

TUMKUR UNIVERSITY

Syllabus for

B.Sc. ZOOLOGY (UG)

CHOICE BASED CREDIT SYSTEM (CBCS)

Framed According to the National Educational Policy (NEP 2020)

III – IV SEMESTERS

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Dr. Asiya Nuzhat F.B Chairman B.O.S. in Zoology Tumkur University TUMAKURU- 572103.

To implement from the academic year 2022-23

Syllabus for B.Sc., Hons in Zoology

Name of the Degree Program: **B. Sc., Hons** Discipline Core: **Zoology** Total Credits for the Program: **50/100/142/184/268** Starting year of implementation: **2021-22 (I & II sem) 2022-23 (III & IV sem)** Progressive Certificate, Diploma, Bachelor Degree or Bachelor Degree with Honours Provided at the End of Each Year of Exit of the Four-year Undergraduate Programme/ Five-year Integrated Master's Degree Programme

Introduction

The curriculum framework takes into account the need to maintain globally competitive standards of achievement in terms of the knowledge and skills in Zoology and allied courses, as well develop scientific orientation, spirit of enquiry problem solving skills and human and professional values which foster rational and critical thinking in the students. This course serves as plethora of opportunities in different fields right from classical to applied Zoology.

AIMS AND OBJECTIVES OF UG PROGRAM IN ZOOLOGY

- The Program offers both classical as well as modern concepts of Zoology in higher education.
- It enables the students to study animal diversity in both local and global environments.
- To make the study of animals more interesting and relevant to human studies more emphasis is given to branches like behavioral biology, evolutionary biology and economic Zoology.
- More of upcoming areas in cell biology, genetics, molecular biology, biochemistry, genetic engineering and bioinformatics have also been included.
- Equal importance is given to practical learning and presentation skills of students.
- The lab courses provide the students necessary skills required for their employability.
- Skill enhancement courses in classical and applied branches of Zoology enhance enterprising skills of students.
- The global practices in terms of academic standards and evaluation strategies.
- Provides opportunity for the mobility of the student both within and across the world.
- The uniform grading system will benefit the students to move across institutions within India to begin with and across countries.
- It will also enable potential employers in assessing the performance of the candidates across the world.

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III Semester B.Sc ZoologyCore Course Content

Course Title/Code: Molecular Biology, Bioinstrumentation & Techniques in Biology	Course Credits: 4
Course Code: DSCC5ZOOT3	L-T-P per week: 4-0-0
Total Contact Hours: 56	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment Marks:60

Course and Learning Outcomes:

At the end of the course the student should be able to understand:

- 1. After successful accomplishment of the course, the learners will be able to acquire better understanding and comprehensive knowledge regarding most of the essential aspects of Molecular Biology subject which in turn will provide a fantastic opportunity to develop professional skill related to the field of molecular biology.
- 2. The course will mainly focus on the study of principal molecular events of cell incorporating DNA Replication, Transcription and Translation in prokaryotic as well as eukaryotic organisms.
- 3. Acquiring knowledge on instrumentation and techniques in biology.

Semester III- Zoology Core Course III Content:

Content	Hours
Unit I	14
 Chapter 1: Process of Transcription Fine structure of gene (Cistron, Recon, Muton) RNA polymerases - types and functions Transcription in prokaryotes and eukaryotes 	8
 Chapter 2: Process of Translation Genetic code and its salient features Translation in prokaryotes and eukaryotes 	6
Unit II	14
 Regulation of gene expression-I Regulation of gene expression in prokaryotes- lac operon (inducible) and trp operon(repressible) in <i>E. coli</i> Regulation of gene expression in eukaryotes - Role of chromatin (euchromatin andheterochromatin) in gene expression Post-transcriptional modification: capping, splicing, polyadenylation Concept of RNA editing (mRNA), gene silencing, and, RNAi 	9
 Chapter 4. Regulation of gene expression-II Post-translational modifications: purpose, advantages, and significance; glycosylation, methylation, phosphorylation, and acetylation. Intracellular protein degradation (lysosomal autophagy and ubiquitin proteosome Pathway). 	5

