Solapur University, Solapur

Faculty of Science

Credit and Grading System

(June, 2014)

Solapur University, Solapur
Faculty of Science
Credit and Grading System
(W.e.f. June, 2014)

- **Title of the Course:** B.Sc.- I
- **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, the Solapur University is implementing 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.-I, there are 4 optional subject and one (English) compulsory subject. For B. Sc.-I, there are 5 contact hours per paper (subject) per week for optional subject and 4 contact hours for English. Therefore, total contact hours per week are 24. Each subject has 75 contact hours, which are transformed into 5 credits. As there are 4 contact hours per week for English, 4 credits shall be assigned for English subject.

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 upto 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 ith course

Gi: Grade point scored in ith 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
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Credit System Structure for B.Sc.I Semester I

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks	UA	CA	Credits	Total
				L	T	P					
B.Sc.I	I	English	English paper I (compulsory)	4	-	-	100	70	30	4	
		Subject 1	Paper I	5	-	-	100	70	30	5	
		Subject 2	Paper I	5	-	-	100	70	30	5	
		Subject 3	Paper I	5	-	-	100	70	30	5	
		Subject 4	Paper I	5	-	-	100	70	30	5	
Total				24			500			24	24
Grand Total				24			500			24	24 credits

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 3.00 hrs duration

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

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Credit System Structure for B.Sc.I Semester II

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks			Practical			Credits
				L	T	P		UA	CA	Marks	UA	CA	
B.Sc. I	II	English	English paper II (compulsory)	4	-	-	100	70	30				4
		Subject 1	Paper II	5	-	-	100	70	30	100	70	30	5
		Subject 2	Paper II	5	-	-	100	70	30	100	70	30	5
		Subject 3	Paper II	5	-	-	100	70	30	100	70	30	5
		Subject 4	Paper II	5	-	-	100	70	30	100	70	30	5
Total				24			500			400			24
		Practical I		-	-	4							4
		Practical I		-	-	4							4
		Practical I		-	-	4							4
		Practical I		-	-	4							4
Total				24		16	500			400			16
Grand Total										900			40
B.Sc.	Part I									1400			24+40 =64

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 3.00 hrs duration

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

General Guidelines for Credit and Grading System

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. B.Sc.Part-I shall consist of two semesters: Semester I and Semester II. In semester –I, there will be one theory paper of 100 marks for each subject. There shall be four optional science subjects and English paper-I compulsory for every student. Similarly, in semester –II there will be one theory paper of 100 marks for each subject. There shall be four optional science subjects and English paper-II compulsory for every student. 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 I Sem I&II the internal assessment will be based on Unit tests, Home assignment, viva, practicals etc as given below. Practical course examination of 100 marks shall be conducted at the end of second semester. The practical examination of 100 marks shall also consist of 70 marks for University practical assessment and 30 marks for college internal assessment. 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.

The details are as follows:

Semester - I:

University Examination (70 Marks): No. of Theory papers: 1 Papers/Subject (Total 5 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 - II:

Theory:

University Examination (70 Marks): No of Theory papers: 1 Papers/Subject (Total 5 Papers)
Internal Evaluation (30 Marks):
Scheme of Marking: 20 Marks: Internal Test
10 Marks: Home assignment/Tutorials/ Seminars/ Group discussion/ Viva/ Field visit/Industry visit.

Practical

University Examination (70 Marks**)**: No of Practicals: 1 Papers/Subject (Total 4 Practicals)
Internal Evaluation (30 Marks):
Scheme of Marking: 20 Marks: Internal Test on any two practicals
10 Marks**:** Lab Journal/viva, attendance, attitude etc.

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 year down 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 5 (five) heads including theory as well as practicals 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

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Nature of Question Paper for Credit-Grading Semester Pattern

• Faculty of Science •

(w.e.f. June 2014)

Time: - 3.00 hrs. Total Marks- 70

Section - I

Q. No.1) Multiple choice questions (5)

1) ----------

a) b) c) d)

2)

3)

4)

5)

Q.No.2) Answer any five of the following (10)

i)

ii)

iii)

iv)

v)

vi)

vii)

Q.No.3 A) Write short notes on any Two of the following (10)

i)

ii)

iii)

B) Answer any one of the following (10)

i)

ii)

Section - II

Q. No.1) Multiple choice questions. (5)

1) ----------

a) b) c) d)

