UNIVERSITY DEPARTMENT OF ZOOLOGY

Vinoba Bhave University, Hazaribag

Four Year Under Graduate Programme (FYUGP)

With effect from 2022-26

DrK.K.Gupta **Mr Y Jaggi** **Dr J.P.Sanyal**

DrManoj Kumar **Dr Rajendra Mistry** **Dr. G.C Baskey**

UG COURSE UNDER NEP -2022

PROPOSED SYLLABI FOR NEP

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

SEMESTER-I

SEM	Common, Introductory, Major, Minor, Vocational & Internships courses			FM				Pass marks
	Code	Papers	Credits			I	E	
	CC-1	Language & communication skills	06	100		25 (20+5)	75	40
	CC-2	Understanding India	02	100		25 (20+5)	75	40
	CC-2	Health & wellness ,Yoga Education & sports & Fitness	02	100		25 (20+5)	75	40
I	IRC-1	Introductory regular cours-1	03	100		25 (20+5)	75	40
	IVS-1A	Introductory Vocational studies-I	03	100		25 (20+5)	75	40
	MJ-1	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

General Instructions to question setter:

- There will be internal for every paper (Common Course, introductory regular course and introductory vocational studies and Major (Disciplinary)Paper. However for practical in Major paper ,there will be no internal .
- End semester will be applicable for all including Practical
- **For SIE (Semester Internal Examination(SIE)** – There will be two groups

  Group A- consists two questions .

  Q.no 1 Very short answer Type (five question of 1 mark each)

  Q.No.2 short answer type of 5 marks
- **Group B** –consists two questions of each 10 marks and of which one has to answer

Internal semester Examination
IRC- 25
IVS-IA- 25
MJ-1 FM=15 theory;
End Semester examination (ESE)
IRC –FM=75
IVS-1A-FM- 75
MJ-1-FM=60 theory; 25 marks practical

B.Sc. Semester I Credits 3 Hrs: 45

FM-100 Internal [20+5 (attendance & Behavior)] External 75

INTRODUCTORY ZOOLOGY-[Code IRC]

1. **Kingdom Animalia : General Characters & Basis of Classification of kingdom Animal with examples ….…….3hrs**
2. **Important Branches of Zoology ……1hr**
3. **Eco-biology ……4 hrs**
   - **A. Ecosystem& Its Types**
   - **B. Biotic And Abiotic Factors**
   - **C. Ecological interactions**
4. **Medical Zoology – Animal Pathogens &Pathogenicity…….5 hrs**
   - ***A.*** **Common Protozoans parasites – *Plasmodium* , *Entamoeba***
   - **B. Common Helminthes Parasites - Tapeworm , *Ascaris* & *Wuchereria***
5. **Biochemistry: Structure Classification & Function …… 5hrs**
   - **A. Protein ,**
   - **B. Carbohydrates**
   - **C. Lipids**
   - **D. Nucleic Acids -**
6. **Cell Biology & Genetics –……6 hrs**
   - **A. The structure of typical animal cell**
   - **B. cell organelles function**
   - **C. cell division**
   - **D. The principles of inheritance-Mendel's laws and the deviations.**
7. **Economic Zoology –……..6hrs**
   - **A. Basic of Sericulture**
   - **B. Basic of Apiculture**
   - **C. Basic of Pisciculture &**
   - **D. Basic of Lac culture**

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8. **Tools & Techniques - ……7hrs**
    - **A. Common Biological tools – Microscope and its Types**
    - **B. Microtome and its use**
    - **C. Camera Lucida & Micrometers**
    - **D. Colorimeter**
    - **E. Centrifuge**
    - **F. Weighing Balance**
9. **Museology& Tissues Processing- ……..4hrs**
    - **A. Preservation of Museum specimens**
    - **B. Tissues Fixation , Dehydration ,embedding ,section cutting & Staining**
10. **Molecular Biology & Biotechnology……..3hrs**
    - **A. Central Dogma of Molecular Biology**
    - **B. Cloning and Genetically Modified Organisms – brief concept**
11. **Applied Zoology – ……5hrs**
    - **A. Primary & Secondary Data**
    - **B. Measurement of central Tendency and Data representation.**
    - **C. Introduction to bioinformatics & Application**
    - **D. Digital Library**

Suggested Books

1. Dalela & Sharma: Animal Taxonomy and Museology (1976, Jai PrakashNath).
2. Roymahoney: Laboratory Techniques in Zoology (1966, Butterworths).
3. Barnes ,R.S.K.,Calow, P.Olive.,Golding,D.W.andSpicer,J.LI.(2002) The Invertebrates; E.J.W, III Edition ,Blackwell Science
4. Nigam: Biology of Non-chordates (1997, S Chand)
5. Miller and Harley : Zoology (6th Ed. 2005,W.C.Brown)
6. Parker & Haswell: Text Book of Zoology, Vol. I (2005, Macmillan)
7. . Nigam: Biology of Chordates (1997, S Chand)
8. Parker &Haswell, A Text Book of Zoology Vol.II (2005, Macmillan)
9. Sinha, A.K., &Adhikari,S and Ganguli, B.B Biology of Animals Vol.II New Central Agency, Calcutta
10. Young,J.J. The life of Vertebrates ,3rd Edition ,ELBS with oxford press ,1981
11. Vishwanath – vertebrate Zoology
12. 5.C.C.Chaterjee Medical physiology
13. 6.Guyton– a book on medical physiology
14. . Gardner *et al*: Principles of Genetics (1991, John Wiley)

