Solapur University, Solapur

B.Sc. Part- II ZOOLOGY

Semester III and IV

C G PA PATTERN SYLLABUS

w.e.f. June 2015

Solapur University, Solapur

Credit and Grading System

(W.e.f. 2015-16)

- **Title of the Course:** B.Sc.- Part II
- **Subject :** Zoology
- **The Credit and Grading System :**
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With the view to ensure worldwide recognition, acceptability, horizontal as well as vertical mobility for students completing under graduate degree, Solapur University has implemented Credit and grading system of Evaluation at Undergraduate level.

Credit is a numerical value that indicates student's work load (Lectures, Lab work, Seminars, Tutorials, Field work, etc.) to complete a course unit. In most of the universities 15 contact hours constitute one credit. The contact hours are transformed into Credits. As per present norms, there are 4 contact hours per paper (subject) per week which works out to be 60 contact hours per paper (subject) per semester.

In Solapur University, for B. Sc.-II, there are 3 optional subjects and Environmental Studies. For B. Sc.-II, there are 6 contact hours per paper (subject) per week for each optional subject. Therefore, total contact hours per week are 18. Each subject has 90 contact hours, which are transformed into 6 credits. As there are 4 contact hours per week for Environmental Studies, 4 credits shall be assigned for Environmental Studies.

Moreover, the grading system of evaluation is introduced for B. Sc. course, wherein process of Continuous Internal Evaluation is ensured. The candidate has to appear for Internal Evaluation of 30 marks and University Evaluation for 70 marks. It is 70 + 30 pattern of evaluation. It is applicable for theory and practical as well. The details regarding this evaluation system are as under.

- **Conversion of marks into Grades :**

A table for the conversion of the marks obtained by a student in each paper (out of 100) to grade and grade points is given below.

Sr. No	Range of Marks	Grade	Grade Point
1.	80-100	O	10
2.	70-79	A+	9
3.	60-69	A	8
4.	55-59	B+	7
5.	50-54	B	6
6.	45-49	C+	5
7.	40-44	C	4
8.	<39	FC	0 (Failed in Term Exam)
9.	<39	FR	0 (Failed in Internal Assessment)

1. Grade Point Average at the end of the Semester (SGPA)

$$SGPA = \frac{(G_1 x C_1) + (G_2 x C_2) + \ldots\ldots}{\Sigma Ci}$$

(ΣCi- The total number of credits offered by the student during a semester)

2. Cumulative Grade Point Average (CGPA)

$$CGPA = \frac{(G_1 x C_1) + (G_2 x C_2) + \ldots\ldots}{\Sigma Ci}$$

Σ Ci - the total number of credits offered by the student up to and including the semester for which CGPA is calculated.)

3. **Final Grade Point Average (FGPA)** will be calculated in the similar manner for the total number of credits offered for completion of the said course.

   Where: Ci: Credits allocated for the the course

   Gi: Grade point scored in the paper (Subject)

4. **Conversion of average grade points into grades:**

SGPA/CGPA/FGPA	**Letter Grade**
9.5 - 10	**O**
8.5 -9.49	**A+**
7.5 – 8. 49	**A**
6.5 – 7.49	**B+**
5.5 – 6. 49	**B**
4.5 – 5. 49	**C+**
4.0 – 4. 49	**C**
< 3.99	**FC /F**
	FR

Solapur University, Solapur
Faculty of Science
Credit System Structure for B.Sc.II Semester III

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks	UA	CA	Credits	Total credits
				L	T	P					
B.Sc.II	III										
		Subject 1	Paper III	3	-	-	100	70	30	3	
			Paper IV	3			100	70	30	3	6
		Subject 2	Paper III	3	-	-	100	70	30	3	
			Paper IV	3			100	70	30	3	6
		Subject 3	Paper III	3	-	-	100	70	30	3	
			Paper IV	3			100	70	30	3	6
Total				18			600			18	18
Grand Total				**18**			**600**			**18**	**18**

Abbreviations: L: lectures, T: Tutorials, P: Practicals; UA: University Assessment by End Semester Examination; CA: College assessment by Internal Continuous Examination

UA (University Assessment): University Theory paper shall be of 70 marks for 3.0 hrs duration

CA (College Assessment): The internal examination for Theory and Practical course.

