SIDO KANHU MURMU UNIVERSITY
DUMKA

CBCS BASED
COURSE CURRICULUM
(ZOOLOGY)

For

UNDERGRADUATE PROGRAMME

[B.Sc. (Major & Introductory Papers)]

ACADEMIC SESSION

w.e.f. 2022-2026

(As per NEP Guidelines)

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B.Sc. ZOOLOGY (MAJOR & INTRODUCTORY PAPERS)

ABSTRACT OF SYLLABUS OF MAJOR & INTRODUCTORY PAPERS
(4 YR DEGREE COURSE UNDER SEMESTER SYSTEM)

MAJOR PAPER: (MJZ)

YEAR	SEMESTER	Theory & Practical			TOTAL MARKS (T+P)
		PAPER CODE	COURSE TITLE	FULL MARKS	
1st	Semester-I (Theory)	Zoo-MJ-I	Non Chordate, Chordate, Comparative Anatomy, Phylogenetic relationship	75	100
	Semester-I (Practical)	Zoo-MJ-I Lab	Dissection, museum specimens, slides, Osteology	25	
	Semester-II (Theory)	Zoo-MJ-II	Non Chordate, Chordate, Comparative Anatomy, General concept	75	100
	Semester-II (Practical)	Zoo-MJ-II Lab	Dissection, museum specimens, slides, Osteology	25	

INTRODUCTORY REGULAR COURSE: (IRC)

YEAR	SEMESTER	Theory & Practical			TOTAL MARKS (T+P)
		PAPER CODE	COURSE TITLE	FULL MARKS	
1st	Semester-I (Theory)	Zoo-IRC-I	An overview of animal kingdom, Microbiology & Diseases, Instruments, Data analysis	75	100
	Semester-I (Practical)	Zoo-IRC-I Lab	Museum specimens, Evolution, Principles and functions of instruments, Population sample analysis	25	
	Semester-II (Theory)	Zoo-IRC-II	Non Chordate, Chordate, Parasitology, Molecular Biology and Physiology	75	100
	Semester-II (Practical)	Zoo-IRC-II Lab	Dissection, Mounting, slides, Miscellaneous	25	

A. THEORY E N D S E M E S T E R E X A M I N A T I O N:
MAJOR PAPER & Introductory Regular Course
(Pattern of questions & Distribution of Marks)

Group	Time: 3hours	Theory (4 units) End Semester Examination	Full Marks : 60
A	**Objective Type: Five Multiple Choice Questions :**		**10x1 = 10 Marks**
B	**Short Answer Type Questions: Four out of six questions**		**5 x4 =20 Marks**
C	Long Answer Type Questions : **Three questions (Out of Five Questions)**		**3x10 = 30 Marks**

Total =60 Marks

B. THEORY INTERNAL TEST: =15 Marks
(Questions to be set from all units)

Pass Marks : End Semester Exam=24Marks, Internal=06 Marks. GT=75 Marks

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Pass Percentage: 40% of total marks in each paper and even in internal test separately

P R A T I C A L (MAJOR PAER): END SEMESTER EXAMINATION

MODEL OF QUESTIONS & DISTRIBUTION OF MARKS

SEMESTER ; I
Full Marks : 25 **Time : 3hrs**

SN	Model of questions	Marks
1	Dissection	**06**
2	Mounting	**04**
3	Spotting: Slide 1+Specimen 1+ bone 1	**06**
4	Model/Chart	**02**
5	Viva	**03**
6	Collection/Record	**04**
Pass percentage 40% (10Marks)	Total	**25**

SEMESTER : II
Full Marks : 25 **Time : 3 hrs**

SN	Model of questions	Marks
1	Dissection	**06**
2	Mounting	**04**
3	Spotting: Museum Specimens (02) & Slides(01)	**06**
4	Observation & Comment	**02**
5	Viva	**03**
6	Collection/Record	**04**
Pass percentage 40% (10Marks)	**TOTAL**	**25**

P R A T I C A L (IRC): END SEMESTER EXAMINATION

MODEL OF QUESTIONS & DISTRIBUTION OF MARKS

SEMESTER ; I
Full Marks : 25 **Time : 3hrs**

SN	Model of questions	Marks
1	Spotting museum specimen and evolution 2+1	**06**
2	Instruments' Principles & uses (02)	**04**
3	Estimation of Starch	**04**
4	Statistics Numerical-1	**04**
5	Viva	**03**
6	Collection/Record	**04**
TOTAL		**25**

Pass Percentage: 40% (10 marks)

