. Prescribed Sanskrit Text Book IV Co-Curricular Activities: (Hours for Activity: 15h)
1. Assignments
2. Seminars, Group discussions, Quiz, Debates etc.
3. Invited lectures and presentations on related topics by experts.

**MAHARAJAH'S COLLEGE (AUTONOMOUS) VIZIANAGARAM
BA,BSc&B.COM (HONS) SECOND SEMESTER-END EXAMINATIONS
SANSKRIT (PAPER:POETRY, PROSE & GRAMMAR)**

Time: 2&1/2HOURS

Max Marks-60M

SECTION-A

I. पञ्चप्रश्नाःसमाधानानिलिकता

5X2=10M

- | | | | |
|------------|-------------|-----------|------------|
| 1) भवामि | 2) पाश्यातु | 3) कपीश | 4) नवोदयः |
| 5) इत्यत्र | 6) ग्रामगतः | 7) अधर्मः | 8) पापभयम् |

SECTION-B

II. एकस्य व्यासरूपं समाधानं लिखत -

1X10=10M

A) “धनुर्भङ्गः” इति पाठ्यभागस्य सारांशं लिखत ?

(अथवा)

B) “शरणागतरक्षणम्” इति पाठ्यभागस्य सारांशं लिखत ?

III.A) “महोदयः” इति पाठ्यभागानुसारं जनानां कुलपतिसहितानां समुद्रयान स्नानादिकं विशदयत ।

(अथवा)

B) । रमाकीर्तिः पाठ्यभागस्य सारांशं लिखत ?

IV. A) पाठ्यभागानुसारेण “खलोक्तेः” परिणामं विशदयत ।

(अथवा)

B) काङ्ग्रेस सम्स्तयः तिलकदासस्य आदिपत्यं लिखत ।

V. चातुर्णम् ससन्दर्भं व्याख्यात -

4 x 2 1/2 = 10M

1. इदं धनुर्वरं राजन्पूजितं सर्वराजभिः ।
2. वर्जयित्वा मुनिवरं राजानं तौ च राघवौ ।
3. यदि त्वमिह धर्मार्थी मामपि द्रष्टुमर्हसि ।
4. न मुञ्चति समाङ्गानि द्विजोऽयं पश्य वै द्विज ।
5. मतिर्दोलायते सत्यं सतामपि खलोक्तिभिः ।
6. क्षीणा नरा निष्करुणा भवन्ति ।
7. तत्फलं लभते सम्यग्रक्षिते शरणागते ।
8. मदेहेना जीवनतु स्वामी

V. द्वयोःशब्दस्य सम्पूर्णरूपाणि लिखत

2X5=10M

- | | |
|---------|---------|
| 1. देव | 3. पितृ |
| 2. भानु | 4. रमा |

R23	SEMESTER 1 Skill Course-I	L	T	P	C
	ANALYTICAL SKILLS	2	-	-	2
	Total Contact Hours - 32				

COURSE OBJECTIVE:

Intended to inculcate quantitative analytical skills and reasoning as an inherent ability in students.

SYLLABUS

UNIT – 1: **12Hours**

Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM & GCD (HCF).

Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – 2: **10 Hours**

Quantitative aptitude: Averages, Ratio and proportion, Problems on ages, Time-distance – speed.

Business computations: Percentages, Profit & loss, Partnership, simple compound interest.

UNIT – 3: **10 Hours**

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs. Venn diagrams.

Recommended Co-Curricular Activities

Surprise tests / Viva-Voice / Problem solving/Group discussion.

Text Book: Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.Chand Publications.

Reference Books

1. Analytical skills by Showick Thorpe, published by S Chand And Company Limited, Ramnagar, New Delhi-110055
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw Hill Publications.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to;

- Understand the basic concepts of arithmetic ability, quantitative ability, logical reasoning, business computations and data interpretation and obtain the associated skills.
- Acquire competency in the use of verbal reasoning.
- Apply the skills and competencies acquired in the related areas
- Solve problems pertaining to quantitative ability, logical reasoning and verbal ability inside and outside the campus.

Model Paper ANALYTICAL SKILLS

Time: 1 ½ hrs

Max.Marks:30M

SECTION-A

- I. Answer any THREE from the following 3x2=6M
- The H.C.F of two numbers is 11 and their L.C.M is 7700.If one of the number is 275, then Find the other number?
 - If $\frac{2x}{1 + \frac{1}{1 + \frac{x}{1-x}}} = 1$, then find the value of x?
 - A, B, C enter into a partnership investing Rs. 35000,45000 and 55,000 respectively. Find the respective shares of A, B,C in an annual profit of Rs. 40,500 ?
 - At what rate percent per annum will a sum of money double in 16 years?
 - How to find the central angle of the component?

SECTION-B

- II. Answer all the following questions. Each question carries EIGHT marks. 3x8=24M

6 (a). Explain any four Divisibility Rules with relevant Examples.

(OR)

6(b). i) What was the day of week on 4th June,2002?

ii) Find at what time between 8 and 9 o'clock will the hands of a clock be in the same straight line but not together?

7(a). i) The present age of a father is 3 years more than three times the age of his son. Three years hence, father's age will be 10 years more than twice the age of the son,. Find the present age of the father?

ii) A cyclist covers a distance of 750m in 2 min 30 sec. What is the speed in km/hr of the cyclist?

(OR)

7(b) . A salesman's commission is 5% on all sales up to Rs. 10,000 and 4% on all sales exceeding this. He remits Rs. 31,100 to his parent company after deducting his commission. Find the total sales.

8(a) . Study the following table carefully and answer these questions:

NUMBER OF CANDIDATES APPEARED AND QUALIFIED IN A
COMPETITIVE EXAMINATION FROM DIFFERENT STATES OVER THE YEARS

Year State	1997		1998		1999		2000		2001	
	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.
M	5200	720	8500	980	7400	850	6800	775	9500	1125
N	7500	840	9200	1050	8450	920	9200	980	8800	1020
P	6400	780	8800	1020	7800	890	8750	1010	9750	1250
Q	8100	950	9500	1240	8700	980	9700	1200	8950	995
R	7800	870	7600	940	9800	1350	7600	945	7990	885

- Combining the states P and Q together in 1998, what is the percentage of the candidates qualified to that of the candidates appeared?

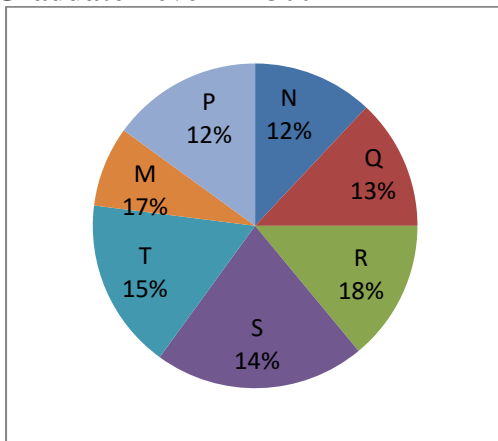
- (a) 10.87% (b) 11.49% (c) 12.35% (d) 12.54%
2. The percentage of the total number of qualified candidates to the total number of appeared candidates among all the five states in 1999 is
 (a) 11.49% (b) 11.84% (c) 12.21% (d) 12.57%
3. What is the percentage of candidates qualified from State N for all the years together, over the candidates appeared from State N during all the years together?
 (a) 12.36% (b) 12.16% (c) 11.47% (d) 11.15%
4. What is the average of candidates who appeared from State Q during the given years?
 (a) 8990 (b) 8760 (c) 8810 (d) 8920

(OR)

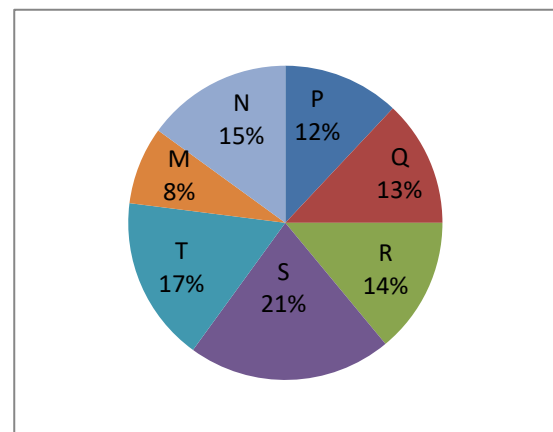
8(b). The following pie-charts show the distribution of students of graduate and post graduate levels in seven different institutes –M,N,P,Q,R,S and T in a town

DISTRIBUTION OF STUDENTS AT GRADUATE AND POST-GRADUATE LEVELS IN SEVEN INSTITUTIONS –M,N,P,Q,R,S and T

Total Number of Students of Graduate Level = 27300



Total Number of Students of Post-Graduate Level = 24700



- How many students of institutes M and S are studying at graduate level?
 (a) 7516 (b) 8463 (c) 9127 (d) 9404
- Total number of students studying at post-graduate level from institutes N and P is :
 (a) 5601 (b) 5944 (c) 6669 (d) 7004
- What is the total number of graduate and post – graduate level students in institute R?
 (a) 8320 (b) 7916 (c) 9116 (d) 8372
- What is the ratio between the number of students studying at post-graduate and graduate levels respectively from institute S?
 (a) 14:19 (b) 19:21 (c) 17:21 (d) 19:14

R 23	Semester-I	Skill Course-II	L	P	T	C
			Communication Skills	2	---	---
TOTAL CONTACT HOURS – 30						

COURSE OBJECTIVES:

The objectives of the course are to make the student :

1. To know about the types interviews and how to face an interview.
2. To get an idea about communication and principles of communication, barriers to communication and effective communication.
3. To know about how to ask and give information, agreeing and disagreeing.
4. Acquire the knowledge about Speaking Skills with reference to Dialogue Building and Giving Instructions /Directions.
5. Apply the knowledge for debating, Descriptions and Role Play.

SYLLABUS:

UNIT-I BASICS OF COMMUNICATION SKILLS

1. Nature and Importance of Communication.
2. Process of communication.
3. Principles of Communication.
4. Barriers to Communication.
5. Strategies for Effective Communication.

UNIT-II PRESENTATION SKILLS

1. Preparation of a Good Presentation.
2. Verbal Communication in Presentation.
3. Non-Verbal Communication in Presentation.
4. Visual aids/Materials in Presentation.
5. Analyzing audience and Managing Questions.

UNIT-III INTERVIEW AND GROUP DISCUSSIONS

1. Interview types.
2. Before, during and after an interview.
3. Do`s and Don` t s in an interview.
4. Basic interview questions.
5. Structure and process of Group Discussions.
6. Role functions, Do`s and Don` ts.

Recommended Activities :

- resenting seminar papers.
- Mock interviews.
- Using Power point presentation in seminars.

CO-CURRICULAR ACTIVITIES:

- Class Room Seminars.
- Elocution.
- Making a Presentation.
- Assignments.

TEXT BOOKS:

- EnglishPraxisCourse-III by Maruthi Publications.
- EnglishPraxisCourse-III by A Course in Conversational Skills by Vivanta Press.

REFERENCE BOOKS:

- Working in English, Jones, Cambridge.
- Business Communication, Raman – Prakash, Oxford.
- Speaking Personally, Porter – Ladousse, Cambridge.
- Speaking Effectively, Jermy Comfort, et.al, Cambridge.
- Anjaneesethi&BhavanaAdhikari, Business Communication Tata McGraw Hill
- Jermy Comfort, Speaking Effectively,et.al, Cambridge.

Skills you need: communication skills

- Information and resources to help develop information skills

Nonverbal Communication

Principles of public speaking

- Online course that aims to help you prepare and deliver effective oral presentations, with an emphasis on informative and persuasive public speaking

33 Nonverbal Communication Tips, in 140 characters or less

- Some short and succinct tips on improving your nonverbal communication skills

Nonverbal communication: how body language & nonverbal cues are key

- Article on nonverbal communication that includes some good tips on watching your body language during online video calls

The power of nonverbal communication

- TED talk from a body language expert

COURSE OUTCOMES:

By the end of the course the learner will be able to:

- Speak fluently in English.
- Participate confidently in any social interaction.
- Face any professional discourse.
- Demonstrate critical thinking.
- Enhance conversational skills by observing the professional interviews.

COMMUNICATION SKILLS -MODEL QUESTION PAPER

Max. Time : 2 Hrs.

Max. Marks : 30 M

Part – A

1. Answer any THREE of the following :

3X2 = 6 M

- a. Define communication.
- b. What is communication process?
- c. Visual aids in presentation.
- d. What are Do's in Interview?
- e. What is GD in communication?

PART-B

Answer any FIVE of the following :

3X8 = 24 M

2. A] What is the nature and importance of communication ?
or
b] Write a note on major barriers to communication ?
3. A] What are the strategies for effective communication?
or
b] Explain verbal and non-verbal communication in presentation.
4. A] What is GD and write its importance.
or
b] What are the Do's and Don'ts of Power Point Presentation?

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R 23	Semester-I	Multy Disciplinary Course(MDC)	L	P	T	C
	INTRODUCTION TO SOCIAL WORK		2	---	---	2
TOTAL CONTACT HOURS – 30						

Course Objectives:

- Understanding the Concept of Social Work
- Exploring the Core Values and Ethics of Social Work
- Developing Knowledge of Social Work Methods and Approaches
- Understanding the Roles and Responsibilities of Social Workers
- Analyzing Social Problems and Their Impact on Individuals and Communities

Syllabus :

Unit-I:- Introduction to social work and concepts related to social work (07Hrs)

Introduction to Social Work- Definition- Scope- objectives - Functions- social service, social welfare services, social reform, major social problems in India; Social work philosophy, values, objectives, principles, methods and fields of social work.

Unit-II: Methods of Working with Individuals and Groups (09Hrs)

Social case work –Definition-scope and importance of social case work, principles and process of social case work -Tools and techniques in social case work- Counseling skills. Social Group Work- Definition-scope- the need for social group work –Group work process - Principles of Group Work - Stages of Group Work-Facilitation skills and techniques.

Unit-III: Working with Communities and Field Work in social work (09Hrs)

Community – definition - characteristics- types- community organization as a method of social work-definition-objectives-principles- phases of community organization - concepts of community development, community participation and community empowerment. Field work in social work – Nature, objectives and types of field work - Importance of field work supervision.

Course Outcomes:

By successful completion of the course, students will be able to:

- Understand the basic concepts relating to social work practice, values, principles of social work and social problems in India.
- List out different approaches of providing help to the people in need.
- Acquaint the process of primary methods of social work
- Get to know the skills of working with individuals, groups and communities.

References:

1. Chowdhary, Paul. D. (1992). Introduction to Social Work. New Delhi: Atma Ram and Sons.
2. Friedlander W.A. (1955). Introduction to social welfare, New York, Prentice Hall.
3. Government of India, (1987). Encyclopedia of Social Work in India (Set of 4 Volumes). New Delhi, Publications Division, Ministry of Information and Broadcasting.
4. Lal Das, D.K. (2017). Practice of Social Research – Social Work Perspective, Jaipur,
5. Rawat Publications.

MULTI DISCIPLINARY COURSE
SEMESTER- I MODEL QUESTION PAPER 1 B. Sc.
PAPER: INTRODUCTION TO SOCIAL WORK

Time: 2 hours

Max.Marks:30

-SECTION-A

1. Answer any three questions from the following. (3x2=06)
Each question carries 2 marks.
- a. Methods of social work
 - b. Social work philosophy
 - c. Write the stages of Group work..
 - d. What is meant by Social Case Work?
 - e. What is Community empowerment ?

SECTION-B

- II. Answer Three questions following internal choice. (3x8=24)
Each question carries 8 marks.
2. A) Write about objectives of social work.
(OR)
B) Write an essay on major Social problems in India.
3. A) Explain the importance of Social Case Work.
(OR)
B) Write the Principles of group work.
- 4.A) Explain the characteristics and types of Community Organization.
(OR)
B) What are the objectives and types of field work?

SEMESTER-II

S. No	COURSE TITLE	COURSE CODE	Course type	Instructions periods per Week	External Marks	Internal Marks	Total Marks	Credits
1	Major-1 Animal Diversity-I Biology of Non-Chordates	R23ZOOT211	Theory	3	60	40	100	3
2	Major-1 Animal Diversity-I Biology of Non-Chordates	R23ZOOL211	Lab	2	30	20	50	1
3	Major-2 Cell and Molecular Biology	R23ZOOT212	Theory	3	60	40	100	3
4	Major-2 Cell and Molecular Biology	R23ZOOL212	Lab	2	30	20	50	1
5	Minor-1 Animal Diversity-I Biology of Non-Chordates	R23ZOOT221	Theory	3	60	40	100	3
6	Minor-1 Animal Diversity-I Biology of Non-Chordates	R23ZOOL221	Lab	2	30	20	50	1
7	Language-1 Reading & Writing Skills	R23ENGT231	Theory	4	60	40	100	3
8	Language-2 Srujanatmaka Rachana/ Poetry, Prose and Grammar-II	R23TELT231 R23SKTT231	Theory	4	60	40	100	3
9	Skill Course-1 Business Writing	R23ENGT251	Theory	2	30	20	50	2
10	Skill Course-2 Digital Literacy	R23CSCT251	Theory	2	30	20	50	2
		TOTAL		27	450	300	750	22
	Community Service Project			4 Weeks	75	25	100	4

R23	SEMESTER II	MAJOR-1	L	T	P	C
	PAPER – III: ANIMAL DIVERSITY –I BIOLOGY OF NONCHORDATES		3	0	2	4
	Total contact hours:48					

Course objectives

- ☑ Understand the general characteristics and classifications of major invertebrate phyla such as Protozoa, Porifera, Coelenterata, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, and Hemichordata.
- ☑ Explain important biological processes like locomotion, nutrition, reproduction, and life cycles of selected organisms (e.g., Elphidium, Trypanosoma, Schistosoma).
- ☑ Analyze structural and functional adaptations in parasitic and free-living invertebrates, such as parasitic adaptations in helminths and polymorphism in coelenterates.
- ☑ 4. Apply knowledge of economic and ecological importance through topics like vermiculture and coral reefs.

SYLLABUS

UNIT-I

[10 Hours]

- 1.1 Protozoa General Characters and classification up to classes with suitable examples
- 1.2 Protozoa Locomotion, Nutrition & Reproduction
- 1.3 Elphidium life history
- 1.4 Life cycle and pathogenicity of Trypanosoma (Trypanosomiasis)

Activity: Assignment / Seminar on the above

Evaluation: Marks to be awarded for written and oral presentations

UNIT –II

[10 Hours]

- 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

Activity: Assignment /Seminar /Quiz/Project on the above

Evaluation: Evaluation of Written part + Evaluation of oral Presentation, Assessment of students in Quiz participation and Ranking - Evaluation of Project Report and oral presentation

UNIT – III

[10 Hours]

- 3.1 Platyhelminthes General characters and classification up to classes with suitable examples
- 3.2 Life cycle and pathogenicity of Schistosoma
- 3.3 Nematelminthes General characters and classification up to classes with suitable examples
- 3.4 Parasitic Adaptations in helminthes

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

[9 Hours]

- 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 Peripatus - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

[9 Hours]

- 5.1 Mollusca General characters and classification up to classes with suitable examples
- 5.2 Pearl formation in Pelecypoda
- 5.3 Echinodermata General characters and classification up to classes with suitable examples; Water vascular system in star fish
- 5.4 Phylogeny and affinities of Hemichordata

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)

- Visit to Zoology Museum
- Charts on polymorphism

Course Outcomes: By the completion of the course the graduate should able to –

- Classify major invertebrate phyla** (Protozoa to Hemichordata) based on their general characteristics.
- Describe key biological processes** such as locomotion, nutrition, reproduction, and life cycles in organisms like *Elphidium*, *Trypanosoma*, and *Schistosoma*.
- Analyze and differentiate structural adaptations** in parasitic and free-living invertebrates, including parasitic adaptations in helminths and polymorphism in coelenterates.
- Evaluate the economic and ecological importance** of invertebrates in practical contexts, such as vermiculture and coral reef ecosystems.
- Demonstrate critical understanding** of invertebrate biology through oral presentations, assignments, and project-based assessments.

REFERENCE BOOKS:

- R.L. Kotpal, 2022. Modern textbook of zoology, Invertebrates. (Rastogi Publ., Meerut). 632 pages.
- E.L. Jordan & P.S. Verma, 1998. invertebrate zoology. (S. Chand & Co.). 1092 pages.
- Akademi, Invertebrates

LMS Link

<https://uou.ac.in/sites/default/files/slm/BSCZO-101.pdf>

MODEL PAPER
COURSE 3:ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES
Time:2 ½ hours Max.marks:60

PART-A

Answer any 5 question from the following.Draw diagrams wherever necessary. 5x2=10 Marks

1.
 - a.What is holozoic nutrition? Give examples.
 - b.What are the types of asexual mode of reproduction in Protozoa?
 - c.Define canal system in sponges and write the functions of canal system.
 - D.What are the two forms in Coelenterata and write their functions.
 - e.Differentiate Amphids and Phasmids.
 - f.What is the connecting link between Annelida and Arthropoda? What is its excretory organs?
 - g.What is the rasping organ in in Molluscs? What is its function?
 - h.What are the respiratory structures in Holothuroidea?

