

Swami Ramanand Teerth Marathwada University,
Nanded



SEMESTER PATTERN CURRICULUM UNDER
CHOISE BASED CREDIT SYSTEM (CBCS)
FACULTY OF SCIENCE
UNDER GRADUATE (UG) PROGRAMMES
B. Sc. FIRST YEAR

SUBJECT: ZOOLOGY

w.e.f. June 2016

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,
NANDED VISHNUPURI, NANDED (M.S.)**

Board of Studies in Zoology

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Chairman, BOS in Zoology, SRTMU Nanded
(Dr. R.P. Mali)
Professor and Head,
PG & Research Department of Zoology
Yeshwant Mahavidyalaya, Nanded



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SUBJECT: ZOOLOGY
(w. e. f. June -2016)

INTRODUCTION:

The SRTMUN is gearing up for several initiatives towards academic excellence, quality improvement and administrative reforms. In view of this priority and in-keeping with Vision and Mission; process was already initiated towards introduction of semester system, grading system and credit system. In the recent past, University had already implemented Credit based grading system to campus schools and Choice Based Credit System (CBCS) for PG in all the affiliated colleges from the academic year **2014-2015**. These regulations shall be called as Choice Based Course Credit System & Grading, 2014. In short it will be referred as **SRTMUN CBCS REGULATION**.

Now University is going one step ahead to implement Choice Based Credit System (CBCS) for UG in all the affiliated colleges from the academic year **2016-2017** progressively for UG Zoology. Revision and updating of the curriculum is the continuous process to provide an updated education to the students at large. Presently there is wide diversity in the curriculum of different Indian Universities which inhibited mobility of students in other universities or states. To ensure and have uniform curriculum at UG and PG levels as per the **SRTMUN CBCS REGULATION**, curriculum of different Indian Universities, syllabus of NET, SET, MPSC, UPSC, Forest Services and the UGC model curriculum are referred to serve as a base in updating the same.

The B.Sc. Zoology (General) semester pattern course is running in different affiliated colleges of the SRTMUN. The course content has been designed under CBCS pattern. The course content of each theory paper is divided into units by giving appropriate titles and subtitles. For each unit, total number of periods required, weight age of maximum marks and credits are mentioned. A list of practical exercises and skills for laboratory work to be completed in the academic year is also given. A list of selected reading material and a common skeleton question paper for all papers of semester-I,II, III, IV, V&VI are also provided at the end of the syllabus.



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SUBJECT: ZOOLOGY

(w. e. f. June -2016)

OBJECTIVES:

1. To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.
2. To update curriculum by introducing recent advances in the subject and enable the students to face NET, SET, UPSC and other competitive examinations successfully.
3. To impart knowledge of zoology (animal science) as the basic objective of Education
4. To develop a scientific attitude to make students open minded, critical and curious
5. To develop an ability to work on their own and to make them fit for the society
6. To expose themselves to the animal diversity amongst life forms
7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of animal materials and data.
8. To make aware of natural resources and environment and the importance of conserving the same
9. To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient
10. To appreciate and apply ethical principles to animal sciences research and studies.



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Under Graduate (UG) Programmes
SUBJECT: ZOOLOGY
(w. e. f. June -2016)**

An Outline:

CLASS: B. Sc. FIRST YEAR

Semester/ Annual	Course Name		Paper No. & Title	Total periods Periods/ Week	Marks for		Credits (Marks)
					External (ESE)	Internal (CA)	
Semester-I	CCZ-I	Section-A	Theory Paper-I: Life & Diversity of Animals – I (Non-Chordata)	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	Theory Paper-II: Cell Biology	45 (03/week)	40	10	Credits: 02 (Marks:50)
Semester-II	CCZ-II	Section-A	Theory Paper-III: Life & Diversity of Animals – II (Chordata)	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	Theory Paper-IV: Developmental Biology	45 (03/week)	40	10	Credits: 02 (Marks:50)
Annual pattern	CCZP-I Section A + Section B		Practical Paper-V: Practical's based on theory papers of CCZ-I & II	22 Prac. (03/week/ batch)	80	20	Credits: 04 (Marks:100)
Total Credits of Semester-I and II					240	60	Credits: 12 (Marks:300)

