

# UG COURSE UNDER NEP-2022

## PROPOSED SYLLABI FOR NEP

Four Years B.Sc.Hons. In Zoology  
(Eight Semester Course)

### SEMESTER-II

Major – 2 (MJ - 2) Cell Biology and Histology

Credit – 4

FM= 100 [75+25]

Lectures – 60 Hours

T= 75 {60Ext. +15 Int.} (10+05)

#### Instructions:

- There will be two groups of questions. **Group A** is compulsory which will contain **three questions**.
- Question no. 1** will be **very short answer type** consisting of **five questions of 1 mark each**.
- Question no. 2 & 3** will be of **short answer type of 5 marks each**.
- Group B** will contain **descriptive type five questions of 15 marks each**, out of which **any three are to answer**.

#### Learning outcomes

After successfully completing this course, the students will be able to understand:

1. Understand the structure, functions and distribution of diversified animals belonging to chordate
2. able to understand the hidden facts of developments in animals
3. Through practical students will develop some skills
4. Students will be primed for the competitive examination

SEM	Common, Introductory, Major, Minor, Vocational & Internships courses			FM		I	E	Pass marks
	Code	Papers	Credits					
	CC-4	Language & communication skills (English)	06	100		25 (20+5)	75	40
	CC-2	Mathematical computation thinking analysis	02	100		25 (20+5)	75	40
	CC-2	Global citizenship education & education for sustainable development	02	100		25 (20+5)	75	40
I	IRC-1	Introductory regular cours-2	03	100		25 (20+5)	75	40
	IVS-1A	Introductory Vocational studies-2	03	100		25 (20+5)	75	40
	MJ-2	Major Paper –I (Disciplinary/Interdisciplinary Major)	04+02= 06	T 75	P 25	T 15 (10+5)	T P 60 +25	30 (T) +10 (P)
			22	600				240
		IRC-2						
II		Major Paper II	04+02= 06	T 75	P 25	T (10+5)	T P 60 +25	

**Semester –II**  
**MJZ-2**

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**Systematic and Diversity of Chordate      Credit -4+2      Hours of teaching -90**

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**MJZ-2 Diversity of Chordates & Developmental Biology**

**Group-A**

**UNIT-1. Hemichordates & Protochordates**

- 1.1 General characters and Affinities of hemichordates
- 1.2 Retrogressive metamorphosis in Herdmania

**UNIT-2 Chordates: General characters and classification of the following up to order with examples**

- 2.1 Cyclostomes
- 2.2 Fishes
- 2.3 Amphibians
- 2.4 Reptiles
- 2.5 Birds
- 2.6 Mammals
- 2.7 Affinities of Prototheria & Metatheria

**UNIT- 3., Cyclostome to Mammals**

- 3.1 Comparative account of Petromyzon and Myxine
- 3.2 Pedogenesis and neoteny with special reference to Axolotl larvae
- 3.3 Origin and evolution of Amphibia
- 3.4 Poisonous & Non-poisonous Snakes of India, Poison's Apparatus and biting Mechanisms , Venome & their toxic effects
- 3.5 Flight Adaptation and mechanisms of flight
- 3.6 Comparative anatomy of integument, Aortic Arches and kidney in vertebrates
- 3.7 Characters, distribution and affinities of Prototheria & Metatheria

**Group B**

**UNIT-4      Developmental Biology**

- 4.1 **Gametes:** Structure of sperm & Ovum and Gametogenesis: Spermatogenesis & Oogenesis
- 4.2 **Fertilization:** Attraction of Gametes, Fertilizin and Anti Fertilizing Reaction, Capacitation & Acrosomal Reaction, Cortical Reaction, Amphimixis & Block to Polyspermy,  
In vitro Fertilization & Amniocentesis, Gamete intra – fallopian transfer (GIFT)
- 4.3 Fate Map & Construction: Frog & Chick
- 4.4 **Early Development:** Direct Development & Indirect Development  
Cleavage: Types and Patterns, Role of Yolk in Cleavage, **Gastrulation** Germ layer differentiation. Epiboly, Emboly/ Invagination, Involution, Ingression)
- 4.5 Late development: Formation & Role of Extra Embryonic Membranes in Chick

- 4.6 Placenta: Type's Structure and Functions.
- 4.7 Metamorphosis in Insect
- 4.8 Regeneration: Epimorphosis, Morphallaxis

## **Books Recommended:**

### **Chordate**

1. Marshall & Williams: Textbook of Zoology, Vo
2. (Parker & Haswell, 7th ed. 1972, Macmillan)
3. Miller & Harley: Zoology (6th ed. 2005, W.C. Brown)
4. Nigam: Biology of Chordates (1997, S Chand)
5. Parker & Haswell: Text Book of Zoology, Vol. II (2005, Macmillan)
6. Purves et al: Life-the Science of Biology, (7<sup>th</sup> ed. 2004, Sinauer)
7. Sinha, A.K., & Adhikari, S and Ganguli, B.B Biology of Animals Vol.II New Central Agency, Calcutta
8. Vishwanath – vertebrate Zoology

### **Developmental Biology**

1. Alberts et al.: Molecular biology of the cell. Garland, 2002.
2. Gilbert: Developmental biology. Sinauers, 2003.
3. Kalthoff: Analysis of biological development. McGraw-Hill, 1996.
4. Wolpert: Principles of development. Oxford, 2002.
5. **Chordate Embryology – P.S Verma & V. K. Agarawal**

### **ONLINE TOOLS AND WEB RESOURCES**

- Swayam (MHRD) Portal ·
- Animal Diversity (<https://swayam.gov.in/courses/5686-animal-diversity>)
- Advances in Animal Diversity, Systematics and Evolution (<https://swayam.gov.in/courses/5300-zoology>)
- ePGPathshala (MHRD) Module :<https://epgp.inflibnet.ac.in/ahl.php?csrno=35>

**B.Sc. Semester-II**  
**P-2 Practical based on MJZ2**

**Credit-4**  
**FM:25**

**Working hours -60**

<b>Practicals</b>	<b>Marks distribution</b>
1. Dissection:	<b>06</b>
2. Slide preparation	<b>02</b>
3. Spotting	
a. Slides:           -1       2X2=04	10
b. Museum Specimens (02)	2X2=04
c. Bones               (01)	2X1=02
4. Class record, poster/models/collection	<b>04</b>
5. <i>viva-voce</i>	<b>03</b>
	<b><u>25</u></b>

**List of suggested Practicals**

**Chordate Diversity**

- 1. Slides of protochordates : w m of balanoglossus , herdmania, oral hood , vestibule of amphioxus .WM of dolilum & salpa**
2. Pisces: Museum specimens -scoliodon Rohu, *Exocoetus*, Hippocampus, Torpedo ( Electric Ray), Trigon
3. Amphibia: Hyla, Alytes, Salamander
4. Reptiles: Draco, Hydrophis, Bungara, Pit Viper, Naja, Python
5. Aves : Ostrich model
6. Prototheria Models of Duck bill platypus ,spiny ant eater
7. Bones of Amphibia and Mammal
8. Study of histological slides : Skin ,Bone ,Lung, Stomach, Intestine, Liver, Kidney of mammals
9. Dissection of local bony fishes ; Afferent and efferent and nervous system
10. Mounting of Scale
11. Mounting of rectrices

**Developmental Biology:**

1. Study of Permanent slides of Frog & Chick Embryo (WM) -18 hrs , 24 hrs, 36 hrs & 72 hrs
2. Types of placenta
3. window preparation in chick egg