PART-B

Answer any 5 question from the following.Draw diagrams wherever necessary. 5x10=50 Marks

- 2(a) Explain the life history of Elphidium.
OR
(b) Explain locomotion in Protozoans.
- 3(a) Write a note on canal system in sponges.
OR
(b) Explain polymorphism in Coelenterates.
- 4(a) Write a note on Platyhelminthes general characters and classification.
OR
(b) Explain life cycle of Ascaris lumbricoides.
- 5(a) Write a note on vermiculture.
OR
(b) Explain Arthropoda general characters and classification.
- 6(a) Explain pearl formation in Pelecypoda.
OR
(b) Explain water vascular system in starfish.

R23	SEMESTER-II	MAJOR-I	P	C
	ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES		2	1
	Total contact hours:30			

SEMESTER-II

COURSE 3: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Practical

Credits: 1

2 hrs/week

LEARNING 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)

- **Protozoa:** Amoeba, Paramecium, Paramecium Binary fission and Conjugation
- **Porifera:** Euspongia, Sycon- T.S & L.S
- **Coelenterata:** Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula
- **Platyhelminthes:** Planaria, Fasciola hepatica, Fasciola larval forms – Miracidium, Redia, Cercaria, Echinococcus granulosus, Taenia solium, Schistosoma haematobium
- **Nemathelminths:** Ascaris-Male, Ancylostoma, Wuchereria
- **Annelida:** Nereis, Chaetoptera, Hirudinaria, Trochophore larva
- **Arthropoda:** Cancer, Palaemon, Scorpion, Scolopendra, Sacculina
Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female Anopheles, Mouthparts of Housefly and Butterfly.
- **Mollusca:** Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus, Glochidium larva
- **Echinodermata:** Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon, Bipinnaria larva
- **Hemichordata:** Balanoglossus, Tornaria larva

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/>
- ☐ <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

R23	SEMESTER-II	MAJOR-II	L	T	P	C
	Paper-IV CELL & MOLECULAR BIOLOGY		3	0	2	4
	Total contact hours:48					

Course objectives

- To understand the cell and distinguish between prokaryotic and eukaryotic cell
- To understand the role of different cell organelles in maintenance of life activities
- To acquaint the students with the concepts of cell division and cell cycle
- To acquaint student with basic concepts of molecular biology as to how characters are expressed with a coordinated functioning of replication, transcription and translation in all living beings
- To acquaint the students on the biological importance of biomolecules.

SYLLABUS

UNIT – I Cell Biology-I

[10 Hours]

- 1.1 Definition, history of the cell, virus, viroids, mycoplasma
- 1.2 Plasma membrane – ultra structure
- 1.3 Transport functions of plasma Membrane-Active – passive- facilitated
- 1.4 Structure and functions of Endoplasmic Reticulum & Golgi complex

Activity: Model preparation of cell/Assignment /Students Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – II Cell Biology-II

[10 Hours]

- 2.1 Structure and functions of Ribosomes & Lysosomes
- 2.2 Structure and functions of Mitochondria
- 2.3 Structure and functions of Nucleus
- 2.4 Ultrastructure of Chromosomes

Activity: Model preparation of cell organelles/Assignment /Students Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – III Cell Biology-III

[10 Hours]

- 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

Activity: Model preparation cell division /Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT IV: Molecular Biology-I

[9 Hours]

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

Activity: Model preparation of DNA/Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT V: Molecular Biology-II

[9 Hours]

5.1 Gene Expression in prokaryotes (Lac Operon)

5.2 Biomolecules- Carbohydrates (Glucose- structure-properties- biological importance only)

5.3 Biomolecules- Protein (Amino acid- structure- properties- biological importance only)

5.4 Biomolecules- Lipids (Fatty acid- structure - properties- biological importance only)

Activity: Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)

Power point presentation of any of the above topics by students

Student Seminars

Course Outcomes: By the completion of the course the graduate should able to –

CO1 Understand the basic unit of the living organisms and to differentiate the organisms by their cellstructure.

CO2 Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.

CO3 Explain the cell cycle and bioenergetics of the cell

CO4 Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins

CO5 Understand the gene expression phenomenon and biological importance of biomolecules

REFERENCES:

Cell and Molecular Biology_S.Chand Publ.

Cell Biology by De Robertis

C.B. Pawar, Cell Biology

LMS Link

<https://www.youtube.com/watch?v=xhnUZAyNdQk>

Model Paper

COURSE 4: CELL & MOLECULAR BIOLOGY

Time:2 ½ hours

Max.marks:60

PART A

Answer any 5 question from the following. Draw diagrams wherever necessary.
5x2=10 Marks

1.

- a. Who proposed cell theory? What are the principles of cell theory?
- b. What is the study of Virus? Give two example viruses related to animals.
- c. What are suicidal bags? Why are they called as suicidal bags?
- d. What are the types of chromosomes based on centromere position?
- e. Name the complexes in electron transport chain.
- f. What is semi-conservative mechanism?
- g. What are disaccharides? Give two examples of disaccharides.
- h. What is unsaturated fatty acids? Give two examples for unsaturated fatty acids.

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary.
5x10=50 Marks

- 2(a) Write a note on electron microscopic structure of animal cell.

OR

- (b) Explain the models and functions of plasma membrane.

- 3(a) Explain the structure and functions of E.R.

OR

- (b) Explain the structure and functions of Nucleus.

- 4(a) What is cell division? Explain meiotic division.

OR

- (b) Explain Krebs cycle.

- 5(a) Write a note on central dogma of molecular biology.

OR

- (b) Explain transcription in prokaryotes.

- 6(a) Explain gene expression in prokaryotes (Lac Operon)

OR

- (b) Give an account on Proteins.

	SEMESTER-II	MAJOR-2	P	C
R23	CELL & MOLECULAR BIOLOGY		2	1
	Total contact hours:30			

COURSE 4: CELL & MOLECULAR BIOLOGY

Practical

Credits: 1

2hrs/week

LEARNING 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. Observation of various stages of Mitosis with prepared slides
2. Observation of various stages of Meiosis with prepared slides
3. Mounting of salivary gland chromosomes of Chironomus
4. Test for carbohydrate in given biological sample (Benedicts test)
5. Test for Protein in given biological sample (Nitric acid test -white ring)

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>

R23	SEMESTER II	L	T	P	C
	MINOR-1 PAPER – I: ANIMAL DIVERSITY –BIOLOGY OF NONCHORDATES	3	0	2	4
	Total contact hours:48				

Course objectives

- 1. Understand the general characteristics and classifications** of major invertebrate phyla such as Protozoa, Porifera, Coelenterata, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, and Hemichordata.
- 2. Explain important biological processes** like locomotion, nutrition, reproduction, and life cycles of selected organisms (e.g., Elphidium, Trypanosoma, Schistosoma).
- 3. Analyze structural and functional adaptations** in parasitic and free-living invertebrates, such as parasitic adaptations in helminths and polymorphism in coelenterates.
- 4. Apply knowledge of economic and ecological importance** through topics like vermiculture and coral reefs.

SYLLABUS

UNIT-I

[10 Hours]

- 1.1 Protozoa General Characters and classification up to classes with suitable examples
- 1.2 Protozoa Locomotion, Nutrition & Reproduction
- 1.3 Elphidium life history
- 1.4 Life cycle and pathogenicity of Trypanosoma(Trypanosomiasis)

Activity: Assignment / Seminar on the above

Evaluation: Marks to be awarded for written and oral presentations

UNIT –II

[10 Hours]

- 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

Activity: Assignment /Seminar /Quiz/Project on the above

Evaluation: Evaluation of Written part + Evaluation of oral Presentation,Assessment of studentsin Quiz participation and Ranking - Evaluation of Project Report and oral presentation

UNIT – III

[10 Hours]

- 3.1 Platyhelminthes General characters and classification up to classes with suitable examples
- 3.2 Life cycle and pathogenicity of Schistosoma
- 3.3 Nematelminthes General characters and classification up to classes with suitable examples
- 3.4 Parasitic Adaptations in helminthes

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

[9 Hours]

- 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 Peripatus - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

[9 Hours]

5.1 Mollusca General characters and classification up to classes with suitable examples

5.2 Pearl formation in Pelecypoda

5.3 Echinodermata General characters and classification up to classes with suitable examples; Water vascular system in star fish

5.4 Phylogeny and affinities of Hemichordata

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)

- Visit to Zoology Museum
- Charts on polymorphism

Course Outcomes: By the completion of the course the graduate should able to –

1. **Classify major invertebrate phyla** (Protozoa to Hemichordata) based on their general characteristics.

2. **Describe key biological processes** such as locomotion, nutrition, reproduction, and life cycles in organisms like *Elphidium*, *Trypanosoma*, and *Schistosoma*.

3. **Analyze and differentiate structural adaptations** in parasitic and free-living invertebrates, including parasitic adaptations in helminths and polymorphism in coelenterates.

4. **Evaluate the economic and ecological importance** of invertebrates in practical contexts, such as vermiculture and coral reef ecosystems.

5. **Demonstrate critical understanding** of invertebrate biology through oral presentations, assignments, and project-based assessments.

REFERENCE BOOKS:

☑ R.L. Kotpal, 2022. Modern textbook of zoology, Invertebrates. (Rastogi Publ., Meerut). 632 pages.

☑ E.L. Jordan & P.S. Verma, 1998. invertebrate zoology. (S. Chand & Co.). 1092 pages.

☑ Akademi, Invertebrates

LMS Link

<https://uou.ac.in/sites/default/files/slm/BSCZO-101.pdf>

MODEL PAPER

MINOR COURSE 1:ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

TIME:2 ½ Hours

Max. marks:60

PART A

Answer any 5 question from the following.Draw diagrams wherever necessary. 5x2=10 Marks

1.
 - a.What is holozoic nutrition? Give examples.
 - b.What are the types of asexual mode of reproduction in Protozoa?
 - c.Define canal system in sponges and write the functions of canal system.
 - d.What are the two forms in Coelenterata and write their functions.
 - e.Differentiate Amphids and Phasmids.
 - f.What is the connecting link between Annelida and Arthropoda? What is its excretory organs?
 - g.What is the rasping organ in in Molluscs? What is its function?
 - h.What are the respiratory structures in Holothuroidea?

PART B

Answer any 5 question from the following.Draw diagrams wherever necessary. 5x10=50 Marks

- 2(a) Explain the life history of Elphidium.
OR
(b) Explain locomotion in Protozoans.
- 3(a) Write a note on canal system in sponges.
OR
(b) Explain polymorphism in Coelenterates.
- 4(a) Write a note on Platyhelminthes general characters and classification.
OR
(b) Explain life cycle of Ascaris lumbricoides.
- 5(a) Write a note on vermiculture.
OR
(b) Explain Arthropoda general characters and classification.
- 6(a) Explain pearl formation in Pelecypoda.
OR
(b) Explain water vascular system in starfish.

R23	SEMESTER II		P	C
	MINOR-1 PAPER – I: ANIMAL DIVERSITY –BIOLOGY OF NONCHORDATES		2	1
	Total contact hours:30			

MINOR COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Practical

Credits: 1

2 hrs/week

LEARNING 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)

- **Protozoa:** Amoeba, Paramecium, Paramecium Binary fission and Conjugation
- **Porifera:** Euspongia, Sycon- T.S & L.S
- **Coelenterata:** Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula
- **Platyhelminthes:** Planaria, Fasciola hepatica, Fasciola larval forms – Miracidium, Redia, Cercaria, Echinococcus granulosus, Taenia solium, Schistosoma haematobium
- **Nemathelminths:** Ascaris-Male, Ancylostoma, Wuchereria
- **Annelida:** Nereis, Chaetopterus, Hirudinaria, Trochophore larva
- **Arthropoda:** Cancer, Palaemon, Scorpion, Scolopendra, Sacculina
Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female Anopheles, Mouthparts of Housefly and Butterfly.
- **Mollusca:** Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus, Glochidium larva
- **Echinodermata:** Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon, Bipinnaria larva
- **Hemichordata:** Balanoglossus, Tornaria larva

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/>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

	Semester-II	Language-I	T	P	C
R -23	“A COURSE IN READING & WRITING SKILLS”		4	0	4
	<u>English Praxis Course-II</u>				
Total Contact Hours - 40					

COURSE OBJECTIVES:

The objectives of this course is to make the students:

- ☑ To get an overall idea about the topics from literature with reference to Tennyson, Robert Frost, AbrarMohsin, Ruskin Bond, A. J. Cronin, Nissim Ezekiel and R.K.Narayan.
- ☑ To Acquire with Vocabulary : Conversion of words, one word substitutes and collocations.
- ☑ To Familiarize with reading comprehension and Note making / taking.
- ☑ To Acquire the knowledge about preparation of Notices, AgendasandMinutes.
- ☑ To Learn how to write CurriculumVitaeandResume, Letters, E-Correspondence.

SYLLABUS:

UNIT – I:

Petry : Ulysses – Alfred Lord Tennyson
Skills : 1.Vocabulary: ConversionofWords.
 2. OneWord Substitutes.
 3.Collocations.

UNIT – II:

Prose : TheBest Investment I Ever Made –A.J. Cronin
Poetry : Odeto theWest Wind PBShelley.
Non-DetailedText : FlorenceNightingale AbrarMohsin.
Skills : SkimmingandScanning.

UNIT – III:

Prose :1.TheNightTrain atDeoli RuskinBond.
Poetry :2.Stopping by Woods on a Snowy Evening Robert Frost
Skills :1. ReadingComprehension (Top Down, Bottom Up &Scheme Theory)
 :2. NoteMaking/Taking.

UNIT – IV:

Poetry :Night of the Scorpion Nissim Ezekiel
Skills :1.ExpansionofIdeas.
 :2.Notice, AgendasandMinutes.

UNIT – V:

Non-DetailedText : AnAstrologer's Day RKNarayan.
Skills : 1.CurriculumVitaeandResume.
 2. Letters.
 3. E-Correspondence.

CO-CURRICULAR ACTIVITIES:

- Class Room Seminars.
- Student Projects.
- JAM Sessions.
- Assignments.

TEXT BOOKS:

- EnglishPraxisCourse-II by Maruthi Publications.
- EnglishPraxisCourse-II by A Course on Communication and Soft skills by Vivanta Press.

REFERENCE BOOKS:

- Black book of English Vocabulary by Nikhil Gupta.
- Advanced Writing skills for Skill Builders by D.S.Paul.
- Improving Reading Comprehension and Speed, Skimming and scanning- Reading for Pleasure by Marcia J. Coman and Kanthy L. Heavers.

1.https://www.goodreads.com/author/show/1305302.R_K_Narayan

2.ESL Gold (<https://www.eslgold.com/>) - ESL Gold offers a range of resources for learners of English, including grammar lessons, vocabulary exercises, and conversation practice.

3.Breaking News English (<https://breakingnewsenglish.com/>) - Breaking News English offers news articles and related exercises for learners of English, with a focus on vocabulary and comprehension.

4.My Language Exchange (<https://www.mylanguageexchange.com/>) - My Language Exchange is a language exchange platform that allows you to connect with native English speakers for conversation practice.

5.<https://www.studocu.com/in/z/37601931?sid=01734585498> [proverbs]

Activities :

- Asking the students to prepare a model resume.
- Quiz on one word substitutes.
- Pair activity on collocations.
- Asking the students to read newsss paper clippings and make notes.

LEARNING OUT COMES:

By the end of the course the learner will be able to:

- Use reading skills effectively.
- Comprehend different texts.
- Interpret different types of texts.
- Analyze what is being read.
- Build up are pository of active vocabulary.
- Use good writing strategies.
- Write well for any purpose.
- Improve writing skills independently for future needs.
- Enhance communicative competence through Reading and Writing Skills

MODEL QUESTION PAPER

Max. Time : 3 Hrs

ENGLISH

Max. Marks: 60M

PART - A

Answer any FIVE of the following questions

5X2=10M

1. What is called conversion of words ? Explain with examples.
2. What are the differences between skimming and scanning?
3. What is note making and what are the characteristics of a good notes?
4. Define Notice and Agenda and Minutes.
5. What is E-Correspondence?
6. How does Ruskin Bond describe the Deoli Station?
7. Why was Florence Nightingale called as 'The Lady With the Lamp'?
8. Define Collocation and give any two examples.

PART - B

Answer the following questions

5X10 = 50 M

9. a] How would you analyze the character of Ulysses by Alfred Lord Tennyson?

OR

B]. Answer the following :

- A. What are the differences among various types of collocations?
 - B. Write one word substitutes for the following expressions :
 - a. A System of government by one person with absolute power.
 - b. One who feeds on human flesh.
 - c. A person speaks more than one language.
 - d. A diplomat of the highest rank representing his country abroad.
10. a] Explain the Morality of the story 'The Best Investment I Ever Made.

OR

B]. Write a note on 'Florence Nightingale and the Crimean War'.

- 11 a] What is the central idea of the poem 'Stopping by Woods on a Snowy Evening'?

OR

B]. Answer the following :

A. Read the following passage and prepare notes :

Verbs are all important for English language. They are broadly of two types. They are main verbs and helping verbs. Helping Verbs are again subdivided into four categories. They are 'Be' forms, 'Do' forms, 'Have' forms and 'Modals'. Main verbs are at another level are of transitive, intransitive and ditransitive types.

B. Read the following passage carefully and answer the questions :

While I was walking along the road, one day I happened to see a small pink leather purse lying on the footpath. I picked it up and opened it up to see, if I could find out the owner's name and address. There was nothing inside except some small change and a rather old photograph – a picture of a woman and a young girl about twelve years old, who looked like the woman's daughter. I put the photograph back and took the purse to the police station, where I handed over it to the sergeant – in-charge. The sergeant made a note of my name and address in case the owner of the purse wanted to write and thank me.

Questions :

- a. What did the narrator happen to see as he was walking along the road?
- b. Why did he open the purse?
- c. What did he find inside the purse?
- d. Where did he go next with the purse?
- e. Why did the sergeant make a note of the narrator's name and address?

12.A] Write a note on critical appreciation of the poem `Night of the Scorpion`

OR

B] Answer the following :

A. Explain the proverb `Slow and Steady Wins the Race` with an illustration.

B. You are the secretary of Geetha Housing Society, Nehru Nagar, Vizianagaram.

Draft a note on stating that the monthly installment of maintenance charges payment before the due date.

13.a] Retell the story of `An Astrologer`s Day` from the view point of Guru Nayak.

OR

B]. Answer the following :

A. Prepare your own C.V / Resume.

B. Write a letter to the principal of your college with a request for the procurement of UG& PG Text Books to your College Library.

R 23	Semester-II	Language-II	L	P	T	C
	Telugu		4	---	---	4
TOTAL CONTACT HOURS – 60						

Course Objectives (అభ్యాసన లక్ష్యాలు):

1. Develop proficiency in reading, writing, and speaking skills
2. Introduce students to classical Telugu literature, including epics, poetry, drama, and philosophical texts.
3. Enhance knowledge of Telugu grammar (Vyakaranam).
4. Provide insights into Indian culture, philosophy, and heritage as reflected in Telugu texts.
5. Encourage the use of Telugu in modern contexts, including employability in education, research, and technology.

Course Outcomes (అభ్యాసన ఫలితాలు):

1. Demonstrate proficiency in Telugu through effective communication, both oral and written.
2. Analyze and interpret classical texts and apply their teachings to contemporary life.
3. Exhibit a clear understanding of Telugu grammar and its application in constructing verses and prose.
4. Develop skills for translation and interpretation of Telugu texts into modern languages.
5. Identify career opportunities in areas like teaching, translation, research, and cultural tourism.

▪ అభ్యసన లక్ష్యాలు

1. తెలుగు సాహిత్య అభ్యసన నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చడం
విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తింపజేయడం
మనిషి వ్యక్తిగత జీవనానికి, సామాజిక వ్యవస్థ పటిష్ఠతకు భాష ప్రధానమని తెలుసుకునేలా జేయడం
తెలుగుభాషలోని కీలకాంశాలైన వర్ణం, పదం, వాక్యాల ప్రాధాన్యాన్ని అవగాహన చేసుకోవడం
2. అనువాద రంగంలో నైపుణ్య సంపాదనను కలగజేయడం
3. సృజన రంగం, ప్రసార మాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిస్తున్నట్లుగా జేయడం
4. వ్యాస రచన ఎలా చేయాలో నేర్పించడం
5. సాంకేతికత రంగంలో తెలుగు ప్రాధాన్యతను గుర్తించేలా జేయడం

పాఠ్య ప్రణాళిక

I. వ్యక్తికరణ నైపుణ్యాలు

- భాష- నిర్వచనాలు, లక్షణాలు
- భాష- ఆవశ్యకత, ప్రయోజనాలు
- భాష - ఉత్పత్తి వాదాలు
- వర్ణం - పదం - వాక్యం

II. అనువాద రచన

- అనువాదం - నిర్వచనాలు, ఆవశ్యకత
- అనువాద పద్ధతులు
- అనువాద సమస్యలు - భౌగోళ, భాష, సాంస్కృతిక సమస్యలు.

