Proposed draft Syllabus for B.Sc. II Zoology

Submitted to

Yashavantrao Chavan Institute of Science, Satara
(Autonomous)

Under
Choice Based Credit System (CBCS)
(June 2019-2020)
B.Sc. Part II Zoology

Semester III

Paper V: Animal Diversity II
Paper VI: Biochemistry

Semester IV

Paper VII: Reproductive Biology
Paper VIII: Applied Zoology

Yashavantrao Chavan Institute of Science, Satara
(Autonomous)
Syllabus for Bachelor of Science Part II

I)Title: Zoology

II) Year of Implementation: 2019-2020

III) Structure of Course:

1. Structure of Syllabus:

B.Sc. – II **Semester –III**

Sr. No.	Course Title	Theory			Practical		
		Paper No.& Paper Code	No. of lectures Perweek	Credits	Course Title	No. of lectures per week	Credits
1	Zoology	Paper-I: BZT301	3	2	Practical Paper – I : BZP303	8	4
		Paper-II: BZT302	3	2			

B.Sc. – II **Semester –VI**

Sr. No.	Course Title	Theory			Practical		
		Paper No.& Paper Code	No. of lectures Per week	Credits	Course Title	No. of lectures Per week	Credits
1	Zoology	Paper-III: BZT401	3	2	Practical Paper – II: BZP403	8	4
		Paper-IV: BZT402	3	2			

Note: B: B. Sc. T=Theory and P= Practical

Evaluation Structure:B. Sc. II Sem-III & IV (Zoology)

Semester	Paper No.& Code	ESE	InternalExam		Paper No. & Code	Practical		Submission		**Total**
			ISE I	ISE II		Exam	Journal	Seminar	Day to Day Performance	
	Paper I :BZT301	30	5	5	Pr. Paper I: BZP 303(A)	25	5	5	5	**150**

III	Paper II :BZT302	30	5	5	Pr. Paper I: BZP 303(B)	25	5			
	Total	60	10	10	Total	50	10	5	5	**150**
IV	Paper III BZT 401	30	5	5	Pr. Paper II: BZP 403(A)	25	5	5	5	**150**
	PaperIV :BZT 402	30	5	5	Pr. Paper II: BZP 403(B)	25	5			
	Total	60	10	10	Total	50	10	5	5	**150**
Total of Sem. III &IV		120	20	20	Total	100	20	10	10	**300**

III[rd] Semester – Number of papers 2

B.Sc. II Zoology

Second Year – Number of papers II

Paper V:

Animal Diversity II

Paper VI:

Biochemistry

IV[th] Semester – Number of papers 2

B.Sc. II Zoology

Second Year – Number of papers II

Paper VII:

Reproductive Biology

Paper VIII:

Applied Zoology

B. Sc. Part II Semester- III

ZOOLOGY

PAPER-V

BZT-301 (ANIMAL DIVERSITY-II)

Theory: 36 hrs. (45 lectures of 48 minutes)

Marks-50 (Credits: 02)

Learning Objectives:

1. To acquire knowledge of biology in diversity of organism.
2. Students will be able to explain and apply the fundamental concepts of animal diversity.
3. Students will be able to communicate scientific information
4. Students should able to explain characteristics and classification.

Unit 1:

Protochordates: (5)

General features and Retrogressive metamorphosis in Ascidian tadpole (Eg. Herdmania)

Agnatha: (5)

General features of Agnatha and classification of cyclostomes up to classes.

Pisces: (6)

General features and Classification up to order:Swim bladder, Breeding and parental care in fishes

Amphibia: (7)

General features and Classification up to order: Neoteny and Parental care in Amphibia (Order:Anura, Apoda, Urodela) Icthyophis

Unit 2:

Reptiles: (7)

General features and Classification up to order:Venomous and non-venomous snakes, Bitingmechanism in snakes. First Aid Treatment, Sources of treatment (Govt. hospitals)

Information of Haffkin institute.

Aves: (7)

General features and Classification up to order: Brain of fowl,

Aerial Adaptations in birds (Morphological, Anatomical and Physiological).

Mammals: (8)

General features and Classification up to order:Study of Adaptive radiations in mammals, (Duck Billed Platypus, Kangaroo, Bottle nose Dolphin, Blue Whale, Scaly ant eater, Spiny ant eater)

Learning Outcomes:

1. Students should learn about classification and general characters of animals.
2. Should will learn difference between venomous and non-venomous snake.
3. Student should learn to apply treatment for snake bite.
4. Students should learn to classify animal's upto orders.

References:

1. **Chordate Zoology-Jhordan & Verma – (Unit 1)**
2. **Chordates- V.S.Verma- S.Chand Publication- (Unit 1)**
3. **Vertebrate Zoology- P.S.Dhami- S.Chand Publication (Unit 1 & 2)**
4. **Modern textbook of Zoology- Vertebrates 2nd edition- R.L.Kotpal –Rastogi Publication (Unit-2)**
5. **Zoology of chordates- Nigam- (Unit 1)**
6. **Fundamental of Zoology-Verma and Dudhane (Unit 2)**
7. **Practical Zoology –Vertebrates-R.L.Kotpal (Unit 1,2)**
8. **Mannual of Practical Zoology –Chordates-P.S.Verma (Unit 1)**
9. **Textbook of Zoology- S.S.Lal (Unit 1,2)**
10. **Vertebrate Zoology –R.L.Kotpal (Unit 1,2)**

B. Sc. Part II Semester- III

ZOOLOGY

Paper-VI

BZT-302 (BIOCHEMISTRY)

Theory: 36 hrs. (45 lectures of 48 minutes)

Marks-50 (Credits: 02)

Learning Objectives

1. Students will be able to acquire the specialized knowledge relevant to biochemistry.
2. Students will be able to demonstrate and understanding the biochemical principles.
3. Students will be able to understand basic laboratory technique in both chemistry and biology
4. Students will be able to apply the scientific method to the experiments.

Unit 1:

Water: Molecular structure of water, Properties of water and Significance of water**(5)**

Unit 2.

Nucleic acids:

1. **DNA and RNA**.Types ,Structure and functions **(5)**
2. **Carbohydrate Metabolism:** Classification, Glycolysis, Krebs Cycle, **(10)** Pentose Phosphate Pathway, Gluconeogenesis, Biological Significance. Metabolic disorders of Carbohaydrate metabolism (Diabetes mellitus)

Unit 3:

Lipid Metabolism: (8)

Classification and β oxidation of palmitic acid, Biological Significance.

Lipid profile disorder(Obesity)

Protein metabolism: (8)

Classification,Transamination, Deamination and Urea Cycle,Biological Significance.