CCZ: Core Course Zoology, **CCZP:** Core Course Zoology Practical, **ESE:** End of Semester Examination, **CA:** Continuous Assessment

Distribution of marks: 80% of the total marks for ESE and 20% for CA

CA of Marks-10: 05 marks for Test/ Assignments & 05 marks for attendance

CA of Marks-20: 10 marks for Test & 10 marks for attendance



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(w. e. f. June -2016)

CLASS: B. Sc. SECOND YEAR

An Outline:

Semester/ Annual	Course Name		Paper No. & Title	Total Periods	Marks for		Credits (Marks)
					External (ESE)	Internal (CA)	
Semester-III	CCZ-III	Section-A	Theory Paper-VI: Genetics	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	Theory Paper-VII: Comparative Anatomy & Physiology	45 (03/week)	40	10	Credits: 02 (Marks:50)
Semester-IV	CCZ-IV	Section-A	Theory Paper-VIII: Genetic Engineering & Evolution	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	Theory Paper-IX: Endocrinology, Histology & Biochemistry	45 (03/week)	40	10	Credits: 02 (Marks:50)
Annual pattern	CCZP-II	Section-A	Practical Paper-X: Practicals based on theory papers-VI & VIII	10 Prac. (03/week/ batch)	40	10	Credits: 02 (Marks:50)
		Section-B	SEC- I: (1 Skill/Optional)	10 Prac. (03/week/ batch)	--	15x3=45* (50*)	Credits: 02* (Marks:50)
Annual pattern	CCZP-III	Section-A	Practical Paper-XI: Practicals based on theory papers-VII& IX	10 Prac. (03/week/ batch)	40	10	Credits: 02 (Marks:50)
		Section-B	SEC-II: (1 Skill/Optional)	10 Prac. (03/week/ batch)	--	15x3=45* (50*)	Credits: 02* (Marks:50)
Total Credits of Semester-III and IV					240	60 (100*)	Credits: 12 (04*) (Marks:300)

CCZ: Core Course Zoology, CCZP: Core Course Zoology Practical, ESE: End of semester examination, CA: Continuous Assessment,
 SEC: Skill Enhancement Course

Distribution of marks: 80% of the total marks for ESE and 20% for CA

CA of Marks-10: 05 marks for Test/ Assignments & 05 marks for attendance

SEC-I: 15marks/Skill/Optional (15x3 =45); Attendance-05 marks

SEC-II: 15marks/Skill/Optional (15x3 =45); Attendance-05 marks



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SUBJECT: ZOOLOGY
(w. e. f. June -2016)

CLASS: B. Sc. THIRD YEAR

An Outline:

Semester / Annual	Course Name		Paper No. & Title	Total Periods	Marks for		Credits (Marks)
					External (ESE)	Internal (CA)	
Semester-V	DSEZ-V	Section-A	Theory Paper-XII: Ecology & Zoogeography	45 (03/week)	40	10	Credits: 02 (Marks: 50)
		Section-B	Theory Paper-XIII: Aquaculture Or Theory Paper-XIII: Applied Parasitology Or Theory Paper-XIII: Entomology Or Theory Paper-XIII: Environmental Science	45 (03/week)	40	10	Credits: 02 (Marks: 50)
Semester-VI	DSEZ-VI	Section-A	Theory Paper-XIV: Ethology, Biometry & Bioinformatics	45 (03/week)	40	10	Credits: 02 (Marks: 50)
		Section-B	Theory Paper-XV: Pisciculture Or Theory Paper-XV: Applied Parasitology Or Theory Paper-XV: Entomology Or Theory Paper-XV: Environmental Science	45 (03/week)	40	10	Credits: 02 (Marks: 50)
Annual pattern	DSEZP-I	Section-A	Practical Paper-XVI: Practicals based on theory papers-XII&XIV	10 Prac. (03/week/ batch)	40	10	Credits: 02 (Marks: 50)
		Section-B	SEC-III: (1 Skill/Optional)	(03/week/ batch)	--	15x3=45* (50*)	Credits: 02 (Marks: 50)