- అభ్యాసం ఆంగ్లంనుంచి తెలుగుకు, తెలుగు నుంచి ఆంగ్లానికి ఒక 'పేరా' అనువాదం చేయడం

III. మాధ్యమాలకు రచన

- పత్రికా రచన - వార్తారచన, సంపాదకీయం, సమీక్ష
- శ్రవ్య మాధ్యమం - రేడియో రచన (కథ), podcast (డాక్యుమెంటరీ)
- దృశ్య మాధ్యమం - టెలివిజన్ (కెమెరా) రచన [రూపకం (Skit), వాఖ్యానం (Anchoring)]
- ముద్రణా మాధ్యమ / శ్రవ్య మాధ్యమ / దృశ్య మాధ్యమ రచన విద్యార్థుల చేత చేయించడం

IV. తెలుగు వ్యాస రచన

తెలుగు వ్యాసం - నిర్వచనాలు, లక్షణాలు

సాక్షి వ్యాసం - స్వభాష

ఉపాధ్యాయ ఉవాచ - మునిమాణిక్యం నరసింహారావు

- విద్యార్థి చేత వ్యాస రచన చేయించడం

V. తెలుగు సాంకేతికత

తెలుగు లిపి పరిచయం - యూనికోడ్

తెలుగు వికీపీడియా

సామాజిక మాధ్యమాల్లో తెలుగు

(' ఇ' పత్రికలు, వెబ్సైట్లు, బ్లాగు)

- తెలుగు వికీపీడియాలో మార్పులు చేర్పులు విద్యార్థుల చేత చేయించడం/
- సామాజిక మాధ్యమాల్లో తెలుగు రచనలు చేయించడం

▪ ఆధార గ్రంథాలు/వ్యాసాలు

1. వ్యక్తికరణ నైపుణ్యాలు - 1. ఆధునిక భాషాశాస్త్ర సిద్ధాంతాలు - ఆచార్య పి. ఎస్. సుబ్రహ్మణ్యం
2. తెలుగు భాషా చరిత్ర - (సం.) ఆచార్య భద్రిరాజు కృష్ణమూర్తి
3. తెలుగు వాక్యం - ఆచార్య చేకూరి రామారావు,
2. ఉత్తమ కవిత-లక్షణాలు - నవ్యకవితవ్ లక్షణములు - ఆచార్య సి. నారాయణరెడ్డి
ఆధునికాంధ్ర కవితవ్ము-సంప్రదాయములు, ప్రయోగములు, చతుర్థ ప్రకరణము.
3. ఉత్తమ కథ -లక్షణాలు - కథాశిల్పం-వల్లంపాటి వెంకటసుబ్బయ్య, పుటలు 11-17.
4. తెలుగు కథానిక - స్వరూప స్వభావాలు - పోరంకి దక్షిణామూర్తి
5. ఉత్తమ వ్యాసం లక్షణాలు - చదువు - సంస్కృతి (వ్యాసం) - కొడవటిగంటి కుటుంబరావు
6. తెలుగు వ్యాస పరిణామం - ఆచార్య కొలకలూరి ఇనాక్
7. అనువాద రచన - 1. అనువాద సమస్యలు - రాచమల్లు రామచంద్రారెడ్డి (పుటలు 61-75, 85-94)
2. అనువాదన పద్ధతులు - ఆచరణ సమస్యలు-చేకూరి రామారావు.
"భాషాంతరంగం", తెలుగు విశ్వవిద్యాలయం ప్రచురణ. (పుటలు 130-146,)
8. ముద్రణా మాధ్యమం - మాధ్యమాలకు రచన (పుటలు 9-12)
డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
9. పత్రికా భాష - మాధ్యమాలకు రచన (పుటలు 67-74)

- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
10. పత్రికా రచన - తెలుగు మౌలికాంశాలు (పుటలు 59-69)
- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
11. ప్రసార మాధ్యమాలు- మాధ్యమాలకు రచన (పుటలు 3-10)
- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
12. రేడియో రచన - మాధ్యమాలకు రచన (పుటలు 141-148)
- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
- చూ. మాధ్యమాలకు రచన (పుటలు 141-148)
13. వ్యాఖ్యానం (యాంకరింగ్) - మాధ్యమాలకు రచన (పుటలు 178-181)
- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
14. టెలివిజన్ రచన - మాధ్యమాలకు రచన (పుటలు 153 -160)
- డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ
15. తెలుగు జర్నలిజం - డా॥ బూదరాజు రాధాకృష్ణ

సూచించబడిన సహపాఠ్య కార్యక్రమాలు

1. భాషాంశాలపై, వాక్య నిర్మాణంపై అసైన్మెంట్లు రాయించడం, పత్రికల్లోని సాహిత్య/భాషాంశాలను సేకరింపజేయడం.
2. విద్యార్థులచేత తెలుగు భాషా సాహిత్యాలపై ప్రసంగ వ్యాసం ఇప్పించడం (సెమినార్, అసైన్మెంట్)
3. వ్యాసరచన, లేఖారచన, స్వీయ కవితలు రాయించి తరగతిలో చదివింపజేయడం
4. వివిధ కార్యక్రమాల్లో విద్యార్థులచేత సదస్సు నిర్వహణ, వ్యాఖ్యానం (యాంకరింగ్) చేయించడం.
5. సమకాలీన భాషాసమస్యలపై / ఉద్యమాలపై/సాంఘిక సమస్యలపై 'బృందచర్చ' (Group Discussion)
6. తెలుగుభాషా దినోత్సవం/అంతర్జాతీయ మాతృభాషా దినోత్సవం మొదలైన రోజుల్లో జరిగే సాంస్కృతిక కార్యక్రమాలు విద్యార్థులచేత నిర్వహింపజేయడం, వాటిపై సమీక్షలు/పత్రికా ప్రకటనలు రాయించడం.
7. సమకాలీన సంఘటనలపై సామాజిక మాధ్యమాల్లో/ టి.వి.ల్లో జరిగే చర్చలను నమోదు చేసి సంకలనం చేయడం.
8. సాంస్కృతిక / చారిత్రక ప్రాశస్త్యం కలిగిన కట్టడాలు, దేవాలయాలు, కళానిలయాలను 'బృందపర్యటన/ క్షేత్ర పర్యటన' ద్వారా విద్యార్థులచేత సందర్శింపజేయడం.

▪ అభ్యసన ఫలితాలు

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. తెలుగు సాహిత్య అభ్యాసన ద్వారా నేర్చుకున్న నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చుకోగలరు. విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తిస్తారు. మనిషి వ్యక్తిగత జీవనానికి, సామాజిక వ్యవస్థ పటిష్ఠతకు భాష ప్రధానమని తెలుసుకుంటారు. తెలుగుభాషలోని కీలకాంశాలైన వర్ణం, పదం, వాక్యాల ప్రాధాన్యాన్ని గుర్తిస్తూ వాగ్రూప, లిఖితరూప వ్యక్తీకరణ ద్వారా భాషానైపుణ్యాలను మెరుగుపరచుకోగలరు.
2. అనువాద ఆవశ్యకతను తెలుసుకుంటారు. అనువాద రంగంలో నైపుణ్యం పెరుగుతుంది.
3. సృజన రంగం, ప్రసార మాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిస్తున్నట్లుగా గుర్తిస్తారు.
4. భాషానైపుణ్యాలను అలవరచుకోవడంతోపాటు వినియోగించడం నేర్చుకుంటారు. భాషానైపుణ్యాలను సృజనాత్మక రూపంలో వ్యక్తీకరించగలరు. మంచి వ్యాస రచనా నైపుణ్యాలను పెంపొందించుకోగలరు.
5. సాంకేతికత రంగంలో తెలుగు ప్రాధాన్యత గురించి అవగాహన పొందగలరు.

R 23	Semester-II	Language-II	L	P	T	C
	SANSKRIT		4	---	---	4
TOTAL CONTACT HOURS – 60						

Course 2: POETRY, PROSE & GRAMMER -II

I Learning Outcomes:

1. संडे कृ त पं कठ वं यो ग माधुयानुभूतः भवित ।
2. संडे कृ त गं कठ वं यो ग माधुयानुभूतः भवित ।
3. अंयाकरणं ानात्लखे नशठुः भवित ।

II Syllabus: (Teaching Hours: 45)

Unit - 1: ढाचीन पं साठ हं यम (9h) ु

1. पाठं णं हणम - ु रघुवठे शमहाकां ये 7 सगः [
2. पठं ाचानम - ु नानां थैः यः

.Unit - 2: आधुनक पं साठ हं यम (9h) ु

1. पठं नाधाठुी - ु मीमं तापरणायनेमेवाडकां डे 13 सगः [
2. सुखवगः [- धं मपदम (Sanskrit Version of Prof. P.Sriramachandrudu)

Unit - 3: गं साठ हं यम (9h) ु

1. अमोघदशनम - ु बाणठे य कादंबरठ तः
2. चां चेठुय तम - ु कठ वकोपकलापतः

Unit - 4: अंयाकरणम (9h) ु

1. अजठु त शठ दाः (नदठ , तनु, वधू, मातृ, वन, फल, वाँ र, मधु)
2. धातवः (इष, ळिलख, ुकृज, ळा ज, ुचरु, ु रमु, वठु, युध) ु

Unit - 5: अंयाकरणम (9h) ु

1. सठु धयः (हल ुसठु धः - ठ वसगसठु धः)
2. समासाः (अं यायीभावः, बहुँीं हः)

III Skill Outcomes:

On successful completion of this course, student shall be able to:

1. संडे कृ तकवीनां पदवां ये यं यो गसरणेरवगितः भवित ।
2. संडे कृतकवीनां भावगठे भीय पाँ रं ानम ुभवित ।
3. वां ये यरचनायाम ुदोषराठ हं यं ांः भवित ।

IV References:

V Co-Curricular Activities: (Hours for Activity: 15h)

1. Assignments
2. Seminars, Group discussions, Quiz, Debates etc.
3. Invited lectures and presentations on related topics by experts.

MAHARAJAH'S COLLEGE (AUTONOMOUS) VIZIANAGARAM
BA, BSc & B.COM (HONS) SECOND SEMESTER-END EXAMINATIONS SANSKRIT
(PAPER: POETRY, PROSE & GRAMMAR)

Time: 2&1/2HOURS

Max Marks-60M

SECTION-A

I. पञ्चप्रश्नाः समाधानानिलिकता

5X2=10M

- 1) तल्लायः 2) वागीषः 3) हरिवन्दे 4) नराईमे
5) उपकृष्णम् 6) चित्रगुः 7) सकृष्णः 8) केशकेसी

SECTION-B

II. एकस्य व्यासरूपं समाधानं लिखत

1X10=10M

A) पाणिग्रहणम् इति पाठ्यभागस्य सारांशं लिखत ।

(अथवा)

B) गणेशाय एकविंशति पत्रार्चनं समर्थायता

III. A) पन्नधात्री इति पाठ्यभागा सारांशं विशदयत।

(अथवा)

B) सुखवर्गानुसारं सुखजीवनरहस्यं प्रकटयत ।

IV. A) अमोघदर्शनम् इति पाठ्यभागस्य सारांशं लिखत ।

(अथवा)

B) चारुचेष्टितम् इत्यस्य पाठ्यभागस्य सारांशं लिखत ?

V. चातुर्णम् ससन्दर्भं व्याख्यात

4 x 2 1/2 = 10M

1. अस्मिन्द्वये रूपविधानयत्नः पत्युः प्रजानां वितथोऽभविष्यत् ।

2. तथा हि शेषेन्द्रियवृत्तिरासां सर्वात्मना चक्षुरिवप्रविष्टा ।

- 3) तस्मिन्द्वये तत्क्षणमात्मवृत्तिः समं विभक्तेव मनोभवेन ।
- 4) कन्याकुमारौ कनकासनस्थावार्द्राक्षितारोपणमन्वभूताम् ।
- 5) अशेषपूजनीया चेयं जातिः ।
- 6) दर्शनात् प्रभृति परवानयं जनः ।
- 7) वरोऽपि नागच्छति, वराहोऽपि नागच्छति ।
- 8) पार्श्वे स्थित्वा हसति अयं नवनीतचोरः ।

VI. द्वयोःशब्दस्य सम्पूर्णरूपाणि लिखत

2X5=10M

1. तनु
2. मातृ
3. वारि
4. मधु

R-23	SEMESTER – II	SKILLS COURSE-I	T	P	C
	COURSE: BUSINESS WRITING		2	0	2

SYLLABUS

Unit 1.

Introduction to Business Writing: Importance and purpose of effective business writing; Characteristics of good business writing; Common challenges and misconceptions. Writing Clear and Concise Emails: Appropriate email etiquette in the professional environment, organizing email content and using effective subject lines, Understanding tone and formality in email communication.

Unit 2.

Memos and Interoffice Communication: Formatting and structure of memos, Writing memos for various purposes like updates, announcements, requests. Ensuring clarity and coherence in interoffice communication. Business Letters and Formal Correspondence: Structure and components of a business letter, writing persuasive and professional business letters, Responding to inquiries and complaints effectively.

Unit 3:

Business Proposals and Reports: Crafting business proposals for projects and initiatives, Formal report writing - format, sections, and organization, Analyzing data and presenting findings in reports. Writing for Digital Platforms: Business writing for websites, social media, and online communication, Leveraging technology for efficient and impactful

COURSE OUT COMES:

By the end of this course, students will be able to:

1. Understand the fundamentals of business writing, including style, tone, and language.
2. Produce well-structured and concise business documents, such as emails, memos, and reports.
3. Apply principles of effective communication in business letters and interoffice correspondence.
4. Craft persuasive and well-organized business proposals and formal reports.
5. Cultivate a professional and ethical approach to business writing.

Text Books:

1. Business Writing Basics by Jane Watson (Author) Publisher: Self Counsel Press Inc; 2nd edition (1 August 2002) ISBN-10: 1551803860 ISBN-13: 978-1551803869
2. Successful Business Writing - How to Write Business Letters, Emails, Reports, Minutes and for Social Media - Improve Your English Writing and Grammar: of Exercises and Free Downloadable Workbook by Heather Baker Publisher: Universe of Learning Ltd; Illustrated edition (1 March 2012) ISBN-10 : 1849370745 ISBN-13 : 978-1849370745
3. Business Correspondence and Report Writing, 6th Edition by R C Sharma, Krishna Mohan, Virendra Singh Nirban. Publisher: McGraw Hill Education (India) Private Limited. ISBN-10: 9390113008 ISBN-13: 978-9390113002

Reference Books:

1. "The Essential Business Handbook: The Nuts & Bolts of Getting Up and Running Fast" by John Storey and Amelia Storey (Indian Edition)
 2. "The AMA Handbook of Business Writing: The Ultimate Guide to Style, Grammar, Punctuation, Usage, Construction, and Formatting" by Kevin Wilson and Jennifer Wauso
1. [Business communication for success](#)
 - Free online textbook covering oral and written business communications
 2. [Effective email communication](#)
 - The University of North Carolina's Writing Center guide to help you communicate more effectively using e-mail.

BUSINESS WRITING

Time: 2 Hours.

Marks: 30

Part – A

1. Answer the following questions

3 X 2 = 6M

- a. Business Writing
- b. Concise E Mail
- c. Memos
- d. Business Letter
- e. Website

Part – B

Answer the following questions

3 X 8 = 24 M

2(a) Write the purpose of Effective Business Writing

Or

(b) Discuss about Appropriate Email etiquette in Professional Environment

3(a) Write about the Components of a Business Letter?

Or

(b) Discuss in Detail about formatting and structure of Memos?

4(a) Explain about Formal Report Writing in Business

Or

(b) Discuss in Detailed about Business Writing for Digital Platforms

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R-23	SEMESTER – II	SKILLS COURSE-II	T	P	C
		COURSE: Digital Literacy		2	0

CO1: Perform operations on the computer

CO2: Access the Internet and finding information of interest

CO3: Register for an E-mail account and operating it

CO4: Make bill payments and use other applications of Internet

CO5: Create, edit and format documents using a word processor Course

Unit-1: operate the elements of a computer and performing operations on the computer

Operate the elements of a computer including power cord, power switch, network connecting cable, USB ports, Mouse operations, Keyboard operations, interface icons, GUI elements, Editing options, perform operations including switching on the computer, logging in, locating a file, opening a file, printing a document, storing a file with proper extension, creating a folder/ sub folder in a volume on hard disk and desktop, shifting files from one folder to another, shutting off the computer

Unit-2: Access the Internet to browse information and E-mail operation

Access the Internet, use a search engine, find information on the topic of interest, register for a web-based E-mail account, access E-mail with attachments, reply to an E-mail, forward an E-mail and delete an E-mail message

Unit-3: Make bill payments, other applications using Internet and word processing

Make utility bill payments, booking bus/train tickets, bank transactions, personal transactions, job search through employment portals, mobile/DTH recharge, word processing basics, creating, editing and formatting of text, saving and printing of word document

Prescribed readings:

1. Appreciation of Digital Literacy Handbook published by Department of Electronics & Information Technology, Ministry of Communications & Information Technology, Government of India

LMS links:

1. https://youtu.be/b2X_j5Bz-VM
2. <https://youtu.be/jln3-P6L2ro>
3. <https://youtu.be/cfDisqUMIvw>
4. https://youtu.be/3h_PyURcdrc
5. <https://youtu.be/EqN0LBcydB>

Model Paper

Time:2 ½

Max.Marks:30

Part –A

1. Answer any three the following questions

3 X 2 = 6M

- a. Computer
- b. Search engine
- c. Email components
- d. Internet
- e. Employment portal

Part – B

Answer the following questions

3 X 8 = 24 M

2 (a) Write a note on desktop icons.

Or

(b) Describe USB ports, Mouse operations, Keyboard operations, interface icons.

3 (a) Give an account on internet.

Or

(b) Explain about electronic mail.

4 (a) Explain about Make utility bill payments, booking bus/train tickets, bank transactions, personal Transactions.

Or

(b) Write a note on word document.

SEMESTER-III

S. No	COURSE TITLE	COURSE CODE	Course type	Instructions periods per Week	External Marks	Internal Marks	Total Marks	Credits
1	Major-1 Animal Diversity-II Biology of Chordates	R23ZOOT311	Theory	3	60	40	100	4
2	Major-1 Animal Diversity-II Biology of Chordates	R23ZOOL311	Lab	2	30	20	50	1
3	Major-2 Principles of Genetics	R23ZOOT312	Theory	3	60	40	100	4
4	Major-2 Principles of Genetics	R23ZOOL312	Lab	2	30	20	50	1
5	Major -3 Animal Biotechnology	R23ZOOT313	Theory	3	30	20	50	3
6	Major -3 Animal Biotechnology	R23ZOOL313	Lab	2	30	20	50	1
7	Major-4 Evolution and Zoogeography	R23ZOOT314	Theory	3	30	20	50	3
8	Major-4 Evolution and Zoogeography	R23ZOOL314	Lab	2	30	20	50	1
9	Minor-1 Animal Diversity-II Bio of Chordates	R23ZOOT321	Theory	3	30	20	50	2
10	Minor-1 Animal Diversity-II Bio of Chordates	R23ZOOL321	Lab	2	30	20	50	1
11	Skill Course-1 Information and Communication Technology	R23ENGT351	Theory	2	30	20	50	2
12	Multi Disciplinary Course Introduction to Public Administration	R23POLT341	Theory	2	30	20	50	2
TOTAL				29	420	280	700	25

R23	SEMESTER III	Major-I	L	T	P	C
	Paper-V ANIMAL DIVERSITY -II – BIOLOGY OF CHORDATES		3	0	2	4
	Total contact hours:48					

Course objectives

- ☑ To understand the taxonomic rules on animal classification of chordates
- ☑ To understand the taxonomic position of Protochordata to Mammalia.
- ☑ To understand the general characteristics of animals belonging to Fishes to Reptilians.
- ☑ To understand the body organization of Chordata.
- ☑ To understand the taxonomic position of Protherian mammal

SYLLABUS

UNIT – I

[10 Hours]

- 1.1 Fundamental and general characters of Chordata
- 1.2 Salient features of Cephalochordata, Salient features of Urochordata
- 1.3 Retrogressive metamorphosis of Herdmania
- 1.4 Cyclostomes general characters

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – II

[10 Hours]

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

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – III

[10 Hours]

- 3.1 General characters and classification of Amphibia,
- 3.2 Rana hexadactyla: External features, Respiratory system, Structure and function of Heart
- 3.3 Rana hexadactyla structure and functions of the Brain
- 3.4 general characters and classification of Reptilia, Identification of Poisonous snakes

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

[9 Hours]

4.1 General characters and classification of Aves up to sub classes with examples

4.2 Columba livia: External features, Respiratory system

4.3 Migration in Birds,

4.4 Flight adaptation in birds

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

[9 Hours]

5.1 General characters of Mammalia

5.2 Classification of Mammalia up to sub - classes with examples

5.3 Dentition in mammals

5.4 Aquatic mammals Adaptations

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Course outcomes

By the completion of the course the graduate should 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 Prochordata to Mammalia.

REFERENCE BOOKS

- 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.

LMS Link

<https://zlib.pub/download/modern-textbook-of-zoology-invertebrates-t1toi37t4i40?hash=f1f9f6040be323ebbeda32bce51d06f6>

Model Paper

COURSE 5: ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Time: 2 ½ hours

Max.marks:60

PART-A

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

1.

- a. What is an endostyle? In which group it is present?
- b. What is the study of fishes? What is the largest fish?
- c. Which scales are similar to that of teeth of higher vertebrates? In which fish they are present?
- d. How the sexual dimorphism is exhibited by frogs?
- e. What are the two important poisonous and non-poisonous snakes?
- f. What is the unique holocrine gland in birds? What is its function?
- g. What is the connecting link between reptiles and birds? Write any two significant features?
- h. What are the three ear ossicles? From where are they made up of?

PART-B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

2(a) Write a note on Chordata primitive and general characters.

OR

(b) Explain retrogressive metamorphosis in Herdmania.

3(a) Write a note on Scyliodon Respiratory System.

OR

(b) Explain the general characters of fishes.

4(a) Explain the structure of heart in frog.

OR

(b) Write a note on general characters and classification of reptiles.

5(a) Explain respiratory system in Columbia Livia.

OR

(b) Write a note on flight adaptations in birds.