2)

3)

4)

5)

Q.No.2) Answer any five of the following (10)

i)

ii)

iii)

iv)

v)

vi)

vii)

Q.No.3 A) Write short notes on any Two of the following (10)

i)

ii)

iii)

B) Answer any one of the following (10)

i)

ii)

Term: SEM-I separate passing Head: No, Min. Papers: Max. Papers: Max:

The papers under Sem- I are as follows:

Paper Name: Physics Paper I
Paper Code: CSSC1PH1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Chemistry Paper I
Paper Code: CSSC1CH1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Botany Paper I
Paper Code: CSSC1BO1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Statistics Paper I
Paper Code: CSSC1 ST1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Geology Paper I
Paper Code: CSSC1 GL1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Microbiology Paper I
Paper Code: CSSC1MB1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Mathematics Paper I
Paper Code CSSC1MT1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Electronics Paper I
Paper Code: CSSC1EL1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Computer Science Paper I
Paper Code: CSSC1CS1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Zoology Paper I
Paper Code: CSSC1ZO1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Geography Paper I
Paper Code: CSSC1GP1 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: English PaperI(Compulsory)
Paper code: CSSC1 ENG1 Min:0, Max:100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	4	4	Theory	--	100	UA	28	70	CA	12	30	Marks system

Term: Sem-II Separate passing Head: No, Min. Papers: Max. Papers: Max:

The papers under Sem-II are as follows:

Paper Name: Physics Paper II
Paper Code: CSSC2PH2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Chemistry Paper II
Paper Code: CSSC2CH2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Botany Paper II
Paper Code: CSSC2 BO2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Statistics Paper II
Paper Code: CSSC2ST2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Geology Paper II
Paper Code: CSSC2GL2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Microbiology Paper II
Paper Code: CSSC2MB2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Mathematics Paper II
Paper Code: CSSC2MT2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	

Paper Name: Electronics Paper II
Paper Code: CSSC2 EL2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	

Paper Name: Computer Science Paper II
Paper Code: CSSC2CS2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	

Paper Name: Zoology Paper II
Paper Code: CSSC2ZO2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	

Paper Name: Geography Paper II
Paper Code: CSSC2GP2 Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	5	5	Theory	--	100	UA	28	70	CA	12	30	

Paper Name: English Paper II(Compulsory)
Paper code: CSSC2ENG2 Min:0, Max:100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	
Lectures	4	4	Theory	--	100	UA	28	70	CA	12	30	

Sem II Practical Examination

Paper Name: Physics Practical
Paper Code: CSSC PHPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Chemistry Practical
Paper Code: CSSC CHPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Botany Practical
Paper Code: CSSC2 BTPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Statistics Practical
Paper Code: CSSC STPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Geology Practical
Paper Code: CSSC GLPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Microbiology Practical
Paper Code: CSSC MBPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Mathematics Practical
Paper Code: CSSC MT PR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Electronics Practical
Paper Code: CSSC ELPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Computer Science Practical
Paper Code: CSSC CSPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Zoology Practical
Paper Code: CSSC ZOPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Paper Name: Geography Practical
Paper Code: CSSC GPPR Min: 0 Max 100

TLM	Hrs	Credits	AM	Min	Max	AT	Min	Max	AT	Min	Max	Evaluation system
Laboratory	4	4	Practical	--	100	UA	28	70	CA	12	30	Marks system

Abbreviations: TLM – Teaching Learning Method; AM – Assessment Method; AT: Assessment Type; UA – University Assessment; CA – College Assessment; Hrs- Contact Hours per Week; Min – Minimum Marks; Max – Maximum Marks

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

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks	UA	CA	Credits	Total
				L	T	P					
B.Sc.I	I	English	English paper I (compulsory)	4	-	-	100	70	30	4	
		Zoology	Paper I Animal Diversity I & Cell Biology and Genetics	5	-	-	100	70	30	5	
Total				9			200			9	Credits : 9 (Sem I)

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Credit System Structure for B.Sc.I Semester II

Class	Sem	Subject	No. of Papers/ practicals	Hrs/Week			Paper Marks			Practical			Credits
				L	T	P		UA	CA	Marks	UA	CA	
B.Sc. I	II	English	English paper II (compulsory)	4	-	-	100	70	30				4
		Zoology	Paper II **Animal Diversity – II & Ecology, Ethology, Evolution and Applied Zoology**	5	-	-	100	70	30	100	70	30	5
Total				9			200			100			9
		Practical Zoology		-	-	4							4
Total				9		4	200			100			13 (sem :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 3.00 hrs duration