Disorders of Protein Metabolism(Common any two)

Enzymes: (9)

Introduction (Classification and structure),Mechanism of enzymeaction, Biological Significance, serum glutamic-oxaloacetic transaminase(SGOT), serum glutamate pyruvate transaminase (SGPT) tests.

Learning Outcomes:

1. Students should understand properties and significance of water.
2. Student should learn interaction and interdependence of biochemical process.
3. Student should know about synthesis of proteins, lipids and role in metabolic pathway.
4. Students Should understand types of enzymes and their mechanism .

References:

1. **Biotechnology and biochemistry- U.Sattyanarayana (Unit 3&4)**
2. **Elements of Biochemistry- H.S.Shrivastava- (Unit 1)**
3. **Animal Physiology and Biochemistry- Agarwal (Unit 2& 3)**
4. **Textbook of Biochemistry-Arumugam (Unit 2,3)**
5. **Cell biology,Genetics,Molecular biology and Evolution-P.S.Verma (Unit 1,2,3)**
6. **Textbook of Biochemistry-Dubey (Unit 2,3)**
7. **Molecular biology of Gene-Lewin (Unit 2,3)**
8. **Bichemistry by Lehninger(Unit 1,2,3)**
9. **Elements of Biochemistry- Kohnstuff(1,2,3)**
10. **Concept of Biochemistry –Martin (Unit 1,2,3)**
11. **Medical Chemistry –Sood and Sood(Unit 2,3)**
12. **Biochemistry and Molecular biology –Wilson and Walker (Unit 1,2,3)**
13. **Tools and Techniques of Biochemistry –Twyman (Unit 2,3)**

B. Sc. Part II

ZOOLOGY PRACTICAL-I

BZP-303

Marks-50 (Credits: 02)

PRACTICAL-I (Based on Animal diversity-II and Biochemistry of Semester-III).

Learning Objectives

1. To develop scientific attitude which is the major objective, this makes the students open minded, critical observations, curiosity, thinking etc.
2. Abilities to apply scientific methods, collection of scientific data, problem solving, organize science exhibitions, clubs etc.

3. Appreciation of the subject, contribution of the scientists, scientific methods, scientific programmes etc.
4. Applications of the knowledge

Group A

Animal diversity-II:

1.**Study of the following specimens with reference to morphological peculiarities and classification upto orders:**Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, 2.**Study of the following specimens with reference to morphological peculiarities and classification upto orders** Labeo, Exocoetus, Anguilla, Ichthyophis, Ureotyphlus,

3.**Study of the following specimens with reference to morphological peculiarities and classification upto orders** Salamandra, Bufo, Hyla,

4**Study of the following specimens with reference to morphological peculiarities and classification upto orders** *Chelone,Hemidactylus, Chamaeleon, Draco,Crocodylus, Gavialis.*

5.Characters identifyingvenomous and non-venomoussnakes:Russell's viper, Saw scaled viper, Common krait, Indian Cobra, Sea snake, Rat snake and Checkered keel back, Sand bow.

6. Study of common birds from any sixdifferent orders.

7. Study of the following specimens with reference to morphological peculiarities and classification up to orders:*Sorex*, *Pipistrellus pipistrellus*, *Funambulus* and *Nycticebus bengalensis.*

An "**animal album**" containing photographs, cut outs, with appropriate write up about theabove mentioned taxa. Different taxa/ topics may be given to students forthis purpose.

8. Dissection of brain of fowl.

9. Temporary preparation of Hyoid apparatus, Sclerotic plate, Pecten of fowl.

10. Temporary preparation of Cycloid, Ctenoid and Placoid scales in fishes.

11. Desert adaptations in reptiles: Phyrenosoma, Chameleon, Crocodile, Wall lizard

12. Review article/work experience /project/visit

Group B

Biochemistry:

1. Qualitative tests of carbohydrates and lipid from given solutions (Glucose, Fructose, Sucrose, Lactose and Lipid).

2. Estimation of total protein in given solutions by Lowry's method/ Quantitative estimation of amino acids by using Ninhydrin reaction.

3. Study of activity of salivary amylase under optimum conditions.

4. DNA isolation from plant/animal.

5. Abnormal constituents of Urine and pathological significance.

6. Estimation of Blood glucose

7. Estimation of Blood Creatinine

8. Estimation of blood Cholesterol

9.Estimation of Blood Urea

Learning outcomes:-

1. Students will be able to identify organisms up to order level.
2. Students develop the skill of dissection of brain of fowl.
3. Students will be able to identifyCharacters ofvenomous and non-venomoussnakes.
4. Students understand Ethological peculiarities in desert animals.

Reference Books for Paper V and VI

1 Biochemistry. VI Edition. W.H Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006).

2. Textbook of Medical Physiology, XII Edition, Guyton, A.C. and Hall, J.E. (2011).

3 Evolution. IV Edition.-B.K. and Hallgrimsson, B. (2008

4. Harper's Illustrated Biochemistry. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009).

5. Principles of Biochemistry Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009

6. Vertebrate life, 8th Edition Pough H. (2008)., 7.Young, J. Z. (2004).. III Edition. Oxford

B. Sc. Part II Semester- IV

ZOOLOGY

Paper-VII

BZT 401 (REPRODUCTIVE BIOLOGY)

Theory: 36 hrs. (45 lectures of 48 minutes)

Marks-50 (Credits: 02)

Learning Objectives

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1. Students will be able to understand the scientific principles of reproduction.
2. Students will be able to understand human male and female reproductive anatomy.
3. Students will be able to understand role of male and female reproductive hormones.
4. Students will be able to understand modern approach about humaninfertility.

Unit 1:

Pituitary Gland: Hormones related to reproductive physiology (3)

Functional anatomy of female reproduction: (14)

Ovary:folliculogenesis, ovulation, corpus luteum formation and regression; and

Reproductive cycles in human and their regulation,changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in thefemale tract, fertilization; Hormonal control of implantation; Hormonal regulation ofgestation, Pregnancy diagnosis, Mechanism of parturition andits hormonal regulation; Lactation and its regulation.

Major disorders of pregnancy:Erythroblastosis foetalis

Miscarriage, Pre-eclampsia and Foetal growth restriction,

Unit 2:

Functional anatomy of male reproduction: (14)

Testis: Cellularfunctions, germ cell; Spermatogenesis; hormonalregulation; Epididymal function and sperm maturation;Accessory glands functions; Sperm transportation in male tract.