Solapur University, Solapur
Faculty of Science
Credit System Structure for B.Sc.II Semester IV

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks			Practical			Credits
				L	T	P		UA	CA	Marks	UA	CA	
B.Sc. II	IV	Environmental Studies	(compulsory)	4	-	-	100	70	30				4
		Subject 1	Paper V	3	-	-	100	70	30				3
			PaperVI	3			100	70	30				3
		Subject 2	Paper V	3	-	-	100	70	30				3
			PaperVI	3			100	70	30				3
		Subject 3	Paper V	3	-	-	100	70	30				3
			PaperVI	3			100	70	30				3
Total Theory				**22**			**700**						**22**
		Practical 1		-	-	8				200	140	60	4
		Practical 2		-	-	8				200	140	60	4
		Practical 3		-	-	8				200	140	60	4
Total Pract.						**24**				**600**			**12**
Grand Total										**1300**			**34 18**
B.Sc. Part II										**1900**			**52**

Abbreviations: L: lectures, T: Tutorials, P: Practicals; UA: University Assessment by End Semester Examination; CA: College assessment by Internal Continuous Examination

UA (University Assessment): University Theory paper shall be of 70 marks for 3.0 hrs duration

CA (College Assessment): The internal examination for theory and Practical course.

General Guidelines for Credit and Grading System
B.Sc.II

1. The University follows Semester system
2. An academic year shall consist of two semesters
3. Each B.Sc. course shall consist of three years i.e. six semesters
4. Environmental Studies paper shall remain compulsory for B.Sc.Part- II students in IVth Sem.
4. B.Sc.Part-II shall consist of two semesters: Semester III and Semester IV.

In semester –III, there will be two theory papers of 100 marks for each subject. There shall be three optional science subjects. Similarly, in semester –IV there will be two theory papers of 100 marks for each subject. There shall be three optional science subjects and Environmental Studies paper compulsory for every student in semester IV.

The scheme of evaluation of performance of candidates shall be based on University assessment as well as College internal assessment as given below. For B.Sc.Part II Sem III & IV the internal assessment will be based on Unit tests, Home assignment, viva, practicals, Project Work etc as given below. Practical course examination of 200 marks for each subject shall be conducted at the end of IVth semester. The practical examination of 200 marks shall also consist of 140 marks for University practical assessment and 60 marks for college internal assessment.

The process of evaluation for Environmental Studies shall be based on University theory examination of 70 marks and 30 marks internal assessment. The internal assessment for environmental studies shall be based on internal test/ home assignment/tutorial of 10 marks and project work for 20 marks.

For University practical examination out of two examiners, one examiner will be internal and another examiner will be External. Both examiners will be appointed by the University. The internal practical assessment shall be done as per scheme given below.

5. **Scheme of evaluation:**

As per the norms of the grading system of evaluation, out of 100 Marks, the candidate has to appear for College internal assessment of 30 marks and external evaluation (University Assessment) of 70 marks. The respective B.O.S. may decide the nature of College internal Assessment after referring to the scheme given below or may be used as it is.

Semester - III:

Theory : (100 marks)

University Examination (70 Marks): No. of Theory papers: 2 Papers/Subject (Total 6 Papers)

Internal Continuous Assessment (30 Marks):

Scheme of Marking: 20 Marks: Internal Test

10 Marks: Home assignment/Tutorials/Seminars/ Group discussion/ Viva/Field visit/Industry visit.

Semester - IV: (100 marks)

Theory:

University Examination (70 Marks): No of Theory papers: 2 Papers/Subject (Total 6+1Papers)

Internal Continuous Assessment (30 Marks):

Scheme of Marking: 20 Marks: Internal Test

10 Marks: Home assignment/Tutorials/ Seminars/ Group discussion/ Viva/ Field visit/Industry visit.

Practical Examination:

University Examination (140 Marks**)**: No of Practicals: 1 Practical /Subject (Total 3 Practicals)

Internal Continuous Assessment (60 Marks):

Scheme of Marking: 40 Marks: Internal Test on any four practicals, 20 Marks: Lab Journal/viva, attendance, attitude etc. For Environmental Studies there shall be theory examination of 70 marks (UA) and 30 marks (CA) internal assessment. The internal assessment for environmental studies shall be based on internal test/ home assignment/tutorial of 10 marks and project work and report of 20 marks.