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Semester/ Annual	Course Name		Paper No. & Title	Total Periods	Marks for		Credits (Marks)
					Exter nal (ESE)	Internal(CA)	
Annual pattern	DSEZP-II	Section-A	Practical Paper-XVII: Practicals based on theory papers- XIII&XV	10 Prac. (03/week/ batch)	40	10	Credits: 02 (Marks: 50)
		Section-B	SEC-IV: (Skill based Project)	(03/week/ batch)	--	50*	Credits: :02* (Marks: 50)
Total Credits Semester-V and VI					240	60 (100*)	Credits: 12 (Marks:300) Credits:(04*) Marks:(100*)

CCZ: Core Course Zoology, CCZP: Core Course Zoology Practical, ESE: End of semester examination, CA: Continuous Assessment, SEC: Skill Enhancement Course, DSEZ: Discipline Specific Elective Zoology

Distribution of marks:

80% of the total marks for ESE and 20% for CA

CA of Marks-10: 05 marks for Test/ Assignments & 05 marks for attendance

SEC-III: 15marks/Skill/Optional (15x3 =45); Attendance-05 marks -Marks 50*

SEC-IV: PROJECT of marks 50*: 50 Marks/Project/Any one optional

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,
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CBCS PATTERN
B.Sc. FIRST YEAR (SEMESTER I)
w.e.f. June 2016
ZOOLOGY
CCZ-I (SECTION A)
LIFE AND DIVERSITY OF ANIMALS – I (Non-Chordata)
(Theory Paper-I)

Credits: 02 Marks: 50

Periods: 45

UNIT I **11**

1. Introduction of Non-chordates

2. Protozoa:

General Characters and classification up to class level.

Plasmodium vivax-

Structure, Life Cycle, Pathogenicity and Control Measures.

3. Porifera:

General Characters and classification up to class level.

Sycon:

General Morphology, different types of cells.

Economic Importance of Porifera

UNIT II **11**

1. Coelenterata:

General Characters and classification up to class level.

Polymorphism in Coelenterata.

Coral, and Coral reefs, its Economic Importance.

2. Platyhelminthes:

General Characters and classification up to class level.

Taenia solium: Structure and life cycle

3. Nematohelminthes.

Ascaris: Structure and life cycle.

UNIT – III

12

1. Annelida:

General Characters and classification up to class level.

Role of Earthworm in Agriculture.

2. Arthropoda:

General Characters and classification up to class level.

Cockroach :

External Morphology, Digestive system, Respiratory system, Nervous system.

Economic Importance of Insects

UNIT IV

11

1. Mollusca:

General Characters and classification up to class level.

Economic Importance of Mollusca.

2. Echinodermata:

General Characters and Classification up to class level.

Star Fish

External Morphology and Water vascular system.

3. Hemichordata:

General Characters and Affinities.

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**CBCS PATTERN
B.Sc. FIRST YEAR (SEMESTER I)
w.e.f. June 2016
ZOOLOGY
CCZ-I (SECTION B)
CELL BIOLOGY
(Theory Paper-II)**

Credits: 02 Marks: 50

Periods: 45

UNIT- I

- 1. Introduction of Cell Biology** **12**
- 2. Microscopy** (An elementary idea)
 - a) Light microscopy
 - b) Electron microscopy
- 3. Types of cells:**
 - a) Prokaryotic cell structure
 - b) Eukaryotic cell structure
- 4. Plasma membrane:**
 - a) Structure
 - i) Bimolecular model,
 - ii) Trilaminar model,
 - iii) Lattice model,
 - iv) Fluid mosaic model,
 - v) Micellar model,
 - b) Composition
 - c) Functions.

