



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

M.Sc. Zoology Syllabus

Class: M.Sc. Subject: ZOOLOGY

S.No.	Semester	Paper	Topic of Paper	Max. M.	Total
1.	Sem. - I	Theory Paper - I	Biosystematics, Taxonomy and Evolution	50	200
		Theory Paper - I	Structure and function of Invertebrates	50	
		Theory Paper - III	Quantitative biology, Biodiversity and Wild Life	50	
		Theory Paper - IV	Biomolecules and Structural Biology	50	
		Practical Paper - I	Related to Ist and IInd Theory Paper	50	100
		Practical Paper - II	Related to IIIrd and IVth Paper	50	
2.	Sem. - II	Theory Paper - I	General and Comparative animal physiology and Endocrinology	50	200
		Theory Paper - II	Population Ecology and Environmental physiology.	50	
		Theory Paper - III	Tools and Techniques for Biology	50	
		Theory Paper - IV	Molecular cell biology and Genetics	50	
		Practical Paper I	Related to I and II theory paper	50	100
		Practical Paper II	Related to III and IV theory paper	50	
3.	Sem.-III	Theory Paper - I	Comparative anatomy of Vertebrates	50	200
		Theory Paper - II	Gamete Biology, Genes, development & differentiation	50	
		Theory Paper - III	Optional	50	
		Theory Paper - IV	Optional	50	
		Practical Paper - I	Related to Ist and IInd theory paper	50	100
		Practical Paper - II	Related to IIIrd and IVth Optional theory paper	50	
		Project Work		50	50
4.	Sem-IV	Theory Paper - I	Animal Behaviors and Neurophysiology	50	200
		Theory Paper - II	Ecotoxicology	50	
		Theory Paper - III	Optional	50	
		Theory Paper-IV	1. Ichthyology 2. Entomology 3. Cell Biology 4. Wild Life Biology and Conservation 5. Biology and Parasitism and vertebrates 6. Aquaculture 7. Limnology		
		Practical	Topics related to Ist and IInd	50	100

Internship/Job oriented project work

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

	Paper-I	theory papers	50	
	Practical	Topics related to IIIrd and IVth		
	Paper-II	theory papers	50	50
		Project work		

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

मध्य प्रदेश उच्च शिक्षा विभाग
उत्तर प्रदेश (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session 2008-09

M.Sc. Zoology
Semester I
Paper I

Biosystematics, Taxonomy and evolution

Theory M.Marks - 112
CCE - 08

Unit I

. Definition and basic concepts of biosystematics taxonomy and classification.

- History of Classification

Trends in biosystematics : Chemotaxonomy cytotaxonomy and molecular taxonomy

Dimensions of speciation and taxonomic characters.

Species concepts : species category, different species concepts, subspecies and other infra-specific categories.

Theories of biological classification: hierarchy of categories.

Unit II

- Taxonomic Characters – Different kinds.
- Origin of reproductive isolation, biological mechanism of genetic incompatibility.
- Taxonomic procedures: Taxonomic collections , preservation ,cureting, process of identification.
- Taxonomic keys,different types of keys, their merits and demerits.
- International code of Zoological Nomenclature (ICZN):
Operative principles, interpretation and application of important rules: Formation of Scientific names of various Taxa.

Unit III

- Taxonomic categories.
- Evaluation of biodiversity indices.

[Signature]

[Signature]

[Signature]
3.9.15

[Signature]
3.9.15

[Signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

- Unit-IV
- Evaluation of Shannon – Weiner Index.
 - Evaluation of Dominance Index.
 - Similarity and Dissimilarity Index.
- Unit-IV
- Concepts of evolution and theories of organic evolution.
 - Neo Darwinism and population genetics:
 - A- Hardy-Weinberg law of genetic equilibrium.
 - B – A detailed account of destabilizing forces:
 - i- Natural selection
 - ii- Mutation
 - iii- Genetic Drift
 - iv- Migration
 - v- Meiotic Drive.
 - Trends in Evolution
 - Molecular Evolution
 - a) Gene evolution
 - b) Evolution of gene families
 - c) Assessment of molecular variation

Unit – V

- Origin of higher categories
- Phylogenetic – gradualism and punctuated equilibrium.
- Major trends in the origin of higher categories
- Micro and macro evolution.