6. **Passing Standard**

The student has to secure a minimum of 4.0 grade points (Grade C) in each paper. A student who secures less than 4.0 grade point (39% or less marks, Grade FC/FR) will be declared fail in that paper (subject) and shall be required to reappear for respective paper. A student who failed in University Examination (Theory) & passed in internal assessment of a same paper (subject) shall be given FC Grade. Such student will have to appear for University Examination only. A student who fails in Internal Assessment and passed in University examination (Theory) shall be given FR Grade. Such student will have to appear for both University examination as well as internal assessment. In case of Annual Pattern/Old Semester Pattern Students/candidates from the mark scheme the candidates shall appear for the same 70 marks paper of the external examination and his performance shall be scaled to 100 marks

- **ATKT**

Candidate passed in all the papers except 4 (four) papers combined together of the semester I and Semester II of B.Sc. Part I examination shall be permitted to enter upon the course of Semester III of B.Sc.Part II

Solapur University, Solapur
Nature of Question Paper for Credit-Grading Semester Pattern
• Faculty of Science
B.Sc.II
(w.e.f. June 2015)

Time: - 3.0 hrs. Total Marks- 70

Q. No.1) Multiple choice questions (10)

1) ----------
a) b) c) d)
2)
3)
4)
5)
6)
7)
8)
9)
10)

Q.No.2) Answer any five (out of seven) of the following (15)

i)
ii)
iii)
iv)
v)
vi)
vii)

Q.No.3) Answer any three (out of four) of the following (15)

i)
ii)
iii)
iv)

Q.No.4) Answer any three (out of four) of the following (15)

i)
ii)
iii)
iv)

Q.No.5) Write short notes on any **three (out of four) of the following** (15)

i)
ii)
iii)
iv)

Solapur University, Solapur
Faculty of Science
Credit System Structure for B.Sc.II Semester III Zoology

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks	UA	CA	Credits	Total credits
				L	T	P					
B.Sc.II	III										
		Zoology	Paper III	3	-	-	100	70	30	3	
			Paper IV	3			100	70	30	3	6
Total				6			200			6	6
Grand Total				**6**			**200**			**6**	**6**

Solapur University, Solapur
Faculty of Science
Credit System Structure for B.Sc.II Semester IV Zoology

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks			Practical			Credits
				L	T	P		UA	CA	Marks	UA	CA	
B.Sc. II	IV	Environmental Studies	(compulsory)	4	-	-	100	70	30				4
		Zoology	Paper V	3	-	-	100	70	30				3
			Paper VI	3			100	70	30				3
Total Theory													
		Practical Zoology		-	-	8				200	140	60	4
Total Pract.						**08**				**200**			**04**
Grand Total													14
B.Sc. Part II													

Abbreviations: L: lectures, T: Tutorials, P: Practicals; UA: University Assessment by End Semester Examination; CA: College assessment by Internal Continuous Examination
UA (University Assessment): University Theory paper shall be of 70 marks for 3.0 hrs duration
CA (College Assessment): The internal examination for theory and Practical course.

SOLAPUR UNIVERSITY, SOLAPUR

B.Sc.II-Zoology-CGPA Syllabus

(w.e.f.June-2015)

SEMESTER-III
THEORY

Paper	Title of the Paper	Marks
III	Paper-III- Animal Diversity	100 (70UA+30CA)
IV	Paper-IV-Cell Science, Genetics, Biological Chemistry and Economics Zoology	100 (70UA+30CA)

SEMESTER-IV
THEORY

Paper	Title of the Paper	Marks
V	Paper-V- Animal Diversity IV	100 (70UA+30CA)
VI	Paper-VI-Histology and Physiology	100 (70UA+30CA)