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

SOLAPUR UNIVERSITY, SOLAPUR

B.Sc. I Zoology

Credit and Grading System semester syllabus

(w.e.f. June, 2014)

SEMESTER- I (THEORY)

Section	Title of the paper: I (Animal Diversity I, and Cell Biology and Genetics)	Marks
I	Animal Diversity I,	100
II	Cell Biology and Genetics	

SEMESTER- II (THEORY)

Section	Title of the paper: II (Animal Diversity –II and Ecology, Ethology, Evolution and Applied Zoology)	Marks
I	Animal Diversity –II	100
II	Ecology, Ethology, Evolution and Applied Zoology	

PRACTICAL

TO BE TAKEN AT THE END OF SEMESTER-II

Practical	Title of the practical	Marks
I	Practical Based on Theory Papers I & II	100

Solapur University, Solapur
B.Sc.Part-I Zoology
Credit and Grading System
semester syllabus
(w.e.f. June, 2014)

1) Title of the Course: B.Sc.-I Zoology

2) Introduction: This course provides a broad overview of zoology and how it applies to the diversity of nature and overall integration of living beings.
Major theoretical perspectives and concepts are presented, including animal diversity; inter relation, and ecological balance.

It also explore the influence of animal and plant life with respect its integration.

3) Objectives of the course:

- To comprehend the systematic position, functional morphology, mode of life, affinities and biodiversity of invertebrates and vertebrates, Ethology, Ecology and Evolution.
- Taking a course on introductory Zoology can help a student to achieve a number of educational goals besides a credit in life sciences or biological sciences.
- To attain a high student population in a class, a professor should clearly outline the objectives to learning Zoology in the syllabus. That's way, a student learns that Zoology can be used as a model in protecting biodiversity and conserving endangered species with the help of new integrated multidisciplinary subjects.
- This course also provide scope for employment opportunities in applied aspects of zoology

4) Advantages of the Course:

- Becoming a Zoologist opens the door to many types of careers,
- Zoologists can be an academician in university and college, wildlife biologists, field technicians, research assistants or animal trainers become as an entrepreneur by initiating applied aspects in Zoology.
- They work in habitat management, field data collection, agricultural research and medical laboratory support.
- A Zoologist has a solid foundation for further education if he wants to become a veterinarian, or to acquire a Ph.D. to teach at the university level.
- Zoologist will have knowledge of animals, their behavior, physiology and evolution, as well as their interactions with each other and their environment which help for conservation and sustainable development.

5) Eligibility of Course:

- For admission into bachelor's degree one should pass higher secondary education or 10+2 with CBSC or from a recognized board with science subjects (Biology, Chemistry, Physics).

6) Duration:

- The duration for this program is of 3 years with semester pattern(06 Semesters)

7) Medium of Instruction: English

8) Structure of the Course:

- Structure of B.Sc. course in faculty of Science has total of 06 semester for 03 years.
- B. Sc. I comprises of total two semesters. In each semester i.e.I & II one theory paper each having weightage of 100 marks , each. At the end of academic year i. e. Semester II the practical examination is conducted which is based on theory papers I & II. Total weightage of practical is 100 marks

9) Syllabus:

SEMESTER – I

Paper- I - Animal Diversity I & Cell Biology and Genetics

(Total credits 5, Contact Hrs 75)

Section I: Animal Diversity I
(Total credits 2.5, Contact Hrs 37.5)

Unit I: Contact Hrs: 15.5, Credits: 1.0

1) Five kingdom classification : Salient features and classification upto classes of following kingdoms with suitable examples –
A) Kingdom : Protista, B) Kingdom : Animalia with reference to phyla Porifera, Coelenterata, Platyhelminthes, Nemathelminthes and Annelida. [Contact Hours 5]
(This topic may be taught in practical classes)

2) Protista – Type Study – Paramecium : Morphology, Locomotion, Nutrition Osmoregulation, Reproduction (Binary fission and conjugation) [Contact Hours 6]

3) Porifera – Type Study – Sycon- Cell types and Canal system [Contact Hours 4.5]

