

ಡಾ. ಮನಮೋಹನ್ ಸಿಂಗ್
ಬೆಂಗಳೂರು ನಗರ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ



Dr. MANMOHAN SINGH
BENGALURU CITY UNIVERSITY

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No.MSBCU/BoS/Syllabus/Science/ 107 /2026-27

Date: 29.06.2026

NOTIFICATION

Sub: Syllabus for the V & VI Semester Under Graduate Courses in the Faculty of Science -reg

- Ref: 1. Government Order No. ED 166 UNE 2023 Bengaluru dated. 08.05.2024
2. Recommendations of the Boards of Studies in the Faculty of Science
3. Approval of the Academic Council in its meeting held on 08.06.2026
4. Orders of Vice-Chancellor dated.29.06.2026

The Syllabus prepared by the Boards of Studies for the different Subjects of V & VI semester Under Graduate Courses, in the faculty of Science based on the Guidelines and Curriculum Structure issued by the Government under ref(1) have been approved by Academic Council meeting held on 08.06.2026.

Accordingly, the CBCS Syllabus for the V & VI Semester UG Courses of Science Faculty in respect of following subjects are hereby notified for implementation from the academic year 2026-27.

Sl. No.	Subjects
1.	Botany– V & VI Semester
2.	Chemistry– V & VI Semester
3.	Zoology and Genetics– V & VI Semester
4.	BoS in Fashion and Apparel Design i. FAD – V & VI Semester ii. IDD– V & VI Semester
5.	Geography– V & VI Semester
6.	Mathematics– V & VI Semester
7.	Physics – V & VI
8.	BoS in Home Science i) Home Science – V & VI ii)Nutrition & Dietetics – V & VI iii)Clinical Nutrition & Dietetics – V & VI iv)Food Technology – I & II Sem

p.t.o

9.	Criminology and Forensic Science– V & VI
10.	Psychology– V & VI Semester
11.	Electronics – V & VI
12.	Statistics – V & VI
13.	Microbiology– V & VI
14.	Biotechnology– V & VI
15.	Environmental Science– V & VI

The detailed Syllabi for above subjects are notified in the University Website:
www.bcu.ac.in for information of the concerned.


REGISTRAR

Copy to;

1. The Registrar(Evaluation), Dr. Manmohan Singh Bengaluru City University
2. The Dean, Faculty of Science, MSBCU.
3. The Principals of the concerned affiliated Colleges of MSBCU- through email.
4. The P.S. to Vice-Chancellor/Registrar/Registrar (Evaluation), MSBCU.
5. Office copy / Guard file / University Website: www.bcu.ac.in



Dr. MANMOHAN SINGH
BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM
[As per SEP]

Syllabus for B.Sc.
Zoology

2026-27 onwards

**Dr. MANMOHAN SINGH BENGALURU CITY UNIVERSITY
BENGALURU**

PROCEEDINGS OF THE MEETING OF BOS (UG) IN ZOOLOGY AND GENETICS

Ref: 1) BCU/BOS/SEP/376/2024-25 Dated 29-01-2025
2) BCU/Syn/BOS/Zoology & Genetics (UG)/404/2024-25 Dated 03-03-2025

The Chairperson- BOS in Zoology / Genetics, Dr. Manmohan Singh Bengaluru City University, Bengaluru greeted the BOS Members before the commencement of the meeting

A meeting of Board of Studies in Zoology and Genetics of BCU was held on 18th and 19th February 2026 (during 10.30Am to 4.30pm) at Department of Zoology, Bangalore University, Jnanabharathi Campus, Bengaluru to scrutinize the drafted syllabus pertaining to B.Sc., Zoology and Genetics, Dr. Manmohan Singh Bengaluru City University, Bengaluru in accordance with SEP- 2024.

Agenda 1: Approval of syllabi for 5th and 6th semester B.Sc., Zoology and B.Sc., Genetics under SEP-2024:

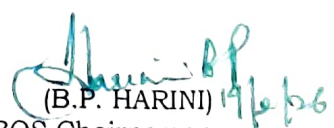
Resolution: The proposed syllabus for 5th and 6th semester B.Sc., Zoology and B.Sc., Genetics (both theory and practical) and as well as the scheme of examination were scrutinized thoroughly, finalized with appropriate inclusion(s) and deletion(s) of the contents and finally approved on 19th February 2026.

Agenda 2: Approval of panel of examiners for B.Sc., Zoology and B.Sc., Genetics for the academic year 2026-2027:

Resolution: The given panel of examiners for UG Zoology and Genetics for the year 2026-2027 were scrutinized thoroughly, finalized with appropriate inclusion(s) and deletion(s) of the contents and finally approved.

The meeting was concluded with the chairperson thanking all the members for rendering cooperation for the smooth conduct of the meeting.

Thanking You


(B.P. HARINI)
BOS Chairperson
Dr. Manmohan Singh Bengaluru City University
Bengaluru

The following BOS Members attended the meeting:

Sl.No.	Members	Designation	Signature
1.	Dr. B.P. Harini, Professor, Department of Zoology, Bangalore University, JB Campus, Bengaluru (Ph.No.9448939066)	Chairperson	<i>Harini B.P.</i>
2.	Dr. Ashalatha, Assoc. Professor, Department of Zoology, Vijaya College, RV Road, Bengaluru, (Ph.No. 9480019720)	Member	<i>B. Ashalatha</i>
3.	Dr. C.E. Thriveni, Assoc. Professor, VV Puram College of Science, Bengaluru (Ph.No. 9902452934)	Member	<i>C.E. Thriveni</i>
4.	Dr. Shubha. M., Assoc. Professor, BMS College for Womens, Basavagudi, (Ph.No. 9900782822)	Member	<i>Shubha</i>
5.	Dr. Salma Banu., Associate Professor, Sheshadripuram First Grade College, Yelahanka (Ph.No. 9886703351)	Member	<i>Salma Banu</i>
6.	Dr. T.N. Ramakrishnaiah., Associate Professor, Department of Genetics, M.S.Ramaiah College, Bengaluru, (Ph.No. 9611928200)	Member	<i>T.N. Ramakrishnaiah</i>
7.	Dr. Abhinandini., Professor, Maharani's Science college for Women, Mysuru (Ph. No.9964123301)	Member	<i>Abhinandini</i>
8.	Dr. Bhushanam., M., Professor, Department of Zoology, Maharani Cluster University, Bengaluru (Ph. No. 8861921326)	Member	<i>Bhushanam</i>
9.	Dr. Dakshayini, P.N., Professor, Department of Zoology, Maharani Cluster University, Bengaluru (Ph. No. 9740809805)	Member	<i>Dakshayini</i>
10.	Dr. Anil.G.B. , Assistant Professor, MES Degree college, Malleshwaram, Bengaluru (Ph. No. 9611325084)	Member	<i>Anil</i>
11.	Dr. Priyadarshini, Associate Professor, Vijaya college, R.V road, Basavanagudi Bengaluru (Ph. No. 9886555917)	Co-opt Member	<i>Priyadarshini</i>
12.	Dr. Rakesh, H., Teaching Faculty, Department of Zoology, Bangalore University, JB Campus, Bengaluru (Ph. No. 9916311539)	Co-opt Member	<i>Rakesh</i>
13.	Dr. Shalini.M ., Teaching Faculty, Centre for Applied Genetics, Bangalore University, JB Campus, Bengaluru (Ph. No. 8050663448)	Co-opt Member	<i>M. Shalini</i>