PRACTICAL
TO BE TAKEN AT THE END OF SEMESTER-IV
Practical Title of the practical

Practical I&II	Practical Based on Theory Papers III,IV,V & VI	**Marks** 200 (140UA+60CA)

UA- University Assessment
CA- College Assessment

SOLAPUR UNIVERSITY, SOLAPUR
B.Sc.II-Zoology
w.e.f. June 2015
Semester-III
Paper-III- Animal Diversity III

Contact Hours:45
Total credits-3

Unit No.I **Taxonomy:** Salient features and Classification up to classes of the following with suitable examples: Arthropoda, Mollusca, Echinodermata and Hemichordata **05**

Unit No.II **Type Study- 1. Cockroach (Phylum-Arthropoda)** **15**

i) Systematic Position
ii) Habits and Habitats
iii) External Morphology
iv) Study of the following systems:
- a) Digestive system
- b) Respiratory system
- c) Circulatory system
- d) Nervous system and compound eye
- e) Excretory system
- f) Reproductive systems

v) Economic importance

Unit No.III **Type Study- 2. Pila (Phylum-Mollusca)** **15**

i) Systematic position
ii) Habits and Habitats
iii) External morphology: Shell and Pallial Complex
iv) Study of following systems:
- a) Digestive system
- b) Respiratory system
- c) Blood Vascular System
- d) Nervous system and Sense organs-Eye, Osphradium, Statocyst
- e) Excretory system
- f) Reproductive systems

v) Economic Importance

Unit No.IV **Study of Insect mouth parts:** (Cockroach, Honeybee, House fly, Butterfly and Mosquito) and Mosquito as insect vector in human diseases with reference to : Malaria, Filaria, and Dengue disease (Prevention, Control measures and Treatment expected). **05**

Unit No.V a) Study of Foot in Mollusca b) Affinities in Hemichordata **05**

List of Recommende Books:

1) Arthropoda, Mollusca and Echinodermata-Kotpal R.L.(Series)
2) Mollusca- Morten J.E.
3) Echinodermata- Nichols D.
4) Invertebrate- Kotpal R.C.
5) Invertebarate Zoology- Jorden E.L. and Verma P.S.
6) Biology of Invertebrates – Russel – Hunter
7) The Text Book of Invertebrate Zoology - Shrivastava

Paper-IV- Cell Science, Genetics, Biological Chemistry and Economic Zoology

Contact Hours:45
Total credits-3

Unit No.I	**Cell Science-** Study of Cell division: Mitosis and meiosis and Specialized cells (structure, types and functions) : i) Nerve cell ii) Muscle cell iii) Leucocyte(WBC)	**05**
Unit No.II	**Genetics-Linkage:** i) Complete linkage with example ii) Incomplete linkage with example iii) Significance of linkage iv) Linkage phases: Introduction to Coupling and Repulsion v) Crossing over: Mechanism and significance vi) Interaction of genes: a) Supplementary genes b) Complementary genes	**05**
Unit No.III	**Biological Chemistry-** Biomolecules-(Definition, Structure, Types and Biological Significance): i) Carbohydrates ii) Proteins iii) Lipids iv) Nucleic Acids(DNA and RNA)	**05**
Unit No.IV	**Economic Zoology-** **1) Economic Fishery** i) Food value of fishes ii) Fresh water Fish farming- Construction and Maintenance iii) Maintenance of glass aquarium and ornamental fishes	**05**
	2) Sericulture i) Types of Silk moth ii) Morphology of mulberry silk moth iii) Life cycle iv) Rearing of silkworm v) Economic importance	**05**
	3) Apiculture i) Types and caste ii) Honey comb iii) Bee keeping iv) Economic importance	**05**

Unit No.V	**4) Dairy Science** i) Breeds: Indigenous and exotic breeds ii) Feeding iii) Housing iv) Economics importance-Milk and Milk Products.	**05**
	5) Poultry Science: i) Poultry breeds-Indigenous and exotic breeds ii) Feeding iii) Housing iv) Management v) Food value-egg and meat vi) Poultry diseases-Small pox and Ranikhet	**05**
	6) Goat Farming i) Breeds ii) Feeding iii) Housing iv) Economic importance	**05**