6(a) Write a note on general characters of mammals.

OR

(b) Explain the dentition in mammals.

R23	SEMESTER III	Major-I	P	C
	Paper-V ANIMAL DIVERSITY -II – BIOLOGY OF CHORDATES		2	1
	Total contact hours:30			

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: Herdmania, Amphioxus.
2. Cyclostomes: Petromyzon and Myxine.
3. Pisces: Pristis, Torpedo, Hippocampus, Exocoetus, Echeneis, Catla, Clarius, Anguilla.
4. Amphibia: Ichthyophis, Amblystoma, Axolotl larva, Hyla,
5. Reptilia: Draco, Chamaeleon, Testudo, Russels viper, Naja, Krait, Hydrophis, Crocodile.
6. Aves: Psittacula, Eudynamis, Bubo.
7. Mammalia: Ornithorhynchus, Pteropus, Funambulus.
8. **Dissections**-As per UGC guidelines
Scoliodon IX and X, Cranial nerves, Scoliodon Brain and Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.
2.Laboratory Record work shall be submitted at the time of practical examination.

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>

R23	SEMESTER-III Major-II	L	T	P	C
	Paper-VI PRINCIPLES OF GENETICS	3	0	2	4
	Total contact hours:48				

Course objectives

- ☑ To provide the background knowledge on the history of genetics and the importance of Mendelian principles.
- ☑ To provide the required knowledge on the gene interactions
- ☑ To acquaint the students, distinguish between polygenic, sex-linked, and multiple allelic modes of inheritance and extrachromosomal inheritance.
- ☑ To understand the principles of sex determination in animals with a reference to human being and sex-linked inheritance
- ☑ To understand the human karyotyping and the concept of pedigree analysis basics

SYLLABUS

UNIT-I

[10 Hours]

- 1.1 History of Genetics- Concepts of Phenotype, Genotype, Heredity, Variation,
- 1.2 Pure lines and Inbred lines
- 1.3 Mendelian Principles on Monohybrid cross, backcross and Testcross
- 1.4 Mendelian Principles on Dihybridcross

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Problem solving on Mendelian principles

UNIT-II

[10 Hours]

- 2.1 Linkage - Definition, Types of linkage-complete linkage and incomplete linkage, Significance of linkage.
- 2.2 Crossing over -definition; Mechanism of crossing over: Chiasma Interference and coincidence
- 2.3 GeneInteractions:Incomplete dominance,Codominance,Pleiotropy
- 2.4 GeneInteractions: Lethalalleles,Epistasis,Non-Epistasis

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Model preparation of linkage/crossing over

UNIT-III

[10 Hours]

- 3.1 Polygenes (General Characteristics & examples)
- 3.2 Multiple Alleles (General Characteristics and Blood group inheritance)
- 3.3 Rh Inheritance erythroblastosis fetalis
- 3.4 Extrachromosomalinheritance-KappaparticlesinParameciumand Shellcoiling in snails

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/Case study on Rh/Erythroblastosis foetalis

UNIT-IV

[9 Hours]

- 4.1 Sexdetermination-ChromosomaltheoryandGenicBalancetheory
- 4.2 Sex determination-Hormonal, Environmental and Haplodiploidy types
- 4.3Sexlinked inheritance: X-linked inheritance
- 4.4Sexlinkedinheritance:Y-linked&XY-linkedinheritance

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Preparation of animated model /chart on sex determination method

UNIT-V

[9 Hours]

5.1 Humankaryotyping, Pedigree Analysis (basics)

5.2 Chromosomal disorders (Autosomal and Allosomal)

5.3 Autosomal Recessive disorder-Sickle cell anaemia – causes, treatment, inheritance pattern, modes of testing and prevention

5.4 Autosomal Dominant disorder-Huntington disease

Activity: Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above/ Case study of a family for pedigree analysis

Co-curricular activities

- Karyotyping and preparation of pedigree charts for identifying diseases in family history
- Charts on chromosomal disorders

Course Outcomes: By the completion of the course the graduate should be able to–

CO1 To understand the history of genetics, gain knowledge basic terminology of genetics

CO2 To acquire knowledge on interaction of genes, various types of inheritance patterns existing in animals with reference to non-Mendelian inheritance.

CO3 To acquire knowledge on chromosomal inheritance

CO4 Acquiring in-depth knowledge on various aspects of genetics involved in sex determination.

CO5 Acquiring in-depth knowledge on human karyotyping, pedigree analysis and chromosomal disorders, concepts of proteomics and genomics

Reference Books

- Rag, Manideep (2018) Cytology, Genetics and Evolution (Kalyani Publ.)
- Daniel, K. (2017) A Text book of Cytology, Genetics and Evolution (Kalyani Publ.)
- Principles of Genetics by Robert H. Tamarin (Tata Magrawhill Publ.)
- Siva Prasad, S & Babu Rao, V. Animal Physiology, Genetics & Organic Evolution
- NPTEL ONLINE LEARNING COURSE-SWAYAM-Basic Human Genetics
By Prof. Md. Niamat Ali University of Kashmir (CEC)

LMS Link

<https://nios.ac.in/media/documents/srsec314newE/PDFBIO.EL21.pdf>

Model Paper
COURSE 6: Principles of Genetics

TIME:2 ½

Max.Marks:60

PART A

Answer any 5 question from the following.Draw the diagrams wherever necessary. 5x2=10Marks

1.
 - a.What are inbreeding lines?
 - b.What is a test cross?
 - c.Define lethal alleles.Give one example.
 - d.Describe erythroblastosis foetalis.
 - e.What are polygenes?
 - f.What is Sickle cell anaemia?
 - g.What is Haplo-diploidy?Give two examples.
 - h.Define Pleiotropy.Give two examples.

PART B

Answer any 5 question from the following.Draw the diagrams wherever necessary. 5x10=50 Marks

- 2(a) Explain monohybrid and dihybrid cross with suitable examples.

OR

- (b) Explain variations.

- 3(a) Write a note on crossing over.

OR

- (b) Explain incomplete and codominance with examples.

- 4(a) Write a note on multiple alleles.

OR

- (b) Explain Extra chromosomal inheritance with suitable examples.

- 5(a) Write a note on Sex determination.Explain Chromosomal theory.

OR

- (b) Define Sex linked inheritance.Explain X-linked inheritance.

- 6(a) Write a note on Human karyotyping.

OR

- (b) Explain the basics on Genomics and Proteomics.

R23	SEMESTER-III	Major-II	P	C
	Paper-VI PRINCIPLES OF GENETICS		2	1
	Total contact hours:30			

COURSE OBJECTIVES

- ☑ To acquire practical knowledge on the importance of Mendelian principles by solving the problems.
- ☑ To provide the required knowledge on the gene interactions.
- ☑ To acquaint the students on Human karyotyping and identification chromosomal disorder's.
- ☑ To understand the various genetic concepts through Virtual labs.
- ☑ To acquire practical knowledge on blood group inheritance and sex-linked inheritance.

SYLLABUS:

1. Study of Mendelian inheritance using suitable examples/Problems.
2. Study of Gene interactions using suitable examples.
3. Blood grouping and Rh in humans.
4. Study of sex-linked inheritance with examples.
5. Study of human karyotypes (Down 's syndrome, Edwards syndromes, Patau syndrome, Turner 's syndrome and Klinefelter syndrome).
6. Demonstration of prenatal diagnosis (Amniocentesis, Ultrasonography)- (Virtual lab).
8. Construction and analysis of Pedigree -REFERENCE.

WEB LINKS:

- <https://www.iitg.ac.in/cseweb/vlab/anthropology/Experiments/Mendels%20law/index.html>
- <https://learn.genetics.utah.edu/content/labs/>
- https://virtuallabs.merlot.org/vl_biology.html
- <https://blog.praxilabs.com/2020/06/30/dna-extraction-virtual-lab/>
- <https://jru.edu.in/studentcorner/lab-manual/agriculture/Fundamentals%20of%20Genetics.pdf>
- https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1008&context=ny_oers

R23	SEMESTER-III	Major-III	L	T	P	C
	Paper-VII Animal Biotechnology		3	0	2	4
	Total contact hours:48					

Course objectives

- ☑ To provide knowledge on animal cell and tissue culture and their preservation
- ☑ To empower students with latest biotechnology techniques like stem cell technology, genetic engineering, hybridoma technology, transgenic technology and their application in medicine and industry for the benefit of living organisms.
- ☑ To explain *in vitro* fertilization, embryo transfer technology and other reproduction manipulation methodologies.
- ☑ To get insight in applications or recombinant DNA technology in agriculture, production of therapeutic proteins.
- ☑ To understand principles of animal culture, media preparation.

SYLLABUS

UNIT I

[10 Hours]

- 1.1 Enzymes and Vectors Restriction modification systems: Types I, II and III.
- 1.2 Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering
- 1.3 DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases
- 1.4 Cloning Vectors: Plasmid vectors: pBR and pUC series, Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs,

UNIT- II

[10 Hours]

- 2.1 Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral mediated delivery
- 2.2 DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing
- 2.3 Hybridization techniques: Southern, Northern blotting
- 2.4 Hybridization techniques: Western blotting

UNIT-III

[10 Hours]

- 3.1 Natural and Synthetic Cell cultures: primary culture, secondary culture, continuous cell lines
- 3.2 Organ culture; Cryopreservation of cultures.
- 3.3 Hybridoma Technology: Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb
- 3.4 Stem cells: Types of stem cells, applications

UNIT-IV

[9 Hours]

- 4.1 Manipulation of reproduction in animals: Artificial Insemination, In vitro fertilization
- 4.2 Manipulation of reproduction in animals: Super ovulation, Embryo transfer, Embryo cloning
- 4.3 Transgenic Animals: Strategies of Gene transfer;
- 4.4 Transgenic - sheep, - fish; applications

UNIT-V

[9 Hours]

5.1 DNA fingerprinting

5.2 Application of biotechnology in fisheries – monoculture in fishes, polyploidy in fishes

5.3 Gene therapy-application

5.4 Bio informatics- concept-definition-database types

Activities:

1. Assignment

2. Student Seminars

3. Quizzes

4. Projects

Course Outcomes: By the completion of the course the graduate should able to –

CO1 Get knowledge of the Vectors and Restriction enzymes used in biotechnology.

CO2 Describe the gene delivery mechanism and understand Hybridization techniques.

CO3 Acquire basic knowledge on culture media preparation and hybridoma technology.

CO4 Understand the manipulation of reproduction with the application of biotechnology.

CO5 Understand the applications of Biotechnology in the fields of industry and agriculture including animal cell/tissue culture, stem cell technology and genetic engineering.

REFERENCES BOOKS:

1. Dr. Prakash S Lohar: a text book of Biotechnology, MJP Publishers,(2012)
2. R.C. Dubey : A Textbook Of Biotechnology, s. Chand &company LTD,(Revised 2006)
3. S.S. Purohit; Biotechnology Fundamentals And Applications (3rd edition) Agrobis (India) publisher.(2003)
4. Dr. U. Satyanarayana: Biotechnology publisher Books and Allied (P) Ltd.

LMS WEB LINKS:

□ <https://vlab.amrita.edu/>

□ <https://www.vlab.co.in/broad-area-biotechnology-and-biomedical-engineering>

R23	SEMESTER-III	Major-II	P	C
	Paper-VII ANIMAL BIOTECHNOLOGY		2	1
	Total contact hours:30			

COURSE OBJECTIVES

This course will provide students with a practical knowledge in animal biotechnology, by the completion of the course the graduate shall able to –

- Acquire knowledge on Cloning vectors widely used in biotechnology
- Empower with the process of DNA quantification and amplification
- Explain purification of biological compounds by paper chromatography
- Get insight maintenance of laboratory apparatus
- Understand principles of animal culture, media preparation

SYLLABUS:

1. Cloning Vectors: Plasmid vectors: pBR and pUC series, Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs, (Charts/Images/Models)
2. DNA quantification using DPA Method.
3. Techniques: DNA Fingerprinting
4. Separation, Purification of biological compounds by paper chromatography
5. Cleaning and sterilization of glass and plastic wares for cell culture.
6. Preparation of culture media.
7. Amplification of DNA by PCR

Note: above practical may be demonstrated in the lab or demonstrated by V- lab

REFERENCE WEB LINKS:

- <https://vlab.amrita.edu/>
- <https://www.vlab.co.in/broad-area-biotechnology-and-biomedical-engineering>
- <https://blog.praxilabs.com/2020/06/30/dna-extraction-virtual-lab/>
- <http://mbvi-au.vlabs.ac.in/>
- https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC203J-lab-manual.pdf
- https://webstor.srmist.edu.in/web_assets/srm_mainsite/files/files/BT%200312%20-%20ANIMAL%20CELL%20AND%20TISSUE%20CULTURE%20LABORATORY.pdf
- <https://davjalandhar.com/dbt/biotechnology/SOP/BSc%20Biotechnology%20Semester%20V%20%26%20VI.pdf>
- https://www.austincc.edu/awheeler/Files/BIOL%201414%20Fall%202011/BIOL1414_Lab%20Manual_Fall%202011.pdf

R23	SEMESTER-III	Major-IV						
	Course-VIII EVOLUTION AND ZOOGEOGRAPHY				L	T	P	C
	Total content hours :48				3	0	2	4

COURSE OBJECTIVES

- ☑ To provide knowledge on origin of life, theories and forces of evolution.
- ☑ To explore the evidences of evolution.
- ☑ To explain the theories of evolution.
- ☑ To understand the role of variations and mutations in evolution of organisms.
- ☑ To understand the zoogeographical distribution of animals.

SYLLABUS

UNIT-I

[10 Hours]

- 1.1 Origin of life: different ancient concepts-Origin of Earth and Solar system: Big Bang theory, Primitive atmosphere, formation of macromolecules
- 1.2 Biological evolution: Coacervates, Microspheres, formation of Nucleic acids, Nucleoproteins
- 1.3 Formation of primary organisms, evolution of modes of nutrition, oxygen revolution, present day atmosphere, evolution of eukaryotes.
- 1.4 Experimental evidences in support of Biochemical origin of life (Miller and Urey experiment)

UNIT-II

[10 Hours]

- 2.1 Palaeontological and taxonomical evidences of evolution
- 2.2 Morphological and anatomical evidences of evolution
- 2.3 Embryological and physiological evidences of evolution
- 2.4 Evidences from connecting links, missing links and biogeographical distribution

UNIT-III

[10 Hours]

- 3.1 Lamarckism-NeoLamarckism
- 3.2 Germplasm theory-August Weismann
- 3.3 Darwinism-Theory of Natural selection
- 3.4 Modern synthetic theory of evolution (NeoDarwinism)

UNIT-IV

[9 Hours]

- 4.1 Variations-types-sources of variations-importance in evolution
- 4.2 Mutations-classification-causes-significance in evolution
- 4.3 Isolation mechanisms-role in evolution
- 4.4 Sewall Wright effect, Hardy Weinberg Principle

UNIT-V

[9 Hours]

- 5.1 Animal distribution and barriers of distribution
- 5.2 Zoogeographical realms – Palearctic & Nearctic regions
- 5.3 Zoogeographical realms – Neotropical & Ethiopian regions
- 5.4 Zoogeographical realms – Oriental & Australian regions

COURSE 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 Evolution and zoogeography, by the completion of the course the graduate shall able to–

- ☑ Understand the principles and forces of evolution of life on earth, the process of evolution of new species and apply the same to develop new and advanced varieties of animals
- ☑ Explain the different evidences of evolution
- ☑ Understand the theories of evolution
- ☑ Explain the various tools for evolution
- ☑ Map the distribution of animals according to zoological realms

REFERENCE BOOKS:

- ☑ Dr.S.Siva Prasad Dr.M.Ananda Rao Sri.V.Babu:Animal Physiology,Genetics & Evolution Telugu Akademi(2011)
- ☑ Prof.S.Sabita Raja & Dr.V.Appala Naidu:Vertebrates,Embryology,Ecology & Zoogeography Telugu Akademi(2012)
- ☑ Dr.Veer Bala Rastogi:Organic Evolution Kedar Nath Ram Nath(2017)

LMS Link

https://littleflowercollege.edu.in/upload/e_contents/files/58a40e26647de0a3d02e13a32b617145.pdf

COURSE 8: EVOLUTION AND ZOOGEOGRAPHY

Time: 2 ½ hours

Max.Marks:60

PART A

Answer any 5 question from the following. Draw neat diagrams wherever necessary. 5x2=10 Marks

- 1
- a. Describe Big Bang theory briefly.
- b. How was the primitive atmosphere?
- c. Mention any four vestigial organs in human beings.
- d. Write any four connecting links.
- e. Who proposed Neo Darwinism?
- f. What is Sewall wright effect?
- g. Write any four mammals specific in Australian region?
- h. What is the famous fish specific in Ethiopian region? What is its significance?

PART B

Answer any 5 question from the following. Draw neat diagrams wherever necessary. 5X10=50 Marks

- 2(a) Give an account of Biological evolution.
OR
- (b) Write a note on Miller and Urey experiment.
- 3(a) Explain palaeontological and taxonomical evidences of evolution.
OR
- (b) Give an account of Embryological and physiological evidences of evolution.
- 4(a) Write a note on Lamarckism.
OR
- (b) Explain Darwinism-Theory of Natural selection.
- 5(a) Give an account of Variations.
OR
- (b) Write a note on Isolation mechanisms.
- 6(a) Give an account of Oriental region.
OR
- (b) Give an account of Nearctic region.

R23	SEMESTER-III	Major-IV		
	Paper-VIII EVOLUTION AND ZOOGEOGRAPHY		P	C
	Total content hours :30		2	1

COURSE OBJECTIVES

- Acquainting and skill enhancement in the usage of laboratory equipment
- To apply the basic concept of inheritance for applied research
- To get familiar with phylogeny and geological history of origin & evolution of animals
- To understand the zoogeographical distribution of animals

SYLLABUS:

1. Study of fossil evidences(ARCHAEOPTERYX)
2. Study of homology from suitable specimens and pictures
3. Study of analogy from suitable specimens and pictures
4. Study of connecting links/missing links images/charts
5. Phylogeny of horse with pictures(Horse evolution)
6. Phylogeny of human with pictures(Human evolution)
7. Study of Genetic Drift by using examples of Darwin's finches/Macroevolution(pictures)
8. Mapping of Zoogeographical Regions
9. Mapping of fauna in Zoogeographical regions(Any three)

REFERENCE WEB LINKS:

- ☑ <https://www.labster.com/course-packages/evolution-and-diversity>
- ☑ <https://www.biointeractive.org/classroom-resources/stickleback-evolution-virtual-lab>
- ☑ <https://www.youtube.com/watch?v=tXbmPhrS4eA>
- ☑ <https://www.studocu.com/en-us/document/temple-university/bioe-lab-2-biomaterials/1632834116536-zoogeography-assignment/17915777>
 - <https://guides.library.tulsacc.edu/c.php?g=932434&p=6720765>
 - https://bio.libretexts.org/Courses/Butte_College/BC%3A_BIOL_2_-
- ☑ [Introduction to Human Biology %28Grewal%29/Text/09%3A_Biological_Evolution/9.3%3A_A](#)
- ☑ [Evidence for Evolution](#)
 - <https://www.coursehero.com/study-guides/boundless-biology/evidence-of-evolution/>

R23	SEMESTER III	Minor-1	L	T	P	C
	ANIMAL DIVERSITY -II – BIOLOGY OF CHORDATES		3	2	0	4
	Total contact hours:48					

Learning objectives

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammal

Learning outcomes

By the completion of the course the graduate should 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 Prochordata to Mammalia.

SYLLABUS

UNIT – I

[10 Hours]

- 1.1 Fundamental and general characters of Chordata
- 1.2 Salient features of Cephalochordata, Salient features of Urochordata
- 1.3, Retrogressive metamorphosis of Herdmania
- 1.4 Cyclostomes general characters

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – II

[10 Hours]

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

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – III

[10 Hours]

3.1 General characters and classification of Amphibia,

3.2 Rana hexadactyla: External features, Respiratory system, Structure and function of Heart

3.3 Rana hexadactyla structure and functions of the Brain

3.4 general characters and classification of Reptilia, Identification of Poisonous snakes

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

[9 Hours]

4.1 General characters and classification of Aves up to sub classes with examples

4.2 Columba livia: External features, Respiratory system

4.3 Migration in Birds,

4.4 Flight adaptation in birds

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above

Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

[9 Hours]

5.1 General characters of Mammalia

5.2 Classification of Mammalia up to sub - classes with examples

5.3 Dentition in mammals

5.4 Aquatic mammals Adaptations

REFERENCE BOOKS

□ 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.

LMS Link

<https://zlib.pub/download/modern-textbook-of-zoology-invertebrates-t1toi37t4i40?hash=f1f9f6040be323ebbeda32bce51d06f6>

Model Paper

COURSE II: ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Time: 2 ½ hours

Max.Marks:60

PART A

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

- 1 What is an endostyle? In which group it is present?
- 2 What is the study of fishes? What is the largest fish?
- 3 Which scales are similar to that of teeth of higher vertebrates? In which fish they are present?
- 4 How the sexual dimorphism is exhibited by frogs?
- 5 What are the two important poisonous and non-poisonous snakes?
- 6 What is the unique holocrine gland in birds? What is its function?
- 7 What is the connecting link between reptiles and birds? Write any two significant features?
- 8 What are the three ear ossicles? From where are they made up of?

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

- 9(a) Write a note on Chordata primitive and general characters.

OR

- 9(b) Explain retrogressive metamorphosis in Herdmania.