Abnormality, Prostatic hypertrophy, Causes and Types of Infertility

Unit 3: Reproductive Health: (14)

Infertility in male and female: Causes, diagnosis and management

Assisted Reproductive Technology: Sex selection, Sperm bank and laws,frozen embryos, invitro fertilization, Tubal Embryo Transfer (TET),Frozen Embryo Transfer(FET),Intra

Uterine Insemination (IUI), Zygote Intra Fallopian Transfer (ZIFT), Gamete Intra Fallopian Transfer (GIFT), Intra Cytoplasmic Sperm Injection, (ICSI), Modern contraceptive technologies.

Menstrual problems, Ectopic pregnancy, Endometriosis, Ovarian Tumors, Ovarian cysts, Ovarian torsion, Polycystic ovary.

Learning Outcomes:

1. Students will come to know aboutrole of hormones in reproductive system.
2. Students will understand mechanism in female reproductive system.
3. Students will understand mechanism in male reproductive system.
4. Students will be aware about the reproductive health.

References:

1. **Human Physiology-Guyton (Unit 1,2,3)**
2. **The Physiology of Reproduction-Knobil*, et al*. (2014). (4th eds). (Unit 3,4)**
3. **The Physiology-A.K.Berry (2,3)**
4. **Human Physiology –Genarld Karp (Unit 1,2,3)**
5. **Animal Physiology –Mohan Arora (Unit 1,2)**
6. **Human Physiology –P.S.Verma (Unit 1,2,3)**
7. **Gynacology-Shaw (Unit 1,2,3)**
8. **Human Obs.Gynac.-Datta (Unit 1,2,3)**
9. **Human Anatomy-P.S.Verma (Unit 1,2)**
10. **Medical Gyanacology –Devid and Mathew(Unit 1,2,3)**

B. Sc. Part II Semester- IV

ZOOLOGY

Paper-VIII

BZT- 402(APPLIED ZOOLOGY)

Theory: 36 hrs. (45 lectures of 48 minutes)

Marks-50 (Credits: 02)

Learning Objectives

1. Students will be able to know host parasitic relationship.
2. Students will be able to know economic importance of Dairy farming.
3. Students will be able to know aspects of poultry farming.
4. Students will be able know economic importance of Lac.

Unit 1:

Introduction to Host-parasite Relationship: (8)

Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis (Common Infectious Diseases)

Unit 2:

Epidemiology of Diseases: (8)

Transmission, Prevention and control of diseases: Tuberculosis, Herpes

Rickettsiae and Spirochaetes: Brief account of *Rickettsia prowazekii* and *Treponema pallidum.*

Unit 3:

Insects of Economic Importance: (8)

Biology, Control and damage caused by *Helicoverpa armigera, Pyrilla perpusilla* and *Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae, Tribolium castaneum*

Unit 4:

Poultry Farming: Indigenous and Exotic breeds **(10)**

Principles of poultry breeding, Management of breeding stock and broilers, Processing and Preservation of eggs. Atomization of Poultry

Poultry Diseases: Coccidiosis, avian Flu, Fowl pox, Botulism, Fowl chlorella

Dairy Farming:(9)

Management of model dairy farming

Common livestock diseases

Nutritive value of Milk products

Lac culture: Life cycle of Lac insect and Economic importance of Lac **(2)**

LearningOutcomes:

1. Students should understand host-parasitic relationship.
2. Students will learn about transmission,control and prevention about diseases.
3. Students should learn about insect biology and control.
4. Student should apply poultry and dairy farming in career.
5. Students will be able to start their own business.

References:

1. **Applied Zoology- Dairy Farming –Dr.N.Arumugam- Saras Publication (Unit 4)**
2. **Textbook on applied entomology. K.P.Shrivastava (Unit 3)**
3. **Elements of Entomology- Rajendra Singh- (Unit 1,2,3)**
4. **Applied Zoology by R.L.Kotpal (Uint 1,2,3,4)**
5. **Economic Zoology by Manju Yadav (Unit 3,4)**
6. **Economic Zoology –Shailendra Singh (Unit 3,4)**
7. **Animal Husbundry by Ashok Kumar (Unit 1,2,3,4)**
8. **Applied Zoology by N. Arumugam (Unit 3,4)**

B. Sc. Part II

ZOOLOGY PRACTICAL-II

BZP-403

Marks-50 (Credits: 02)

PRACTICAL-II (Based on Reproductive Biology and Applied Zoology of Semester-IV).

Learning Objectives

1. To develop skills in practical work, experiments and laboratory materials, instruments
2. To develop interest in the subject and scientific hobbies.
3. The students are expected to acquire the knowledge of animal science, natural phenomenon, manipulation of nature and environment by man.
4. Understanding the scientific terms, concepts, facts, phenomenon and their interrelationships.

Group A

Reproductive Biology:

1. Study of animal house: Set up and maintenance of animal house, ,
2. Study of animal house:Breeding techniques
3. Study of animal house:care of normal and experimental animals.
4. Study of stages of estrus cycle through permanent slides.
5. Examination of histological sections from photomicrographs/ permanent slides ofrat: Sections of testis, epididymis and accessory glands of male reproductive systems.
6. Examination of histological sections from photomicrographs/ permanent slides ofrat: Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervix and vaginaof female reproductive systems.
7. Sperm count and sperm motility.
8. Study of modern contraceptive devices (Photographs).
9. Visit to gynecology section
10. Awareness regarding population explosion

Group B

Applied Zoology:

1. Study of arthropod vectors associated with human diseases: *Pediculus, Culex, Anopheles, Aedes* and *Xenopsylla.*
2. Study of insect damage to different plant parts/stored grains through damaged Products/photographs.
3. Identifying feature and economic importance of *Helicoverpa* (*Heliothis*) *armigera, Papilio demoleus, Pyrilla perpusilla,*

4. Identifying feature and economic importance of*Callosobruchus chinensis, Sitophilus oryzae* and*Tribolium castaneum.*

5. Poultry: Egg and Meat Nutritive value

6. Poultry diseases-

7. Dairy: Nutritive value of Milk Products: Curd, Buttermilk, Ghee, Paneer, Cheese

8. Life cycle of lac insect

9. Economic importance of Lac

10. Field trip to poultry farm or animal breeding center or any other suitable place related to

Syllabus. Submission of field trip report (Printed/Hand writings).

Learning outcomes:-

1. Students will be able to acquire the knowledge of applied Zoology for the development own business (Income generation).
2. The students will be able to identify organisms in their own habitat with the help of study tour.
3. Calculate nutritive value of required daily food.
4. Students will study the vectors of human disease.

Reference Books for Paper VII and VIII

1. Medical Parasitology. II Ed Arora, D. R and Arora, B. (2001)..

2. Agricultural Pests of India and South East AsiaAtwal, A.S. (1986)

3. Reproduction in Mammals. Austin, C.R. and Short, R.V. (1982).

4. The Insects: Structure and Function.IV Edition-Chapman, R.F. (1998)., 5.Dennis, H. (2009). Agricultural Entomology. Timber Press (OR).