Harini B.P.
Dr. B.P. HARINI

Professor

Chairperson- BOS in Zoology & Genetics (UG/PG)

Dr. Manamohan Singh Bengaluru City University, Bengaluru-560001

FOREWORD

As per the recommendations made by State Education Policy (SEP) led by Prof. Sukhdeo Thorat commission, the Government of Karnataka has reinforced the three-year degree programme from the academic year 2024-25. The new changes come close on the heels of students and colleges who have expressed concerns over the lack of clarity in pursuing a four year programme as per NEP. As per the recommendations, now colleges can offer degrees with three majors with a general degree in all six semesters; three majors up to fourth semester, and specialization in one subject in fifth and sixth semester or; a single subject specialization from first semester with minors. In addition to majors and specialization courses, the three subjects will be compulsory. First a course with practical (skill) orientation which is linked to the theoretical major course and is expected to improve employability. Students have to learn two languages: Kannada/ other Indian languages, and English. The third compulsory subject is value or moral education which will include teaching constitutional moral values/ principles of equality, liberty, fraternity, national unity, non-discrimination and similar values. Two electives that can be selected by the students based on the availability of courses may be discipline based or distinctly related to discipline-based majors. It is recommended that a tutorial or assignment with a project component based on the survey which will give or involve practical experience may be included. It is also suggested that skill enhancement course with a tutorial based on the survey/laboratory be introduced for single subject specialization and deep specialization in 5th and 6th semesters. The examination pattern will be 80:20-80 for the semester-end exam, and 20 for internal assessment. Likewise, for practical oriented science subjects, the examination pattern will be 40:10-40 for the semester-end practical exam, and 10 for internal assessment.

The prominent features of the new scheme framework are:

1. Colleges can offer degrees with three majors-three majors up to fourth semester, and specialization in one subject in fifth and sixth semester or; a single subject specialization from first semester with minors. In addition to majors and specialization courses, the three subjects will be compulsory.
2. Students have to learn two languages: Kannada/ other Indian languages, and English.
3. The third compulsory subject is value or moral education which will include teaching constitutional moral values/ principles of equality, liberty, fraternity, national unity, non-discrimination and similar values.
4. Two electives that can be selected by the students based on the availability of courses may be discipline based or distinctly related to discipline based majors.

I am delighted to present curriculum structure pertaining to B.Sc., Degree in subject Zoology. I hope that the curriculum structure and syllabus will pave the way for overall development of the student community. I ensure that, students community will procure the benefits at large in higher education.



Dr. B. P. HARINI
Chairperson - BOS (UG) in
Zoology & Genetics
Dr. Manmohan Singh
Bengaluru City University

DR. MANMOHAN SINGH BENGALURU CITY UNIVERSITY
DEPARTMENT OF ZOOLOGY

Credit framework for Science Stream (B. Sc.,) with 3-major subjects (3 + 2 C)

Semester	CORE-1 (T + P)	CORE-2 (T + P)	CORE-3 (T + P)	Elective (E)	Languages (1 & 2)	Compulsory Skill	Total credits
I semester	3 +2 = 5	3 +2 = 5	3 +2 = 5		L-1= 3 L-2= 3	C-1 (Constitution Values) = 2	23
II semester	3 +2 = 5	3 +2 = 5	3 +2 = 5		L-1= 3 L-2= 3	C-2 (Constitution Values + EVS) = 4	25
III semester	3 +2 = 5	3 +2 = 5	3 +2 = 5	E-1= 2	L-1= 3 L-2= 3		23
IV semester	3 +2 = 5	3 +2 = 5	3 +2 = 5	E-2= 2	L-1= 3 L-2= 3	Skill-1 = 2 (Pr.knowd.)	25
V semester (2 T ^{^^} + 1 P)	3 +2 = 5 3 +0 = 3	3 +2 = 5 3 +0 = 3	3 +2 = 5 3 +0 = 3			Skill-2 = 2 (Pr.knowd.)	26
VI semester (2 T ^{^^} + 1 P)	3 +2 = 5 3 +0 = 3	3 +2 = 5 3 +0 = 3	3 +2 = 5 3 +0 = 3			Skill-3 = 2 (Pr.knowd)	26
Total	36	36	36	4	24	12	148

All numerical may read as credits

Note - **(Two theory):** 2 T^{^^} with approval from Academic bodies.