- 10(a) Write a note on Scoliodon Respiratory System.

OR

- 10(b) Explain the general characters of fishes.

- 11(a) Explain the structure of heart in frog.

OR

- 11(b) Write a note on general characters and classification of reptiles.

- 12(a) Explain respiratory system in Columbia Livia.

OR

- 12(b) Write a note on flight adaptations in birds.

- 13(a) Write a note on general characters of mammals.

OR

- 13(b) Explain the dentition in mammals.

R23	SEMESTER III	Minor-I	P	C
	Paper-V ANIMAL DIVERSITY -II – BIOLOGY OF CHORDATES		2	1
	Total contact hours:32			

COURSE II: ANIMAL DIVERSITY-II BIOLOGY OF CHORDATES

Practical

Credits: 1

2 hrs/week

LEARNING 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: *Herdmania*, *Amphioxus*.

2. Cyclostomes: *Petromyzon* and *Myxine*.

3. Pisces: *Pristis*, *Torpedo*, *Hippocampus*, *Exocoetus*, *Echeneis*, *Catla*, *Clarius*, *Anguilla*.

4. Amphibia: *Ichthyophis*, *Amblystoma*, *Axolotl* larva, *Hyla*,

5. Reptilia: *Draco*, *Chamaeleon*, *Testudo*, *Russels viper*, *Naja*, *Krait*, *Hydrophis*, *Crocodile*.

6. Aves: *Psittacula*, *Eudynamis*, *Bubo*.

7. Mammalia: *Ornithorhynchus*, *Pteropus*, *Funambulus*.

8. Dissections-As per UGC guidelines *Scoliodon IX* and *X*, Cranial nerves, *Scoliodon* Brain and Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.

2. Laboratory Record work shall be submitted at the time of practical examination.

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>

R-23	SEMESTER III	Skill Course-I			
		Information & Communication Technology	L	T	P
	2		2	0	2
		Total Hrs.30			

OBJECTIVES:

This course aims at acquainting the students with basic ICT tools which help them in their day today and life as well as in office and research.

COURSE OUT COMES:

After completion of the course, student will be able to;

1. Understand the literature of social networks and their properties.
2. Explain which network is suitable for whom.
3. Develop skills to use various social networking sites like twitter, flickr, etc.
4. Learn few GOI digital initiatives in higher education.
5. Apply skills to use online forums, docs, spreadsheets, etc. for communication, Collaboration and research.
6. Get acquainted with internet threats and security mechanisms.

SYLLABUS

UNIT-I:

(08 hrs.)

Fundamentals of Internet: What is Internet? Internet applications, Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser –Types of Browsers, Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Face book, flickr, Skype, yahoo, YouTube, WhatsApp.

UNIT-II:

(08 hrs.)

E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management.

G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

UNIT-III:

(10 hrs.)

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues.

What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, eacharya, e-Yantra and NPTEL).

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(04 hrs.)

(Co-curricular activities shall not promote copying from textbook or from others work and shall Encourage self/independent and group learning)

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
 1. Quiz and Group Discussion
 3. Slip Test
 4. Try to solve MCQ's available online.
 5. Suggested student hands on activities:
 - a. Create your accounts for the above social networking sites and explore them, Establish a video conference using Skype.
 - b. Create an Email account for yourself- Send an email with two attachments to Another friend. Group the email addresses use address folder.
 - c. Register for one online course through any of the online learning platforms like NPTEL, SWAYAM, Alison, Codecademy, Courser. Create a registration form for your college campus placement through Google forms.

Reference Books:

1. In-line/On-line : Fundamentals of the Internet and the World Wide Web, 2/e –by Raymond Greenlaw and Ellen Hepp, Publishers: TMH
2. Internet technology and Web design, ISRD group, TMH.
3. Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, KunaiSen and Cathleen Morin, TMH.

INFORMATION AND COMMUNICATION TECHNOLOGY

MODEL QUESTION PAPER

SECTION: A

Answer any **THREE** of the following:

3X2=6M

1. Define Internet?
2. What is Email ID?
3. Explain Google Drive.
4. Explain about SWAYAM and NTPEL?
5. What is a Browser?

SECTION-B

Answer the following questions:

3x8=24M

6 a. What is Browser? Explain different types of Browsers?

(or)

b. Write a short note on components of URL?

7 a. Define Email. What are the advantages and disadvantages of it?

(or)

b. What are the steps to create Google forms?

8 a. Explain a different types of computer viruses?

(or)

b. Write about SWAYAM Prabha, E-sodh-sindhu and NDLI?

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R-23	SEMESTER III	MDC			
		L	T	P	C
	INTRODUCTION TO PUBLIC ADMINISTRATION	2	0	0	2
		Total Hrs.30			

Course Objectives:

1. Understand the concept and scope and evolution of public administration.
2. Understand the relationship between public administration and public policy.
3. Develop critical thinking and analytical skills to evaluate public administration practices.

Learning Outcomes:

Students at the successful completion of the course will be able to;

- 1.Awareness about the evolution and growth of the discipline of public administration.
- 2.Familiarity with the constitutional framework on which Indian Administration is based.
- 3.Understanding the in-built control mechanism over constitutional bodies and administration in general..

SYLLABUS

Unit: I

Introduction to public administration –Woodrow-Wilson-Definition and nature and scope of Public Administration –Significance – Distinction between public and private administration.

Unit: II

All Indian Services- Central Services –State Services – Importance of All Services UPSC&SPSCs Powers and Functions –NITI Aayog

Unit: III

Accountability of Administration in India –Legislative –Executive –Judiciary
Judicial Activism –e-Governance in India –Good Governance initiatives –
Functions and roles of Administrators.

Activities:

- 1.Class participation and discussions
- 2.Field trips to Government offices
- 3.Individual or group assignments
- 4.Student’s projects – Individual and group
- 5.Quizzes or Slip tests.
- 6.Presentations
7. Research papers

References:

1. Public Administration by Awasthi & Maheswari
2. Indian Administration by Maheswari
3. Administration Theories by Mohit Bhattacharya
4. Comparative Administration by i Mohit Bhattacharya
5. Indian Government & Politics by B.L.Fadia

PAPER : INTRODUCTION TO PUBLIC ADMINISTRATION

Time: 1.30 hours

Max.Marks:30

SECTION-A

(3X2=06)

I. Answer any THREE questions from the following.
Each question carries 2 marks.

- a. Public Administration
- b. POSDCORB
- c. NITI Aayog
- d. All Indian Services
- e. E-Governance

SECTION-B

(3X8=24)

II. Answer following questions internal choice.
Each question carries 8 marks.

2A. Explain the meaning and scope of Public Administration.

(OR)

.B. Differences between Public and Private Administration.

3A. Explain the Powers and Functions of UPSC.

(OR)

B. Describe the Functions of NITI Aayog.

4A.. Discuss various functions of Legislature?.

(OR)

B.. Discuss the varies components of E-Governance?.

SEMESTER-IV

S. No	COURSE TITLE	COURSE CODE	Course type	Instructions periods per Week	External Marks	Internal Marks	Total Marks	Credits
1	Major-1 Embryology	R23ZOOT411	Theory	3	60	40	100	3
2	Major-1 Embryology	R23ZOO411	Lab	2	30	20	50	1
3	Major-2 Animal Physiology: Life Sustaining Systems	R23ZOOT412	Theory	3	60	40	100	3
4	Major-2 Animal Physiology: Life Sustaining Systems	R23ZOO412	Lab	2	30	20	50	1
5	Major-3 Immunology	R23ZOOT413	Theory	3	60	40	100	3
6	Major-3 Immunology	R23ZOO412	Lab	2	30	20	50	1
7	Minor-1 Embryology	R23ZOOT421	Theory	3	60	40	100	3
8	Minor-1 Embryology	R23ZOO421	Lab	2	30	20	50	1
9	Minor-2 Animal Physiology: Life Sustaining Systems	R23ZOOT422	Theory	3	60	40	100	3
10	Minor-2 Animal Physiology: Life Sustaining Systems	R23ZOO422	Lab	2	30	20	50	1
11	Multi Disciplinary Course Indian Philosophy	R23PHIT441	Theory	2	30	20	50	2
12	Skill Course-1 Cybersecurity	R23CHET451	Theory	2	30	20	50	2
		TOTAL		29	510	340	850	24

R23	SEMESTER 4	Major-1	L	T	P	C
	Paper-IX EMBRYOLOGY		3	0	2	4
	Total contact hours:48					

LEARNING OBJECTIVES:

- ✓ To provide a comprehensive understanding of the fundamental principles of animal development, including cell fate, differentiation, and morphogenetic gradients.
- ✓ To familiarize students with the processes of gametogenesis, fertilization, cleavage, and gastrulation, emphasizing their role in embryonic development.
- ✓ To develop a critical appreciation of the formation of germ layers, placenta, and extra-embryonic membranes, along with genetic regulation of development.
- ✓ To explore the mechanisms of metamorphosis and regeneration, including their hormonal and cellular regulation.
- ✓ To introduce the concept of teratogenic agents and their impact on embryonic development.
- ✓ To provide insights into programmed cell death and its significance in developmental biology.
- ✓ To enable students to examine the process of organogenesis, particularly the development of the central nervous system, sensory organs, skin, and circulatory system.

SYLLABUS

UNIT-I:

9 Hours

- 1.1 Fundamental Concepts of Development: Potency, commitment, growth, determination.
- 1.2 Differentiation and Morphogenetic Gradients
- 1.3 Cell fate and cell lineages
- 1.4 Stem Cells

UNIT-II:

10 Hours

- 2.1 Gametogenesis: Spermatogenesis, Oogenesis
- 2.2 Types of eggs, Fertilization (External and Internal)
- 2.3 Planes and patterns of cleavage; Morula and formation of Blastula
- 2.4 Early development of frog and chick up to gastrulation

UNIT-III:

10 Hours

- 3.1 Formation of germ layers
- 3.2 Extra-embryonic membranes
- 3.3 Placenta (Structure, types and functions of placenta)
- 3.4 Regulation, genetic control of development.

UNIT-IV:

9 Hours

- 4.1 Metamorphosis: Changes, hormonal regulations in amphibians
- 4.2 Regeneration: Modes of regeneration, epimorphosis, and compensatory regeneration
- 4.3 Teratogenic agents and their effects on embryonic development
- 4.4 Programmed cell death

UNIT-V:

10 Hours

- 5.1 Organo genesis of Central Nervous system
- 5.2 Organogenesis of Eye, Ear
- 5.3 Organogenesis of Skin
- 5.4 Organogenesis of Circulatory system
- (* Organogenesis in Human need to be explained)

LEARNING OUTCOMES:

- ✓ By the end of this course, students will develop a **deep understanding** of the key principles of embryology and developmental biology.
- ✓ **Understand** the fundamental concepts of embryonic development, including cell potency, determination, and differentiation.
- ✓ **Describe** the processes of **gametogenesis, fertilization, and cleavage patterns**, with examples from different animal models.
- ✓ **Explain** the formation and role of **germ layers, extra-embryonic membranes, and placenta** in development.
- ✓ **Analyze** the hormonal regulation of **metamorphosis** and different modes of **regeneration** in animals.
- ✓ **Evaluate** the effects of **teratogenic agents** on embryonic development and their implications in birth defects.
- ✓ **Discuss** the role of **programmed cell death** in shaping the development of organisms.
- ✓ **Examine and compare** the developmental processes of various **organ systems** such as the **nervous system, sensory organs, skin, and circulatory system** in humans.

REFERENCE BOOKS:

- ☑ Chordate embryology by Varma and Agarwal
- ☑ B.Sc., Second year Telugu academy text book (2018 edition)
- ☑ Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer Associates Inc., Publishers, Sunderland, USA.

LMS LINK:

<https://allmedicalpdfs.com/human-embryology-pdf-notes/>

COUSE 9: EMBRYOLOGY MODEL QUESTION PAPER

Time: 2 ½Hours

Max. Marks: 60

PART A

1. Answer any five questions. Each question carries 2 marks. 5×2=10 Marks

- a. Define Cell fate in development.
- b. What are morphogenetic gradients?
- c. Differentiate between spermatogenesis and oogenesis.
- d. What are the types of eggs based on yolk distribution?
- e. Define placenta and its function.
- f. What are the different modes of regeneration?
- g. What is programmed cell death?
- h. What are extra-embryonic membranes?

PART B

(Answer any five questions. Each question carries 10 marks.) (5×10=50 Marks)

2(a). Explain the fundamental concepts of development with reference to potency, commitment, and growth.

OR

(b). Discuss stem cells, their types, and their significance in development.

3(a). Describe fertilization and its different types with examples.

OR

(b). Explain Early development of frog up to gastrulation

4(a). Explain the formation of germ layers.

OR

(b). Discuss the structure, types, and functions of the placenta.

5(a). Describe metamorphosis in amphibians and its hormonal regulation.

OR

(b). Explain the different types of regeneration with suitable examples.

6(a). Describe the organogenesis of the central nervous system.

OR

(b). Explain the organogenesis of the circulatory system.

R23	SEMESTER IV	Major-I	P	C
	EMBRYOLOGY		2	1
	Total contact hours:30			

COURSE 9: EMBRYOLOGY

Practical

Credits: 1

2 hrs/week

LEARNING OBJECTIVES

The objective of this course is to provide comprehensive practical knowledge on embryology.

- Students must develop a critical understanding of early embryological events.
- Acquire knowledge on the developmental stages of frog and chick embryos through permanent slides.
- Understand the histology of the placenta using photomicrographs and slides.
- Develop observational and analytical skills by preparing a project report on chick embryo development.

SYLLABUS:

1. Study of whole mounts and sections of developmental stages of frog through permanent slides:
Cleavage stages, blastula, gastrula, tadpole.
2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak
(13 and 18 hours), 24, 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

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/department_materials/doc_501.pdf
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

R23	SEMESTER-IV	Major-2	L	T	P	C
	Course – 14: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS		3	0	2	4
	Total contact hours:48					

LEARNING OBJECTIVES

- To acquire knowledge of organ systems function.
- To develop the ability to integrate physiology from the cellular and molecular level to the organ system and organismic level of organization.
- To Effectively read, evaluate and communicate scientific information related to physiological processes in the body.
- To gain a deep knowledge of current topics in physiology.

SYLLABUS

UNIT-I: Physiology of Digestion

- 1.1 Structural organization and functions of gastrointestinal tract and associated glands; ,mechanical and chemical digestion of food
- 1.2.Absorptions of carbohydrates, lipids, proteins.; vitamins
Gastro intestinal hormones and regulation of digestion

UNIT-II: Physiology of Respiration

- 2.1 Structural organization of Respiratory system, Mechanism of respiration,
- 2.2 Pulmonary ventilation, Transport of oxygen and Corbo dioxide

UNIT-III: Renal Physiology`

- 3.1 Structure of kidney and its functional unit
- 3.2 Mechanism of urine formation, counter current mechanism

UNIT-IV: Physiology of exciting tissues

- 4.1 Neuron structure, Nerve impulse transmission-(Myelinated, Non-myelinated,)
- 4.2 Ultra structure of muscle , Molecular and chemical basis of muscle contraction

UNIT- V: Physiology of Heart

- 5.1 Structure of mammalian heart
- 5.2 working of mammalian heart,cardiac cycle

REFERENCE BOOKS :

- Jordan .E.L.& Verma.P.S. Chordate Zoology.(S.Chand&co)
- Sobti.R.C. Animal Physiology.(Y.Narosa Publ.)
- Christopher.D.Moyes &Patricia Schulte. Principals of physiology. (Pearson Publ.).
- SivaPrasad.S&BabuRao.v.sAnimal Physiology, genetics &Organic Evolution.
- Verma .P.S. & Agrawal.2010.Chordate Embryology.(S.Chand &Co).

MODEL PAPER

COURSE 10: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

Time:2 ½ hours

Max.marks:60

PART A

I Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

- a. Chemical digestion of proteins?
- b. Ghrelin ?
- c. What is chloride shift?
- d. Draw oxyhaemoglobin curve.?
- e. Counter current mechanism?
- f. How is mixturation process performed in humans?
- g. Draw a neat labelled diagram of multipolar neuron?
- h. Cardiac output ?

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

2(a) Give an account of structural organization and functions of gastrointestinal tract and associated glands.

OR

(b) Give an account on absorptions of carbohydrates, lipids, proteins, and vitamins.

3(a) Write an essay on the structural organization , mechanism of Respiration

OR

(b) Explain the mechanism of transport of oxygen in the blood

4(a) Explain the structure of kidney and functional unit of kidney.

OR

(b) Explain the mechanism of urine formation

5(a) Write an essay on Nerve impulse transmission in myelinated, non-myelinated nerves

OR

(b) Explain molecular and chemical basis of muscle contraction

6(a) Explain the Structure of mammalian heart.

OR

(b) Write a note on function of heart (cardiac cycle).

R23	SEMESTER-IV	Major-2	P	C
	Course – 10: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS		2	1
	Total contact hours:30			

Practical

Credits: 1

2 hrs/week

LEARNING OBJECTIVE:

- To observe and identify the histological structure of various mammalian organs.
- To develop the ability to test the biological sample like saliva.
- To test for the presence of carbohydrates (e.g., starch, reducing sugars) in unknown samples using tests like Benedict's, Iodine,
- To detect the presence of proteins in a sample using Heller's test, which involves the formation of a precipitate when nitric acid is added to the sample.
- To observe the characteristic colour change or precipitate formation in the presence of proteins.
- To test the solubility properties of suspected lipids (fats/oils) in different solvents (e.g., water, alcohol, ether) to identify the presence of lipids.
- To differentiate lipids from other organic compounds based on their solubility in non-polar solvents.
- To detect ammonia in samples using qualitative tests such as Nessler's reagent
- To detect Urea in samples using qualitative tests such as Nessler's reagent

SYLLABUS:

1. Examination of sections of mammalian esophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney
2. Study of activity of Salivary amylase under optimum condition
3. Qualitative tests for identification of Carbohydrates
4. Qualitative tests for identification of Proteins
5. Qualitative tests for identification of Fats
6. Qualitative tests for identification of Ammonia
7. Qualitative tests for identification of Urea

LEARNING OUTCOMES: -

- Understanding of how the structure of organs (e.g., villi in the ileum, alveoli in the lungs) supports their specific functions.
- Understanding the role of salivary amylase in carbohydrate digestion
- Identification of reducing sugars through color changes in the Benedict's test.
- Detection of starch through the blue-black color change with iodine.
- Understanding the chemical basis behind the formation of the precipitate due to the reaction between proteins and nitric acid
- Understanding the solubility properties of lipids and distinguishing them from other organic molecules based on these properties.
- Understanding ammonia's role in nitrogen metabolism and waste excretion
- understanding how the ammonia from urea hydrolysis reacts with Nessler's reagent to produce a distinctive colour change.

REFERENCE BOOKS

- SivaPrasad.S&BabuRao.v.sAnimal Physiology, genetics &Organic Evolution.
- Verma .P.S. & Agrawal.2010.Chordate Embryology.(S.Chand &Co).

REFERENCE WEB LINKS:

- <https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham>
- <https://library.csi.cuny.edu/oer/virtuallabs-simulations#anatomy>
- <https://www.labster.com/simulations?course-packages=animal-physiology>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>
- [https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_\(2013\).pdf](https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_(2013).pdf)

R23	SEMESTER-IV	Major-3	L	T	P	C
	IMMUNOLOGY		3	0	2	4
	Total contact hours:48					

COURSE OBJECTIVES

By the completion of the course the graduate will able to –

- ☑ Understand the fundamental principles of the immune system, including innate and adaptive immunity.
- ☑ Describe the structure, types, and functions of antigens.
- ☑ Apply knowledge of antigen-antibody interactions to immunological techniques and diagnostics.
- ☑ Apply knowledge of immune system pathways, including antigen presentation, cytokine signaling, and immune responses.
- ☑ Apply immunological concepts to explain hypersensitivity reactions, autoimmunity, and immunodeficiency disorders.

SYLLABUS

UNIT – I: Overview of Immune system [10 Hours]

- 1.1 Introduction to basic concepts in Immunology
- 1.2 Innate and adaptive immunity
- 1.3 Cells of immune system
- 1.4 Organs of immune system

UNIT – II : Antigens [10 Hours]

- 2.1 Basic properties of antigens
- 2.2 B and T cell epitopes, paratopes
- 2.3 Haptens and adjuvants
- 2.4 Factors influencing immunogenicity

UNIT – III: Antibodies [10 Hours]

- 3.1 Structure of antibody
- 3.2 Classes of antibodies
- 3.3 Functions of antibodies
- 3.4 Monoclonal antibodies

UNIT – IV: Working of Immune system [9 Hours]

- 4.1 Structure and functions of major histocompatibility complexes
- 4.2 Exogenous pathway of antigen presentation and processing
- 4.3 Endogenous pathway of antigen presentation and processing
- 4.4. Basic properties and functions of cytokines

UNIT – V: Immune system in health and disease [9 Hours]

- 5.1 Gell and Coombs' classification and brief description of various types of hypersensitivities
- 5.2 Introduction to concepts of autoimmunity and immunodeficiency
- 5.3 General introduction to vaccines Types of vaccines, Immunization programme
- 5.4 Organ transplantation- Graft rejection, immune suppressors

LEARNING OUTCOMES:

- ☑ The overall course outcome is that the student shall develop deeper understanding of concepts of immunology. This course will provide students with a deep knowledge in immunology by the completion of the course the graduate shall able to –
- ☑ Articulate the roles of innate recognition receptors in immune responses
- ☑ Compare and contrast humoral versus cell-mediated immune responses
- ☑ Distinguish various cell types involved in immune responses and associated functions;
- ☑ Distinguish and characterize antibody isotypes, development, and functions
- ☑ Understand the role of cytokines in immunity and immune cell activation;
- ☑ Understand the significance the Major Histocompatibility Complex in terms of immune response and transplantation

REFERENCES BOOKS:

- Latha, Madhavee P. S. Chand Publishing, 2024 - Science - 303 pages A TEXTBOOK OF IMMUNOLOGY
- Intermediate Telugu Akademi Physiology, Genetics, Evolution and Applied Biology Text Book (1 January 2019)

LMS Link

<https://www.cbcszoology.org/study-material-pdf>

Model Paper
COURSE 11: IMMUNOLOGY

Time: 2 ½ hours

Max.marks:60

PART A

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

- 1
- a. Define immunity and immunology.
- b. What are B-cells?
- c. Briefly describe Haptens.
- d. Differentiate epitopes and paratopes.
- e. What is IgA?
- f. Which antibody is a pentamer among the classes of antibodies?
- g. What are cytokines?
- h. Define hypersensitivity.

