

7/7/15

Department of Higher Education, Govt. of M.P.  
Under Graduate Semester wise Syllabus  
as recommended by Central Board of Studies In Zoology

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातक कक्षाओं के लिये सत्रेस्टर अनुसार पाठयक्रम  
केन्द्रीय अध्ययन मण्डल प्राणीशास्त्र द्वारा अनुशंसित

Class / कक्षा	:	B.Sc.
Semester / सत्रेस्टर	:	I
Subject / विषय	:	Zoology (प्राणीशास्त्र)
Title of Paper	:	Invertebrate
Max. Marks:		85

**Unit-I**

1. Elementary Knowledge of Zoological Nomenclature and International Code.
2. Classification of Lower Invertebrates (According to Parker and Haswell 7<sup>th</sup> edition)
3. Classification of Higher Invertebrates (According to Parker and Haswell 7<sup>th</sup> edition)
4. Protozoa- Type Study of Plasmodium.
5. Protozoa and Diseases.

**Unit-II**

1. Porifera- Type study of Sycon.
2. Types of Canal system.
3. Coelenterata- Type study of Obelia
4. Corals and Coral Reef formation.

**Unit-III**

1. Helminthes- Type study of Liver Fluke.
2. Nematodes and diseases.
3. Annelida- Type study of earthworm , metamerism.
4. Type Study of Hirudinaria.
5. Structure and significance of Trochophore larva.

**Unit-IV**

1. Arthropoda- Type study of Prawn.
2. Types study of Periplanata.
3. Larval forms of Crustacea.
4. Insect as Vectors of human diseases.

**Unit-V**

1. Mollusca- Type study of Pila
2. Echinodermata- External features and water vascular system of Star fish
3. Larval forms of Echinoderms.
4. Minor Phyla - Ectoprocta & Rotifera.

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Class / कक्षा	:	B.Sc.
Semester / समेस्टर	:	द्वितीयसं. I
Subject / विषय	:	Zoology (प्राणीशास्त्र)
Max. Marks:		50

PRACTICAL

The Practical's work will be based on theory syllabus and the candidates will be required

to show knowledge of the following -

1. Study of Museum Specimens, slides relevant to the type study in theory
2. Mounting ( Temporary)
  - a. Mouth parts of insects ✓
  - b. Statocyst of Prawn
  - c. Ctenidium and Osphradium of Pila
  - d. Mounting Material
3. Major Dissection
  - a. Earthworm: Digestive system, nervous system and reproductive system. ✓
  - b. Cockroach : Digestive system, Nervous system. ✓
  - c. Prawn : Nervous system, Appendages.
  - d. Pila: Nervous system
- 4 Minor Dissection
  - a. Hastate plate and appendages of Prawn.
  - b. Salivary glands of Cockroach. ✓
  - c. Radula of Pila.
  - d. Earthworm: Typhlosole / Septal webbs etc. ✓

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**Class / कक्षा** : **B.Sc.**  
**Semester / सेमेस्टर** : **III**  
**Subject / विषय** : **Zoology (प्राणीशास्त्र)**  
**Title of Paper** : **Cell biology and  
Developmental Biology**

**Max. Marks**

**85**

Unit-I	<ol style="list-style-type: none"> <li>1. History of Cell Biology.</li> <li>2. Cell Theory , Prokaryotic and eukaryotic Cells.</li> <li>3. Microscopy : Principle and application of Compound microscope &amp; Electron microscope.</li> <li>4. Structure and transport across the plasma membrane.</li> <li>5. Extra nuclear organization of cell.</li> </ol>
Unit-II	<ol style="list-style-type: none"> <li>1. Nuclear organization of cell.</li> <li>2. Nucleo cytoplasmic interactions.</li> <li>3. Amitosis , mitosis and meiosis.</li> <li>4. Cell death : Necrosis and Apoptosis.</li> </ol>
Unit-III	<ol style="list-style-type: none"> <li>1. Spermatogenesis</li> <li>2. Oogenesis</li> <li>3. Fertilization</li> <li>4. Parthenogenesis</li> <li>5. Patterns of cleavage.</li> </ol>
Unit-IV	<ol style="list-style-type: none"> <li>1. Frog and Chick embryology upto the formation of three germinal layers.</li> <li>2. Fate map construction in frog and chick.</li> <li>3. Gastrulation in Frog and chick up to the formation of germinal layers.</li> </ol>
Unit-V	<ol style="list-style-type: none"> <li>1. Concept of competence</li> <li>2. Determination and differentiation</li> <li>3. Extra embryonic membranes in chick</li> <li>4. Concept of regeneration</li> <li>5. Stem cells..</li> </ol>

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<b>Class / कक्षा</b>	:	<b>B.Sc.</b>
<b>Semester / समेस्टर</b>	:	<b>Practical</b>
<b>Subject / विषय</b>	:	<b>Zoology (प्राणीशास्त्र)</b>

1. Study of type of cells through histological preparations
2. Study of embryological slides
3. Study of embryo, through window preparation in fertilized bird egg
4. Smear/ squash preparation techniques
5. Study of mitosis, meiosis, oogenesis, spermatogenesis

Distribution of Marks

Time 3 hours  
Marks: 50

Maximum

Marks Allotted

1. Spotting (5 spots)	10
2. Squash preparation/ smear preparation	05
3. Identification of embryological stages (2 slides)/ window preparation	07
4. Identification of stage in cell division	05
5. Microtomy techniques/ double or single staining	08
6. Viva	10
7. Record	05
Total	50