6. Endocrinology. W.B. Saunders and Company-Degroot, L.J. and Jameson, J.L. (2010).

7. Aquaculture and Fisheries Biotechnology Genetic Approaches Dunham R.A. (2004)..

8. Reproduction in Farm Animals. Hafez, E. S. E. (1962).

9. The Physiology of Reproduction Knobil, *et al.* (2014). (4th eds

10. Preventive and Social Medicine. XVI Edition Park, K. (2007).

11. Entomology and Pest Management.Pedigo L.P. (2002).

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B+ Accredited

By NAAC 2009

Revised Syllabus

For **Bachelor of**

Science (Part -

II) ZOOLOGY

(Subject to the modifications to be made from time totime)

Syllabus to be implemented from June - 2014onwards.

Revised syllabus – (As per U.G.C. guidelines) for B.Sc. II Semester III & IV Zoology to be submitted to the Shivaji University, Kolhapur (To be implemented from **June 2014**)

B.Sc. II Semester III & IV

Zoology Aims and Objectives-

A) Aims-

1) To impart the knowledge of animal science to thepupils.

2) To make the pupil to use the knowledge in their dailylife.

3) To make the pupil aware of natural resources andenvironment.

4) Application of knowledge in Zoology for nutrition, agriculture &livestock.

5) To provide practical experiences which form a part of their learning processes.

6) To develop aptitude for scientific work & ability to pursue studies far beyond graduation.

7) To encourage the pupil to take life science as a carrier which is the need now adays.

8) To make the pupils fit for thesociety.

B) Objectives-

1) To impart knowledge is the basic aim of education. The students are

expected to acquire the knowledge of animal science, natural phenomenon, manipulation of nature & environment byman.

2) Understanding the scientific terms, concepts, facts, phenomenon &their interrelationships.

3) Applications of theknowledge.

4) To develop skills in practical work, experiments & laboratory materials, instruments.

5) To develop interests in the subject & scientifichobbies.

6) To develop scientific attitude which is the major objective. This makes the students open minded, critical observations, curiosity, thinkingetc.

7) Abilities to apply scientific methods, collection of scientific data, problem solving, organize science exhibitions, clubsetc.

8) Appreciation of the subject, contributions of scientists, scientific methods, scientific programsetc.

Duration – The course shall be full time three years degree course

Pattern – For Theory semester & for practicals annual.

Medium of Instruction – English

Structure ofCourse- B.Sc.-IIZoology

Sem. III			
Sr.No	Paper No.	Marks	
		Paper	
1	Paper V	50 marks	
2	Paper VI	50 marks	
	Sem. IV		

3	Paper VII	50 marks	
4	Paper VIII	50 marks	
	Practical (Annual)		
1	Practical 1	50	----
2	Practical 2	50	----
	Grand Total		**300**

Scheme of Teaching –

Sr.No.	**Theory Paper**	**Lectures**
1	Sem -III Paper V	3
2	Paper VI	3
3	Sem- IV Paper VII	3
4	Paper VIII	3

Practical

Sr.No.	**Practical Paper (Annual)**	**Lectures**
1	Paper V	4
2	Paper VI	4
3	Paper VII	4

4	Paper VIII	4

(**Note** – 3 Lectures per paper per week for theory & 4 lectures per paper per week for practical)

SCHEME OF EXAMINATION

Question paper will be set in the view of the / in accordance with the entire syllabus and preferably covering each unit of syllabi.

EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS (FOR REVISED SYLLABUS)

Refer last page

OTHER FEATURES

. Required Books,and Journals are stated in each syllabus of Part I, Part II and Part III of Zoology andFisheries.

A) LIBRARY:

Reference books,Text Books, Journals and Periodicals.Reference Books for Advanced Studies.

B) SPECIFIC EQUIPMENTS: Necessary to run the Course (T.V., L.C.D.,and Overhead Projector), (Computer and necessary soft wares , operating systems, internet .
etc.)

C) LABORATORYSAFETY

- Fire Extinguishers at least two sets in each laboratory. (Lab. area 600sq.ft.)
- Leakage of gases be avoided.
- Primary medical aid box (First AidKit)
- Sugar / Glucose – 500 gm pack: Pinch of sugar and a cup of drinking water in hypoglycemic condition. OR In extreme weakness of student or

personconcerned.

- Rules of animal ethics should be strictlyfollowed.

D) LABORATORYINSTRUCTIONS

1) Always wear an apron inside the laboratory. Do not wear itoutside.

2) Do not drink or eat inside thelaboratory.

3) Do not place pencil, fingers or any material in the mouth. Moisten labels withwater.

4) Use microscopes and other instrumentscarefully.

5) Discard all used glassware such as test tube, pipettes, petry-plates, glass slides in a receptacle meant forit.

6) Put cotton plugs, papers, matches, waste dissection material etc. in a waste-paper basket. Do not throw them in sink not leave them on desk orfloor.

7) Regard all cultures as pathogenic. Take every precaution againstinfection.

8) Report all accidents to the concerned teacherimmediately.

9) Wash hands thoroughly with soap and water before and after dissection andexperiment.

10) Always turn off water, gas and electricity before leaving thelaboratory.

11) When students enter in lab. they should have – A Laboratory Journal, pencil and eraser, foot rule, dissection box with dissecting instruments, a smallnapkin.

12) All drawings must be made with drawing pencilonly.

13) As the journal is to represent student's bonafide work during the whole year, student should keep it as clean as possible and do not looseit..

14) Students should not forget that unless their journals are certified, they are not allowed to appear for the universityexamination.

B.Sc. II Zoology
Semester III

Paper V - Animal Diversity-III

A) Lectures / Contact Hours per unit :11
B) Contact hours per practical : 04

4
5

UNIT I : Study ofNonchordates

A. Salient features and Classification up to classes of thefollowingwith Suitable examples: **10**

i. Arthropoda
ii. Mollusca
iii. Echinodermata
iv. Hemichordata

B. Amazinginvertebrates:
i. Bioluminescence inFirefly**.**
ii. Parental care in mudwasp.
iii. Courtship in Prayingmantis.
iv. Protective behavior insepia

1
1

UNIT II : Study of phylum Arthropoda

A. Crab:
i Systematic
position ii
Habits and
habitat

iii. Morphology.
iv. Nervoussystem.