Molecular population genetics

- Pattern of changes in nucleotide and amino and sequence.
- Ecological significance of molecular variations (genetic polymorphism)

Genetic & Speciation

- Phylogenetic and biological concept of species.
- Patterns and mechanism of reproductive isolation.
- Modes of speciation (allopatry & sympatry)

Origin and Evolution & Economically important microscopes and animals.

[Signature]

[Signature]

[Signature]

[Signature]
3.9.15

[Signature]

PRINCIPAL
Govt. Tulsi College Anuppur
D'stt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

मध्यप्रदेश उच्चशिक्षण विभाग
उत्तरपुर (म. प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session 2008-09

MSc Previous
Subject: Zoology
SEMESTER -I
Paper-I List of Books

SUGGESTED READING MATERIAL

1. M. Koto-The. Biology of biodiversity-Springer
2. E.O. Wilson-Biodiversity-Academic Press Washington.
3. G.G.-Simpson-Principle of animal taxonomy Oxford IBH Publication company.
4. E-Mayer-Elements of Taxonomy
5. Bastchelet-F-Introduction to mathematics for life scientists Springer Verlag, Berling.
6. Skoal R.R. and F.J.Rohiff Biometry-Freeman, San-Francisco.
7. Snecdor, G.W. and W.G. Cochran Statistical Methods of affiliated-East-West Press, New Delhi.
8. Murry J.D. Mathematical Biology-Springer, Verlag, Berlin.

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
3.9.15

[Handwritten signature]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

मध्य प्रदेश उच्च शिक्षा विभाग
अनूपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Post Graduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session 2008-09

Theory Max. Mark 42
CCE - 08

Class	-	M.Sc.
Subject	-	Zoology
Paper Title	-	Paper II STRUCTURE AND FUNCTION OF INVERTEBRATES
Semester	-	I

Max. Mark- 50

UNIT - I

1. Origin of metazoa
2. Organization of Coelom
 - A. Acoclomates
 - B. Pscudocoelomates
 - C. Coclomates
3. Locomotion.
 - A. Amoeboid flageller and cillary movement in protozoa
 - B. Hydrostatic movement in Coelenterata
 - C. Annelida and Echinodermata

UNIT - II
A: NUTRITION AND DIGESTION
Patterns of Feeding and digestion in lower metazoa, Mollusca, Echinodermata Filter feeding in polychaeta.
B: Respiration
Organs of respiration : Gills, lungs and trachea, respiratory pigments.
Mechanism of respiration.

UNIT - III
EXCRETION
Excretion in lower invertebrates.
Excretion in higher invertebrates.
Mechanism of Osmoregulation.

UNIT - IV
NERVOUS SYSTEM.

[Signatures]