DR. MANMOHAN SINGH BENGALURU CITY UNIVERSITY
CREDIT DISTRIBUTION FOR THE COURSE
CURRICULUM FOR B. Sc., ZOOLOGY (UG) 2025-26

Title of the Paper	Total no. of hours	Contact hrs./week	Exam hrs.	I. A	End Sem Ex. Marks	Total marks	Credits
First and Second Semester (Framed during 2024-2025)							
Zoology-I: DSCZOO-T1 Systematics and Animal Diversity - 1 (Protozoa To Hemichordata)	56 hrs	4	3	20	80	100	3
Zoology Practical- I: DSCZOO-P1 Systematics and Animal Diversity- 1 (Protozoa To Hemichordata)	45 hrs	3	3	10	40	50	2
Zoology-II: DSCZOO-T2 Animal Diversity -2 (Protochordata To-Mammalia)	56 hrs	4	3	20	80	100	3
Zoology Practical- II: DSCZOO-P2 Animal Diversity -2 (Protochordata To-Mammalia)	45 hrs	3	3	10	40	50	2
THIRD SEMESTER							
Zoology-III: DSCZOO-T3 Anatomy and Histology	56 hrs	4	3	20	80	100	3
Zoology Practical-III: DSCZOO-P3 Anatomy and Histology	45 hrs	3	3	10	40	50	2
<i>Zoology Elective-1: DSEZOO-1*</i> Biology of Parasites and Diseases	28 hrs	2	1.5	10	40	50	2
FOURTH SEMESTER							
Zoology-IV: DSCZOO-T4 Cell Biology and Genetics	56 hrs	4	3	20	80	100	3
Zoology Practical-IV: DSCZOO-P4 Cell Biology and Genetics	45 hrs	3	3	10	40	50	2
<i>Zoology Elective-2: DSEZOO-2*</i> Food, Health and Nutrition	28 hrs	2	1.5	10	40	50	2
SKILL-1: COMPULSORY (SEC – 1) Applied Zoology - I	45 hrs	3	2	10	40	50	2
FIFTH SEMESTER							
Zoology-V: ZOO-T5 Animal Physiology and Endocrinology	56 hrs	4	3	20	80	100	3
Zoology Practical-V: DSCZOO-P5 Animal Physiology, Biostatistics and Techniques in Biology	45 hrs	3	3	10	40	50	2
Zoology-VI: DSCZOO-T6 Biostatistics and Techniques in Biology	56 hrs	4	3	20	80	100	3
SKILL-2: COMPULSORY (SEC – 2) Applied Zoology -II: Community health and Management	45 hrs	3	3	10	40	50	2
SIXTH SEMESTER							
Zoology-VII: DSCZOO-T7 Developmental Biology and Evolutionary Biology	56 hrs	4	3	20	80	100	3
Zoology Practical-VI: DSCZOO-P6 Developmental Biology and Environmental Biology	45 hrs	3	3	10	40	50	2
Zoology-VIII: DSCZOO-T8 Environmental Biology and Behavioural Biology	56 hrs	4	3	20	80	100	3
SKILL-3: INTERNSHIP	90 hrs	3	2	10	40	50	2

Syllabus for B.Sc., in Zoology

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.

PROGRAM OUTCOMES IN B. Sc., Zoology (UG)

- **PO1** - Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms.
- **PO2** – Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment.
- **PO3** – Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms.
- **PO4** – Understands the complex evolutionary processes and behaviour of animals.
- **PO5** – Correlating the physiological processes and relationship of organ systems.
- **PO6** – Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species.
- **PO7** – Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming and vermicomposting preparation.
- **PO8** – Understands about concepts of genetics and its importance in human health.
- **PO10** – Apply the knowledge and understanding of Zoology to one's own life and work
- **PO11** – Develops empathy and love towards the animals.
- **PO12**– To correlate the relationships among animals, plants and microbes.

Program Specific Outcomes:

- **PSO1.** Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology.
- **PSO2.** Analyse the relationships among animals, plants and microbes.
- **PSO3.** Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, tools and techniques of Zoology, Toxicology, Entomology, Nematology, Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology.
- **PSO4.** Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine.
- **PSO5.** Gains knowledge about research methodologies, effective communication and skills of problem solving methods.
- **PSO6.** Contributes the knowledge for Nation building.

GRADUATE ATTRIBUTES IN B.Sc., Zoology

Some of the characteristic attributes a graduate in Zoology should possess are:

- Develop the essential and fundamental skills required to enter the professional world of animal sciences.
- Tasks, including DNA analysis and trace evidence examination.
- Skilled communication and developing scientific knowledge.
- Critical thinking and problem solving capacity.
- Ethical awareness / reasoning.

Weightage for assessments

Type of Course	Formative Assessment / IA Marks	Summative Assessment Marks
Theory	20	80
Practical	10	40

Projects*		
Experiential Learning (Internships etc.)		

*In lieu of the research Project, two additional elective papers/ Internship may be offered.

Credit distribution for the course.

Outline of the blue-print of Question papers to be prepared. (% of share in each category)

THEORY

- Part – A: Short answer questions: (Answer any 5 out of 8) 5x 2 = 10
 - Part – B: Medium size questions: (Answer any 6 out of 8)
(to test overall understanding of subject): - 6x 5 = 30
 - Part – C: Essay type questions: (Answer any 4 out of 5)
(to test overall understanding of subject): - 4 X 10 = 40
- Total Marks: 80
- IA marks: 20
- Total: 100

PRACTICALS

Total Practical exam Marks: 40

IA marks: 10

Total: 50

V SEMESTER B.SC., ZOOLOGY THEORY SYLLABUS
THEORY PAPER V: ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY

Program Name:	B.Sc.	Semester:	V
Course Title:	Animal Physiology and Endocrinology		
Course Code:	DSCZOO-T5	No. of Credits:	3
Contact hours:	56 Hours	Duration of SEA/Exam:	3 hrs
Formative Assessment Marks:	20	Summative Assessment Marks	80

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- CO1:** Understand the fundamental physiological processes, including digestion, respiration, circulation, excretion, and muscle physiology in animals.
- CO2:** Explain the role of the nervous and endocrine systems in regulating homeostasis and reproduction.
- CO3:** Describe the structure, functions, and mechanisms of action of hormones and their role in physiological Processes.
- CO4:** Explain the mechanisms of osmoregulation in different animal groups, including adaptations in freshwater, marine, and terrestrial environments.
- CO5:** Explore the clinical implications of endocrine disorders and their impact on human and animal health.