2015- Jan'2016

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<b>Class / कक्षा</b>	<b>B.Sc.</b>
<b>Semester / समेस्टर</b>	<b>IV</b>
<b>Subject / विषय</b>	<b>Zoology (प्राणीशास्त्र)</b>
<b>Title of Paper</b>	<b>Genetics</b>
<b>Maximum Marks</b>	<b>85</b>

**Unit I: Heredity & Variation, Gene and Genetic Material**

1. Chromosome: The Physical basis of heredity and transmitters of heredity.
2. Types of chromosomes: Lampbrush, salivary gland and Beta Chromosomes.
3. Nucleocytoplasmic interactions : Ultra structure of nucleus, nucleolus, Role of nucleus and nucleolus in nucleocytoplasmic interactions including Synthesis & Export of RNA, transport of proteins
4. Heredity and Variation : Sources of variation, Genotype, phenotype and environmental variations (elementary idea )
  - Mendel's laws of heredity
  - Kinds of variations
  - Genetic basis of variation.
- 5 (a) Chemistry of Gene ; Nucleic Acids and their structure.
  - (b).Concept of DNA replication.
  - (c).Nucleosome (Solenoid model).
  - (d) Split genes, overlapping genes and Pseudo genes.
  - (e) Genetic Code.

**Unit II: Linkage and Chromosomal Aberrations**

1. Gene Linkage: Kinds and Theories of linkage, significance of linkage.
2. Crossing over: Types and mechanism.
3. Theories of sex determination.
4. Sex linked inheritance ( Haemophilia, Colour blindness )

**Unit III: Cytoplasmic Inheritance, Gene Expression and Regulation**

1. Cytoplasmic inheritance: Maternal effect on lunnea (Shell Coiling), Kappa particles in Paramecium.
2. Transcription in Prokaryotes and Eukaryotes
3. Translation in Eukaryotes
4. Gene Expression: Regulation of protein synthesis, transcription in Prokaryotes and Eukaryotes.
- 5: Gene Expression: Lac operon model

**Unit IV: Mutation and Applied Genetics**

1. Mutation

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Jan 2016

2. Structural and numerical changes in chromosomes.
3. Causes of mutation.
4. Mutagens- classification, Types & effects.

#### **Unit V: Human Genetics & Genetic Engineering**

1. Human chromosomes, Elementary idea of Human Genome Project
2. Common genetic diseases in man (Autosomal syndromes, sex chromosome syndromes, diseases due to mutation-Sickle cell anaemia, Albinism & Alkaptonuria.
3. Multiple factors and blood groups.
5. Techniques used in recombinant DNA technology. Construction of Chimeric DNA, Elementary idea of plasmids & vectors.
6. Gene cloning and Polymerase Chain Reaction (PCR), Gel Electrophoresis, Northern & Southern Blotting.
7. Gene therapy.
8. DNA finger printing.

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Class / कक्षा : B.Sc.  
Semester / समेस्टर : चतुर्थ वर्ष IV  
Subject / विषय : Zoology (प्राणीशास्त्र)

Practical

1. Identification of spots related to theory.
2. Squash preparation of onion root tip / Chironomous larva salivary gland / grass hopper testis.
3. Study of instruments techniques related to applied genetics - PCR, Gel electrophoresis, DNA fingerprinting etc.
4. Problems based on genetics.
5. Study of chromosomal DNA (Isolation and demonstration)

Distribution of Marks

Time 3 hours

Maximum Marks: 50

Marks Allotted

1. Spotting ( 5 Spots)	10 Marks
2. Squash preparation	05 Marks
3. Study of instruments / techniques related to applied genetics	05 Marks
4. Problems on Genetics	10 Marks
5. Viva-Voce	05 Marks
6. Extraction of chromosomal DNA	05 Marks
7. Practical Record and Collection	10 Marks

Total 50 Marks

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- Chromatography: Principles & Types of chromatography (Paper Chromatography).
- Types of microtome and their uses.
- General ideas of some common fixatives, stains and reagents.
- Museum keeping, preservation and skeleton preparation, taxidermy(Bird)

B. Sc. V Semester  
2013-2014 sessions  
Subject-Zoology

**PRACTICALS**

1. Study of museum specimen of fresh water edible fishes.
2. Study of pH of Water and soil.
3. Study of Chromatography ( Paper Chromatography).
4. Study of working instrument : Microtome.
5. Study of different techniques for Museum Keeping.
6. Maintenance of aquarium.
7. Study of pests-  
Stored grain pests- *Sitophilus Oryzae* & *Tribolium castanaeum*.  
Vegetable pests- *Pieris brassicae* & *Dacus cucurbitae*
8. Study of Plankton – Euglena, Paramoecium, Cyclops, Mysis, Daphnia

**Scheme of Practical Examination**

Time 3 hrs	M M 50
1 Exercise based on simple Chromatography	10
2. Exercise based on pH determination	05
3. Exercise based on Applied Zoology ( Life cycle )	04
4. Exercise based on Museum Keeping Techniques / Microtome	05
5. Spotting	16
6. Viva.	05
7. Practical record / Collection.	05
<b>Total</b>	<b>50</b>

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