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

- 2(a) Write a note on Innate and adaptive immunity.
OR
(b) Give an account on lymphoid organs of immune system.
- 3(a) Explain the basic properties of antigen.
OR
(b) What are the factors influencing immunogenicity?
- 4(a) Explain the structure of antibody.
OR
(b) Give an account of monoclonal antibodies.
- 5(a) Describe MHC.
OR
(b) Explain endogenous pathway of antigen presentation and processing.
- 6(a) Explain the concepts of autoimmunity and immunodeficiency.
OR
(b) Give an account of vaccines.

R23	SEMESTER-IV	Major-3	P	C
	IMMUNOLOGY		2	1
	Total contact hours:30			

COURSE 11: IMMUNOLOGY

Practical

Credits: 1

2 hrs/week

LEARNING OBJECTIVES

- To acquire knowledge on the distribution of lymphoid organs
- To acquire knowledge on immune cells
- To understand histology of spleen, thymus and lymph nodes
- To understand the different types of antibodies
- To acquaint with the process of blood grouping with kit

SYLLABUS:

1. Demonstration of lymphoid organs(Virtual mode)
2. Demonstration of immune cells(Virtual mode)
3. Histological study of spleen, thymus and lymph nodes (through prepared slides/charts/models)
4. Demonstration of IgG,IgA,IgM,IgD,IgE antibodies(Virtual mode)
5. Blood group determination

REFERENCE WEB LINKS:

- <https://vlab.amrita.edu/?sub=3&brch=69>
- <https://ivl1-au.vlabs.ac.in/List%20of%20experiments.html>
- <https://ivl2-au.vlabs.ac.in/List%20of%20experiments.html>
- <https://www.medicine.mcgill.ca/physio/vlab/immun/vlabmenuimmun.htm>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>
- <http://www.lucp.net/books-pdf/Lab%20Manual%20Dr.%20Idris%20Adewale%20Ahmed/15.%20BASIC%20IMMUNOLOGY.pdf>
- https://www.avit.ac.in/lab/immunology_bioprocess_engineering_lab/download/17BTCC89/lab_manual.pdf
- [https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC106J-](https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC106J-Of)

R23	SEMESTER-IV	MINOR-1	L	T	P	C
	COURSE-3 EMBRYOLOGY		3	0	2	4
	Total contact hours:48					

LEARNING OBJECTIVES:

- ✓ To provide a comprehensive understanding of the fundamental principles of animal development, including cell fate, differentiation, and morphogenetic gradients.
- ✓ To familiarize students with the processes of gametogenesis, fertilization, cleavage, and gastrulation, emphasizing their role in embryonic development.
- ✓ To develop a critical appreciation of the formation of germ layers, placenta, and extra-embryonic membranes, along with genetic regulation of development.
- ✓ To explore the mechanisms of metamorphosis and regeneration, including their hormonal and cellular regulation.
- ✓ To introduce the concept of teratogenic agents and their impact on embryonic development.
- ✓ To provide insights into programmed cell death and its significance in developmental biology.
- ✓ To enable students to examine the process of organogenesis, particularly the development of the central nervous system, sensory organs, skin, and circulatory system.

SYLLABUS

UNIT-I:

9 Hours

- 1.1 Fundamental Concepts of Development: Potency, commitment, growth, determination.
- 1.2 Differentiation and Morphogenetic Gradients
- 1.3 Cell fate and cell lineages
- 1.4 Stem Cells

UNIT-II:

10 Hours

- 2.1 Gametogenesis: Spermatogenesis, Oogenesis
- 2.2 Types of eggs, Fertilization (External and Internal)
- 2.3 Planes and patterns of cleavage; Morula and formation of Blastula
- 2.4 Early development of frog and chick up to gastrulation

UNIT-III:

10 Hours

- 3.1 Formation of germ layers
- 3.2 Extra-embryonic membranes
- 3.3 Placenta (Structure, types and functions of placenta)
- 3.4 Regulation, genetic control of development.

UNIT-IV:

9 Hours

- 4.1 Metamorphosis: Changes, hormonal regulations in amphibians
- 4.2 Regeneration: Modes of regeneration, epimorphosis, and compensatory regeneration
- 4.3 Teratogenic agents and their effects on embryonic development
- 4.4 Programmed cell death

UNIT-V:

10 Hours

- 5.1 Organogenesis of Central Nervous system
 - 5.2 Organogenesis of Eye, Ear
 - 5.3 Organogenesis of Skin
 - 5.4 Organogenesis of Circulatory system
- (* Organogenesis in Human need to be explained)

LEARNING OUTCOMES:

- ✓ By the end of this course, students will develop a **deep understanding** of the key principles of embryology and developmental biology.
- ✓ **Understand** the fundamental concepts of embryonic development, including cell potency, determination, and differentiation.
- ✓ **Describe** the processes of **gametogenesis, fertilization, and cleavage patterns**, with examples from different animal models.
- ✓ **Explain** the formation and role of **germ layers, extra-embryonic membranes, and placenta** in development.
- ✓ **Analyze** the hormonal regulation of **metamorphosis** and different modes of **regeneration** in animals.
- ✓ **Evaluate** the effects of **teratogenic agents** on embryonic development and their implications in birth defects.
- ✓ **Discuss** the role of **programmed cell death** in shaping the development of organisms.
- ✓ **Examine and compare** the developmental processes of various **organ systems** such as the **nervous system, sensory organs, skin, and circulatory system** in humans.

REFERENCE BOOKS:

- ☑ Chordate embryology by Varma and Agarwal
- ☑ B.Sc., Second year Telugu academy text book (2018 edition)
- ☑ Gilbert SF. 2006. *Developmental Biology*, 8th Edition. Sinauer Associates Inc., Publishers, Sunderland, USA.

LMS LINK:

<https://allmedicalpdfs.com/human-embryology-pdf-notes/>

MODEL PAPER
COURSE 3: EMBRYOLOGY QUESTION PAPER

Time: 2 ½Hours

Max. Marks: 60

PART A

Answer any five questions. Each question carries 2 marks. 5×2=10 Marks

1

- a. Define Cell fate in development.
- b. What are morphogenetic gradients?
- c. Differentiate between spermatogenesis and oogenesis.
- d. What are the types of eggs based on yolk distribution?
- e. Define placenta and its function.
- f. What are the different modes of regeneration?
- g. What is programmed cell death?
- h. What are extra-embryonic membranes?

PART B

(Answer any five questions. Each question carries 10 marks.)

(5×10=50 Marks)

2(a). Explain the fundamental concepts of development with reference to potency, commitment, and growth.

OR

(b). Discuss stem cells, their types, and their significance in development.

3(a). Describe fertilization and its different types with examples.

OR

(b). Explain Early development of frog up to gastrulation

4(a). Explain the formation of germ layers.

OR

(b). Discuss the structure, types, and functions of the placenta.

5(a). Describe metamorphosis in amphibians and its hormonal regulation.

OR

(b). Explain the different types of regeneration with suitable examples.

6(a). Describe the organogenesis of the central nervous system.

OR

(b). Explain the organogenesis of the circulatory system.

R23	SEMESTER IV	MINOR-I	P	C
	Course 3: EMBRYOLOGY		2	1
	Total contact hours:30			

COURSE 9: EMBRYOLOGY

Practical

Credits: 1

2 hrs/week

LEARNING OBJECTIVES

The objective of this course is to provide comprehensive practical knowledge on embryology.

- Students must develop a critical understanding of early embryological events.
- Acquire knowledge on the developmental stages of frog and chick embryos through permanent slides.
- Understand the histology of the placenta using photomicrographs and slides.
- Develop observational and analytical skills by preparing a project report on chick embryo development.

SYLLABUS:

- 1.Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, tadpole.
- 2.Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak(13 and 18 hours), 24, 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

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/department_materials/doc_501.pdf
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>

R23	SEMESTER-IV	Minor-2		L	T	P	C
	Course 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS			3	0	2	4
	Total contact hours:48						

LEARNING OBJECTIVES

- To acquire knowledge of organ systems function.
- To develop the ability to integrate physiology from the cellular and molecular level to the organ system and organismic level of organization.
- To Effectively read, evaluate and communicate scientific information related to physiological processes in the body.
- To gain a deep knowledge of current topics in physiology.

SYLLABUS

UNIT-I: Physiology of Digestion

- 1.2 Structural organization and functions of gastrointestinal tract and associated glands;
 ,mechanical and chemical digestion of food
 1.2.Absorptions of carbohydrates, lipids, proteins.; vitamins
 Gastro intestinal hormones and regulation of digestion

UNIT-II: Physiology of Respiration

- 2.1 Structural organization of Respiratory system, Mechanism of respiration,
 2.2 Pulmonary ventilation, Transport of oxygen and Carbon dioxide

UNIT-III: Renal Physiology

- 3.1 Structure of kidney and its functional unit
 3.2 Mechanism of urine formation, counter current mechanism

UNIT-IV: Physiology of exciting tissues

- 4.1 Neuron structure, Nerve impulse transmission-(Myelinated, Non-myelinated,)
 4.2 Ultra structure of muscle , Molecular and chemical basis of muscle contraction

UNIT- V: Physiology of Heart

- 5.1 Structure of mammalian heart
 5.2 working of mammalian heart,cardiac cycle

LEARNING OUTCOMES:

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

- Understand the physiology of digestion and hormonal control of digestion
- Develop a comprehensive picture of respiratory physiology
- Acquire knowledge on the Renal physiology
- Understand the physiology of Nerve and muscle
- Understand the physiology of heart

REFERENCE BOOKS :

- Jordan .E.L.& Verma.P.S. Chordate Zoology.(S.Chand&co)
- Sobti.R.C. Animal Physiology.(Y.Narosa Publ.)
- Christopher.D.Moyes &Patricia Schulte. Principals of physiology. (Pearson Publ.).
- SivaPrasad.S&BabuRao.v.sAnimal Physiology, genetics &Organic Evolution.
- Verma .P.S. & Agrawal.2010.Chordate Embryology.(S.Chand &Co).

LMS Link

- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>
- [https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_\(2013\).pdf](https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_(2013).pdf)

Model Paper

COURSE 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

Time:2 ½ hours

Max.marks:60

PART A

I Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

- a. Chemical digestion of proteins?
- b. Ghrelin ?
- c. What is chloride shift?
- d. Draw oxyhaemoglobin curve.?
- e. Counter current mechanism?
- f. How is mixturition process performed in humans?
- g. Draw a neat labelled diagram of multipolar neuron?
- h. Cardiac output ?

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

2(a) Give an account of structural organization and functions of gastrointestinal tract and associated glands.

OR

(b) Give an account on absorptions of carbohydrates, lipids, proteins, and vitamins.

3(a) Write an essay on the structural organization , mechanism of Respiration

OR

(b) Explain the mechanism of transport of oxygen in the blood

4(a) Explain the structure of kidney and functional unit of kidney.

OR

(b) Explain the mechanism of urine formation

5(a) Write an essay on Nerve impulse transmission in myelinated, non-myelinated nerves

OR

(b) Explain molecular and chemical basis of muscle contraction

6(a) Explain the Structure of mammalian heart.

OR

(b) Write a note on function of heart (cardiac cycle).

R23	SEMESTER-IV	Minor -2	P	C
	Course 4: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS		2	1
	Total contact hours:30			

COURSE 10: ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

Practical

Credits: 1

2 hrs/week

LEARNING OBJECTIVE:

- To observe and identify the histological structure of various mammalian organs.
- To develop the ability to test the biological sample like saliva.
- To test for the presence of carbohydrates (e.g., starch, reducing sugars) in unknown samples using tests like Benedict's, Iodine,
- To detect the presence of proteins in a sample using Heller's test, which involves the formation of a precipitate when nitric acid is added to the sample.
- To observe the characteristic colour change or precipitate formation in the presence of proteins.
- To test the solubility properties of suspected lipids (fats/oils) in different solvents (e.g., water, alcohol, ether) to identify the presence of lipids.
- To differentiate lipids from other organic compounds based on their solubility in non-polar solvents.
- To detect ammonia in samples using qualitative tests such as Nessler's reagent
- To detect Urea in samples using qualitative tests such as Nessler's reagent

SYLLABUS:

1. Examination of sections of mammalian esophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney
2. Study of activity of Salivary amylase under optimum condition
3. Qualitative tests for identification of Carbohydrates
4. Qualitative tests for identification of Proteins
5. Qualitative tests for identification of Fats
6. Qualitative tests for identification of Ammonia
7. Qualitative tests for identification of Urea

LEARNING OUTCOMES: -

- Understanding of how the structure of organs (e.g., villi in the ileum, alveoli in the lungs) supports their specific functions.
- Understanding the role of salivary amylase in carbohydrate digestion
- Identification of reducing sugars through color changes in the Benedict's test.
- Detection of starch through the blue-black color change with iodine.
- Understanding the chemical basis behind the formation of the precipitate due to the reaction between proteins and nitric acid
- Understanding the solubility properties of lipids and distinguishing them from other organic molecules based on these properties.
- Understanding ammonia's role in nitrogen metabolism and waste excretion
- understanding how the ammonia from urea hydrolysis reacts with Nessler's reagent to produce a distinctive colour change.

REFERENCE BOOKS

- SivaPrasad.S&BabuRao.v.sAnimal Physiology, genetics &Organic Evolution.
- Verma .P.S. & Agrawal.2010.Chordate Embryology.(S.Chand &Co).

REFERENCE WEB LINKS:

- <https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham>
- <https://library.csi.cuny.edu/oer/virtuallabs-simulations#anatomy>
- <https://www.labster.com/simulations?course-packages=animal-physiology>
- <http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf>
- [https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_\(2013\).pdf](https://physiology.elte.hu/gyakorlat/jegyzet/Physiology_Pactical_(2013).pdf)

R 23	SEMESTER-IV	MDC	L	P	T	C
	INDIAN PHILOSOPHY		2	---	---	2
TOTAL CONTACT HOURS – 30						

Learning Objectives:

1. The student should understand and appreciate the diverse philosophical theories of ancient India.
2. The student should develop rational perspectives on pertinent questions of the world and human life, as viewed by ancient thinkers.
3. The student should comprehend the intellectual heritage and legacy of free thinking in India.

Syllabus:

Unit-I

Introduction to Philosophy – Metaphysics, Epistemology and Ethics - Indian Philosophical Tradition – Vedas – Philosophical Speculations of Upanishads – Darsanas – Orthodox and Unorthodox Systems of Philosophy – Metaphysical Diversity – Overview.

Unit -II

Indian Epistemology – Knowledge – Sources of Knowledge (Pramanas) – Perception (Pratyaksha) – Inference (Anumana) – Sabda (Testimony) – Other Pramanas – Theories of Error – Nyaya Philosophy

Unit –III

Ethics – Morality and Ethics – Significance of Ethics in Indian Philosophy - Rita – Hedonism of Materialists - Dharma – Karma – Moksha - Ethics of Renunciation – Nirvana – Pamcha Vratas – Purusharthas - Duties of a Student - Varna and Asrama - Ethics of Bhagavad-Gita – Nishkama Karma – Sthithaprajna

Activities:

Group Discussions
Debates
Assignments
Essay Writing
PPT Presentation
Charts/Poster presentation

Learning Outcomes: On successful completion of the course, the student

1. Understands what Philosophy is and its significance in human life.
2. Gains knowledge of Indian philosophical tradition and intellectual heritage.
3. Develops a critical understanding of philosophical theories of ancient systems.
4. Examines the rational character of Indian theories of knowledge.
5. Appreciates the ethical insights of ancient thinkers.

Reference Books:

- An Introduction to Indian Philosophy by Satishchandra Chatterjee and DM Dutta, Motilal Banarsidass Publishers, 2016
- The Essentials of Indian philosophy by M. Hiriyanna, Motilal Banarsidass Publishers, 1995
- A Source Book in Indian Philosophy by Dr. Sarvepalli Radhakrishnan, Princeton University Press, 2014
- A History of Indian Philosophy by Surendranath Dasgupta, the University of California, 1922
- A Critical Survey of Indian Philosophy by Chandradhar Sarma, Motilal Banarsidass Publishers, 2000.
- The Six Ways of Knowing by D. M. Datta, Open Source, 1960

FOURTH SEMESTER: EXAMINATIONS
B.Sc INDIAN PHILOSOPHY

Time: 2.00 Hour

Max Marks: 30

PART- A

I. Answer any THREE of the following.

3X2 = 6 M

- a. Meta physics
- b. Vedas
- c. Dharma
- d. Moksha
- e. Panchavratas,

PART B

II. Answer any THREE of the following internal choice

3X8= 24 M

- 2. A) Explain the Philosophical Speculations of Upanishads ?
(OR)
B) Elucidate the Meta Physics, Epistemology and Ethics?
- 3. A) Discuss the Perception and inference?
(OR)
B) Describe the Morality and Ethics?
- 4. A) Discuss the Ethics of Bhagavad-Gita?
(OR)
B) Explain the Characteristics of Sthithaprajna?

R23	SEMESTER IV	Skill Course-I	L	T	P	C
	CYBER SECURITY		2	-	-	2
	Total Hours – 30					

Learning Outcomes:

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

- Develop an understanding of cybercrimes and various legal perspectives involved.
- Develop a security model to handle mobile, wireless devices and related security issues of an organization.
- Use the cybercrime tools and methods in solving real world problems

UNIT – I 8 hrs

Introduction to Cybercrime: Introduction, Cybercrime: Definition and origins of the word, Cybercrime and Information Security, who are cyber criminals? Classifications of cybercrimes, cybercrime: the legal perspectives, an Indian perspective, cybercrime and the Indian IT Act 2000, a Global perspective on Cybercrimes.

UNIT – II 12 hrs

Cybercrime-Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Authentication Service Security, Attacks on Mobile/Cell Phones.

Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT – III 10hrs

Tools and Methods Used in Cybercrime: Password Cracking, key loggers and Spywares, virus and worms, Trojan Horses and Backdoors, Steganography, attacks on wireless networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

Text Books:

1. Mark Rhodes, Ousley, Information Security, 1st Edition, MGH, 2013.
2. Nina Godbole and SunitBelpure - Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, 1st Edition Publication Wiley, 2011.

Activities to be planned:

1. Identify a user of internet, label him as a cybercriminal or not.
2. Checklist for reporting cybercrime at Cybercrime Police Station.
3. Checklist for reporting cybercrime online.
4. Reporting phishing emails.
5. Demonstration of email phishing attack and preventive measures.
6. Checklist for secure net banking.

**MODELQUESTIONPAPER
CYBER SECURITY**

Time: 2Hrs.

Max. Marks: 30

SECTION – A

I. Answer all TEN questions:

[10 X 1 = 10 M]

1. What is cybercrime?
2. What are the main categories of cybercrime?
3. What are some common examples of cybercrime?
4. Who are cybercriminals?
5. Mention some of the wireless devices.
6. What is mobile malware?
7. What is Bluetooth hacking?
8. What is a keylogger?
9. What is a DDoS attack?
10. What is cryptojacking?

SECTION – B

II. Answer any FIVE of the following questions:

[5 X 4 = 20 M]

11. Explain the common cyber security threats faced by individuals and businesses today.
12. Describe the differences between antivirus, firewall, and intrusion detection systems in the context of cyber security.
13. Explain the concept of phishing and how individuals can protect themselves from phishing attacks.
14. How can users protect their mobile devices from malware?
15. What are rogue Wi-Fi networks, and how can they be dangerous?
16. What is a mobile ransom ware attack? Explain.
17. Explain about the Trojan Horses and Backdoors.
18. Explain the steganography technique.