List of Recommended Book :

1) The Cell-Bruce Albert
2) The Cell- De Roberties
3) Cell Biology-C.B. Power
4)The Cell-Cooper
5) Biochemistry – Lehninger A.L.
6) Biochemistry –Das
7) Biochemistry Vol I-Dasgupta S.K.
8) Biochemistry – Voet and Voet
9) Biochemistry – Stryer
10) Molecular biology – Gupta P.K.
11) Principles of Genetics – Gardner
12) Genetics – Strickberger
13) Cell biology, Genetics, Evolution – Verma Agrawal
14) Molecular Biology of the Gene – Watson J.D.
15) Fish Culture – K.H. Alikuhni
16) Fish Culture – Lagler
17) Hand Book of Animal Husbandary and Dairy –Mudlyer
18) Bee keeping in India – Sardar Sing
19) Bee Keeping in India – M.G. Smith
20) Poultry keeping in India – Naidu P.N.M.
21) Poultry Husbandry – M.A. Jule
22) Introduction to sericulture – Ganga and Shetty

Semester-IV
Paper-V- Animal Diversity IV

Contact Hours:45
Total credits-3

Unit No.I	**Taxonomy:** Salient features and classification of Reptiles, birds and mammals up to orders with suitable examples	**05**
Unit No.II	**Type study: 1. Rat** i) Systematic position ii) Habits and Habitat iii) External Morphology iv) Study of following systems: a) Digestive system b) Respiratory system c) Circulatory system d) Excretory system e) Nervous system- Brain and Spinal cord f) Sense Organs – Eye and Ear g) Reproductive systems (Male and Female)	**20**
Unit No.III	**Study of general topics:** A. Mesozoic reptiles: a) Aquatic : Ichthyosaur and Plesiosaur b) Terrestrial : Pterosaur, Herbivorous (Brontosavrus) and Carnivorous dinosaur (Taranosaurus) B. Salient features and affinities: Monotremes and Marsupials C. Dentition in mammals: Introduction, Herbivorous, Carnivorous and Omnivorous	**10**
Unit No.IV	**Poisonous and non-poisonous snakes:** a) Identification features with example b) Poison apparatus c) Venom and its medicinal uses d) Antivenom production e) Effects of venom f) First aid treatment of Snake bite	**05**
Unit No.V	i) Archaeopteryx ii) Aerial adaptations in birds iii) Beak and Leg modification in birds iv) Migration in Birds	**05**

List of Recommended Books:

1) Rat : Rowett
2) Rat : Kshirsagar G.R.
3) T.B.of vertebrate Zoology-Prasad S.N.I
4) Vertebrates – Kotapal R.C.
5) Comparative vertebrate anatomy-Hyman L.H.

Paper-VI- Histology and Physiology

Contact Hours:45
Total credits-3

Unit No.I	**Study of Tissues** (Review of following tissues with reference to origin, location and functions) i) Epithelial ii) Connective iii) Muscular iv) Nervous	**05**
Unit No.II	**Histology of following mammalian organs:** i) Tooth ii) Salivary gland iii) Oesophagus iv) Stomach v) IIeum vi) Rectum vii) Liver viii) Pancreas ix) Kidney x) Spinal cord xi) Testis xii) Ovary xiii) Uterus xiv) Pituitary gland	**15**
Unit No.III	**Reproductive physiology:** i) Hormones of pituitary ii) Sex hormones iii) Oestrous sycle iv) Menstrual cycle v)Hormonal control of pregnancy, parturition and lactation vi) Hormonal control of testicular activity vii) In-vitro fertilization viii) Amniocentesis	**10**
Unit No.IV	**Study of Contraceptives: Male and Female**	**05**
Unit No.V	**Body defense mechanism-** A) Immune system i) Humoral immunity and its mechanism a) B-Cell Immunity b) Structure and types of antibodies ii) Cellular immunity and its mechanism a) Types of T-Cell b) T-Cell Immunity B) Organs involved in immune system a) Bone marrow b) Lymphatic nodes	**10**