B. Cockroach:
i Systematic
position ii
Habits
andhabitat

iii. Morphology.
iv. Study of digestivesystem.
v. Study of excretorysystem.

vi. Nervoussystem
vii. Study of reproductivesystem.
viii. Cocoonformation
ix. Controlmeasures

1
2

UNIT III : Study of phylum
Mollusca Pila:

i Systematic
position ii .
Habits and
habitat.

iii. Morphology – Shell and pallial complex.

iii. Study of digestivesystem.
iv. Study of respiratorysystem.
v. Study of nervoussystem,
vi.Studyof sense organs- osphradium andstatocyst.
vii. Study of reproductivesystem.

1
2

UNIT IV : Study of following general topics in Nonchordates

A. Mouthparts ininsects:
i. Cockroach
ii. Honeybee
iii. Housefly
iv. Mosquito- Anopheles &Culex
v. Butterfly
B. Foot inMollusca
C. Pedicellariae inEchinodermata
D. Affinities inHemichordata

Paper – VI Genetics and Biological Chemistry

4
5

UNIT I : GeneticsPartI **12**

A. Linkage and Crossingover

i. Incomplete and completeLinkages.
ii. Mechanism of Crossingover.
iii. Cytological evidence of Crossingover.
iv. Significance of Linkage and Crossingover.

B. Sexdetermination.

i. SexChromosomes.
ii. ChromosomalTheory.
iii. Genic BalanceTheory.
iv. Environmentally controlled sex determination(Bonelia)

C. Gynandromorphs.

i. Types ofgynanders.
ii. Causes of formation ofgynanders.
iii. Examples with morphologicalcharacters.

UNIT II : Genetics Part II **10**

A. Interaction of genes.

i. Supplementary genes with suitableexample
ii. Complementary genes with suitableexample
iii) Inhibitory genes with suitable example

B. Lethal Genes.

i. Fully lethal genes with suitableexample
ii. Semi lethal genes with suitableexample.

C. Twins inhuman

i. Types ofTwins
ii. Origin ofTwins
iii. Environmental influence on twins

UNIT III : Biological Chemistry PartI **10**

A. pH and Buffers.

i. Water Properties, Dissociation andSignificance.
ii. pH definition , Henderson-HasselblanchEquation.
iii. Buffers in BiologicalSystems.

B. Classification and Biological Significance of -

i. Carbohydrates
ii. Proteins
iii. Lipids.

UNIT IV : Biological Chemistry Part II **13**

A. Nucleic Acids.

i. DNA- Structure and BiologicalSignificance.
ii. RNA- Structure, Types and BiologicalSignificance.

B. Enzymes.
i. Classification(outline)
ii. Characteristics ofenzymes.
iii. Mechanism of enzyme action with suitableexample.
iv. Factors controlling enzymeaction.
v. Isoenzymes, Co-factors andCo-enzymes.

C. Significance of metal ions with reference to human body
i. Iron ii. Calcium iii. Sodium iv. Potassium v. Iodine

List of Reference Books:

1. The invertebrates: Hyman. L.H.
2. Arthropoda, Mollusca and Echinodermata:Kotpal.R.L.
3. Mollusca:Mortan.J.E.
4. Echinodermata: Nichols,D.
5. Students Text-Book of Zoology: Sedgwick. A (Vol.I toIII).
6. Invertebrate Zoology;Barnes.
7. Biology of Higher Invertebrates:Russell-Hunter.
8. Invertebrate Zoology: Jordan, E.L. and Verma,P.S.
9. The Text-Bo0ok of Invertebrate Zoology. Agarwal, V.P. andDakeka.R.C
10. Invertebrates:Kotpal.R.C.
11. Principles of Modern Zoology: Nigam.H.C.
12. A Textbook of Invertebrate Zoology. Prasad.S.N.
13. A Textbook of Invertebrate Zoology:Srivastava.M.
14. Cell and Molecular Biology. Derobertis.
15. Genetics: M.W.Strickberger, NewYork.
16. Principles of genetics: Sinnot, Dunn andDobzansky.
17. Principles of genetics: EdidonGardner.
18. Molecular Biology of the Dell. Alberts, Bray/Raff/Roberts andWatson.
19. The Molecular biology of the Gene. J.D.Watson.
20. Cell Biology:C.B.Powar.
21. Outline of Biochemistry. Conn.E.E. and Stumpf. P.Y.
22. Biochemistry: Leninger. A.L.
23. Biochemistry:Das;
24. Biochemistry Vikl IDasgupta.S.K.
25. Textbook of Biochemistry: Rao.K.R.
26. Textbook of Biochemistry: West. E.S., Todd, W.R., Mason.H.S. And Van Bruggen,J.T.
27. Review of Physiological Chemistry: Harper.H.A.
28. Molecular Biology: Gupta.P.K.

29. Genetics: Gupta.P.K.

Zoology

Semester IV

A) Lectures / Contact Hours per unit :11
B) Contact hours per practical : 04

Paper VII Animal Diversity - IV

4
5

UNIT I: Studyof Chordates **10**
A. Salient features and classification of Reptiles, Birds and Mammals up to orders with suitableexamples.
B. Poisonous and non-poisonoussnakes.
i. Identificationcharacters.
ii. Poisonapparatus.
iii. Venom, antivenom production , effects ofvenom.
iv. Snake bite and first aidtreatment.

UNIT II : Study of Rat (*Rattus rattus*) -PartI **10**

i. Systematicposition.
ii. Habits andhabitat.
iii. Morphology.
iv. Study of digestivesystem.
v. Study of respiratorysystem.

UNIT III : Study of Rat(*Rattus rattus*)-PartII **13**

i. Study of circulatorysystem.
ii. Study of excretorysystem.
ii. Study of central nervous system.
iv. Study of sense organs - eye and ear.
v. Study of reproductivesystem.
vi. Controlmeasures.

UNIT IV : Study of the followinggeneraltopics **12**
i. AmazingVertabrates
a) Desert adaptations inPhrynosoma.
b) Flying adaptations in lizard(Draco)
c) Nesting habits in Swift &swallow
d) Aquatic mammals –Whale &Walrus
ii. Aerial adaptations inbirds.
iii. Dentition inmammals.

iv. Salient features and affinities of monotremes andmarsupials.

Paper – VIII Histology and Physiology

4
5

UNIT I : Histology of mammalian organsPart I **11**

i. Tooth
ii. Tongue
iii. Salivary gland (parotidgland)
iv. Stomach
v. Duodenum
vi. Ileum
vii. Liver
viii. Pancreas

UNIT II : Histology of mammalian organsPart II

1

1

i. Kidney
ii. Testis
iii. Ovary
iv. Uterus
v. Pituitary

UNIT III : PhysiologyPart I

1

1

i. Hormones of pituitarygland
ii. Sexhormones
iii. Oestrouscycle
iv. Menstrual cycle
v. Hormonal control of pregnancy, parturition and lactation vi . Hormonal control of testicularactivities

UNIT IV : PhysiologyPart II **12**

A) Contraception.