UNIT- II

11

- 1. Endoplasmic reticulum:**
 - a) Structure
 - b) Functions
- 2. Golgi complex:**
 - a) Structure
 - b) Functions
- 3. Mitochondria:**
 - a) Structure
 - b) Functions

4. Ribosomes:

- a) Structure
- b) Functions

UNIT – III

11

1. Lysosomes:

- a) Structure
- b) Functions

2. Nucleus:

- a) Structure
- b) Functions

3. Nucleolus:

- a) Structure
- b) Functions

4. Chromosome:

- a) Shape – (metacentric, submetacentric ,Acrocentric and Telocentric,)
- b) Structure
- c) Functions
- d) Polytene and Lampbrush chromosomes

UNIT – IV

11

1. Cell cycle:

- a) Phases
- b) Mitosis and its significance
- c) Meiosis and its significance

2. Cytology of cancer:

Malignant and Non-malignant

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**CBCS PATTERN
B.Sc. FIRST YEAR (SEMESTER II)
w.e.f. June 2016
ZOOLOGY
CCZ-II (SECTION A)
LIFE AND DIVERSITY OF ANIMALS -II (CHORDATA)
(Theory Paper- III)**

Credits: 02 Marks: 50

Periods: 45

UNIT I 10

1. Introduction of Chordates.

2. Protochordata:

Urochordata:- General characters, concept of retrogressive metamorphosis.

Cephalochordata: General Characters.

3. Agnatha:

Cyclostomata : General characters of cyclostomes.

UNIT II 12

1. Pisces:

General characters and classification of Pisces up to class level.

Scoliodon (Dogfish):

External characters, Digestive system,
Respiratory system, Circulatory System, Nervous system.
Economic Importance of Fishes.

UNIT III 11

1. Amphibia:-

General characters and classification up to order level.

Parental care in amphibians.

Summer and Winter sleep in Frog.

2. Reptilia:

General characters.

Poisonous and Non-poisonous snakes.

Importance of snake Venom.

3. Aves:

General characters.

Flight Adaptations in birds.

Migration of birds.

UNITS IV

12

1. Mammals:

General characters and classification up to order level.

2. Rat-

External characters,

Digestive system (Anatomy),

Respiratory system,

Circulatory system.

Nervous system - Brain and spinal cord

Eye and Ear.

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**CBCS PATTERN
B.Sc. FIRST YEAR (SEMESTER II)
w.e.f. June 2016
ZOOLOGY
CCZ-II (SECTION B)
DEVELOPMENTAL BIOLOGY
(Theory Paper-IV)**

Credits: 02 Marks:-50

Periods: 45

UNIT- I **11**

1. Introduction of Developmental Biology
2. **Gametogenesis:**
 - a) Spermatogenesis
 - b) Oogenesis
3. **Types of eggs**
 - a) On the basis of amount of yolk
 - b) On the basis of distribution of yolk

UNIT- II **11**

1. **Gametes of frog:**
 - a) Structure of sperm
 - b) Structure of ovum
2. **Frog Embryology:**
 - a) Fertilization
 - b) Cleavage
 - c) Blastulation
 - d) Gastrulation
 - e) Formation of three germinal layers
3. **Regeneration in Non- chordates and chordates**

UNIT – III

11

1. Chick Embryology:

(Extra-embryonic membranes)-

- a) Yolk sac, structure and its functions
- b) Amnion, structure and its functions
- c) Chorion, structure and its functions
- d) Allantois, structure and its functions

2. Placentation in mammals:

Classification on the basis of

- a) Mode of origin
- b) Mode of distribution of villi
- c) Functions of Placenta

UNIT- IV

12

1. Stem Cell:

- a) Sources
- b) Types – Embryonic, Haemopoietic, Adult, Nervous
- c) Role of stem cells in human welfare