List of Recommended Books:

1) Histology – Ham A.W.
2) Baileys's T.B. of Histology – Williams and Williams
3) An Atlas of Histology – Heineman Educational Book Ltd.London
4) Microscopic anatomy of vertebrates –Lea and Febigen, Philadelphia
5) Histology of Mammals – Atavale M.V. and Latey A.N.
6) Human physiology by Chatterjee C.C.
7) Physiology – A.C. Guyton

Practical Course in Zoology for B.Sc.II
Semester III and IV (Total Credits 2+2=4)
(Final practical examination to be conducted at the end of Semester IV)

Practical – I — Total credits-2

I. **Taxonomy**-
Classification with morphological peculiarities of the following up to classes.
a) Arthropoda- Apus, Balanus, Prawn, Lobster, King-crab, Grasshopper, Butterfly Moth, Millepeds, Centipede, Scorpion, Spider, Peripatus
b) Mollusca – Chiton, Dentalium, Patella, Aplysia, Snail, Slug, Mytilus, Pearl Oyster, Sepia, Octopus
c) Echinodermata – Sea-star, Brittle star, Sea-lilly, sea urchin, sea cucumber
d) Hemichordata – Balanoglossus

II. Study of Cockroach-
a) External characters and sexual dimorphism (CD/Model/Chart)
b Anatomical observation and detailed explanation of systems using CD/Model/Chart of
i) Digestive system
ii) Nervous system
iii) Male reproductive system
iv) Female Reproductive system
c) Anatomical observation and detail explanation of systems using CD/Model/Chart of
i) Walking leg
ii) Mouth parts
iii) Thoracic spiracles
iv) Salivary apparatus
v) Gizzard
vi) Cornea
vii) Trachea

III. Study of Pila-
A) External character- Shell, Pallial complex (CD/Model/Chart)
B) Anatomical observation and detailed explanation of systems using CD/Model/Chart of
i) Digestive system
ii) Nervous system
C) Observation and detail explanation using CD/Slide/Model/Chart of
i) Osphradium
ii) Radula
iii) Statocyst

IV. **Study of mouth parts** of : Honey bee, Mosquito, Butterfly, Housefly using permanent slides/CD/Model/Chart

V. **Mosquito as disease vector** : Whole mounts of Anopheles, Culex, Aedis using permanent slides/CD/Model/Chart

VI. **Study of foot in mollusca** with reference to Chiton, Pila, Mytilus, Unio, Sepia/Octopus using museum specimens/CD/Model/Chart

VII. Study of mitosis using onion root tip

VIII. Differential count of WBCs.

IX. Examples in genetics (at least 10 examples): Examples based on Crossing over, Linkage and interaction of genes

X. Detection of Carbohydrates(Gulcose, Fructose, Maltose/Lactose, Starch), Proteins and Lipids.

XI. Colorimetric estimation of protein by biuret method

XII. Colorimetric estimation of glucose by suitable method

XIII. Study of Glass aquarium fishes using laboratory specimens/photographs/CD/videos (Any five fishes)

XIV. **Study of Apiculture** – Kinds and castes of Bees, Honeycomb, Honey, Bee wax using laboratory specimens/material

XV. **Study of Sericulture** – Study of silk moth, silk cocoons, and silk using laboratory specimens/material

XVI **Study of Dairy Science** – Study of Milk and Milk products using available material

XVII. **Study of Poultry Science**- Different kinds of Poultry birds, Eggs and Poultry manure using available laboratory specimens/material

Practical –II Total credits-2

I. **Taxonomy-**
Classification with morphological peculiarities of the following up to orders:
i) Reptiles – Turtle, Tortoise, Chamaeleon, Garden lizard, Crocodile
ii) Aves – Duck, Kite, Woodpecker, Sparrow, Sunbird, Vulture, Kingfisher Fowl.
iii) Mammals - Platypus, Bat, Scaly ant eater, Loris, Rabbit
(Models/Photographs/Sketches)

II. **Study of Rat** : Anatomical observation and detailed explanation of the following system with CD/Model/Chart of
i) Digestive system
ii) Respiratory system
iii) Arterial system
iv) Venous system
v) Excretory system
vi) Reproductive systems (Male and Female)