[Stamp]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



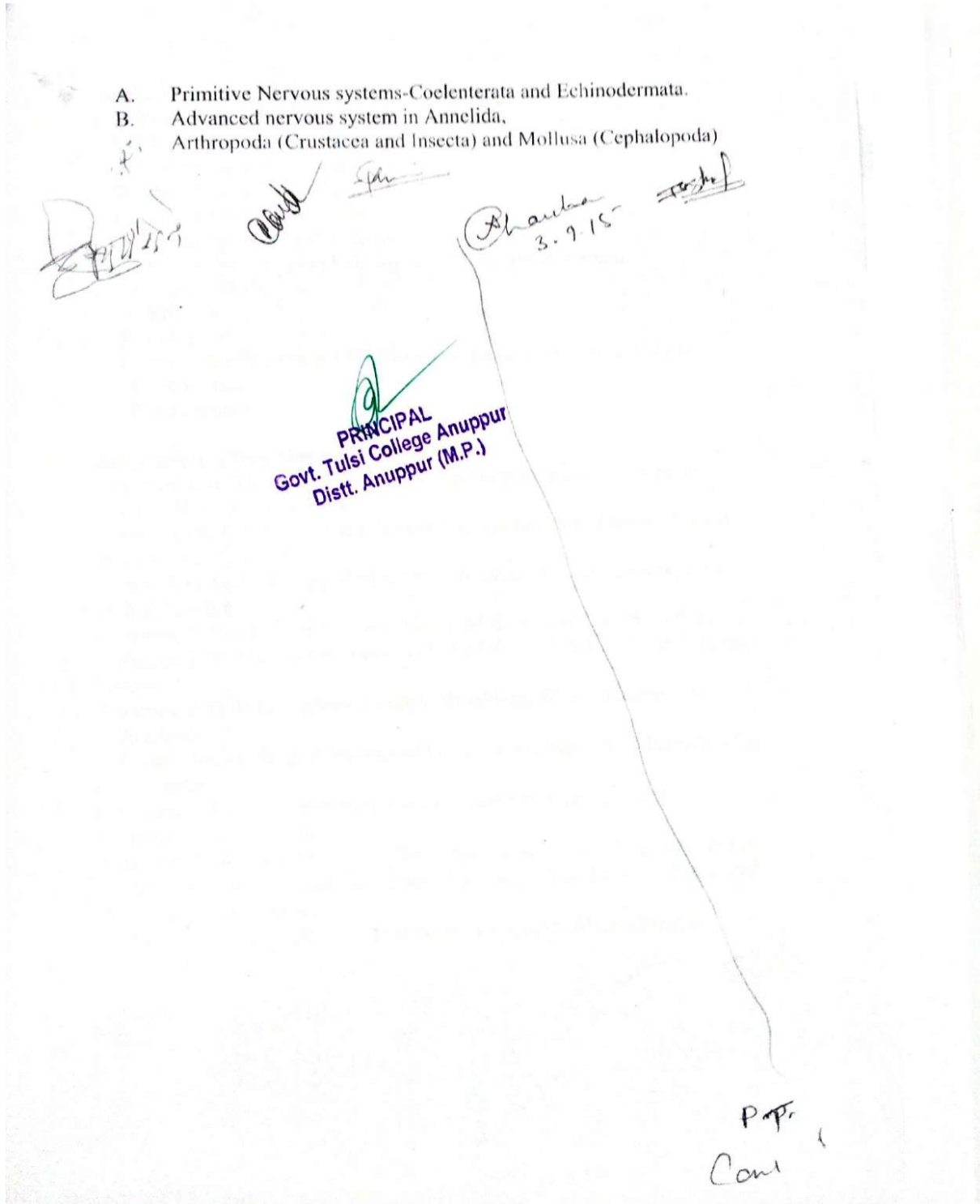
OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404





OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

UNIT - V

A. INVERTEBRATES LARVAL FORMS AND THEIR EVOLUTIONARY SIGNIFICANCE.

- A. Trematoda and Cestoda
- B. Larval forms of Crustacea
- C. Larval forms of Mollusea
- D. Larval forms of Echinodermata.