Unit III	14
Chapter 5: Microscopy	9
• Principles and applications of Light microscopy, Dark field microscopy, Phase contrast microscopy, Fluorescence microscopy, Confocal microscopy and Electron microscopy (SEM and TEM).	
Chapter 6: Centrifugation and Chromatography	5
 Centrifugation: Principles, types, and applications(High speed and Ultracentrifugation) Chromatography : Principle and applications of TLC, HPLC and CC 	
Chromatography . Principle and applications of: TEC, HPEC and GC	
	14
 Chapter 7: Biochemical Instrumentation Colorimetry and Spectrophotometry: Beer-Lambert's law, Absorption spectrum, UV-VLSpectrophotometer. pH meter, measurement of pH Principle, applications and safety measures of Radio-tracer techniques - Autoradiography. 	6
Chapter 8: Molecular Techniques	8
 Principle and applications of Agarose gel-electrophoresis, SDS-PAGE, DNA Sequencing (Sanger's Dideoxy method) PCR, DNA Fingerprinting, ELISA, Southern Blotting and Western Blotting. 	

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in Marks
House Examination/TestC1	20
Written Assignment/Presentation/ProjectC2	20
Total	40

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Zoology

Core Course Lab Content

Semester III (Practical III)

Course Title: Molecular Biology, Bioinstrumentation and Techniques in Biology	Course Credits: 2
Course Code: DSCC5ZOOP3	L-T-P per week: 0-0-4
Total Contact Hours: 56	Duration of ESA: 3 Hours
Formative Assessment Marks: 25	Summative Assessment Marks:25

Course and Learning Outcomes:

At the end of the course the student should be able to:

- 1. At the end of the course, students will be able to understand the applications of biophysics and principle involved in bio-instruments.
- 2. Understand the methodology involved in bio techniques.
- 3. Students can demonstrate knowledge and practical skills of using instruments in biology and medical field.
- 4. They can perform techniques involved in molecular biology and diagnosis of diseases.

Lab Course Content

List of experiments	14 units (1unit- 4hrs)
1. To study the principle and applications of simple, compound and binocular Microscopes.	1
2. To study the principle and applications of various lab equipment- pH meter, Electronic balance, Vortex mixer, use of glass and micropipettes, Laminar air flow Incubator shaker. Water bath and centrifuge	2
3.To prepare Buffer solutions (Phosphate, Citrate, Tris-HCl buffer)	1
4. To estimate amount of RNA by Orcinol method.	2
5. Demonstration of differential centrifugation to fractionate components in a given mixture.	1
6. To estimate amount of protein by Lowry's method.	2
To identify different unknown amino acids using ascending paper Chromatography.	1
8. Extraction of DNA from the given animal tissue sample.	2
9. To estimate amount of DNA by di-phenyl amine (DPA) method.	2

Suggested Readings:

- 1. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. Molecular Biology of the Cell, 4th edition. New York: Garland Science (2002).
- Daniel L. Hartl and Maryellen Ruvolo. Genetics: Analysis of Genes and Genomes, 8th Edition. Burlington, Mass.: Jones & Bartlett Learning (2012).
- 3. Gerald Karp. Cell and Molecular Biology: Concepts and Experiments, 5th Edition. Wiley Publication (2008).
- 4. Harvey Lodish, Arnold Berk, Paul Matsudaira, Chris A. Kaiser, Monty Krieger, Freeman. Molecular Cell Biology, 5th edition. W. H. & Company (2003).
- 5. James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, RichardLosick. Molecular Biology of the Gene, 5th edition. Cold Spring Harbor Laboratory Press (2003).
- 6. Stryer, Lubert. Biochemistry, 2nd Edition. W. H. Freeman and Company, New York (1981).