SEMESTER : II
Full Marks : 25 **Time : 3 hrs**

SN	Model of questions	Marks
1	Dissection	06
2	Mounting	04
3	Spotting: Museum Specimens (02)	04
4	Biochemical Test	04
5	Viva	03
6	Collection/Record	04
TOTAL		25

Pass Percentage: 40% (10 Marks)

S.K.M. University, Dumka

B.Sc: ZOOLOGY (MAJOR)

Course objectives: The primary objective of the course in semester-I and semester-II is to impart appreciation for different life forms on earth and drive home the relationship between different living forms both at the genetic and the ecological level. It will provide an opportunity to have a novel branch of science dealing with identification and assigning exact position in animal kingdom. The evolutionary aspect dealing with origin of some animals in evolutionary scale has been incorporated to have an idea of advent of recent life forms.

SEMESTER-I

MAJOR PAPER-I

Zoo-MJ- I **Full Marks:75 (60+15)**

SECTION-A

UNIT-I: Non-Chordates:

1. **General characters and classification up to class:**
   1.1 Body cavities: Acoelomate, Pseudocoelomate, Coelomate
   1.2 Symmetry: Radial, Bilateral
2. **Protozoa:**
   2.1 Locomotion, Nutrition & Reproduction (General)
   2.2 Life cycle and pathogenicity of Leishmania
3. **Porifera:**
   3.1 Canal system (General)
   3.2 Life cycle of sycon
4. **Cnidaria:**
   4.2 Life cycle of Obelia
   4.3 Coral reefs

5. **Ctenophora**: Affinities

6. **Platyhelminthes:** Parasitic adaptation (General)

UNIT-II: Chordates:

1. **Chordates**- General characters and classification up to orders
2. **Urochordates & Cephalochordates-**
   2.1 General characters with example
   2.2 Retrogressive metamorphosis in Herdmania
3. **Cyclostomes: General characters**
4. **Pisces:**
   4.1 Type study- Labeo and Scoliodon
   4.2 Migration in Fishes
   4.3 Dipnoi
5. Amphibia: Parental care in Amphibia

UNIT-III: Comparative anatomy of vertebrates:

1. Skin
2. Heart
3. Aortic Arches
4. Coelom, Pseudocoel, Hemocoel

UNIT-IV: Phylogenetic relationship, origin & evolution

1. **Origin and Evolution of Amphibia**
2. **Origin and Evolution of Birds**
3. **Latimeria**
4. **Archeopterix**

ZOO-MJ-I Lab **LIST OF PRACTICALS**

FULL MARKS: 25

Questions to be set from both units:

UNIT-I: Non Chordate:

A. STUDY OF SLIDES:

1. Protozoa : Amoeba ,Entamoeba,Paramecium, Leishmania
2. Porifera : Spicules, Gemule , T.S & L.S. of Sycon
3. Coelenterata : W.M.,T.S & L.S. of Hydra, Obelia Colony
4. Platyhelminthes: Fsaciola (wm), Larval forms

B. STUDY OF SPECIMENS:

1. Porifera : Sycon
2. Coelenterata : Aurelia , Porpita ,Physalia
3. Helminthes : Fasciola hepatica, Liver fluke , Ascaris

UNIT-II: Chordate:

A. DISSECTION:

Scoliodon: General anatomy, Afferent and efferent blood vessels

B. **MOUNTING**

Placoid, Cycloid, Ctenoid scales of fishes

C. **STUDY OF SLIDES:** T.S of Testes, Ovary, Skin, Liver, Pancreas, Stomach, Intestine (All Frog)

D. STUDY OF SPECIMENS:

1. Fish: Torpedo,Hammer headed shark, Hippocampus,Exocoetus, Anabas testudeneus,Channa punctatus,Clarias batrachus,Heteropneustes fossilis,Catla catla,Labeo rohita
2. Amphibia: Ichthyophis, Hyla,

E. OSTEOLOGY: Study of vertebrae &Limb bones of Amphibia, and Mammal

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SEMESTER-II

ZOO- MJ-II

FM: 75 (60+15)

UNIT-I

Non Chordates:

1. **Nemathelminthes:**
   - 1.1 Life cycle of Ascaris lumbricoids
   - 1.2 Life cycle of Wuchereria bancrofti

2. **Annelida:**
   - 2.1 Metamerism
   - 2.2 Type study: Leech and Earthworm (Digestive, Excretory, Circulator system - Comparative)

3. **Arthropoda:**
   - 3.1 Larval forms of crustacean
   - 3.2 Mouth parts in insects
   - 3.3 Vision (Structure of eye)in prawn and cockroach

4. **Mollusca:**
   - 4.1 Torsion and detorsion in gastropod
   - 4.2 Respiration in Mollusca (Unio & Pila)