Types of

Contraceptives B..

Invitro fertilization:

i. Technique
ii. Significance

C. Bodydefence:

i. Immune system: a) Humoral immunity and itsmechanism.
b) Cellular immunity and its mechanism.
ii. Organs involved in immunesystem:
a) Bonemarrow
b) LymphaticNodes.

List of Reference Books:

1. Rat : Rowett
2. Rat : Kshirsagar
3. Studies on the structure and Development of Vertibrates:
Goodrich, E.S (Vol I &II)
4. Introduction to Chordates : ManjupuriaT.C
5. A textbook of zoology : Parkar, T.J and Haswell,W.A
6. A textbook of vertebrate Zoology : Prasad,S.N
7. The life of vertebrates : Younge, J.Z
8. Comparative Vertebrates Anatomy : Hayman,L.H
9. The anatomy of Garden lizard (Calotes versicolor);
Paranjpe, S.Y (Zoology monograph Pub. Uni. OfPoona).
10. Zoology of Chordates:Nigam,H.C.
11. The Text-Book of Vertebrate Zoology: Agarwal, IV, P and Dalela,R.C.
a. Chordates: Dhami andDhami.
b. Rat : Dhami andDhami.
12. Vertebrates: Kotpal,R.C.
13. Textbook of Histology: Bloom W and FawcettD.W.
14. Bailey's Textbook of Histology. Williams and Wilkins, Baltmore
and Scientific Book Agency, Calcutta: Copenhaver,W.M.
15. Histology: Lippinocott. Ham,A.W.
16. Histology: Greep, R.O and Well,L.
17. An Atlas of Histology. Heinemann Educational Book Ltd. London
And ELBS: Freeman. W.H. And Bracegirdle,B.
18. Microscopic Anatomy of vertebrates, Lea and Febigen.
Philadelphia: Kendall, J.I.
19. Histology of Mammals: Athavale, M.V and Latey,A.N.
20. Human Physiology: Chattergee, C.C.
21. Physiology: Guyton and Hall.

Detailed Syllabus of Practicals for B.Sc.Part-II (Zoology) Semester – III & IV (Annual Pattern)

Practical-I (Based on Paper V & VI)

Unit I

A. Classification and mophological peculiarities of the following up to classes.

(Sketches/Photographs may be used)

i. **Arthropoda** - Apus, Balanus, Lobster, Grasshopper, Butterfly, Moth, Millipede, Centipede, Scorpion, Spider,Peripatus.

ii. **Mollusca** - Chiton, Dentalium, Patella, Aplysia, Snail, Slug,Mytilus, Pearl Oyster,

Octopus. iii **Echinodermata** - Sea-lily, Brittle-star, Starfish, Sea-urchin, Seacucumber

iv. **Hemichordata** -Balanoglossus.

B . Amazing invertebrates - Fire fly, Mud wasp, Praying mantis, Sepia, Spider.

Unit II

A. Crab :

i. Systematic position and externalcharacters.
ii. Study ofappendages.
iii. Dissection of nervous system.(Demonstration)

B. Cockroach :

i. Systematic position and externalCharacters.
ii. Sexual dimorphism
iii. Dissection of-
a) Digestive system
b)Nervoussystem
c) Male reproductivesystem
d)Female reproductivesystem
iii. Temporary preparation of–
Trachea ,Striated muscles. Gizzard, Mouth parts, Walking leg, Thoracic spiracles and Gonapophysis

Unit III

A. Pila:

i. Systematic position and externalCharacters
ii. Dissection of –(Demonstration)
a) Digestivesystem.
b) Nervous system
iii. Temporary Preparation of -–(Demonstration) Osphradium, Radula. and Statocyst.

B. Study of Mouth Parts of Insects. - Honeybee, Mosquito, Housefly,Butterfly

Unit IV

A. Study of foot in Mollusca:
Chiton, Pila, Mytilus, Unio, Sepia.

B. Demonstration of water current inBivalve

B. Examples in Genetics (at least 10examples)
Examples based on Crossing over, Linkage, Interaction of genes (Complementary, Supplementary & Inhibitory) &and Sex- determination.

C. Biochemical Detection of foodconstituents
Carbohydrates- Starch Maltose, Lactose, Glucose, Fructose Proteins and Lipids.

D. Demonstration of enzymeaction:
i. Urea-Urease reaction.
ii. Effect of temperature and pH on enzymeactivity.
iii. Action of protease (papaine) onproteins.
E. Study of enzyme action of salivaryamylase.

Practical-II (Based on Paper VII & VIII)

Unit I

A . Classification and Morphological Peculiarities of the following up to orders:

(Sketches/Photographs may be used)
i. **Reptilia** - Chameleon, Gecko, Cobra,Crocodile.

ii. **Aves** - Duck, Kite, Woodpecker, Sparrow, Sunbird,Vulture, Kingfisher.

iii. **Mammals**- Platypus, Bat, Scaly ant eater, Loris, Rabbit, Tiger, Whale

B. Rat : (Demonstration Practical) Study of the followingSystems:
i. DigestiveSystem.

RespiratorySystem.

ii. ArterialSystem.
iii. VenousSystem.
iv. ExcretorySystem.
v. ReproductiveSystem.

Unit II
A . Dissection of –

i. Brain of Rat/fowl

B.. Temporary Preparation of :
i. Blood ofmammal.
ii. Pecten offowl.
iii. Sclerotic Plate offowl.
iv. Collumella offowl.
v. Hyoid Apparatus of fowl.

Unit III
A . Identification of the following Poisonous and Non-Poisonous snakes.

Cobra, Pit viper, Russell's viper, Saw Scaled viper, Krait, Sea snake, Rat snake, Water snake.

B .Study of Amazing Vertebrates - Phrynosoma, Draco , Swift,Swallow, Whale,Walrus.

C. Dentition in Mammals with referenceto:
Rabbit, Sheep, Rat, Dog, Man.

Unit IV
A . Study of histology of following mammalian organs :

i. Tooth (V.S.) ii. Tongue iii. Salivary gland (Parotid) iv. Stomach v Duodenum.vi. Ileum vii.
Liver viii. Pancreas ix. Kidney x. Testis xi.
Ovary xii Pituitary gland xiii. Uterus.

B . Preparation of Haemin crystals.
C. Detection of bleeding & clotting time.

D . Study of abnormal constituents of urine. E . Study of Blood groups.

F . Visit to Sea-shore/any suitable place to study animal diversity.