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SEMESTER-V

S. No	COURSE TITLE	COURSE CODE	Course type	Instructions periods per Week	External Marks	Internal Marks	Total Marks	Credits
1	Major-1 Poultry Management-I (Poultry Farming)	R23ZOOT511	Theory	3	60	40	100	3
2	Major-1 Poultry Management-I (Poultry Farming)	R23ZOOL511	Lab	2	30	20	50	1
3	Major-2 Poultry Management-II (Poultry Production and Management)	R23ZOOT512	Theory	3	60	40	100	3
4	Major-2 Poultry Management-II (Poultry Production and Management)	R23ZOOL512	Lab	2	30	20	50	1
5	Major-3 Sustainable Aquaculture Management	R23ZOOT513	Theory	3	60	40	100	3
6	Major-3 Sustainable Aquaculture Management	R23ZOOL513	Lab	2	30	20	50	1
7	Major-4 Post-Harvest Technology of Fish and Fisheries	R23ZOOT514	Theory	3	60	40	100	3
8	Major-4 Post-Harvest Technology of Fish and Fisheries	R23ZOOL514	Lab	2	30	20	50	1
9	Minor-1 Poultry Management-I (Poultry Farming)	R23ZOOT521	Theory	3	60	40	100	3
10	Minor-1 Poultry Management-I (Poultry Farming)	R23ZOOL521	Lab	2	30	20	50	1
11	Minor-2 Poultry Management-II (Poultry Production and Management)	R23ZOOT522	Theory	2	30	20	50	2
12	Minor-2 Poultry Management-II (Poultry Production and Management)	R23ZOOL522	Lab	2	30	20	50	1
12	Environmental Education		Theory	2	30	20	50	2
		TOTAL		31	540	360	900	25

R23	SEMESTER V	Major-1	L	T	P	C
	POULTRY MANAGEMENT-I (POULTRY FARMING)		3	-	2	4
	Total contact hours:48					

COURSE OBJECTIVES:

- To understand the importance and growth of the poultry industry in India
- To explore modern poultry farming practices
- To examine diversified poultry farming systems
- To appreciate indigenous poultry breeds in India
- To gain insights into the contributions of the Central Avian Research Institute (CARI)

SYLLABUS

Unit 1 Indian poultry Industry

- 1.1 Importance of poultry farming and poultry development in India.
- 1.2 Present status and future prospectus of poultry Industry

Unit -2 Scientific Poultry Keeping

- 2.1 Modern breeds of Chicken
- 2.2 Mini breeds- dwarfism in mini-Leghorns

Unit-3 Diversified Poultry

- 3.1 Ducks and Geese-classification- rearing system-classification-advantages
- 3.2 Guinea fowls - guinea fowl farming in India-Production-varieties,Emu-rearing- Economical aspects-commercial products

Unit-4 Desi Chickens:

- 4.1 Indigenous breeds and economical aspects of desi chicken
- 4.2 Indigenous breeds-Aseel-Chittagong-Kadakhnath-Bursa

Unit -5 Breeds from Central Avian Research Institute – Izatnagar

- 5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)
- 5.2 CARI- Priya Layer, CARI- Sonali Layer

LEARNING OUTCOMES:

- Understand the significance of poultry farming in India
- Identify and describe modern poultry breeds and production systems
- Describe diversified poultry farming system
- Evaluate indigenous poultry breeds
- Appreciate the contributions of CARI in poultry breeding

REFERENCES:

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No.9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN:9788120412606

Web sources:

5. <https://www.drvet.in/p/e-books.html>
6. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
7. https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

R23	SEMESTER V	Major-1	P	C
	POULTRY MANAGEMENT-I (POULTRY FARMING)		2	1
	Total contact hours:48			

**COURSE 12: POULTRY MANAGEMENT-I (POULTRY FARMING)
(PRACTICAL)**

LEARNING OBJECTIVES:

- Observation and understanding of different types of poultry rearing systems
- Exploration of different types of poultry housing
- Identification and observation of different layer breeds
- Identification and observation of different broiler breeds
- Examination of Nandanam breeds:

SYLLABUS:

1. Different types of Poultry rearing (Students has to observe and draw the different types ofpoultry rearing systems)
2. Different types of poultry Housing - Models / Images/charts
3. Different layer breeds images/charts/ Models (Observation of characters)
4. Types of broilers images/charts/ Models (Identification of important Character)
5. Nandanam breeds- images/charts (Identification of characters)

*** (This practical is 70 % (Web based /virtual) 30% physical: student and teachers must browse the web for the specimens models – write down the important characters based on theweb resources)

LEARNING OUTCOMES:-

- Differentiate between poultry rearing systems
- Identify various types of poultry housing
- Identify key characteristics of layer breeds
- Recognize and characterize broiler breeds
- Identify and observe the traits of Nandanam breeds
- Examine the attributes of CARI-developed poultry breeds

REFERENCES:

1. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN:9788120412606
2. http://www.agritech.tnau.ac.in/expert_system/poultry/Poultry%20House%20Construction.html
3. <https://petkeen.com/best-chicken-breeds-for-eggs/>
4. <https://garden.decorexpro.com/en/hozyajstvo/ptitsevodstvo/porody-brojlnykh-kur-s-foto-i-opisaniem.html>

Co-Curricular Activities:

1. Max marks for Fieldwork/Project work Report: 05.
2. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detailsofplace visited, observations made, findings and acknowledgements.*
3. I am adam again Chandra Mani Chisi Dhorak Dhar Kalaiu Kathar Darki Dilri Pothar Very good welcome daddy Maria was mad at me Matra Taneledu Pakadu I never had a Hindi music Hima Bhawani Di Kodu Kulekhne Tandri Yemato Hindu Unit tests. (IE)

a.Suggested Co-Curricular Activities

1. Web resources – visiting the web sites of CARI-IZATNAGA <https://cari.icar.gov.in> procuring additional information on the poultry breeds
2. Web resources- visiting the web site of NANADANAM http://www.tanuvac.ac.in/ipmmadhavaram_tech.html
3. Collection of additional data on different types of Poultry breeds
4. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Videopreparation etc.

Model Paper

SEMESTER-V

COURSE 12: POULTRY MANAGEMENT-I (POULTRY FARMING)

Time:2 ½ hours

Max.marks:60

PART A

I Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

- a. Define poultry
- b. Advantages of poultry
- c. What is modern breeds of chicken
- d. What is Rearing
- e. Economical importance of Guinea fowls
- f. What do you mean by indigenous
- g. Any two characteristics of Aseel, Chittagong,
- h. HITCARI

PART B

Answer any 5 questions from the following. Draw diagrams wherever necessary. 5x10=50 Marks

- 2 (a) Discuss the importance of poultry farming?
OR
(b) Present status and future prospectus of poultry Industry?
- 3(a) Explain the characteristics of modern breeds of chickens?
OR
(b) Explain the concept of dwarfism in mini-Leghorns?
- 4(a) Give details about classification of ducks and their Advantages?
OR
(b) Explain the significance of guinea fowl farming in India?
- 5(a) Write note on indigenous breeds of desi chickens?
OR
(b) Explain the characteristics of the Kadak Nath, and Bursa
- 6(a) Discuss the features and advantages of the CARI Nirbheek and CARI Shyama breeds in poultry farming.
OR
(b) Explain the importance of CARI Priya and CARI Sonali layers in the Indian poultry industry

R23	SEMESTER V	Major-2	L	T	P	C
	PAPER – 13: POULTRY MANAGEMENT-II (POULTRY PRODUCTION AND MANAGEMENT)		3	0	2	4
	Total contact hours:48					

Learning objectives

1. Identify common poultry diseases and understand their causes and prevention methods.
2. Analyze the costs and profits of raising layers and broilers, and create simple project reports for poultry businesses.
3. Manage layer and broiler breeder flocks by providing proper housing and nutrition for different age groups.
4. Implement vaccination schedules and prevent diseases in breeder flocks while addressing fertility issues.
5. Apply best practices in hatchery management, including egg incubation, sanitation, and record-keeping.

UNIT I HEALTH CARE

- 1.1 Common poultry diseases: bacterial, viral.
- 1.2 Fungal diseases, parasitic and nutritional deficiencies.
- 1.3 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.

UNIT-II: ECONOMICS

- 2.1 Economics of layer and broiler production
- 2.2 Projects reports in different systems of rearing for layer & broilers.
- 2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.

UNIT-III: BREEDER FLOCK MANAGEMENT

- 3.1 Layer and broiler breeder flock management housing & space requirements
- 3.2 Different stage of management during life cycle; Light management during growing and laying period,
- 3.3 Artificial insemination.

UNIT-IV: BREEDER HEALTHCARE

- 4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.
- 4.2 Common diseases of breeders (Infectious and metabolic disorders)- prevention.

UNIT-V: HATCHERY PRACTICES

- 5.1 Management principles of incubation.
- 5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs.
- 5.3 Fumigation; sanitation and hatchery hygiene.

Course Outcomes: By the completion of the course the graduate should able to –

CO1 Analyze and manage the health and welfare of poultry a comprehensive understanding of poultry diseases, vaccination protocols, and disinfection practices.

CO2 Understand the economics of poultry production, including the costs and profits of layer and broiler systems,

CO3 Manage layer and broiler breeder flocks effectively by understanding housing requirements, lifecycle management, and nutritional needs.

CO4 Health and productivity of breeder through effective vaccination, disease prevention.

CO5 Effective hatchery management practices to enhance incubation, hatchability of eggs.

REFERENCE BOOKS:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. **Poultry Production** by R.A. Singh - Kalyani Publishers (2019)
3. **Commercial Poultry Production and Hatchery Management** by T. P. Prabakaran - International Book Distributing Co. (IBDC) (2016)
4. **Poultry: Diseases, Production, and Management** by A.M. Pearson & T.A. Gillett - AVI Publishing (2008)

Web resources:

1. <https://www.drvet.in/p/e-books.html>
2. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
3. https://www.helpforag.app/2018/02/livestock-production-and-managementlpm_14.html?m=1

**COURSE 13: POULTRY MANAGEMENT-II
(POULTRY PRODUCTION AND MANAGEMENT)**

Model Paper

Time:2 ½ hours

Marks:60

PART A

1. Answer any 5 questions from the following. Draw diagrams wherever necessary.

5x2=10 Marks

- A** List two common bacterial diseases in poultry.
- B** Pre and post vaccination care
- C** Define feed restriction in breeder flock management.
- D** Explain the importance of hatchery hygiene.
- E** What is the role of artificial insemination in poultry breeding?
- F** Name two types of disinfectants used in poultry farms.
- G** What is the economic importance of broiler production?
- H** List two nutritional deficiencies commonly found in poultry.

PART-B

Answer any 5 questions from the following. Draw diagrams wherever necessary.

5x10=50 Marks

2(A) Explain the common poultry bacterial and viral diseases?

OR

2(B) Discuss the Vaccination schedule for commercial layers and broilers?

3(A) Elaborate Economics of layer and broiler production?

OR

3(B) Explain the different Feasibility studies on poultry rearing- in context of small units?

4(A) Write a detailed note Layer flock management?

OR

4(B) Discuss the process of Artificial insemination in breeder flock management ?

5 (A) Explain Vaccination of breeder flock ?

OR

5 (B) Discuss difference between vaccination schedule of broilers and commercial birds.?

6.A) Explain the Management principles of incubation.?

OR

6 (B) Describe the importance of sanitation and hatchery hygiene?

R23	SEMESTER V	Major-2	P	C
	PAPER – 13: POULTRY MANAGEMENT-II (POULTRY PRODUCTION AND MANAGEMENT)		2	4
	Total contact hours:48			

(POULTRY PRODUCTION AND MANAGEMENT)

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES: completing this practical course, students will:

1. Identify poultry diseases using histopathological slides.
2. Prepare and analyse poultry establishment feasibility reports.
3. Create flowcharts for rearing layers and broilers.
4. Study and analyse hatchery records with modified data.

SYLLABUS:

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters)
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

LEARNING OUTCOMES:

On successful completion of this practical course, student shall be able to:

- Identify Poultry diseases by observation
- Analyze Poultry establishment feasibility
- Understand the Poultry Records

REFERENCES:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018

LMS

1. Flow chart hatchery : <http://lms.tanuvas.ac.in/mod/resource/view.php?id=45106>
2. Feasibility report:<https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf>

R23	SEMESTER II	Major-3	L	T	P	C
	Course – 14: SUSTAINABLE AQUACULTURE MANAGEMENT		3	0	2	4
	Total contact hours:48					

Learning objectives

- ✓ To understand the present status of Aquaculture – Global and National scenario and different cultures of fin fish.
- ✓ To understand the nature of various ponds for the culture of fin fish.
- ✓ To understand the need of fertilizer and manure application in aquaculture and physico-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, BOD, CO₂ and nutrients).
- ✓ To understand the pre-stocking, stocking and stocking management techniques in Indian major carps.
- ✓ To understand the commercial importance of shrimp & prawn, hatchery management in *Macrobrachium rosenbergii*.

SYLLABUS

Unit: 1

- 1.1 Present status of Aquaculture – Global and National scenario.
- 1.2 Traditional, Extensive, semi-intensive and intensive cultures of fin fish.

Unit: 2

- 2.1 Design and Construction of fish farm/pond.
- 2.2 Functional classification of ponds - head pond, hatchery pond, nursery pond, rearing pond, production pond, stocking pond, quarantine pond.

Unit: 3

- 3.1 Need of fertilizer and manure application in culture.
- 3.2 Physico-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light transparency, PH, DO, BOD, COD, CO₂ and nutrients).

Unit: 4

- 4.1 Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization).
- 4.2 Culture of Indian major carps - Stocking management, post-stocking management; waste management.

Unit: 5

- 5.1 Commercial importance of shrimp and prawn
- 5.2 *Macrobrachium rosenbergii*- hatchery management

LMS Link

<https://sustainablefish.org/wp-content/uploads/2021/09/Aquaculture-Best-Practices-Guide-Nov-9-web-1.pdf>

Learning Outcomes: By the completion of the course the graduate should be able to –

- ✓ **CO1** understand the present status of Aquaculture – Global and National scenario and different cultures of fin fish .
- ✓ **CO2** understand the nature of various ponds for the culture of fin fish how they are important for the growth of each stage of fish.
- ✓ **CO3** understand the need of fertilizer and manure application in aquaculture and physico-chemical conditions of soil and water optimum for culture and their importance.
- ✓ **CO4** understand the pre-stocking, stocking and stocking management techniques in Indian major carps for the prominent culture.
- ✓ **CO5** understand the commercial importance of shrimp & prawn, hatchery management in *Macrobrachium rosenbergii*.

REFERENCE BOOKS:

1. Arumugam, N., 2018. Aquaculture and fisheries. Sara's publication, Periyavilai.
2. Satyanarayana reddy, A and M. Lakshmi, 2011. Applied Zoology.
3. Srivastava sushma srivastava, C.B.L. A test book of fishery science and Indian fisheries.

MODEL PAPER
MAJOR COURSE 3: SUSTAINABLE AQUACULTURE MANAGEMENT
TIME:2 ½ Hours

Max. marks:60

PART A

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10 Marks

1.

- a. What is Aquaculture?
- b. Describe a nursery pond.
- c. What is a head pond?
- d. Differentiate BOD and COD.
- e. What are algal blooms?
- f. Define liming.
- g. Mention any four waste management techniques in the culture of Indian major carps.
- h. Differentiate Pokkali culture and Bheri culture.

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50 Marks

2(a) Write an essay on Present status of Aquaculture – Global and National scenario.

OR

(b) Give an account on Traditional, Extensive, semi-intensive and intensive cultures of fin fish

3.(a) Explain functional classification of ponds.

OR

(b) Write a note on Design and Construction of fish farm/pond.

4(a) Write a note on need of fertilizer and manure application in culture

OR

(b) Explain the Physico-chemical conditions of soil and water optimum for culture

5(a) Write a note on Pre-stocking management in Indian major carps.

OR

(b) Explain Stocking management, post-stocking management in Indian major carps.

6(a) Write a note on commercial importance of shrimp and prawn.

OR

(b) Write a note on Macrobrachium rosenbergii- hatchery management

	SEMESTER-V	Major-3	P	C
	Course – 14: SUSTAINABLE AQUACULTURE MANAGEMENT		2	4
R23	Total contact hours:48			

SYLLABUS

1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings) – Catla Catla , labeo rohita, Cirrhinus mrigala ,Macrobrachium Rosenbergii, Macrobrachium -Malcomsonii.
2. Brackish water cultivable species (Fin & Shell fish- Specimens- Observation of Morphological Character by observing drawing) – Chanos chanos ,Mugil cephalus, Terapon jarbua, Perna viridis, Perna indica.
3. Determination of Dissolved oxygen in the water sample.
4. Determination of Salinity in the water sample.
5. Demonstration of Hypophysation (Virtual mode).
6. Viral diseases and prophylaxis [Natural disease control] of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of viral pathogens in fin/ shell fish) - Infectious pancreatic necrosis, White spot syndrome
7. Bacterial diseases and prophylaxis [Natural disease control] of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish) - Fin and Tail rot disease , Necrotizing hepatopancreatic diseases in shrimp.
8. Fungal diseases and prophylaxis [Natural disease control] of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish) – Whirling disease, Larval mycosis, Black gill disease.

REFERENCE BOOKS:

1. Arumugam.N, 2018. Aquaculture and fisheries. Sara's publication ,periavilai.
2. Satyanarayana reddy.A and M.lakshmi, 2011. Applied Zoology.
3. Srivasthava sushma srivastava.C.B.L. A test book of fishery science and Indian fisheries.

Co-Curricular Activities

1. For Student: Students shall (individually) visit a Hatchery/Farm/ Aqua diagnostic center and make careful observations of the process method and implements- protocols and report on the same in 10 pages hand written Fieldwork/Project work Report.
2. Max marks for Fieldwork/Project work Report: 05.
3. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.

R23	SEMESTER 5	Major-4	L	T	P	C
	Paper-15: POST HARVEST TECHNOLOGY OF FISH AND FISHERIES		3	0	2	4
	Total contact hours:48					

LEARNING OBJECTIVES

1. Identify Fish Handling and Storage Practices

- Describe postmortem changes in fish and their implications on quality.
- Explain handling techniques to minimize spoilage in marine and freshwater fish.

2. Explain Principles and Methods of Fish Preservation

- Describe key principles like temperature control, salting, and gamma irradiation.
- Distinguish between traditional methods (drying, curing, smoking) and advanced preservation techniques (freezing, canning, irradiation).

3. Explore Fish Product and By-product Processing

- Detail the processes for creating various fish-based products like fish oil, fish meal, and fish protein concentrate.
- Discuss the utilization of by-products, such as fish glue and chitosan, in different industries.

4. Implement Sanitation Protocols in Processing Plants

- Identify best practices for environmental and personal hygiene in processing facilities.
- Outline steps for quality control across different stages of fish processing.

5. Apply Quality Assurance and International Standards

- Define GMP, GLP, SOP, and HACCP systems in the context of seafood safety.
- Understand international seafood safety standards, including ISO 9000 and Codex Alimentarius, and their impact on quality management.

SYLLABUS

Unit – I: Handling and Principles of Fish Preservation

1.1 Handling of fresh fish, storage and transport of fresh fish, postmortem changes (rigor mortis), spoilage in marine fish and freshwater fish

1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays

Unit – II: Methods of Fish Preservation

2.1 Traditional methods – sun drying, salt curing, pickling and smoking

2.2 Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, irradiation, and Accelerated Freeze Drying (AFD)

Unit – III: Processing and Preservation of Fish and Fish By-products

3.1 Fish products – fish minced meat, fish meal, fish oil, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure

3.2 Fish by-products – fish glue, Isinglass, chitosan, shark fins, fish leather, and fish maws

Unit – IV: Sanitation and Quality Control

4.1 Sanitation in processing plants – environmental hygiene and personal hygiene in processing plants

4.2 Quality control of fish and fishery products – pre-processing control, control during processing, and control after processing

Unit – V: Quality Assurance, Management, and Certification

5.1 Seafood Quality Assurance and Systems – Good Manufacturing Practices (GMPs), Good Laboratory Practices (GLPs), Standard Operating Procedures (SOPs), Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety

5.2 National and international standards – ISO 9000: 2000 Series of Quality Assurance System, Codex Alimentarius

LEARNING OUTCOMES

By the end of the course on Postharvest Technology of Fish and Fisheries, students will be able to:

1. **Comprehend the Principles of Fish Preservation**
Grasp the various methods of handling, storing, and preserving fish to maintain its quality and safety from harvest to consumption.
2. **Analyze Preservation Techniques**
Evaluate traditional and advanced preservation methods, understanding their roles in extending shelf life and maintaining fish quality.
3. **Apply Knowledge in Fish Processing and By-product Utilization**
Recognize the processes involved in creating diverse fish products and by-products, utilizing fish parts that might otherwise go to waste.
4. **Ensure Sanitation and Quality Control**
Implement effective hygiene and quality control measures in processing plants, ensuring compliance with safety standards.
5. **Understand Quality Assurance and Certification Standards**
Identify and apply seafood quality assurance practices, including international standards like GMP, HACCP, and ISO, to ensure consumer safety and product quality.

REFERENCES:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford-IBH, New Delhi
2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House
3. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
4. Safety and Quality Issues in Fish Processing (Woodhead Publishing Series in Food Science, Technology and Nutrition) by H A Bremner K.A Mahanthy, Innovations in Fishing and Fish Processing Technologies, January 2021

WEB RESOURCES:

1. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=145743>
2. https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03

R23	SEMESTER 5	Major-4	P	C
	Paper-15: POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES		2	4
	Total contact hours:48			

PAPER-15 POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES

Practical

Credits: 1

3 hrs/week

LEARNING OBJECTIVES

- Understand the importance of quality assessment by evaluating fish and fishery products for organoleptic, chemical, and microbial quality to ensure safety standards.
- Gain knowledge of traditional and modern preservation methods, including preparation techniques for dried, cured, and fermented fish products.
- Analyze key chemical properties by examining salt, protein, and moisture content in dried and cured fish products to verify quality.
- Identify spoilage factors in various processed fish products, including marinades, pickles, and sauces, to prevent quality degradation.
- Learn extraction techniques for valuable by-products, such as isinglass, collagen, and chitosan, from shrimp and crab shells.
- Develop hazard analysis skills by constructing flowcharts and worksheets for identifying and managing hazards in fish processing.
- Implement corrective action protocols by preparing flowcharts and worksheets for quality control during fish processing.
- Observe fish anatomy and understand various processing techniques, including fish mincing, to enhance practical knowledge in postharvest handling.