5. **Echinodermata:**
   - 5.1 Water vascular system in Holothuria
   - 5.2 Larval forms of Echinodermata

Hemichordates: General characters and affinities

UNIT-II

Chordates:

1. **Reptilia:**
   - 1.1 Origin and evolution of Reptilia
   - 1.2 Types of Skulls
   - 1.3 Biting and Swallowing mechanism in snakes

2. **Aves:**
   2.1 Origin and evolution of Aves
   2.2 Flight adaptation
   2.3 Migration

3. **Mammalia:**
   3.1 Origin of mammals
   3.2 Affinities of Prototheria and Metatheria
   3.3 Adaptive radiation with reference to locomotary appendages

UNIT-III

Comparative Anatomy of Vertebrates:

1. Respiratory System
2. Brain
3. Urinogenital System
4. Endoskeleton

UNIT-IV

General concept

1. Respiratory pigments in invertebrates and vertebrates
2. Eye structure in animal kingdom
3. Major excretory products of animals
4. Significance of biodiversity

PRACTICAL

ZOO-MJ-II Lab

Full Marks 25

UNIT-I

Non Chordate

A. DISSECTION :

1. Earthworm: Digestive system
2. Prawn : Nervous system

A. MOUNTING:

Earthworm: Setae, Spermatheca, Septal nephredia, Statocyst

B. **Museum Specimens**:

1. Annelida : Earthworm , Leech
2. Arthropoda : Limulus,Scorpion , Julus, Prawn.Praying mantis,Dragon fly
3. Mollusca : Unio , Pila ,Chiton , Octopus, Sepia
4. Echinodermata : Starfish

UNIT-II

Chordate

A. **Dissection**

1. Cranial Nerves of Scoliodon
2. Digestive system of Scoliodon

B.Observation

3. Lateral line system
4. Accessory respiratory organs
5. Eye muscles
6. Electric organ

C. Museum specimens

1. Reptilia: Draco,Python,Bungarus,Naja

2. Aves: Pigeon
3. Mammal: Bat

D. Osteology

1. skull bones of Reptilia and Mammal

Course Learning outcomes: Having completed Semester-I and Semester-II, the students would develop an aptitude for classical Zoology which is integral part for understanding the life forms with a vision of comparative account of different systems of the animals. Without having wide spectrum knowledge of life forms, the concept of biodiversity will be hard to understand and especially, their identification. This paper will enable the students to create interest in animal world who will carry forward their knowledge to the future generation to unravel many mysteries of animal forms. .

Recommended Books:

1. Kotpal,Agarwal & Khetrapal : Modern Textbook of Zoology: Invertebrate (Rastogi publication)
2. R. L.Kotpal : Invertebrate series – Protozoa to Minor phyla : (Rastogi publication).
3. Young,J.Z. : Life of Vertebrates (Oxford University Press)
4. Comparative Anatomy of Vertebrates: R.K. Saxena & Sumitra Saxena
5. Vertebrates: Comparative Anatomy, Function, Evolution. Kenneth V. Kardong
6. Chordate Zoology: E.L. Jordan & Dr. P.S. Verma, S. Chand Publication
7. The Chordates - Alexander, R.M. (Cambridge University Press)
8. The Chordates - Monaith, A. R. (Cambridge University Press)
9. Chordata - Structure and Function - Waterman, A. J. (Mac Millan Co.)
10. Young,J.Z. : Life of Vertebrates (Oxford University Press)
11. Hildebrand : Analysis of vertebrates Structure (Wiley)
12. Kingsley : Outline of Comparative anatomy (Central Book Depot)
13. George C.Kent & Larry Miller : Comparative Anatomy of the Vertebrates (W.C.B Publisher)
14. Noble,G.K.,The Biology of the Amphibia(Ney York)
15. Protochordata – O.P.Saxena (S.Chand & Com.LTD)
16. Barnes, R.D. Invertebrate Zoology -(W.B. Saunders Co.)
17. Hyman,L.H. : Ihe Invertebrates Vi. I & II (Mc graw Hill)
18. Invertebrate structure and function : Barrington (Nelson)
19. Kotpal,Agarwal & Khetrapal : Modern Textbook of Zoology: Invertebrate (Rastogi publication)

1. **A Manual of Practical Zoology Invertebrates: S. Chand, Harnam Singh & Dr. P.S. Hemne**
2. **Practical Zoology Vertebrate: S.S. Lal, Rastogi**

3. **SaraS Practical Zoology, Vol 3: N. Arumugam, S. Prasanna Kumar, L.M. Narayan,------Saras Publication (for Physiology, Biochemistry, Cytology)**