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15. . Griffith *et al*: An Introduction to Genetic Analysis (2005, Freeman)
16. . Prost, P. J. (1962). *Apiculture*. Oxford and IBH, New Delhi.
17. Sericulture, *FAO Manual of Sericulture.*
18. Sardar Singh, *Beekeeping in India*, Indian council of Agricultural Research, New Delhi.
19. Dhyan Singh Bisht, *Apiculture*, ICAR Publication.
20. Knobil, E. and Neill, J. D. (2006). *The Physiology of Reproduction*, Vol. 2, Elsevier Publishers.
21. .Kumar& Nigam-Economic and applied entomology
22. 1 Boyer: Concepts in Biochemistry (3rd ed. 2006, Brooks/Cole)
23. Lehninger, Nelson & Cox: Principles of Biochemistry (4th ed, 2007, Worth),
24. Stryer: Biochemistry (5th ed. 2001, Freeman)
25. Odum,E.P.,(2008), Fundamentals of Ecology and field Biology, Harpper and Row publishers
26. Ecology Environment and Resources conservation: J.S. Singh, S.p.Singh and S R Gupta , Anamaya Publishers, New Delhi
27. . Albert*set al*: Essential Cell Biology (1998, Garland)
28. Karp: Cell and Molecular Biology (2008, John Wiley)
29. Cooper and Hausman: The Cell A Molecular approach (2007, Sinauer)
30. Mariyappam –Biostatistics (Pearson Publications)
31. P.N.Arora , P.K.Mallhotra – Biostatistics
32. Rout K. Sourya – Biostat & Human health
33. Bioinformatics –Principles & application –Zhumer Gosh & Bibekanand Mallick-Oxford University Press

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Semester I

Major Zoology [MJZ-1) **FM=60 (External)**
Internal 15

Credit 4 (T) +2 (P)

Instruction for Internal Semester Examination FM 15 (T)

Semester Internal Examination (SIE 10+5=15 marks):

For 10 marks ,there will be two groups .

Group A will contain five short type questions of 1 mark each and will be compulsory.

Group B will contains two question of 5 marks each and one has to be answered

5 marks for attendance , behavior and participation in extracurricular activities

End Semester Examination (ESE 60 marks):

There will be **two** group of questions.

Group A will contain three questions in which all are to be answered.

Question No.1 will be **very short answer type (not MCQ)** consisting of five questions of 1 mark each.

Question No.2 & 3 will be short answer type of 5 marks each.

Group B will contain descriptive type five questions of fifteen marks each, out of which any three are to be answered.

Note: There may be subdivisions in each question of group B.

Semester –I
MJZ-1

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

UNIT-1 Non–Chordates: Characters & Classification

General characters and classification of different phyla of Non Chordates up to classes with examples showing distinctive / adaptive features

UNIT-2 Non Chordates: Protists to Pseudocolmates

2.1 Phylum Protozoa: General account and reproduction

2.2 Phyla Porifera: Canal system in Porifera

2.3 **Coelentrate:** Obelia Life cycle and metagenesis,

Coral Reefs –types, formation and distribution

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2.4 Platyhelminthes&Aschelminthes: Parasitic Adaptation, Life Cycle and Pathogenecity

UNIT-3 Non Chordate: Coelomates

3.1 Annelida: Segmental organs (Coelomo-ducts & meta-nephridia) in annelid

3.2 Arthropoda: Larval form of Crustacean

3.3 Mollusca: Torsion and Detorsion in Gastropods

3.4 Echinoderm: Water vascular System in Asterias

Suggested Books

1. Ruppert and Barnes ,RD(2006) Invertebrate Zoology, VIII edition .Holt Saunders

International edition

2. Barnes ,R.S.K.,Calow, P.Olive.,Golding,D.W.andSpicer,J.LI.(2002) The Invertebrates; E.J.W, III Edition ,Blackwell Science
3. Barrington,E.J.W.(1979)Invertebrate structure & function .II edition .E.L.B.S and Nelson
4. Boolotian and stiles: College Zoology (10th Ed. 1981,Macmillin)
5. Campbell & Reece: Biology (7thedn. 2005, Pearson
6. Nigam: Biology of Non-chordates (1997, S Chand)
7. Miller and Harley : zoology (6th Ed. 2005,W.C.Brown)
8. Parker & Haswell: Text Book of Zoology, Vol. I (2005, Macmillan)

Major Practical -MJZP-01 Credit 02

Practical Based on MJZ-01)

(Credit 4)) **Hours of Practical - 2X15=30 hrs**

Part A: Systematics and Diversity of Non Chordates

Semester-I **Practical** **FM: 25 External**

	Practical				Marks Distribution
1.	**Dissection :**				**06**
2.	**Slide Preparation :**				**05**
3.	**Spotting :**		**2.5X4**	**=**	**10**
	a. Slides	**(02)**	**2.5X2**		
	b. Museum Specimens	**(02)**	**2.5X2**		
4.	**Class record**				**2**
5.	**Viva -Voce**				**2**
					20

Suggested Practicals

1. Study of Available Museum Specimens of animals

- Sycon (As an example of parazoa), Hydra ,Fasciola ,Ascaris, Hirudinaria ,Hermit Crab, Scorpion, Unio, Sepia, Aplysia, Loligo, Sea Urchin , Ophiothrix (Brittle star)
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2. Study of the following through permanent slides

1.Paramecium Slide (WM) 2. Gemmules of sponges 3. Conjugation in Paramecium, 4. Sporocyst of Fasciola with developing Redia, Cercaria and Metacercaria larvae 5.Nauplius ,Metanauplius, Cypris, Megalopa and Zoea larvae of Crustacea

3. Dissection:

1. Dissection of Digestive and nervous system of Earthworm
2. Dissection of digestive system of *Palaemon* and Nervous system of *Palaemon*

4. Mounting

Mounting of Nephridia &ovary of earth worm, trachea and salivary gland of *Periplaneta americana*,Cephalic appendages of *Palaemon*

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