LEARNING OUTCOMES

Upon successful completion of this practical course, students will be able to:

- Identify and assess the quality of processed aqua products.
- Determine the quality standards and specifications for various fishery by-products.
- Analyze and implement protocols for various aqua processing methods to ensure quality and safety.
- Conduct basic procedures for fish preservation and by-product processing.
- Apply hazard analysis techniques and identify corrective actions in fish processing.

SYLLABUS

1. Observation of Fish Anatomy and Fish Processing
2. Preparation of Fish Minced Meat
3. Organoleptic Evaluation of Fish/Fishery Products
4. Examination of Spoilage of Dried/Cured Fish Products
5. Preparation of Isinglass from Air Bladder of Fish
6. Synthesis of Chitosan from Crab Shell
7. Developing Flow Charts and Exercises in Identification of Hazards – Preparation of Hazard Analysis Worksheet

REFERENCE WEB LINKS:

1. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
2. https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03
3. <https://vikaspedia.in/agriculture/fisheries/post-harvest-and-marketing/processing-in-fisheries/fermented-products>
4. <https://krishi.icar.gov.in/jspui/bitstream/123456789/20500/1/Fermentation%20technology%20for%20fish.pdf>
5. <http://jebas.org/00200620122014/Abujam%20et%20al%20JEBAS.pdf>
6. https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
7. https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
8. https://agritech.tnau.ac.in/fishery/fish_byproducts.html
9. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5352841/>
10. <http://www.fao.org/3/i1136e/i1136e.pdf>
11. <http://www.fao.org/3/x5989e/X5989e01.htm#What%20is%20sensory%20assessment>

Co-Curricular Activities

a) Mandatory: (*Lab/field training of students by teacher (lab 10 + field 05)*):

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on various steps of post-harvest techniques of fishes, on the advanced techniques in post-harvest technology – Training of students on other employability skills in the Post-harvest sector of Aquaculture Industry- like Processing, Packing, marketing of processed aqua products.
2. For Student: Students shall (individually) visit - Any fish/shrimp Processing Plant/Packing industry and make observations on post harvesting techniques and submit a brief handwritten Fieldwork/Project work Report with pictures and data /survey in 10 pages.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements*
5. (IE): Unit tests,

b) Suggested Co-Curricular Activities

1. Observation of fish/shrimp processing plants – visit web sites of processing companies and record the details of that Unit
2. Interaction with local fishermen to know the method of preservation and details with the available traditional technology
3. Collection of web resources on the Quality assurance, quality control measures in Aqua Industries- cross checking the standards during the visit to any processing units.
4. Assignments, Seminar, Group discussion. Quiz, Collection of Material, Invited lecture, Videopreparation etc.,

COURSE 15: POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES
MODEL QUESTION PAPER

Time: 2 1/2 Hours

Max. Marks: 60

PART A

1. Answer any five questions. Each question carries 2 marks.

5×2=10 Marks

- a) What is rigor mortis in fish?
- b) Define spoilage in marine fish.
- c) Define Salting method?
- d) What is the role of refrigeration in fish preservation?
- e) Define fish meal and its uses.
- f) Give 4 fish products names?
- g) What is the importance of sanitation in fish processing plants?
- h) Define HACCP.

PART B

(Answer any five questions. Each question carries 10 marks.)

5×10=50

Marks

2 (a) Explain the handling, storage, and transport of fresh fish in detail.

OR

(b) Discuss the principles of fish preservation and their applications.

3 (a) Explain the traditional methods of fish preservation.

OR

(b) Describe the advanced preservation techniques such as freezing, canning, and irradiation.

4 (a) Discuss the different fish products and their importance in the industry.

OR

(b) Write an Essay on fish by-products.

5 (a) Describe the importance of sanitation in fish processing plants.

OR

(b) Explain the Quality control of fish and fishery products.

6 (a) Discuss the significance of seafood quality assurance systems such as GMP, GLP, and SOP.

OR

(b) Explain the role of international standards like ISO 9000 and Codex Alimentarius in fish processing.

R 2 3 O U R	SEMESTER V	Minor-1	L	T	P	C
	POULTRY MANAGEMENT-I (POULTRY FARMING)		3	-	2	4
	Total contact hours:48					

SE OBJECTIVES:

- ☑ To understand the importance and growth of the poultry industry in India
- ☑ To explore modern poultry farming practices
- ☑ To examine diversified poultry farming systems
- ☑ To appreciate indigenous poultry breeds in India
- ☑ To gain insights into the contributions of the Central Avian Research Institute (CARI)

SYLLABUS

Unit 1 Indian poultry Industry

- 1.3 Importance of poultry farming and poultry development in India.
- 1.4 Present status and future prospectus of poultry Industry

Unit -2 Scientific Poultry Keeping

- 2.1 Modern breeds of Chicken
- 2.2 Mini breeds- dwarfism in mini-Leghorns

Unit-3 Diversified Poultry

- 3.1 Ducks and Geese-classification- rearing system-classification-advantages
- 3.2 Guinea fowls - guinea fowl farming in India-Production-varieties,Emu-rearing- Economical aspects-commercial products

Unit-4 Desi Chickens:

- 4.1 Indigenous breeds and economical aspects of desi chicken
- 4.2 Indigenous breeds-Aseel-Chittagong-Kadakhnath-Bursa

Unit -5 Breeds from Central Avian Research Institute – Izatnagar

- 5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)
- 5.2 CARI- Priya Layer, CARI- Sonali Layer

COURSE OUTCOMES:

- ☑ Understand the significance of poultry farming in India
- ☑ Identify and describe modern poultry breeds and production systems
- ☑ Describe diversified poultry farming system
- ☑ Evaluate indigenous poultry breeds
- ☑ Appreciate the contributions of CARI in poultry breeding

REFERENCES:

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606

Web sources:

- ☑ <https://www.drvet.in/p/e-books.html>
- ☑ <https://byjus.com/biology/animal-husbandry-poultry-farming/>
- ☑ https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

R23	SEMESTER V	Minor-1	P	C
	POULTRY MANAGEMENT-I (POULTRY FARMING)		2	1
	Total contact hours:48			

COURSE OBJECTIVES:

- Observation and understanding of different types of poultry rearing systems
- Exploration of different types of poultry housing
- Identification and observation of different layer breeds
- Identification and observation of different broiler breeds
- Examination of Nandanam breeds:

SYLLABUS:

1. Different types of Poultry rearing (Students has to observe and draw the different types of poultry rearing systems)
 2. Different types of poultry Housing - Models / Images/charts
 3. Different layer breeds images/charts/ Models (Observation of characters)
 4. Types of broilers images/charts/ Models (Identification of important Character)
 5. Nandanam breeds- images/charts (Identification of characters)
- (This practical is 70 % (Web based /virtual) 30% physical: student and teachers must browse the web for the specimens models – write down the important characters based on the web resources)

COURSE OUTCOMES:-

- Differentiate between poultry rearing systems
- Identify various types of poultry housing
- Identify key characteristics of layer breeds
- Recognize and characterize broiler breeds
- Identify and observe the traits of Nandanam breeds
- Examine the attributes of CARI-developed poultry breeds

REFERENCES:

1. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606
2. http://www.agritech.tnau.ac.in/expert_system/poultry/Poultry%20House%20Construction.html
3. <https://petkeen.com/best-chicken-breeds-for-eggs/>
4. <https://garden.decorexpro.com/en/hozyajstvo/ptitsevodstvo/porody-brojlernyh-kur-s-foto-i-opisaniem.html>

Co-Curricular Activities:

1. Max marks for Fieldwork/Project work Report: 05.
2. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
3. I am adam again Chandra Mani Chisi Dhorak Dhar Kalaiu Kathar Darki Dilri Pothar Very good welcome daddy Maria was mad at me Matra Taneledu Pakadu I never had a Hindi music Hima Bhawani Di Kodu Kulekhne Tandri Yemato Hindu Unit tests. (IE)

a. Suggested Co-Curricular Activities

1. Web resources- visiting the websites of CARI-IZATNAGAR <https://cari.icar.gov.in> procuring additional Information on the poultry breeds.
2. Web resources- visiting the website of NANADANAM http://www.tanuvac.ac.in/ippmmadhavaram_tech.html
3. Collection of additional data on different types of Poultry breeds
4. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Video preparation

Model Paper
SEMESTER-V
COURSE 12: POULTRY MANAGEMENT-I (POULTRY FARMING)
Time:2 ½ hours **Max.marks:60**

PART A

I **Answer any 5 question from the following. Draw diagrams wherever necessary. 5x2=10**
Marks

- a. What is poultry farming?
- b. Disadvantages of poultry ?
- c. What is Mini breeds? give one example?
- d. What is Rearing ?
- e. Economical importance of Emu ?
- f. What are the two characteristics of indigenous breeds?
- g. Kadak Nath, and Bursa ?
- h. What is full form of CARI in poultry?

PART B

Answer any 5 question from the following. Draw diagrams wherever necessary. 5x10=50
Marks

- 2 (a) Write about poultry development in India.
OR
(b) Explain Present status and future prospectus of poultry Industry
- 3(a) Write about modern breeds of chickens
OR
(b) Write about dwarfism in mini-Leghorns
- 4(a) Explain the classification, rearing system, and advantages of geese in poultry farming.
OR
(b) Explain the significance of guinea fowl farming in India, including the varieties and economic potential
- 5(a) Write about economic importance of indigenous chicken
OR
(b) Write about the characteristics of the Aseel, Chittagong,
- 6(a) Write about CARI Nirbheek and CARI Shyama and HITCARI (Nacked neck cross)
OR
(b) Write about CARI Priya layers and CARI Sonali layers

	SEMESTER V	Minor-2	L	T	P	C
R23	Course – 13: POULTRY MANAGEMENT-II (POULTRY PRODUCTION AND MANAGEMENT)		3	0	2	4
	Total contact hours:48					

Learning objectives

6. Identify common poultry diseases and understand their causes and prevention methods.
7. Analyze the costs and profits of raising layers and broilers, and create simple project reports for poultry businesses.
8. Manage layer and broiler breeder flocks by providing proper housing and nutrition for different age groups.
9. Implement vaccination schedules and prevent diseases in breeder flocks while addressing fertility issues.
10. Apply best practices in hatchery management, including egg incubation, sanitation, and record-keeping.

UNIT I HEALTH CARE

- 1.3 Common poultry diseases: bacterial, viral.
- 1.4 Fungal diseases, parasitic and nutritional deficiencies.
- 1.3 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.

UNIT-II: ECONOMICS

- 2.1 Economics of layer and broiler production
- 2.2 Projects reports in different systems of rearing for layer & broilers.
- 2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.

UNIT-III: BREEDER FLOCK MANAGEMENT

- 3.1 Layer and broiler breeder flock management housing & space requirements
- 3.2 Different stage of management during life cycle; Light management during growing and laying period,
- 3.3 Artificial insemination.

UNIT-IV: BREEDER HEALTHCARE

- 4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.
- 4.2 Common diseases of breeders (Infectious and metabolic disorders)- prevention.

UNIT-V: HATCHERY PRACTICES

5.1 Management principles of incubation.

5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs.

5.3 Fumigation; sanitation and hatchery hygiene.

Course Outcomes: By the completion of the course the graduate should be able to –

CO1 Analyze and manage the health and welfare of poultry a comprehensive understanding of poultry diseases, vaccination protocols, and disinfection practices.

CO2 Understand the economics of poultry production, including the costs and profits of layer and broiler systems,

CO3 Manage layer and broiler breeder flocks effectively by understanding housing requirements, lifecycle management, and nutritional needs.

CO4 Health and productivity of breeder through effective vaccination, disease prevention.

CO5 Effective hatchery management practices to enhance incubation, hatchability of eggs.

REFERENCE BOOKS:

1.HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International

Publishers-2018

2.**Poultry Production** by R.A. Singh - Kalyani Publishers (2019)

3.**Commercial Poultry Production and Hatchery Management** by T. P. Prabakaran - International Book Distributing Co. (IBDC) (2016)

4.**Poultry: Diseases, Production, and Management** by A.M. Pearson & T.A. Gillett - AVI Publishing (2008)

Web resources:

1. <https://www.drivet.in/p/e-books.html>

2. <https://byjus.com/biology/animal-husbandry-poultry-farming/>

3. https://www.helpforag.app/2018/02/livestock-production-and-managementlpm_14.html?m=1

MODEL PAPER
SEMESTER- V :MINOR -2 ZOOLOGY
COURSE-6 :POULTRY MANAGEMENT-II
(POULTRY PRODUCTION AND MANAGEMENT)

Time:2 ½ hours

Max.marks:60

PART A

1. Answer any 5 questions from the following. Draw diagrams wherever necessary. 5X2=10 Marks

- A. List two common viral diseases in poultry.
- B. What are the factors that govern the vaccination schedule in poultry?
- C. What is the purpose of light management in breeder flock management?
- D. Name two common fungal diseases in poultry.
- E. What is the significance of fumigation in hatchery practices?
- F. What are the key components of a project report for poultry rearing?
- G. What are the common metabolic disorders in breeder flocks?
- H. What factors affect fertility and hatchability in poultry?

PART-B

Answer any 5 questions from the following. Draw diagrams wherever necessary. 5X10=50 Marks

2. (A) Explain Common Poultry Diseases and Their Management?

(OR)

(B) Discuss Nutritional Deficiencies in Poultry?

3. (A) Prepare Project Reports for Poultry Rearing Systems?

OR

(B) Explain Feasibility Studies for Small-Scale Poultry Units?

4. (A)Elaborate Housing and Space Requirements for Breeder Flocks?

OR

(B) Explain Life Cycle Management of Breeder Flocks?

5. (A) Discuss Prevention of Infectious Diseases in Breeder Flocks?

OR

(B) Explain Vaccination of Breeder Flocks?

6.A) Explain the Management principles of incubation.?

OR

6 (B) Describe the importance of sanitation and hatchery hygiene?

R23	SEMESTER V	Minor-2	P	C
	Course – 13: POULTRY MANAGEMENT-II (POULTRY PRODUCTION AND MANAGEMENT)		2	4
	Total contact hours:48			

(POULTRY PRODUCTION AND MANAGEMENT)

Practical

Credits: 1

2 hrs/week

COURSE OBJECTIVES: completing this practical course, students will:

1. Identify poultry diseases using histopathological slides.
2. Prepare and analyse poultry establishment feasibility reports.
3. Create flowcharts for rearing layers and broilers.
4. Study and analyse hatchery records with modified data.

SYLLABUS:

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters)
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

LEARNING OUTCOMES:

On successful completion of this practical course, student shall be able to:

- Identify Poultry diseases by observation
- Analyze Poultry establishment feasibility
- Understand the Poultry Records

REFERENCES:

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018

LMS

- 1.Flow chart hatchery : <http://lms.tanuvas.ac.in/mod/resource/view.php?id=45106>
- 2.Feasibility report:<https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf>

R23	SEMESTER V	Major-1	L	T	P	C
	ENVIRONMENTAL EDUCATION		2	-	-	2
	Total contact hours:30					

Course objective: A Generic Course intended to create awareness that the life of human beings is an integral part of environment and to inculcate the skills required to protect environment from all sides.

Course outcomes: On completion of this course the students will be able to

- Understand the nature, components of an ecosystem and that humans are an integral part of nature.
- Realize the importance of environment, the goods and services of a healthy biodiversity, dependence of humans on environment.
- Evaluate the ways and ill effects of destruction of environment, population explosion on ecosystems and global problems consequent to anthropogenic activities.
- Discuss the laws/ acts made by government to prevent pollution, to protect biodiversity and environment as a whole.
- Acquaint with international agreements and national movements, and realize citizen's role in protecting environment and nature.

SYLLABUS

Unit 1: Environment and Natural Resources 06 Hrs.

1. Multidisciplinary nature of environmental education; scope and importance.
2. Man as an integral product and part of the Nature.
3. A brief account of land, forest and water resources in India and their importance.
4. Biodiversity: Definition; importance of Biodiversity - ecological, consumptive, productive, social, ethical and moral, aesthetic, and option value.
5. Levels of Biodiversity: genetic, species and ecosystem diversity.

Unit-2: Environmental degradation and impacts 10Hrs

1. Human population growth and its impacts on environment; land use change, land degradation, soil erosion and desertification.
2. Use and over-exploitation of surface and ground water, construction of dams, floods, conflicts over water (within India).

3. Deforestation: Causes and effects due to expansion of agriculture, firewood, mining, forest fires and building of new habitats.
4. Non-renewable energy resources, their utilization and influences.
5. A brief account of air, water, soil and noise pollutions; Biological, industrial and solid wastes in urban areas. Human health and economic risks.
6. Green house effect - global warming; ocean acidification, ozone layer depletion, acid rains and impacts on human communities and agriculture.
7. Threats to biodiversity: Natural calamities, habitat destruction and fragmentation, over exploitation, hunting and poaching, introduction of exotic species, pollution, predator and pest control.

Unit 3: Conservation of Environment

10 Hrs

1. Concept of sustainability and sustainable development with judicious use of land, water and forest resources; afforestation.
2. Control measures for various types of pollution; use of renewable and alternate sources of energy.
3. Solid waste management: Control measures of urban and industrial waste.
4. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
5. Environment Laws: Environment Protection Act; Act; Wildlife Protection Act; Forest Conservation Act.
6. International agreements: Montreal and Kyoto protocols; Environmental movements: Bishnois of Rajasthan, Chipko, Silent valley.

Suggested activities to learner: (4 hours)

1. Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc
2. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural site.
3. Study of common plants, insects, birds and basic principles of identification.
4. Study of simple ecosystems-forest, tank, pond, lake,mangroves etc.
5. Case study of a Forest ecosystem or a pond ecosystem.

Suggested text book :

- ☑ ErachBarucha (2004) *Text book of Environmental Studies for Undergraduate courses*
 - (Prepared for University Grants Commission) Universities Press.
- ☑ PurnimaSmarath (2018) *Environmental studies* Kalyani Publishers, Ludhiana

Reference books :

- ☑ Odum, E.P., Odum, H.T. & Andrews, J. (1971) *Fundamentals of Ecology*. Philadelphia: Saunders.
- ☑ Pepper, I.L., Gerba, C.P. & Brusseau, M.L. (2011). *Environmental and Pollution Science*. Academic Press.
- ☑ Raven, P.H., Hassenzahl, D.M. & Berg, L.R. (2012) *Environment. 8th edition*. John Wiley & Sons.
- ☑ Singh, J.S., Singh, S.P. and Gupta, S.R. (2014) *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
- ☑ Sengupta, R. (2003) *Ecology and economics: An approach to sustainable development*. OUP.
- ☑ Wilson, E. O. (2006) *The Creation: An appeal to save life on earth*. New York: Norton.
- ☑ Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll (2006) *Principles of Conservation Biology*. Sunderland: Sinauer Associates,

Model question paper for theory examination at the end of V Semester

Life Skill Course / ENVIRONMENTAL EDUCATION

Max. Time: 2 Hrs.

Max. Marks: 50

Max. Marks: 50

Time: 1 1/2 hrs (90 Minutes)

(Total: 4x5=20 Marks)

Section -A

(Answer any **four questions**. Each answer carries **5 marks**)

(Total 8 questions. At least 1 question should be given from each Unit)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Section- B

(Total: 3x10 = 30 Marks) (Answer any

three questions. Each answer carries **10 marks**)

(Total five questions. At least 1 question should be given from each Unit)

- 1.
- 2.
- 3.
- 4.
- 5.

Note: Questions may be set in such a way to test the outcomes instead of recalling of information.

SEMESTER-VI: Long-term Internship (4 Months)

INTERNSHIP FOR A PERIOD OF 16 WEEKS FOR 12 CREDITS

S.No.	Course title	Course type	Instructions periods per Week	Internal Marks	Exter Marks	Total Marks	Credits
1.	Long-Term Internship		16	50	150	200	12

Assessment model for the semester long apprenticeship / on the job training / internships during the VI Semester: The assessment for the V / VI Semester long apprenticeship is for 200 marks and credits assigned are 12. A monthly report is to be submitted to the teacher guide online within 15 days after the completion of every month up to four months. The last two months of internship period shall be used for preparation of final project report simultaneously undergoing on the job training / internship / apprenticeship. The assessment for this internship / on the job training will be both internal and external assessment. The internal assessment will be for 25% of marks which will be continuous and the assessment by the industry /enterprise / organization where the student does his/her internship will be indicated in grades.

SEMESTER-VII

S. No	DESCRIPTION	PAPER TITLE	NO. OF HOURS	NO. OF CREDITS
1	MAJOR-1		3+2	4
2	MAJOR-2		3+2	4
3	MAJOR-3		3+2	4
4	SKILL COURSE-1		3+2	4
5	SKILL COURSE-2		3+2	4
6	OOTD		2	2
7	IKS		2	0
TOTAL			29	22

SEMESTER-VIII

S. No	DESCRIPTION	PAPER TITLE	NO. OF HOURS	NO. OF CREDITS
1	MAJOR-1		3+2	4
2	MAJOR-2		3+2	4
3	MAJOR-3s		3+2	4
4	SKILL COURSE-1		3+2	4
5	SKILL COURSE-2		3+2	4
6	OOTD		2	2
7	IKS		2	0
TOTAL			29	22