Content	56 hrs
Unit - I	14 hrs
- Digestion: Digestive secretions: Neuronal - Digestive phases (cephalic, gastric and intestinal) and neural response in each phase; Hormonal- Gastro-intestinal (GI) hormones and their role in digestion; Symbiotic digestion in ruminants; Role of microbiota in GI health, Ulcers of GI tract, Liver cirrhosis. - Circulation: Composition and functions of blood, Blood coagulation, Classical theories (Best & Taylor), Anaemia, Myocardial infarction. - Respiration: Respiratory pigments: Major types, features and physiological role; Transport of respiratory gases: Oxygen and Carbon dioxide (Highlight on Hamburger's phenomenon); Oxygen dissociation curve: Definition, factors affecting - Carbon Dioxide, pH, Temperature and 2,3- diphosphoglycerate; Bohr effect and Haldane effect, Asthma. - Excretion: Ammonotelism, Uricotelism and Ureotelism with examples; Urea cycle (Ornithine cycle); Physiology of urine formation (Glomerular filtration, Tubular reabsorption and secretion), Role of antidiuretic hormone (ADH) and Aldosterone, Kidney stones.	
Unit - II	14 hrs
- Muscle Physiology: Ultrastructure of skeletal muscle; Chemical composition of muscle; Sliding filament Theory of muscle contraction; Physico- chemical changes of muscle contraction, DMD. - Neurophysiology: Generation and conduction of nerve impulse (Resting membrane potential and action potential) - Axonal (myelinated and Non-myelinated) and Synaptic conduction (chemical and electrical), Alzheimer's disease. - Vision: Image formation and accommodation, Photoreceptors: rods and cones, Visual pigments and retinal visual cycle (Rhodopsin), Colour vision: Young-Helmholtz trichromatic theory, Dark and light adaptation, Glaucoma. - Hearing and Balance: Mechanism of hearing, Organ of Corti and auditory transduction, Vestibular apparatus Utriculus, sacculus and semicircular canals, Static and dynamic equilibrium, Vertigo.	

Unit - III	14 hrs
- Homeostasis and feedback mechanism: Concept of internal environment; Positive feedback mechanism - oxytocin secretion; Negative feedback mechanism - Thyroid secretion. - Osmoregulation: Osmoconformers and Osmoregulators; Stenohaline and euryhaline Animals; Osmoregulation in teleosts (Fresh water and marine), Marine elasmobranchs, Terrestrial animals (e.g., Camel), Marine birds, and turtle; Ionic balance in migratory Eel and Salmon.	
- Thermoregulation: Homeotherms, Poikilotherms, Ectotherms and Endotherms; Methods of heat gain and heat loss in homeotherms; Thermoregulatory mechanisms in endotherms; Behavioural adaptations: Hibernation and aestivation; Role of hypothalamus in thermoregulation. - Reproduction: Female reproduction – hormones and its functions; menstrual cycle and its regulation; Male reproduction – hormones, Functions and regulation; Infertility in men and women, PCOD, menstrual irregularities. Hypogonadism and erectile dysfunction in males.	
Unit - IV	14 hrs
- Endocrine system: Neuroendocrine system and endocrine glands, Classification of hormones based on chemical nature, Characteristics of hormones, Mechanism of hormone action. - Hypothalamus: Hypothalamus as a neuroendocrine organ. - Pituitary gland: Hormones and their functions, Dwarfism and Gigantism. - Thyroid and Parathyroid gland: Hormones and their functions. Goiter. - Adrenal gland: Hormones and their functions, Addison's disease and Cushing's syndrome. - Pancreas: Pancreatic islets – Hormones and their functions; hormonal control of blood glucose, Diabetes mellitus type II.	

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Formative Assessment for Practical	
Assessment Occasion/type	Marks
House Examination/Test	05
Class room Performance/Participation	05
Total	10 Marks

References:

- Barret, K.; Brooks, H.; Boitano, S. and Barman, S. (2010) Ganong's Review of Medical Physiology (23rd edition) Lange Medical.
- Tortora, G.J. and Derrickson, B.H. (2009) Principles of Anatomy and Physiology (12th edition) John Wiley and Sons, Inc.
- Widmaier, E.P., Raff, H. and Strang, K.T. (2008) Vander's Human Physiology (9th edition) McGraw Hill.
- Guyton, A.C. and Hall, J.E. (2011) Textbook of Medical Physiology (12th edition) Harcourt Asia Pvt. Ltd/ W.B. Saunders Company.
- The Williams Textbook of Endocrinology (15th edition), Jameson & DeGroot.
- Textbook of Endocrinology by Dharmalingam.

V SEMESTER B.SC., ZOOLOGY THEORY SYLLABUS
THEORY PAPER VI: BIOSTATISTICS AND TECHNIQUES IN BIOLOGY

Program Name:	B.Sc.	Semester:	V
Course Title:	Biostatistics and Techniques in Biology		
Course Code:	DSCZOO-T6	No. of Credits:	3
Contact hours:	56 Hours	Duration of SEA/Exam:	3 hrs.
Formative Assessment Marks:	20	Summative Assessment Marks:	80

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- CO1:** Explain the basic principles of biostatistics including data collection, classification, tabulation, and graphical representation.
- CO2:** Apply statistical methods for data analysis in biological research, including measures of central tendency, dispersion, and hypothesis testing.
- CO3:** Use graphical and computational tools to interpret biological data effectively.
- CO4:** Demonstrate proficiency in laboratory techniques such as spectrophotometry, chromatography, electrophoresis, and microscopy.
- CO5:** Understand the principles and applications of molecular biology techniques, including microscopy, spectrophotometry, PCR, ELISA, and DNA sequencing.

Content	56 hrs
Unit - I	14 hrs
Biostatistics - 1 - Statistics: Definition and scope; Concepts of statistical population and sample, - Sampling methods: Simple random sampling, stratified, systematic and cluster sampling methods. - Data: quantitative and qualitative, cross sectional and time-series, discrete and continuous. - Scales of measurement: nominal, ordinal, interval and ratio. - Collection of data: presentation of data - tabular and graphical. - Frequency distributions, cumulative frequency distributions and graphical representations.	
Unit - II	14 hrs
Biostatistics - 2 - Measures of central tendency: Mean, Median, Mode. - Mean- arithmetic mean- grouped and ungrouped data - Median- grouped and ungrouped data - Mode- ungrouped and grouped (continuous series) - Data summarizing: Graphical presentation – bar diagram, pie diagram, histogram - Elementary idea of probability and its applications - Definition, formula, rules of probability and simple problems. - Measures of dispersion: Range, Standard Deviation, Variance. - Correlation- Karl pearson and Regression –definition - Tests of significance: Definition & applications of F-test, ANOVA, t-test and Chi square test.	