Unit II: Contact Hrs: 22, Credits: 1.5

4) Coelenterata – Type Study – Hydra: Morphology (including cell types), Locomotion, Nutrition and Reproduction [Contact Hours 5]

5) Platyhelminthes – Type Study – Tape worm : Morphology, life cycle and Parasitic adaptations [Contact Hours 5]

6) Annelida – Type study – Earthworm (*Pheretima posthuma*): Morphology, Body wall, Coelom, Digestive system, Circulatory system, Excretory system, Reproductive system (copulation, fertilization and cocoon formation) and Nervous system- Brain. [Contact Hours 12]

Total contact Hours: [37.5]
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SEMESTER –I
Section – II Cell Biology and Genetics

(Total credits 2.5, Contact Hrs 37.5)

Unit I:Contact Hrs: 22, Credits: 1.5

1) Compound and Electron microscope: Principle and applications [Contact Hours 2]
2) Ultrastructure of Prokaryotic and Eukaryotic cells [Contact Hours 2]
3) Study of Nucleus with reference to Nuclear membrane, Nucleoplasm, Chromatin and nucleolus. [Contact Hours 3]
4) Study of Ultra structure and functions of the following [Contact Hours 12]
i) Plasma membrane (Fluid Mosaic Model)
ii) Mitochondria
iii) Endoplasmic reticulum
iv) Golgi complex
v) Lysosome
vi) Ribosomes
vii) Giant chromosomes – Polytene and lamp brush chromosome
5) Mendelian inheritance : Law of dominance, segregation and independent assortment with suitable examples. [Contact Hours 3]

Unit II: Contact Hrs: 15.5, Credits: 1.0

6) Study of Co- dominance and incomplete dominance with suitable examples [Contact Hours 2]
7) Multiple alleles – Characterstics, ABO- Blood group system & Rh factor and Coat colour in rabbit [Contact Hours 3.5]
8) Sex determination : Chromosomal theory of sex determination, XO,XY,ZW,Environmental and Hormonal methods of sex determination. [Contact Hours 5]
9) Human genetics [Contact Hours 5]
a) Phenyl keton uric imbecility (PKU)
b) Sickle cell anemia

Total contact Hours: 37.5

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SEMESTER –II

Paper: II Animal Diversity –II & Ecology, Ethology, Evolution and Applied Zoology
(Total credits 5, Contact Hrs 75)

Section – I - Animal Diversity –II
(Total Credits: 2.5, Contact Hrs 37.5)

Unit I (Contact Hrs 15, Credits 1.0)

1) Classification of Chordates : Salient features and classification upto orders of the following with suitable examples – [Contact Hrs 5]
A) Protochordata : Urochordata and Cephalochordata
B) Craniata : i) Agnatha, Cyclostomata
ii) Gnathostomata : a) Superclass : Pisces
b) Superclass :Tetrapoda : Class - Amphibia
(This topic may be taught in practical classes)
2) Cyclostomata: General Characters, Ammocoetus larva [Contact Hrs 3]
3) Fishes :
a) Types of fins and scales
b) Structure of gills in cartilaginous and bony fish
c) Mechanism of gill respiration [Contact Hrs 7]

Unit II (Contact Hrs 22, Credits 1.5)

4) Amphibia: Type Study – Frog (*Rana tigrina*) [Contact Hrs 20]
a) Morphology
b) Histological structure of skin
c) Digestive system
d) Respiratory system and mechanism of respiration
e) Blood vascular system : Blood, Heart, Arterial and Venous system
f) Excretory and Reproductive system
g) Nervous system
h) Embryology of frog : Structure of Egg, Cleavage, Blastula and its fate map, Gastrulation and formation of three germ layers. Metamorphosis.
5) Neotany and parental care in amphibian. [Contact Hrs 2.5]

Total contact Hrs: [37.5]

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Semester II

Section – II

Ecology, Ethology, Evolution and Applied Zoology

(Total Credits: 2.5, Contact Hrs 37.5)

Unit I (Contact Hrs 22, Credits 1.5)

I) Ecology

1. Introduction, definition, aim and scope of Ecology [Contact Hrs 3]

2. Biotic factors : Brief idea of following animal associations with suitable examples
A)Intraspecific associations: i) Beneficial : Mate and reproduction,
Parental care, Groupism, and Social behaviour.
ii) Harmful : Cannibalism and Competition
B)Interspecific associations : Neutralism, Symbiosis (Commensalism & Mutualism), Antagonism (Predation and Parasitism), Types of Parasite & Host.
[Contact Hrs 6]