B.Sc. Part II

Sr. No.	SUK/ UGC Syllabus	Autonomous Syllabus	Removed	Scope

Semester III

ZoologyPaper V

DSC (Animal Diversity II)

1.	**Protochordates:** General features and Phylogeny of Protochordata. **Agnatha:**General features of Agnatha and classification of cyclostomes up to classes. **Pisces:**General features and Classification up to orders; Osmoregulation in Fishes. **Amphibia:** General features and Classification up to orders; Parental care.	**Unit 1:** **Protochordates:** General features and **retrogressive metamorphosis in Ascidian tadpole (Eg. Herdmania)** **Agnatha:**General features of Agnatha and classification of cyclostomes up to classes. **Pisces:**General features and Classification up to order:**Swim bladder, Breeding and parental care in fishes** **Amphibia:** General features and Classification up to order: **Neoteny** and Parental care in Amphibia **(Order:Anura, Apoda, Urodela) Icthyophis**	Phylogeny of Protochordata. Osmoregulation in Fishes.	Students will understand that most of these characters are lost or become degenerate as the active larva metamorphoses.. To understandAccessory respiratory organs develop as adaptation to the particular environmental conditions. Students will come to know about various devices uses by females and males for parental care
2	**Reptiles:**General features and Classification up to orders; Venomous and non-venomous snakes, Bitingmechanism in snakes. **Aves:** General features	**Reptiles:**General features and Classification up to order: Venomous and non-venomoussnakes, Bitingmechanism in snakes. **First Aid**		Introduction to first aid treatment.

	and Classification up to orders; Brain of fowl. **Mammals:**General features and Classification up to orders; Origin of mammals.	**Treatment, Sources of treatment (Govt. hospitals) Information of Haffkin institute.** **Aves:** General features and Classification up to order: Brain of fowl, **Aerial Adaptations in birds (Morphological, Anatomical and Physiological).** **Mammals:**General features and Classification up to order: **Study of Adaptive radiations in mammals, (Duck Billed Platypus, Kangaroo, Bottle nose Dolphin, Blue Whale, Scaly ant eater, Spiny ant eater)**		Will come to know about aerial adaptation in birds Will come to know about adaptive radiation in mammals.

B.Sc. Part II

Semester III

ZoologyPaper VI

DSC (Biochemistry)

Sr. No.	SUK/ UGC Syllabus	Autonomous Syllabus	Removed	Scope
1.	**Nucleic acids:** **DNA and RNA.** **Carbohydrate Metabolism:**Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain.	**Water: Molecular structure of water, Properties of water and Significance of water**		Students will come to know about Biochemistry of water .
2	**Unit 2.** **Nucleic acids:** **3. DNA and RNA.** **4. Carbohydrate Metabolism:** Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain.	**Unit 2.** **Nucleic acids:** **DNA and RNA. Types , Structure and functions** **Carbohydrate Metabolism:Classification,**Glycolysis, Krebs Cycle, Pentose Phosphate Pathway, Gluconeogenesis, **Biological Significance.** **Metabolic disorders of Carbohaydrate metabolism (Diabetes mellitus)**	Glycogen metabolism, Review of electron transport chain.	Students will come to know about Biochemistry of Nucleic acid and metabolism.
3	**Lipid**	**Lipid Metabolism:**Classification and β		

	Metabolism: Biosynthesis and β oxidation of palmitic acid. **Protein**	oxidation of palmitic acid, **Biological Significance.** **Lipid profile disorder(Obesity)** **Protein metabolism:** Classification,		
Sr. No.	SUK/ UGC Syllabus **metabolism:**Transamination,	Autonomous Syllabus Transamination, Deamination and	Removed Urea	Scope
	Deamination and Urea Cycle. **Enzymes:** Introduction, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation.	Cycle,**Biological Significance.** **Disorders of Protein Metabolism(Common any two)** **Enzymes:** Introduction **(Classification and structure),**Mechanism of enzyme action, **Biological Significance, serum glutamic-oxaloacetic transaminase(SGOT), serum glutamate pyruvate transaminase (SGPT) tests.**	Enzyme Kinetics, Inhibition and Regulation.	Will learn about the biologicalsignificanc of bio-molecules.

B.Sc. Part II
Semester IV
ZoologyPaper VII
DSC (Reproductive Biology)

1.	**Functional anatomy of female reproduction:** Outline and histological of female reproductive system in rat and human; Ovary: folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis andsecretion of ovarian hormones; Reproductive cycles in human and their regulation,changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in thefemale tract, fertilization; hormonal control of implantation; Hormonal regulation of gestation, pregnancy diagnosis, Mechanism of parturition andits hormonal regulation; Lactation and its regulation.	**Pituitary Gland: Hormones related to reproductive physiology** **Functional anatomy of female reproduction:** Ovary:folliculogenesis, ovulation, corpus luteum formation and regression; andReproductive cycles in human and their regulation,changes in the female tract; Ovum transport in the fallopian tubes; Sperm transport in thefemale tract, fertilization; Hormonal control of implantation; Hormonal regulation ofgestation, Pregnancy diagnosis, Mechanism of parturition andits hormonal regulation; Lactation and its regulation.**Major disorders of pregnancy: Erythroblastosis foetalis Miscarriage, Pre-eclampsia and Foetal growth restriction,**	Outline and histological of female reproductive system in rat and human Steroidogenesis andsecretion of ovarian hormones; human;	They will become aware about the function of Pituitary gland. Makes students aware of disorders related to pregnancy.
2	**Functional anatomy of male reproduction:** Outline and histological of male reproductive system in human; Testis: Cellular functions, germ cell;	**Functional anatomy of male reproduction:** Testis: Cellular functions, germ cell; Spermatogenesis; hormonalregulation; Epididymal function and	Outline and histological of male reproductive system in human; kinetics	

	Spermatogenesis: kinetics and hormonalregulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation;Accessory glands functions; Sperm transportation in male tract.	sperm maturation;**Accessory glands functions; Sperm transportation in male tract. Abnormality,Prostatic hypertrophy, Causes and Types of Infertility**		Will learn about male reproductive system and related disorders.
3.	**Reproductive Health**Infertility in male and female: causes, diagnosis and management; Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization, ET, EFT, IUT, ZIFT, GIFT, ICSI, Modern contraceptive technologies.	**Reproductive Health: Infertility in male and female**: Causes, diagnosis and management **Assisted Reproductive Technology**: Sex selection, Sperm bank and laws,frozen embryos, invitro fertilization, Tubal Embryo Transfer (TET),Frozen Embryo Transfer(FET), Intra Uterine Insemination (IUI), Zygote Intra Fallopian Transfer (ZIFT), Gamete Intra Fallopian Transfer (GIFT), Intra Cytoplasmic Sperm Injection, (ICSI), Modern contraceptive technologies. **Menstrual problems, Ectopic pregnancy, Endometriosis, Ovarian Tumors, Ovarian cysts, Ovarian torsion, Polycystic ovary.**		

B.Sc. Part II

Zoology Practical I

PRACTICAL-I (Based on Animal diversity-II and Biochemistry of Semester-III).