Unit - III	14 Hrs
Techniques in Biology – I • Microscopy: Introduction and history of Microscopy. • Types of microscopes: Principle and applications of Compound microscope, fluorescent microscopy, electron microscopy (SEM and TEM). • pH meter: Principle and applications of pH meter. • Principles and Applications of Colorimeter. • Spectrophotometer: Principles; Types - UV spectrophotometers and applications. • Blotting techniques: Southern and Western blotting. • Immunoassay: ELISA - Principle and applications. • DNA finger printing: Principle, steps involved and applications. • Autoradiography: Principle and applications.	
Unit – IV	14 hrs
Techniques in Biology – II • Centrifugation: Principle; types - high speed centrifuge, ultra-centrifuge and applications. • Cell fractionation – principle and applications. • Chromatography: Principle; types - paper chromatography, TLC, HPLC and its applications. • Electrophoresis: Principle; types - Horizontal gel type, SDS – PAGE and Immuno electrophoresis and applications. • PCR Technique – principle and applications. • Animal Cell culture: Introduction, basic requirements, culture media – nutrient and non-nutrient, cell viability testing and cryopreservation.	

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Formative Assessment for Theory	
Assessment Occasion / type	Marks
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Classroom Performance/Participation	05
Total	20 Marks

References:

1. A Textbook of Biostatistics and Research Methodology by Dr. Dattatraya M. Shinkar.
2. Biostatistics by Dr. K.S. Negi.
3. A Textbook of Biostatistics by B Annadurai.
4. Statistical Methods (Eighth Edition) by G. W. Snedecor and W. G. Cochran, Willey Blackwell.
5. Biostatistics (Tenth Edition) by W.W. Daniel and C. L. Cross, Wiley
6. Introductory Biological Statistics (Fourth Edition) by John E. Havel, Raymond E. Hampton and Scott J. Meiners.
7. Techniques and Methods in Biology by Ghatak K.L
8. Concept Of Laboratory Techniques in Biology by Kiran Singh; Manish Sharma.
9. Practical Techniques in Molecular Biology and Instrumentation by Sarita Manandhar, Sulochana Manandhar.
10. A Textbook of Tools and Techniques in Biology by Vijayshree Hemke

V SEMESTER B.SC., ZOOLOGY PRACTICAL SYLLABUS

PRACTICAL PAPER V: ANIMAL PHYSIOLOGY, BIOSTATISTICS AND TECHNIQUES IN BIOLOGY

Program Name:	B.Sc.	Semester:	V
Course Title:	Animal Physiology, Biostatistics and Techniques in Biology		
Course Code:	DSCZOO-P5	No. of Credits:	2
Contact hours:	45 Hours	Duration of SEA/Exam:	3 hrs
		Hours / Week:	3 hrs
Formative Assessment Marks:	10	Summative Assessment Marks:	40

Course Outcomes: After the successful completion of the course, the student will be able to:

CO1: Identify carbohydrates, proteins, lipids, and nitrogenous wastes using simple laboratory tests.

CO2: Estimate oxygen consumption and salt balance in freshwater crab.

CO3: Perform basic laboratory techniques like paper chromatography, haemocytometer counting, and micrometry.

CO4: Calculate mean, median, mode, variance, and standard deviation from biological data.

CO5: Apply Chi-square test to test the significance of experimental data.

Sl. No.	Practical Contents	10 Units
1.	Qualitative analysis of Carbohydrates, Proteins and Lipids.	1
2.	Qualitative analysis of Nitrogenous wastes – Ammonia, Urea and Uric acid.	1
3.	Quantitative estimation of Oxygen consumption by fresh water Crab.	1
4.	Quantitative estimation of salt gain and salt loss by fresh water Crab.	1
5.	Paper Chromatography for separation of amino acids and proteins.	1
6.	Differential counting of RBC's using haemocytometer.	1
7.	Micrometry of cell types.	1
8.	Biostatistics: Calculate the mean, median, mode, variance and standard deviation. Test of Significance - Chi square test.	2
9.	Project report on: Dialysis, Diabetes mellitus, Obesity, Cardio vascular diseases and Anaemia.	1

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment, Test

Formative Assessment for Practical	
Assessment Occasion/type	Marks
House Examination/Test	05
Class Room Performance / Attendance	05
Total	10 marks

V SEMESTER B.Sc., ZOOLOGY SKILL ENHANCEMENT COURSE PRACTICAL SYLLABUS
PRACTICAL PAPER: APPLIED ZOOLOGY – II
COMMUNITY HEALTH AND MANAGEMENT

Program Name:	B.Sc.	Semester	V
Course Title:	Community Health and Management		
Course Code:	SEC – 2	No. of Credits:	2
Contact hours:	45 Hours	Duration of SEA/Exam:	3 hrs.
Formative Assessment Marks:	10	Summative Assessment Marks:	40

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO1: Perform basic clinical laboratory tests such as RBC and WBC count and estimation of haemoglobin.

CO2: Analyze urine and blood samples to detect glucose, proteins, ketone bodies, and measure blood glucose and blood pressure.

CO3: Evaluate the nutritional value of different foods based on carbohydrates, proteins, vitamins, and minerals.

CO4: Understand the basic principles and applications of medical diagnostic techniques such as X-ray, ECG, CT scan, and MRI.

CO5: Identify common vector-borne diseases and understand primary healthcare services through field visits and case studies.

Sl. No.	Practical Contents	10 Units
1	Blood cell count of RBCs.	01
2	Blood cell count of WBCs.	01
3	Estimation of haemoglobin by Sahli's method (Haemoglobinometer).	01
4	Analysis of Urine for Glucose, Proteins and Ketone bodies (Cow).	01
5	Test for Blood Glucose by glucometer.	01
6	Estimation of Blood Pressure using digital BP meter.	01
7	Dietary analysis of food: Fruits, vegetables and junk food (Carbohydrates, proteins, vitamins and minerals) (Any three examples each).	01
8	Study of Techniques: Principle and Applications of X- Ray, ECG, CT Scan and MRI Scan.	01
9	Study of vector borne diseases – Malaria, Cholera, Typhoid.	01
10	Case studies – Visit to Primary health center / Anganwadi's.	01

Note:

1. Maximum number of students in Skill Enhancement Courses (Practical Based) is 15 (Fifteen) and is considered as FULL BATCH with TWO TEACHERS.
2. Field visit / Industrial visit pertaining to the syllabus during the semester is compulsory and the report of this is to be submitted along with practical record as a part of practical examination.