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Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in Marks
House Examination/TestC1	13
Written Assignment/Presentation/Project/Seminar/Reports on Field visitsC2	12
Total	25

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Semester IV- Zoology Core Course IV Content:

Semester: IV Semester, B. Sc., (Hons) Zoology

Course Title: Core Course Content: Gene Technology Immunology and Computational Biology	Course Code: DSCC5ZOOT4
Course Type: Discipline Core Theory, L-T-P: 4-0-0	Course Credits: 4
Total Contact Hours: 56	Duration of ESA: 2Hrs.
Formative Assessment Marks: 40	Summative Assessment Marks:60

Course and Learning Outcomes:

At the end of the course the student should be able to:

- 1. Acquaint knowledge on versatile tools and techniques employed in genetic engineering and recombinant DNA technology.
- 2. An understanding on application of genetic engineering techniques in basic and applied experimental biology.
- 3. To acquire a fundamental working knowledge of the basic principles of immunology.
- 4. To understand how these principles, apply to the process of immune function.
- 5. Use, and interpret results of, the principal methods of statistical inference and design; helps to communicate the results of statistical analyses accurately and effectively; helps in usage of appropriate tool of statistical software.

Course Content	Hrs.
Unit I	14
Chapter 1: Principles of Gene Manipulation	07
 Recombinant DNA Technology: Introduction, steps involved. Restriction Enzymes, ligases and Nucleic acid modifying enzyme. Gene cloning Vector: Concept of plasmids-pBR322, Lamda phage vectors, cosmids 	
• Gene transfer techniques (Direct and indirect).	
• Screening and selection of recombinant colonies	
 Chapter 2: Applications of Genetic Engineering Transgenic animals (Transgenic cow, Transgenic Fish); Transgenic plants (cry protein); Gene silencing (Knock out and Knock in mouse). Production of Human Recombinant insulin Hybridoma technology: Synthesis and applications of Monoclonal antibodies Gene Therapy (SCID) Biosensors and its applications 	07
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Unit II	14
Chapter 3: Introduction to the Immune System	07
 Defence against diseases: Introduction, First and second line of defence, Innate and acquired immunity; Antigen presenting cells (APC's), Role of B and T-lymphocytes (Humoral immunity and cell mediated immunity), primary and secondary immune response. Types of Immunity Functional aspects of organs of the Immune system – Thymus,Bone marrow, Spleen, Lymph Node, Small intestine and Liver (Peyer's patches and Von Kupffer cells). 	
Chapter 4: Antigens and Antibodies	07
 Antigens and haptens: Properties (foreignness, molecular size, heterogeneity). B and T cell epitopes. Structure of IgG and functions of different classes of immunoglobulins. Major histocompatibility complex - Structure of MHC I & II. 	
Unit III	14
 Chapter 5: Clinical Immunology Immunity against diseases of viral, bacterial and protozoan infections. Vaccines: Types and Uses - Immunization schedule for children. Transplantation immunology: Transplantation of organ- Types, graft rejection and Immuno-suppressors. 	07
Chapter 6: Bioinformatics	07
• Databases: Sequence and structural	07
 Sequence analysis (nomology): Pairwise and Multiple Sequence alignment- BLAST, CLUSTALW, Sequence alignment- FASTA. Scope and applications of Bioinformatics. 	
Unit IV	14
Chapter 7: Biostatistics I	07
 Measures of central tendency: Mean, Median, Mode. Data summarizing: Frequency distribution, Graphical presentation - bar diagram, pie diagram, histogram. Elementary idea of probability and its applications. 	
Chapter 8: Biostatistics II	
 Measures of dispersion: Range, Standard Deviation, Variance. Correlation and Regression. Tests of significance: F-test, ANOVA, t-test and Chi square test. 	07

Recommended Books:

- 1. Primrose & Twyman. Principles of Genome Analysis and Genomics. Blackwell (2003).
- 2. Hartl& Jones. Genetics: principles & Analsysis of Genes & Genomes. Jones & Bartlett (1998).
- 3. Sambrook*et al*. Molecular Cloning Vols I, II, III. CSHL (2001).
- 4. Primrose. Molecular Biotechnology. Panima (2001).
- 5. Clark & Switzer. Experimental Biochemistry. Freeman (2000)
- 6. Sudbery. Human Molecular Genetics. Prentice-Hall (2002).
- 7. Wilson. Clinical Genetics-A Short Course, Wiley (2000).
- 8. Pasternak. An Introduction to Molecular Human Genetics. Fritzgerald (2000).
- 9. Biostatistical Analysis (Fourth Edition) by Jerrold H. Zarr, Pearson Education Inc., Delhi.

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- 10. Statistical Methods (Eighth Edition) by G. W. Snecdecor and W. G. Cochran, Willey Blackwell
- 11. Biostatistics (Tenth Edition) by W.W. Daniel and C. L. Cross, Wiley
- 12. Introductory Biological Statistics (Fourth Edition) by John E. Havel, Raymond E. Hampton and Scott J. Meiners
- 13. Westhead et al Bioinformatics: Instant Notes. Viva Books (2003)
- 14. Genetic engineering: Sandhya Mitra BITS, Pilani
- 15. Principles of Biostatistics Khan and Khanam
- 16. Transgenic animals: Ranga

Pedagogy: Lectures, Presentations, videos, Assignments and Weekly Formative Assessment Tests.

Formative Assessment		
Assessment Occasion	Weightage in Marks	
Assignment/ Field Report/ Project – C1	20 Marks	
TestC2	20 Marks	
Total	40 Marks	

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Semester: IV

Course Lab Content

Course Title: Gene Technology, Immunology and Computational Biology	Course Credits: 02
Course Type: Minor Discipline Core Practical, L-T-P: 0-0-4	Corse Code: DSCC5ZOOP4
Total Contact Hours: 56	Duration of ESA: 3 Hours
Formative Assessment Marks: 25	Summative Assessment Marks: 25

Course and Learning Outcomes:

At the end of the course the student should be able to:

- 1. Accurately, safely and appropriately use all the equipment regularly used in Molecular Biology (DNA manipulation, including balances, pipettes, electrophoresis and centrifuges).
- 2. Prepare chemical solution and reagents to the precision appropriate to the task.
- 3. Demonstrate knowledge of the biochemical basis underpinning the molecular biology techniques.

Lab

Course Content

	List of labs to be conducted	14 units (1unit- 4hrs)
1.	Calculate the mean, median, mode and standard deviation (Measurement of	1
	pre and post clitellar lengths with suitable examples).	
2.	Measure the height and weight of all students in the class and apply statistical	1
	measures.	
3.	Determination of ABO Blood group and Rh factor.	1
4.	To study Restriction enzyme digestion using teaching kits (Demonstration	1
	only).	ł
5.	To detect genetic mutations by Polymerase Chain Reaction (PCR) using	1
	teaching kits (Demonstration only).	
6.	Demonstration of agarose gel electrophoresis for detection of DNA.	1
7.	Demonstration of Polyacrylamide Gel Electrophoresis (PAGE) for detection	2
	of proteins.	
8.	To calculate molecular weight of unknown DNA and protein fragments from	2
	gel pictures. (https://youtube/mCiCiO0cfbg)	
9.	To learn nucleotide sequence database.	2
10	. To learn sequence alignment: Pairwise alignment (Protein/ DNA).	2

Pedagogy: Lectures, Presentations, videos, Labs, Assignments, Tests, Individual or group Fieldoriented Project Report.