1.	**Animal diversity-II:** 1.Study of the following specimens with reference to morphological peculiarities and classification upto orders:*Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo,Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus,Salamandra, Bufo, Hyla, Chelone,Hemidactylus, Chamaeleon, Draco,Crocodylus, Gavialis.* 2.Characters identifingvenomous and non-venomous snakes:Russell's viper, Saw scaled viper, Common krait, Indian Cobra, Sea snake, Rat snake and Checkered keelback. 3. Study of any sixcommon birds from different orders. 4. Study of the following specimens with reference to morphological peculiarities and classification upto orders:*Sorex*, Bat, *Funambulus* and *Loris.* An "**animal album**" containing photographs, cut outs, with appropriate write up about theabove mentioned taxa. Different taxa/ topics may be given to students forthis purpose.	**Animal diversity-II:** 1.Study of the following specimens with reference to morphological peculiarities and classification upto orders:*Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo,Labeo, Exocoetus, Anguilla, Ichthyophis, Ureotyphlus,Salamandra, Bufo, Hyla,Chelone,Hemidactylus, Chamaeleon, Draco,Crocodylus, Gavialis.* 2.Characters identifyingvenomous and non-venomous snakes:Russell's viper, Saw scaled viper, Common krait, Indian Cobra, Sea snake, Rat snake and Checkered keel back, Sand bow. 3. Study of common birds from any sixdifferent orders. 4. Study of the following specimens with reference to morphological peculiarities and classification up to orders:*Sorex, Pipistrellus pipistrellus*, *Funambulus* and *Nycticebus bengalensis.* An "**animal album**" containing photographs, cut outs, with appropriate write up about theabove mentioned taxa. Different taxa/ topics may be given to students forthis purpose. **5. Dissection of brain of fowl.** **6. Temporary preparation of Hyoid apparatus, Sclerotic plate, Pecten of fowl.** **7. Temporary preparation of Cycloid, Ctenoid and Placoid scales in fishes.** **8. Desert adaptations in reptiles: Phrenosoma, Chameleon, Crocodile, Wall**	

		lizard **9. Review article/work experience /project/visit**	
2	**Biochemistry:** 1. Qualitative tests to identify functional groups of carbohydrates and lipid in given solutions (Glucose, Fructose, Sucrose, Lactose and Lipid). 2. Estimation of total protein in given solutions by Lowry's method/ Quantitative estimation of amino acids by using ninhydrin reaction. 3. Study of activity of salivary amylase under optimum conditions. 4. DNA isolation from plant/animal. 5. Dissection of brain of fowl. 6. Temporary preparation of hyoid apparatus, sclerotic plates, pecten and collumella of fowl. 7. Temporary preparation of cycloid, ctenoid and placoid scales in fishes. 8. Estimation of uric acid from bird excreta.	**Biochemistry:** 1. Qualitative tests of carbohydrates and lipid from given solutions (Glucose, Fructose, Sucrose, Lactose and Lipid). 2. Estimation of total protein in given solutions by Lowry's method/ Quantitative estimation of amino acids by using Ninhydrin reaction. 3. Study of activity of salivary amylase under optimum conditions. 4. DNA isolation from plant/animal. 5. **Abnormal constituents of Urine and pathological significance.** 6**. Estimation of Blood glucose** **7. Estimation of Blood Creatinine** **8. Estimation of blood Cholesterol** **9.Estimation of Blood Urea**	

B.Sc. Part II

Sr. No.	SUK/ UGC Syllabus		Removed

Zoology Practical I

1.	Reproductive Biology: 1. Study of animal house: set up and maintenance of animal house, breeding techniques, care of normal and experimental animals. 2. Examination of vaginal smear rats from live animals/Study of stages of estrus cycle through permanent slides. 3. Surgical techniques: principles of surgery in endocrinology. Ovarectomy, hysterectorny, castration and vasectomy in rats. 4. Examination of histological sections from photomicrographs/ permanent slides of rat: testis, epididymis and accessory glands of male reproductive systems; Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervix and vagina. 5. Human vaginal exfoliate cytology. 6. Sperm count and sperm motility in rat/ Any mammal. 7. Study of modern contraceptive devices.	**Unit:1** **Reproductive Biology:** 1. Study of animal house: set up and maintenance of animal house, breeding techniques, care of normal and experimental animals. 2. Examination of vaginal smear rats from live animals/Study of stages of estrus cycle through permanent slides. 3. Surgical techniques: principles of surgery in endocrinology. Ovarectomy, hysterectorny, castration and vasectomy in rats. 4. Examination of histological sections from photomicrographs/ permanent slides ofrat: testis, epididymis and accessory glands of male reproductive systems;Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervixand vagina. 5. Human vaginal exfoliate cytology. 6. Sperm count and sperm motility in rat/ Any mammal. 7. Study of modern	

		contraceptive devices.	
2	Applied Zoology: 1. Study of arthropod vectors associated with human diseases: Pediculus, Culex, Anopheles, Aedes and Xenopsylla. 2. Study of insect damage to different plant parts/stored grains through damaged products/photographs. 3. Identifying feature and economic importance of Helicoverpa (Heliothis) armigera, Papilio demoleus, Pyrilla perpusilla, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum. 4. Field trip to poultry farm or animal breeding centre. Submission of field trip report (Printed/Hand writings).	**Applied Zoology:** 4. Study of arthropod vectors associated with human diseases: *Pediculus, Culex, Anopheles, Aedes* and *Xenopsylla.* 5. Study of insect damage to different plant parts/stored grains through damaged products/photographs. 6. Identifying feature and economic importance of *Helicoverpa* (*Heliothis*) *armigera*, *Papilio demoleus*, *Pyrilla perpusilla*, *Callosobruchus chinensis*, *Sitophilus oryzae* and *Tribolium castaneum.* 4. **Poultry: Egg and Meat Nutritive value** **5. Poultry diseases**	

		6. **Dairy: Nutritive value of Milk Products: Curd, Buttermilk, Ghee, Paneer, Cheese** **7. Economic importance of Lac** 8. Field trip to poultry farm or animal breeding center or any other suitable place related to syllabus. Submission of field trip report (Printed/Hand writings).	