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Formative Assessment for Practical	
Assessment Occasion/type	Marks
Two tests of 2 marks	04
Assignment/Project report submission	03
Attendance	03
Total	10

VI SEMESTER B.SC., ZOOLOGY THEORY SYLLABUS
THEORY PAPER VII: DEVELOPMENTAL BIOLOGY AND EVOLUTIONARY BIOLOGY

Program Name	B.Sc.	Semester	VI
Course Title	Developmental Biology and Evolutionary Biology		
Course Code:	DSCZOO-T7	No. of Credits	3
Contact hours	56 Hours	Duration of SEA/Exam	3 hrs.
Formative Assessment Marks	20	Summative Assessment Marks	80

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- CO1:** Understand the fundamental concepts of embryology including gametogenesis, fertilization, types of eggs, and patterns of cleavage in different organisms.
- CO2:** Understand and compare the processes of blastulation, gastrulation, neurulation, foetal membrane formation, and early human development across selected vertebrates.
- CO3:** Discuss major theories of evolution, origin of life, and patterns of evolution, and explain the role of evolutionary forces in shaping populations using Hardy–Weinberg principles.
- CO4:** Analyze mechanisms of speciation, isolating mechanisms, and reproductive barriers contributing to the formation of new species.
- CO5:** Evaluate evidences supporting organic evolution including fossil records, anatomical, embryological data, adaptive radiation, and trace the major stages in human evolution.

Content	56 hrs
Unit - I	14 hrs
Developmental Biology - 1 - Embryology: Definition and Scope; theories (Preformation theory, Von-Baer's law, biogenetic law). - Gametogenesis: Introduction, Spermatogenesis- Formation of spermatids, Spermiogenesis, role of Sertoli cells, Structure of a typical mammalian sperm. Oogenesis: Phases and vitellogenesis, Structure of a mature mammalian ovum. - Fertilization: Definition, Types, Mechanism of fertilization (sea urchin) and significance. - Types of eggs: Based on amount of yolk and distribution of yolk with examples. Mosaic and regulative eggs; non-cleidoic egg (Frog's egg) and Cleidoic egg (e.g., Hen's egg) and its significance. - Cleavage: a) Definition, types of cleavage (Holoblastic and meroblastic-discoidal and superficial), planes of cleavage – meridional, vertical, equatorial and latitudinal. b) Patterns of cleavage – radial, biradial, spiral and bilateral cleavage with examples. c) Influence of yolk in cleavage.	

Unit - II	14 hrs
Developmental Biology - 2 - Blastulation: Comparative account with reference to <i>Amphioxus</i>, Frog and Chick. - Fate maps: Definition, Methods (Methodology to be avoided) and fate maps in Frog and Chick. - Gastrulation in <i>Amphioxus</i>, Frog and Chick. - Late Development: Neurulation in Frog; Post-neural development and metamorphosis in Frog. - Foetal membranes in Chick - Formation, structure and functions. - Human development: Early development process (fertilization, Blastocyst formation and Placentation).	
Unit - III	14 hrs
Organic Evolution - I - Theories of Evolution: Origin of Life – Introduction, Chemical theory of origin of life by Oparin and Haldane, Stanley Miller's experiment. - Historical review of evolutionary concept: Lamarckism, Darwinism, Modern synthetic theory (Neo-Darwinism). - Patterns of evolution: Concepts of Divergence, Convergence, Parallel, Co- evolution. Role of Evolutionary forces: - Gene pool, gene flow, gene frequencies, genotype frequencies, Hardy-Weinberg equilibrium. - Forces of evolution: Mutation, Natural Selection (Introduction, Types-Stabilizing selection, Disruptive selection, Directional selection), Genetic drift (Introduction, Types - Founder's effect, Bottle neck effect).	
Unit - IV	14 hrs
Organic Evolution - II Speciation Mechanism: Speciation - definition, Biological Species concept, modes of speciation – Phyletic, Allopatric and Sympatric speciation. - Isolation and Isolating mechanisms – Definition, types - Geographical isolation and Reproductive isolation - Reproductive isolation: a. Prezygotic/Premating isolation mechanisms – Ecological, Seasonal, Ethological, Mechanical, Physiological and Gametic mortality. b. Post zygotic/Postmating isolation mechanisms – Cytological, Zygotic mortality, Hybrid inviability, Hybrid sterility. Evidences of Organic Evolution - Paleontological evidences: Fossils: Definition, fossil formation and types (Petrification, preservation, impressions, moulds and casts). Dating of fossils: Uranium-Lead method, Carbon method, Potassium–Argon method. - Morphology and Anatomical evidences: Homologous structures (Fore limb of vertebrates, mouth parts of insects), analogous structures (cephalopod eye and vertebrate eye, wing of insect and bird). - Embryological evidences. - Adaptive radiations (Darwin finches) and atavism. - Human evolution: Salient features of man, Important fossil stages of man: Dryopithecus, Ramapithecus, Australopithecus, Java man, Neanderthal man and Cromagnon man.	

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Formative Assessment for Theory	
Assessment Occasion / type	Marks
House Examination/Test	10

Written Assessment/Presentation/Project/Term Papers/Seminars	05
Classroom Performance/Participation	05
Total	20 Marks

References:

1. Developmental Biology: Michael J. F. Barresi, Scott F. Gilbert, Oxford University Press. (2019).
2. T. Subramaniam, Developmental Biology: (Reprint), Narosa Publishing House Pvt. Ltd., New Delhi.
3. A Text Book of Embryology (Developmental Zoology) by N Arumugam, Saras Publication (2014).
4. Developmental biology: Werner A. Müller, Springer Science & Business Media. (2012).
5. Human Embryology and Developmental Biology E-Book: Bruce M. Carlson, Elsevier Health Sciences.
6. A Text Book of Organic Evolution by Dr. Himanshu Arora, Dr. Mohan P. Arora.
7. Organic Evolution by Dr. N. Arumugam, Saras Publication.
8. Organic Evolution: Evolutionary Biology by Veer Bala Rastogi, Kedar Nath Ram Nath.