2. Embryo Transfer Techniques:

- a) Gamete Intra-Fallopian Transfer (GIFT)
- b) Test tube baby
- c) Infertility in male
- d) Infertility in female

3. Parthenogenesis:

- a) Natural
- b) Artificial

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**CBCS PATTERN
w.e.f. June 2016
B.Sc. FIRST YEAR
ZOOLOGY
CCZP-I (Section A + Section B)
(PRACTICAL'S BASED ON THEORY PAPERS OF CCZ-I & II)
(PRACTICAL PAPER- V)**

Credits: 04 Marks: 100

Practicals: 22 (03/Week/Batch)

- 1) Study of at least two museum specimens from Invertebrate Phyla.
(Protozoa to Echinodermata and Hemichordate) **(3 Practicals)**
- 2) Study of at least two museum specimens from Protochordata to Mammalia. **(3 Practicals)**
- 3) **Demonstration based on Models, Charts and Computer Aided Techniques: (3 Practicals)**
 - i) Cockroach: Digestive system, Nervous system.
 - ii) Scoliodon: Digestive system, Heart and ventral Aorta, Afferent arteries, Brain
- 4) **Mountings - (3 Practicals)**
 - i) Mouth parts of Cockroach
 - ii) Trachea of Cockroach
 - iii) Salivary glands of Cockroach
 - iv) Nereis Parapodia
 - v) Mountings of Scales (by Local Available Fishes): Ctenoid and Cycloid.
- 5) **Skeleton of Rat/Rabbit:** Atlas Vertebra, Thoracic Vertebra, Pectoral Girdle, Pelvic Girdle, Humerus, Femur, Tibia-Fibula, Radius-ulna (Models / Charts). **(3 Practicals)**
- 6) **Study of permanent slides of mitosis.**
- 7) **Squash preparation of Onion root tips.**
- 8) **Study of permanent slides of meiosis.**
- 9) **Squash preparation of Onion buds.**
- 10) **Study of permanent slides of Frog Embryology (Any Five).**
- 11) **Study of permanent slides of Chick Embryo:** 18 hrs. 24 hrs. 36 hrs. 48 hrs. 72 hrs. Stages.
- 12) **Short excursion/ study Tour is compulsory.**

Note: Submission:

- i) Practical record book duly signed by the teacher in charge/Head of the Department.
- ii) Five permanent stained micro preparations.
- iii) Excursion report.

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FACULTY OF SCIENCE
CBCS PATTERN
B.SC. FIRST YEAR
w.e.f. June 2016
SUB: - ZOOLOGY
(NON CHORDATES, CELL BIOLOGY, CHORDATES AND DEVELOPMENTAL BIOLOGY)
PRACTICAL EXAMINATION
QUESTION PAPER PATTERN
(Practical Paper-V)

Time : 4 Hours

Credits: 04 Marks : 80

Center No. :

Batch No. :

Date :

-
- Q.1 Demonstrate ----- so as to explain its -----System and leave a labelled diagram
(Scoliodon- Digestive System, Heart, Ventral aorta and brain.) 10
- Q.2 Demonstrate ----- so as to explain its -----System and leave a labelled Diagram.
(Cockroach- Digestive System and Nervous System) 10
- Q.3 Spotting : Identify and Describe as per instructions (1 - 10 Spots) 20
(4- invertebrate, 3- vertebrate, 1- Bone,1- Frog Embryo slide ,1- Chick Embryo slide)
- Q.4 Prepare a permanent stained micro preparation of material provided. 10
(Mounting of Scales of local available fishes/ Mouth parts/ Trachea/ Salivary glands of cockroach/ Nereis Parapodia)
- Q.5 Prepare a temporary Squash preparation of Onion Root tips for Mitosis. 10
(Identify, sketch and describe any one stage)
- Q.6 Record Book. 10
- Q.7 Excursion report and submission of slides 10

Note: Demonstration of animals through Models, Charts and Computer Aided Techniques