Formative Assessment						
Assessment Occasion	Weightage in Marks					
Assignment/MonographC1	13					
TestC2	12					
Total	25					

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List of Zoology Open Elective Course Content for II year

Course Title: ENDOCRINOLOGY Course Code: OEC5ZOOT3	Course Credits:3
Total Contact Hours: 42	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment Marks:60

Course and Learning Outcomes:

At the end of the course the student should be able to:

Differentiate among endocrine, paracrine and autocrine systems.

- 1. Describe the different classes and chemical structures of hormones.
- 2. Identify the glands, organs, tissues and cells that synthesize and secrete hormones, hormone precursors and associated compounds.
- 3. Identify and discuss the integration of the endocrine system in general with focus on specific interactions.
- 4. Explain the consequences of under- and overproduction of hormones.

Course Content

Content	Hrs.					
Unit I						
Chapter 1. Endocrine glands						
 Endocrine glands and classifications of hormones. 						
Characteristics and Transport of Hormones.						
Chapter 2. Hypothalamus-Hyphophysis						
 Hypothalamus as a neuroendocrine organ 						
• Pituitary – Structure and functions						
• Chemical nature, mode of action and functions.						
• Pituitary disorders						
Chapter 3. Pineal gland						
• Structure and functions of Pineal gland.						
• Hypo- and hyperactive states of the gland.						
Unit II	14					
Chapter 4. Thyroid and parathyroid						
 Histological structure of the glands. 						
• Chemical nature, mode of action and functions of the hormones.						
• Hypo-and hyperactive states of the glands.						
Chapter 5.: Adrenal cortex and medulla						
 Histological structure of the gland. Chemical nature and functions 						
• Hypo- and hyperactive states of the gland.	N					
Chapter 6. Prostaglandins						

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Unit – III	14
Chapter 7: Pancreas:	
 Pancreatic islets - histological structure. Chemical nature and function. Hormona 	al
control of blood sugar.	
 Hyperinsulinism and diabetes mellitus. 	
Chapter 8: Gastro-intestinal hormones	
• Functions and regulation of secretion of the hormones.	
Chapter 9: Different types of Rhythms	
• Ultradian, circadian, infradian. Different zeitgebers and their relation with circa	dian
clock	
 Neural basis of biological clock and role of suprachiasmatic nuclei. Sleep- 	
wakefulness cycle. Time keeping genes. Jet-lag and shift work.	
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- 1. William's Text Book of Endocrinology Larsen et al.: An Imprint of Elsevier.
- 2. Endocrinology, Mac E. Hadley, Pearson Education.
- 3. The Kidney-An outline of Normal and Abnormal Functions, by H.E. Dewardener, ELBS.
- 4. Vander's Human Physiology, E.P. Widmaier et al., McGraw-Hill, Higher Education.
- 5. Concise Medical Physiology by S.K. Chaudhuri, New Central Book Agency.
- 6. Endocrinology. Vols.I, II and III by L.O. DeGroot. W.B. Saunders Co.
- 7. The Physiology of Reproduction, Vols.I & II, by E. Knobil and J.D. Neil. Raven Press.
- 8. Guyton and Hall. Textbook of Medical Physiology. 13th Edition.
- 9. Histology: A Text and Atlas. Sixth Edition. Ross & Pawlina. Lippincott Williams & Wilkins.
- 10. Vertebrate Endocrinology by David O. Norris.

Course Books published in English and Kannada may be prescribed by the Universities and Colleges.

Pedagogy: Chalk and Talk, PPT, Group discussion, Seminar.