VI SEMESTER B.SC., ZOOLOGY PRACTICAL SYLLABUS
PRACTICAL PAPER VI: DEVELOPMENTAL BIOLOGY AND ENVIRONMENTAL BIOLOGY

Program Name	B.Sc.	Semester	VI
Course Title	Developmental Biology and Environmental Biology		
Course Code:	DSCZOO-P6	No. of Credits	2
Contact hours	45 Hours	Duration of SEA/Exam	3 hrs.
Formative Assessment Marks	10	Summative Assessment Marks	40

Course Out comes (COs): After the successful completion of the course, the student will be able to:

- CO1:** Perform microscopic examination of early and late embryonic development in frog and chick through observation of permanent slides, models, and specimens.
- CO2:** Understand the process of metamorphosis in frog and correlate structural changes with functional adaptations during development.
- CO3:** Differentiate morphological and histological types of placenta and relate their structure to functional significance in mammals.
- CO4:** Perform basic water quality assessment techniques including collection of water samples and estimation of selected parameters such as dissolved oxygen, carbon dioxide, hardness, and salinity.
- CO5:** Analyse animal adaptations and associations by correlating structural modifications with their ecological significance.

Sl. No	Practical Contents	10 Units
1	Early development of Frog: Egg, Cleavage, Blastula, Gastrula and Neurula.	1
2	Late development of Frog: Metamorphosis (Tadpole to young Frog)	1
3	Development of Chick: Avian sperm and Hen's egg: Egg, 18 hrs, 24 hrs, 36 hrs and 48 hrs incubation stages.	2
4	Placenta: Morphological and histological types.	1
5	Limnological Experiments: Estimation of Dissolved Oxygen (O ₂), carbon dioxide (CO ₂), hardness and salinity in different water samples. (Any three experiment to be conducted)	3
6	Animal Adaptations: • Tubiculous forms: Chaetopterus • Fossorial (Burrowing) forms: Dentalium. • Sedentary forms: Sea anemone. • Flight adaptations: a. Passive fliers: Exocoetus b. Active fliers: Bat • Animal associations: Facultative mutualism: Hermit crab and Sea anemone • Arboreal forms: Hyla • Desert forms: Phrynosoma • Mimicry: Chameleon	2

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Formative Assessment for Practical	
Assessment Occasion/type	Marks
House Examination/Test	05
Class room Performance/Participation	05
Total	10 Marks

VI SEMESTER B.SC., ZOOLOGY THEORY SYLLABUS
THEORY PAPER VIII: ENVIRONMENTAL BIOLOGY AND BEHAVIOURAL BIOLOGY

Program Name	B.Sc.	Semester	VI
Course Title	Environmental Biology and Behavioural Biology		
Course Code:	DSCZOO-T8	No. of Credits	3
Contact hours	56 Hours	Duration of SEA/Exam	3 hrs.
Formative Assessment Marks	20	Summative Assessment Marks	80

Course Out comes (COs): After the successful completion of the course, the student will be able to:

- CO1:** Understand fundamental concepts of ecology, population, community interactions, and climate change.
- CO2:** Analyse population parameters and community relationships, and interpret ecological data related to growth patterns, dispersion, and interspecific interactions.
- CO3:** Understand wildlife management principles, conservation strategies, and wildlife protection policies.
- CO4:** Illustrate the concepts and mechanisms of animal behaviour, including stereotyped and learned behaviours, communication systems, social organization, and reproductive strategies.
- CO5:** Analyse behavioural adaptations such as courtship, parental care, territoriality, chronobiology, pheromonal communication, and bioluminescence for their role in survival and evolutionary success.

Contents	56 hrs
Unit - I	14 hrs
Environmental Biology: - Fundamentals of Ecology: a. Sub-divisions and Scope of Ecology. b. Concept of habitat: Micro-habitat and Macro-habitat. c. Concept of Ecological Niche: Spatial, Trophic and Multidimensional. d. Abiotic factors: Light, Temperature and Soil. - Population Ecology: Density, Natality, Mortality, Age distribution, Growth, Dispersion and Biotic Potential. - Community Ecology: Interspecific interactions – Negative (Antibiosis, Competition, Parasitism and Predatism) and Positive (Commensalism, Co-operation and Mutualism). - Scientific understanding in climate change - greenhouse effect, forest fire, melting of iceberg, ocean warming and coral bleaching.	
Unit - II	14 hrs
Wildlife Management: - Definition, value and importance of wildlife; Causes of depletion of wildlife; Inventory and classification of wetland and animal inhabitants; Population vulnerability analysis and its components. - Red Data Book – Definition and salient features. - Wildlife conservation: In situ conservation - Wild life sanctuaries, National parks and Biosphere reserves. Ex situ conservation - Zoological gardens, Botanical gardens. - Project Tiger, Project Elephant, Project Lion, Wildlife Protection Act 1972. - Concept of home range, wildlife corridors and territory, animal census, tracing movement and remote sensing and GIS.	

Unit - III	14 hrs
Animal Behaviour – I - Ethology / Animal Behaviour: Definition and Introduction, brief contributions of Karl Von Frisch, Ivan Pavlov, Konrad Lorenz, Niko Tinbergen. - Patterns of behavior: a. Stereotyped behaviour: Kinesis, Taxes, Reflexes, Instincts and Motivation with suitable examples. b. Acquired behaviour (Learnt behaviour): Imprinting, Habituation, Trial and Error learning, Insight learning. c. Associative learning: classical, operant conditioning and observational learning. - Kinds of behavior - Foraging behaviour, Territorial behavior, Mate selection and Courtship behavior, Parental care, Defensive behavior, Allelomimetic and Maladaptive (abnormal) behaviour. (Definition with one example)	
Unit - IV	14 hrs
Animal Behaviour – II: - Communication in Animals: Introduction and its types. a. Visual Communication - Dance of honey Bees (Waggle dance), Toad prey capture b. Auditory communication - sound localization in owls, echolocation in bats. c. Chemical communication (Pheromones): Definition and types, Pheromones in insects and mammals. - Social Behaviour: Introduction, Aggregations - Schooling in fishes, flocking in birds, herding in mammals, group selection, Kin selection, Territoriality and Altruism. - Social Organization in Ants and Monkeys. - Courtship behavior, Mimicry, Sexual dimorphism, Mate choice in peacock. - Nesting behavior in Weaver bird and Tailor bird. - Chronobiology: Definition, Biological clocks: Biological rhythms, Circadian and circannual rhythms. Advantages of biological rhythms.	