III. Anatomical observation and detailed explanation of brain of bird with CD/Model/Chart-

IV. Observation and detail explanation of following with CD/Slide/Model/Chart-
i) Blood of mammal ii) Pecten of bird iii) Sclerotic plate of bird
iv) Collumela of bird v) Hyoid apparatus of bird

V. Study of Mesozoic reptiles (using chart/models/CD)

VI. Identification of the following poisonous and non poisonous snakes using laboratory specimens
i) Cobra ii) Russel's Viper iii) Indian little Viper (Phoorsa) iv) Krait v) Sea snake
vi) Rat snake vii) Sand boa

VII. Study of Beak and leg modification in birds using laboratory specimens
i) Parrot ii) Woodpecker iii) Heron iv) Duck v) Sparrow/Pigeon vi) Hawk/Kite
viii) Owl ix) Vulture

VIII. Study of dentition in mammals using laboratory materials/models/CD of:
Sheep, Rat, Rabbit, Dog, Man

IX. Study of histological structure (T.S./V.S.) of the following mammalian organs using permanent slides:
i) Tooth ii) Salivary gland iii) Oesophagus iv) Stomach v) IIeum vi) Rectum vii)Liver viii) Pancreas ix) Kidney x) Testis xi) Ovary xii) Uterus xiii) Pituitary gland xiv) Spinal cord

X. Study of Rat sperm and vaginal smear using CD/Chart/Permanent slides

XI. Study of following abnormal urine constituents: Glucose, Bile, Blood and Albumin

XII. Study of ABO blood group system and blood group antigens

XIII. Study of following contraceptives: Oral contraceptives (pills), Intra-uterine device, Condom using chart/photographs.

Excursion Tour : Six days tour is recommended

As a part of practical, visit to sea-shore/any suitable place of Zoological interest (Visit to sea-shore, Fishery Centers, National Parks, Wildlife Sanctuaries, National Research Institutes, Central Research Institutes, Zoological Survey of India, Fresh Water Ecosystem etc. to study animal diversity and economic Zoology. A report is to be submitted at the time of Practical examination.

Note:

As per the guidelines of **UGC notification number F.14-6/2014(CPP-II) dated 1st August, 2014** it is now essential to make necessary modifications to stop dissection and promote and orient students towards the knowledge component rather than skill development. However, ITC based virtual dissections are promoted. Now, the responsibility to discontinue dissections and use of animals in experiments totally rests on concerned authorities of respective colleges/Institutes. As per the notification it is important to encourage the field trips and observations without disturbing the biodiversity.

Distribution of Marks for Practical Examination in B.SC.II-Zoology
[Total Marks-200 (UA-140+CA-60)]

PRACTICAL I :

Q.1	Analysis and explanation of anatomical part of given figure/CD/Chart/Model of Cockroach & *Pila*	Marks 12
Q.2	Analysis and explanation of anatomical part of given figure/CD/Chart/Model of Cockroach & *Pila*	Marks 08
Q.3	Cytological preparation of mitosis/W.B.C.count	Marks 10
Q.4	Genetics example	Marks 10
Q.5	Biochemical tests/Estimations of protein/glucose	Marks 10
Q.6	Identification/Spotting	Marks 10
Q.7	Journal (Practical Record Book)	Marks 10
		Total Marks 70

PRACTICAL II:

Q.1	Analysis and explanation of anatomical part of given figure/CD/Chart/Model of brain of bird	Marks 12
Q.2	Analysis and explanation of anatomical part of given figure/CD/Chart/Model of - pecten/sclerotic plate/blood of mammal/hyoid apparatus/Collumela of bird	Marks 08
Q.3	Detection of abnormal constituents of urine	Marks 10
Q.4	Examination of vaginal smear/Sperm smear/Blood group antigens	Marks 10
Q.5	Submission of excursion report and viva based on it	Marks 10
Q.6	Identification/Spotting	Marks 10
Q.7	Journal (Practical Record Book)	Marks 10
		Total Marks 70