At the end of the course the student will be able to:

- 1. Demonstrate comprehensive understanding of the structure, function and development of the human body as related to endocrinology physiology.
- 2. Demonstrate elementary understanding of the clinical applications of physiology.
- 3. Critically evaluate the impact of the recent information on the genesis of current concepts related to various topics of physiology

Formative Assessment						
Assessment Occasion	Weightage in					
House Examination/TestC1	20					
Written Assignment / Case Presentation / Project / SeminarC2	20					
Total	40					

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Open Elective Course Content

Course Title: Animal Behavior Course Code: OEC5ZOOT4	Course Credits:3
Total Contact Hours: 42	Duration of ESA: 2 Hours
Formative Assessment Marks: 40	Summative Assessment Marks:60

Course and Learning Outcomes):

At the end of the course the students will be able to:

- 1. Examine and critically to evaluate the emergence of ideas that have shaped how we observe and collect data on animal behaviour.
- 2. Understand the main historical ideas that underpin animal behaviour theory
- 3. Critically review hypotheses to explain animal behaviour
- 4. Understand different methods for collecting data on animal behaviour
- 5. Have advanced their written and oral presentation skills.

Course Content

Content						
Unit – 1						
Chapter 1.: Introduction to Animal Behaviour	14					
 Brief contributions of Karl Von Frish, Ivan Pavlov, Konrad Lorenz, Niko Tinbergen. Proximate and ultimate causes of behaviour. 						
Chapter 2. Patterns of Behaviour						
 Stereotyped Behaviors - Orientation and Reflex. Individual Behavioural patterns: Instinct and Learned Behaviour Associative learning, classical and operant conditioning, Habituation, Imprinting. 						
Unit – 2	14					
 Chapter 3. Social Behaviour: Social organization in termites and honey bees. Social behaviour: Altruism. Conflict behaviour. Chapter 4. Sexual Behaviour Sexual dimorphism, Mate choice in peacock. Intra-sexual selection (male rivalry in red deer). Kinship theory: Relatedness & inclusive fitness. Parental care in fishes (Nest Building & cost benefit) 						
Unit – 3	14					
 Chapter 5. Chronobiology Brief historical developments in chronobiology. Adaptive significance of biological clocks. Biological Rhythms Chapter 6: Communications in animals Bioluminescence in deep sea fishes and insects Territoriality in Monkeys and Dogs Role of pheromones in animal communication- Insects and Vertebrates. Communication in Honey bees (Waggle Dance) 						
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Suggested Readings:

- 1. Animal Behaviour by Drickamar.
- 2. John Alcock, Animal Behaviour, Sinauer Associate Inc., USA.
- 3. Paul W. Sherman and John Alcock, Exploring Animal Behaviour, Sinauer Associate Inc., Massachusetts, USA.
- 4. Chronobiology Biological Timekeeping: Jay. C. Dunlap, Jennifer. J. Loros, Patricia J. DeCoursey (ed). 2004, Sinauer Associates, Inc. Publishers, Sunderland, MA, USA
- 5. Insect Clocks D.S. Saunders, C.G.H. Steel, X., Afopoulou (ed.) R.D. Lewis. (3rdEd) 2002 Barens and Noble Inc. New York, USA
- 6. Biological Rhythms: Vinod Kumar (2002) Narosa Publishing House, Delhi/ Springer-Verlag, Germany.

Pedagogy: Chalk and Talk, PPT, Group discussion, Seminar, Interaction, virtual lab, Lab visit

Formative Assessment						
Assessment Occasion	Weightage in					
House Examination/Test—C1	20					
Written Assignment / Case Presentation / Project / Seminar—C2	20					
Total	40					

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Scheme of examination for B.Sc. / B.Sc. (Hons.) as per NEP (2021-22 onwards)Subject: ZOOLOGY

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	Title of the paper	CORE subject	Open elective	
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II B.Sc. III and IV Semester IA Pattern