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

Note: Field visit to nearby National park/ Wildlife sanctuary to study the behavior of the animals or Social Organization in Termites and Primates (observation of termites behaviour in Termitaria and monkey's behavior in parks) at the end of semester is compulsory and the report of this is to be submitted as a part of IA marks.

Formative Assessment for Theory	
Assessment Occasion / type	Marks
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Classroom Performance/Participation	05
Total	20 Marks

References:

- Colinvaux P. A.(1993) Ecology (2nd edition) Wiley, John and Sons, Inc.
- Krebs C. J.(2001) Ecology (6th edition) Benjamin Cummings.
- Odum E.P., (2008) Fundamentals of Ecology. Indian Edition. Brooks/Cole. (3rd Edition) BlackwellSci.

4. Kendeigh FC.(1984) Ecology with Special Reference to Animal and Man. Prentice HallInc.
5. Caughley,G. and Sinclair, A.R.E.(1994) Wildlife Ecology and Management. Blackwell Science. Animal Behaviour by Drickamar.
6. An Introduction to Animal Behaviour, Manning and Dawkins (2012), 6th Edition, Cambridge University Press.
7. Animal Behaviour, John Alcock, Sinauer Associate Inc., USA.
8. Introductory Zoology, Vol 8, C M Vimala, Interline Publication (2010).
9. Exploring Animal Behaviour, Paul W. Sherman and John Alcock, Sinauer Associate Inc., Massachusetts, USA.
10. Biological Rhythms: Vinod Kumar (2002) Narosa Publishing House, Delhi/ Springer-Verlag, Germany.

VI Semester B.Sc., Zoology Skill Enhancement Course Practical Syllabus
INTERNSHIP / PROJECT

Program Name:	B.Sc.	Semester:	VI
Course Title:	Internship / Project		
Course Code:	SEC - 3	No. of Credits:	2
Contact hours:	90 Hours	Duration of SEA/Exam:	2 hrs.
		Hours / Week:	3
Formative Assessment Marks:	10	Summative Assessment Marks:	40

1. Introduction

The Internship Programme is a mandatory component of the Undergraduate (UG) curriculum. It is designed to provide students with practical exposure to real-world work environments, enabling them to apply theoretical knowledge, develop professional skills, and gain industry or field experience relevant to their discipline.

2. Duration of Internship

- The internship shall be undertaken during the **VI Semester** of the programme as prescribed in the curriculum.
- The duration of the internship shall be **4 to 6 weeks / 90 hours** as prescribed by the University.
- Students may complete the internship in industries, research laboratories, hospitals, NGOs, government organizations, educational institutions, or other relevant organizations related to their subject.

3. Approval of Internship

- The internship organization must be approved by the Head of the Department (HoD) or Internship Coordinator.
- Students must submit an internship proposal or consent letter from the organization before commencing the internship.

4. Attendance and Conduct

- Students must maintain at least 90% attendance during the internship period.
- They must follow the rules, discipline, and work ethics of the host organization.
- Any misconduct or absence without permission may lead to cancellation of the internship.

5. Internship Report Submission

- At the end of the internship, students must submit a detailed Internship Report certified by the Supervisor, Authority of the Host Organization and HOD / HOI.
- The report should include:
 - a) Introduction of the organization.
 - b) Objectives of the internship.
 - c) Work carried out / training received.
 - d) Skills learned and observations.
 - e) Conclusion and learning outcomes.

7. Evaluation of Internship (Total: 50 Marks)

Sl. No.	Component	Marks
1	Attendance and Performance at Organization (Certified by Supervisor)	10
2	Internship Report / Record	30

Sl. No.	Component	Marks
3	Presentation / Viva-Voce	10
	Total	50 Marks

7. Viva-Voce Examination

- Students must give a presentation or appear for a viva-voce before the departmental committee.
- The committee may consist of HoD, Internship Coordinator and subject faculty members.

8. Certification

- Students must submit the Internship Completion Certificate issued by the host organization along with the report.

9. Passing Criteria

- Students must obtain a minimum of 40% marks in the internship evaluation to pass.
- Students who fail to complete the internship or submit the report must repeat the internship as per departmental guidelines.

SCHEME OF PRACTICAL EXAMINATION

V Semester B.Sc., Zoology

Paper V: Animal Physiology, Biostatistics and Techniques in Biology

Duration: 3 hrs

Max. Marks: 40

1.	Physiological Experiments: Oxygen consumption / salt lost or salt gained by crab / Carbohydrates and Proteins / Nitrogenous waste products	12 marks
2.	Biostatistics Problem: Any two (Grouped Data)	10 marks (5 x 2 = 10)
3.	Techniques In Biology: Chromatography / Micrometry / Haemocytometer	08 marks
4.	Project Report Submission	05 marks
5.	Class Records	05 marks
	Total	40 marks

Scheme of Valuation

1. Physiology Experiments: Performance – **04M**, Principle – **02M**, Procedure – **03M**,
Result – **01M**, Discussion – **02M**.
2. Biostatistics: One problem from Mean, Mode, median and SD – **05M**
Second Problem from Chi-square test - **05M**
3. Techniques in Biology: Performance – **03M**, Principle – **02M**, Calculations – **02M**,
Result – **01M**

SCHEME OF PRACTICAL EXAMINATION

VI Semester B.Sc., Zoology

Paper VI: Developmental Biology and Environmental Biology

Duration: 3 hrs

Max. Marks: 40

1.	Identify and comment on A to C with neat labelled diagrams. (Embryological slides: One from Frog , one chick and one mammalian placenta)	12 marks (3 x 4 = 12)
2.	Limnology Experiments: (DO / salinity / CO ₂ / hardness) – Any one	10 marks
3.	Ecological Adaptations: Identify and Comment on D and E with their ecological adaptive characters with neat labelled diagrams.	08 marks (2 x 4 = 8)
4.	Viva voce (Pertaining to the practical syllabus)	05 marks
5.	Class Records	05 marks
	Total	40 marks

Scheme of Valuation

1. Spotters: Identification – **01M**; Comments – **02M**, Diagram – **01M**
2. Experiment performance – **03M**, Principle – **02M**, Procedure – **03M**, Result – **01M** and Discussion – **01M**.
3. Spotters: Identification – **01M**; Comments – **02M**, Diagram – **01M**
4. **Viva voce** – Any 5 questions from the practical syllabus – **05M**