B. 1. Structure affinities and life history of the following minor noncoelomate Phyla -

- A. Rotifera
- B. Entoprocta

2. Structure affinities and life history of the following minor Phyla

- A. Phoronida
- B. Ectoprocta

Suggested Reading Material -

1. Hyman, L.H. The invertebrates, Vol. 1. protozoa through Ctenophora, McGraw Hill Co., New York
2. Barrington, E.J.W. Invertebrate structure and function. Thomas Nelson and Sons Ltd., London.
3. Jagerstein, G. Evolution of Metazoan life cycle, Academic Press, New York & London.
4. Hyman, L.H. The Invertebrates. Vol. 2. McGraw Hill Co., New York.
5. Hyman, L.H. The Invertebrates. Vol. 8. McGraw Hill Co., New York and London.
6. Barnes, R.D. Invertebrates Zoology, III edition. W.B. Saunders Co. Philadelphia.
7. Russel-Hunter, W.D. A biology of higher invertebrates, the Macmillan Co. Ltd., London.
8. Hyman, L.H. The Invertebrates smaller coelomate groups, Vol. V. McGraw Hill Co., New York.
9. Read, C.P. Animal Parasitism. Parasitism. prentice Hall Inc., New Jersey.
10. Sedgwick, A.A. Student text book of Zoology. Vol. I, II and III. Central Book Depot, Allahabad.
11. Parker, T.J., Haswell W.A. Text book of Zoology, Macmillan Co., London.


PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

Department of Higher education, Govt. of M.P.

Semester wise Syllabus for Post Graduates

As recommended by Central board of Studies and

Approved by HE the Governor of M.P.

Session 2008-09

M.Sc. Previous

I Sem III Paper

Theory Max. Marks - 42
CCE - 08

Quantitative biology, biodiversity and wildlife

Unit - I Quantitative biology

- Basic mathematics for biologists
- matrices and vectors
- Exponential functions
- Differential equations integration
- Periodic functions
- Sprobability distribution properties and probability theory

Unit - II

- Experimental designing and sampling theory
- Completely randomized design and randomized block design
- Analysis of variance
- Co-relation- types of correlation
- Karl persons coefficient correlation
- Regression

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
3.9.15

[Handwritten signature]

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

Unit – III Biodiversity

- concept and principal of biodiversity
- causes for the lose of biodiversity
- Biodiversity conservation method
- Medicinal uses of forest plant

Unit – IV Wildlife of India, types of wildlife

- Values of wildlife positive and negative
- Wildlife protection Act
- Conservation of wildlife in India
- Endangered and threatened species

Unit – V Wildlife and conservation

- National Parks and Sanctuaries
- Project Tiger
- Project Gir lion and Crocodile breeding project
- wildlife in M.P. with references to Reptiles Birds and mammals
- Biospheres reserves

Suggested Readings Materials

- Bataschelet, E. Introduction to mathematics for site scientist springer-verlag, berling
- Jorgenserr, S.E. Fundamental of Ecological modling E. sevier New York
- Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.
- Sokal, R.R. and F. J. Rohit Biometry Freeman San Francisco
- Snedecor, G.W. and W.G. cochrane, statial methods, Affiliated East, West Press New Delhi (Indian ed.)
- Muray, J.D. Methamatical Biology. Springer Verlag Berlin

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature] 3.9.15

[Handwritten signature]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

- Pelon, E.C. The interpretation of ecological data : A primer on classification and ordination.
- A. Lewis – Biostatistics
- B.K. Mahajan Methods in Biostatistics
- V.B. Saharia wildlife in India
- S.K. Tiwari wildlife in central India
- J.D. Murrey Mathematical Biology
- Georgs & Wilians Startical method
- R.K. Tondon Biodiversity Texonomy & Ecology
- M.P. Arora An Introduction to prevantology
- P.C. Kotwal Biodiversity and conservation

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

**1st Semester
Suggested reading materials:**

1. M. Koto : The Biology of Biodiversity. Springer.
2. E. O. Wildon : Biodiversity. Academic Press Washington.
3. G.G. Simpson : Principles of Animal Taxonomy. Oxford IBH Publication Company.
4. E. Mayer : Elements of Taxonomy.
5. Dobzansky : Biosystematics.
6. Dallela and Sharma : Animal Taxonomy and Museology.
7. Dodzhansky: The Genetics and origin of species. Columbia University Press.
8. Futuyama D.I. Evolutionary Biology. INC Publishers Dunderland.
9. Jha A.P. : Genes and Evolution – John Publication, New Delhi.