3. Abiotic factors : Introduction and Effects on Plants and Animals :
i) Temprature ii) Light iii) Water iv) Humidity v) Soil vi) Wind Vii) Fire [Contact Hrs 4]

4.Brief idea (definition) of Species, Community, Niche, Ecosystem, Biome and Biosphere. [Contact Hrs 4]

5.Grass land and Pond ecosystems with reference to Food chain, Ecological pyramids and Energy flow. [Contact Hrs 3]

6. .Ecological successions : Introduction and Types ,Primary and secondary succession. [Contact Hrs 2]

Unit II (Contact Hrs 15, Credits 1.0)

II) **Ethology** [Contact Hrs 4]
1. Mimicry – Stick insect and Camouflage – chameleon
b) Courtship behavior in birds, weaver (baya) birds.
c) Social behavior in Honey bees: Casts, swarming, absconding, Nauptial flight and communication (waggle and round dance).

III**) Evolution** [Contact Hrs 5]
a) Organic evolution concepts
b) Paleontological evidences
c) Anatomical evidences

IV) **Applied Zoology** [Contact Hrs 6]
1. Brief idea (definition and scope) of Sericulture, Apiculture, Poultry science , Dairy science, Fishery science, Pearl culture, Lac culture, Goat farming and Piggary.
2. Vermitechnology : Techniques and importance of Vermiculture, Vermicompost and Vermiwash

Total contact Hrs: [37.5]

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List of Recommended Books for Semester I syllabus:

1) Hyman, L. H. – The invertebrates, Vol. I (McGraw Hill)
2) Hyman L.H. – The invertebrates, Vo. II (McGraw Hill)
3) Barnes R. D. – Invertebrate Zoology (W.B. Saunders Co.)
4) Pearse / Buchschaum – Living invertebrates, Blackwell Scientific Publications, California
5) Parker and Haswell – A Text Book of Zoology – Invertebrates Vol. I Edited by Marshall and Williams, C.B.S. Publishers and Distributors, New Delhi.
6) P. S. Dhami and J.K. Dhami – Invertebrates, S. Chand and Company. New Delhi
7) De Robertis EDP and De Robertis EME – Cell and Molecular Biology
8) C.B. Powar – Cell Biology, Himalaya Pub. House
9) Verma P. S. and Agarwal V. K. – Genetics, S. Chand and Company
10) Strickberger – Genetics. C Millian Publications
11) Winchester – Genetics, Oxford Publication
12) E. L. Jordan & P. S. Varma – Invertebrate Zoology
13) Genetics by P.P. Meyyan
14) A Text Book of Invertebrates – N. C. Nair, N. Soundara Pandian, S. Leelavathy, T. Murugan
15) R. L. Kotpal – Modern Text Book of Zoology, Invertebrates
16) Cell Biology – Dr. N. Arumugam
17) P. S. Varma & V. K. Agarwal – Cell Biology, Genetics, Molecular Biology, Evolution and Ecology
18) R. P. Meyyan, N, Arumugam – Genetics & Evolution
19) P. K. Gupta – Cell and Molecular Biology
20) Search engine- www.wikipedia.org

List of Recommended Books for Semester II syllabus:

1) Evolution & Biostatistics – by N. Arumugam & R. P. Meyyan.
2) Environmental Studies – Based on UGC syllabus – N. Arumugam & V. Kumaresan
3) Organic Evolution – N. Arumugam
4) Chordate Zoology – A. Thangamani, S. Prasanna Kumar, N. Arumugam, L. M. Narayanan
5) Ecology – By E. P. Odum
6) The Protochordates – by S. H. Bhamrah and Kavita Juneja – Anmol Publications, New Delhi
7) Introduction to Protochordata – S. H. Bhamrah and Kavita Juneja – Anmol Publications, New Delhi
8) Chordate Zoology – S. Chand Company, New Delhi
9) Text Book of Zoology – Vertebrates, Vol. II – T. J. Parker and W. A. Haswell Edited by Marshall and Williams, CBS Publications and Distributors, New Delhi.
10) E. L. Jordan – Chordate Zoology, S. Chand and Company, New Delhi.
11) Odum – Ecology (Amerind)
12) Fundamentals of Ecology – Odum – (Saunders)
13) Ecology – Rickelfs (W.H. Freeman)
14) Economic Zoology – Venkitraman (Sudarshana Publishers)
15) The Foundations of Ethology (Spinger Verlog)
16) Economic Zoology – Shukla and Upadhyaya – Rastogi Publications
17) Immelamann – Introduction of Ethology (Plenum Press)
18) A Text Book of Chordates – A. Thangamani, L. M. Narayan, S. Prasannakumar, N. Arumugam
19) R. L. Kotpal – Modern Text Book of Zoology, Vertebrates
20) A. Arumugam, J. Johnson Rajeshwar, S. Arumuam, R. Ram Prabhu – Applied Zoology