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Tota	hour		56hrs			56hrs			56hrs			56hrs			42hrs	42hrs	3	
	TOTAT	TOTAL	40			25			40			25			40	40	A Sus	D
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	C	17	20			13			20			13	5		20	20		
SAM			60			25			60			25			60	60		
Course	credit		4			2			4			5			e,	3		
QP	Code																	
Course code			DSCC5Z00T3			DSCC5Z00P3			DSCC5Z00T4		1.	DSCC5Z00P4			OEC5Z00T3	OEC5ZOOT4		
Lecture/	Practical		Lecture			Practical			Lecture			Practical			Lecture	Lecture		
Course Title			Molecular biology,	Bioinstrumentation and	techniques in Biology	Molecular biology,	Bioinstrumentation and	techniques in Biology	Gene technology	Immunology and	computational biology	Gene technology	Immunology and	computational biology	Endocrinology OEC	Animal Behaviour OEC		
SI	no					5			ŝ	terint term		4			5	6		

Scheme of Practical ExaminationBSc. Zoology III Semester Core Subject: Molecular Biology, Bioinstrumentation and Techniques in Biology

Duration: 3 hours	Max. Marks: 25
1. Extraction of DNA from the given animal tissueOR Estimation of DNA / RNA / Proteins	09M
2. Separate and Identify the given unknown amino acids by using asce	nding paper Chromatography 05M
 Identify and give the working principle of the spotters A and B Class Records 	3X2-6M 05M
	TOTAL Marks 25M

Practical Internal Assessment Pattern

1. C1		13 Marks		
<u>2.</u> C	2	12Marks		
Total		25 Marks		

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Scheme of Practical Examination

BSc. Zoology IV Semester

Duration: 3 hours	Max. Marks: 25
1. Determine the blood group of the given sample and commen	nt 06M
2. Problem on Chapter 1	04M
3. Problem on Chapter 2	04M
4. Identify and comment on the given spotters A and B	2X3=6M
(PCR/PAGE/Restriction enzyme kit/FASTA/BLAST/Datab	base)
5. Class record	05M
TOTA	AL Marks 25M

Practical Internal Assessment Pattern

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Total	25 Mark
2. C2	12Marks
1. C1	13 Marks

II B.Sc., Degree Examination Third semester II B.Sc., Degree Examination (NEP)

Core Course-I Course Code: DSCC5ZOOT3 Molecular Biology, Bioinstrumentation and Techniques in Biology

Duration: 2 Hrs.

Max. Marks: 60

Instructions to Candidates: Draw labeled diagrams wherever necessary. PART-A

I. Answer any FC	UR of the following:	1711(1-7)			(4×2=8)
1.					
2.					
3.					
4.					
5.					
6.					
		DAD'	ГВ		

PART-B

II. Answer any FOUR of the following :

Total

7.		
8.		
9.		
10.		
11.		
12.		

PART-C

 III. Answer any FOUR of the following :
 (4×8=32)

 13.
 14.

 15.
 16.

 16.
 17.

 18.
 Theory Internal Assessment Pattern

 1. CI
 20 Marks

 2. C2
 20 Marks

40 Marks

18

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 $(4 \times 5 = 20)$

II B.Sc., Degree Examination Third semester II B.Sc., Degree Examination (NEP)

Core Course-I Course Code: DSCC5ZOOT3

Molecular Biology, Bioinstrumentation and Techniques in Biology

Duration: 2 Hrs.

Max. Marks: 60

Instructions to Candidates: Draw labeled diagrams wherever necessary.

		PART-A	
I.Answe	er any FOUR of the following:		(4×2=8)
1.			
2.			
3.			
4.			
5.			
6.			
		PART-B	
II.Answe	er any FOUR of the following:		(4×5=20)
7.			
8.			
9.			
10.			
11.			
12.			
		PART-C	
III.Answ	er any FOUR of the following	:	(4×9-22)
12			(4^0-32)
1.0.			
14. 1C			
15.			
10.			
17.			
18.			
	Theory Inte	ernal Assessment Pattern	
	a. $C1$	20 Marks	
	Total	20 Marks 40 Marks	
		CALINAL UT	

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Fourth semester II B.Sc., Degree Examination (NEP)

Core Course-I Course Code: DSCC5ZOOT4

Gene Technology, Immunology and Computational Biology

Time: 2 Hrs.