10) Practicals :

Practical Course in Zoology for B. Sc. I

Semester I and II (Credits 4)

I. Dissection of Earthworm :
i) Systematic position and External morphology
ii) Digestive System
iii) Reproductive system
iv) Nervous system

II. Temporary Mounting of Earthworm:
Septal nephridia, Setae, Spermatheca, Ovary,

III. Cytological Preparation :
1) Stained preparation of Mitochondria using Janus green B from any suitable material.
2) Stained preparation of Nucleus of squamous epithelium of frog.

IV. Examples in Genetics – Examples based on Monohybrid, Dihybrid and Blood groups and Coat colour in rabbit (10 examples are to be solved).

V. Identifications / Spottings :
A) Animal classification -
1) Study of Five kingdom classification.
2) Salient features and classification upto classes of following kingdoms with suitable examples –
A) Kingdom : Protista - Amoeba, Paramoecium, Euglena
B) Kingdom : Animalia with reference to phyla :
i) Porifera : Sycon, Spongilla, Hyalonema
ii)Coelenterata : Hydra, Obelia, Aurelia, Sea anemone and Coral
iii)Platyhelminthes : Planaria, Liverfluke, Tape -worm
iv)Nemathelminthes : Ascaris
v)Annelida : Nereis, Earthworm, Leech
3) Classification of Chordates : Salient features and classification upto orders of the following with suitable examples –
Protochordata :
i) Urochordata - Herdmania,
ii)Cephalochordata : Amphioxus
A) Craniata : i) Agnatha, Cyclostomata : Petromyzon / Myxine
ii) Gnathostomata :
a) Superclass : Pisces : I) Class – Chondrichthyes : Dogfish, Sting – ray / Electric – Ray. II) Class – Osteichthyes : Flying fish, Sea- Horse, Eel, Labeo.
b) Superclass :Tetrapoda : Class - Amphibia: Ichthyophis, Frog, Toad and Salamander.

B) Study of Earthworm : Sections of Earthworm Passing through Pharynx, Gizzard, Typhlosole region, study of cocoon

C)Study of Paramoecium : Binary fission and conjugation

D)Study of Sycon : Spicules , T.S. and L. S. of Sycon

E) Study of Hydra – Whole mount with bud, Sections through Body, Ovary and Testis

F) Study of Tapeworm - Scolex, Mature and Gravid proglottids, Hexacanth larva

G) Study of Fishes – Types of fins : Paired , Un-paired & Types of Tail fins
Types of Scales – Placoid,Cycloid & Ctenoid
Study of Gills – Cartilaginous & Bony fish

H)Study of Mimicry- stick insect and camouflage - chameleon

I) Study of Honey bee – Queen, Worker, Drone and Bee hive

J)Study of Frog – (Demonstration Practicals)
Heart, Digestive system, Lungs, Kidneys, Ovaries, Testis, Blood and Brain.
Skeleton **- Axial** : Skull, Lower jaw, Hyoid apparatus & Vertebrae

Appendicular : Pectoral & Pelvic girdles,Fore & Hind limb bones

K) Study Tour – Visit to any suitable place of Zoological interest to study animal biodiversity (Upto four days).

B.Sc. Part I Semester I and Semester II (Zoology)

Nature of Question Paper for Practical

Scheme of Marking for Practical

Q.1. Dissection	Marks 13
Q.2. Temporary stained preparation	Marks 8
Q.3. Genetics example	Marks 10
Q.4. Cytological preparation	Marks 8
Q.5. Spotting	Marks 10
Q.6. Tour Report	Marks 8
Q.7. Laboratory Record	Marks 8
Q8: Viva -Voce	Marks 5

Total Marks [70]

CHAIRMAN
B. O. S. ZOOLOGY