Max .Marks:60

Instructions to Candidates: Draw labeled diagrams wherever necessary.

PART-A

I. Answer any FOUR	of the following:	(4×2=8)
1.		()
2.		
3.		
4.		
5.		
6.		
	PART-B	
II Answer any FOUR		
	tor the following :	(4×5=20)
7.		
8.		
9.	×	
10.		
11.		
12.		
	PART-C	
III. Answer any FOUR	R of the following:	$(4 \times 8 = 32)$
13		(4.0-52)
14		
15		
15.		
17		
17.		
18.		
1 CI	Theory Internal Assessment Pattern	
2. C2	20 Marks	
Z. UZ Total	20 Marks	
TOTAL	40 Marks	
	20	20
	As	ryan
		0

II B.Sc., Degree Examination (NEP)

Model Question Paper Zoology Open Elective (OE) ENDOCRINOLOGY

Time: 2hours

Instructions to Candidates:

- 1. All sections/parts are compulsory.
- 2. Draw neat labelled diagrams wherever necessary.

PART A

I. Answer any Four of the following

- 1. Mention four examples for endocrine glands
- 2. What are the neuroendocrine cells of hypothalamus?
- 3. List out any four functions of melatonin
- 4. What are the different types of biological rhythms?
- 5. Mention the 3 hormones of adrenal cortex.
- 6. What are the types of cells found in parathyroid gland? Mention one function.

PART- B

II. Answer any Four of the following

- 7. Explain the functions and regulations of cholecystokinin.
- 8. What are time keeping genes? How does it influence sleep?
- 9. Explain the histological structure of islets of Langerhans.
- 10. Write a note on prostaglandins.
- 11. Mention the different types of cells of adenohypophysis with its secretions.
- 12. Write a note on pineal gland.

PART-C

III. Answer any Four of the following

- 13. What are hormones? Classify the hormones based on chemical nature.
- 14. Explain the hormonal control of blood sugar.
- 15. Discuss the functions of thyroid gland. Add a note on its hypersecretion.
- 16. Explain how zeitgebers affect time signals and reset sleep.
- 17. How does Jetlag and shift work contribute to sleep deprevation
- 18. Explain hyper secretion of parathyroid gland.

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(4X8=32)

(4X2=08)

(4X5=20)

Max.Marks:60

II B.Sc., Degree Examination (NEP)

Model Question Paper Zoology Open Elective (OE) ANIMAL BEHAVIOUR

Time: 2hrs

Instructions to Candidates:

- 1. All sections/parts are compulsory.
- 2. Draw neat labeled diagrams wherever necessary.

PART A

I. Answer any Four of the following

- 1. Define habituation with example.
- 2. Mention the two dances of honey bees.
- 3. What is bioluminescent organism? Give example
- 4. Mention the four types of altruism.
- 5. List any two differences between classical & Operant conditioning.
- 6. List any four contribution of Ivan Pavlov.

PART-B

II. Answer any Four of the following

- 7. "Termites are social insects". Justify.
- 8. Explain imprinting with an example of geese.
- 9. Write a note on mate choice in Peacock.
- 10. Explain kinship theory with reference inclusive fitness.
- 11. Explain territoriality in monkeys.
- 12. Write a note on parental offspring conflict.

PART-C

III. Answer any Four of the following

- 13. What are Pheromones? Explain its role in animal communication example.
- 14. Explain Social organization in termites.
- 15. Explain parental care in fishes.
- 16. Briefly explain the historical development in Chronobiology.
- 17. Explain stereotyped behavior with an example.
- 18. Describe Biological rhythm.

Members 1. Dr. KumAR Humay 3. Bhavani Patil Show

a Nuzhat F Chairman B.O.S. in Zoolog **Tumkur University** TUMAKURU- 572103,

(4X8=32)

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