[Handwritten signatures of five individuals]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

मध्य प्रदेश उच्च शिक्षा विभाग
अनूपुर (म.प्र.)

**Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates**

As recommended by Central board of Studies and
Approved by HE the Governor of M.P.

Session : 08-09

Theory Max. marks 42
CCE 08

Class: M.Sc.

SEMESTER - I

Paper: IVth Paper

BIOMOLECULES AND STRUCTURAL BIOLOGY

Unit - I

Chemical Foundation of biology

- PH, PK, acids bases, buffers, weak bonds
- Free energy, resonance, isomerisation
- Acid soluble pool of living tissues – aminoacids, monosaccharides, oligosaccharides, nucleotides, peptides.
- Nanoparticles
- Biomaterials

Unit - II

1. Primary, Secondary, tertiary and quaternary structures of proteins, protein folding and denaturation
2. DNA & RNA: Double helical structure of DNA, Structure of RNA, role of RNA in gene expression
3. DNA replication, recombination and repair
4. Functional importance of lipid storage and membrane lipids
5. Membrane channels and pumps

Unit - III

1. Basic concepts of metabolism: Coupled and interconnecting reactions of metabolism cellular energy resources and ATP synthesis
2. Glycolysis and glyconeogenesis
3. Citric acid cycle
4. Oxidative phosphorylation : Protein and it's regulation
5. Fatty acid metabolism: Synthesis and degradation of fatty acids

Unit - IV

1. RNA synthesis and splicing
2. Biosynthesis of amino acids
3. Biosynthesis of nucleotides
4. Biosynthesis of membrane lipids and steroids
5. Protein synthesis

[Signature]

[Signature]

[Signature]

[Signature]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

Unit - V

1. Enzymes: Terminologies, classification and basics of enzyme kinetics
2. Mechanism of enzyme catalysis
3. Regulation of enzyme action
4. Concept of free energy and thermodynamic principals in biology
5. Energy rich bonds, compound and biological energy transducers

Suggested Readings:

1. Voet, D. and J.G. Voet. Biochemistry John Wiley & Sons.
2. Freifelder, D. Physical Biochemistry W.H. Freeman & Co.
3. Segal, I.H. Biochemical calculations John Wiley and Sons
4. Creighton, T.E. Protein Structure and Molecular Properties W.H. Freeman & Co.
5. Freifelder, D. Essentials of Molecular Biology
6. Wilson, K. and K.H. Goulding A Biologists Guide to Principals and Techniques of Practical Biochemistry
7. Cooper, T.G. Tools of Biochemistry
8. Hawk, Practical Physiological Chemistry
9. Garret, R.H. and C.M. Grisham. Biochemistry. Saunders college Publishers.

[Handwritten signatures and initials]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराजा जयसिंह तुलसीदास विश्वविद्यालय
छतरपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

Class: M.Sc.
SEMESTER - I
Practical : Ist

1. Spotting – Classification and identification of various phylum.	M,M, 50
2. One major dissection of various systems of invertebrates – Squilla, Prawn, Sepia, Loligo.	10
3. One minor dissection- Grosshopper, Honeybee, Echinus, Starfish, Aplysia.	10
4. Mounting material - permanent balsum mount	5
5. Spottings related with Adaptation, Homologies, Analogies and modification of mouth parts :	5
6. Viva Voce.	10
7. Pratical Records, collection	5
Total Marks	50

[Handwritten signatures]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

मध्य प्रदेश शासन
उच्च शिक्षा विभाग
अनूपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

Class: M.Sc.
SEMESTER - I
Practical : IInd

M.M, 50

- | | |
|--|----|
| 1. Problem based on Biodiversity and wild life.
Mammals and Fishers group (Spots 5 +5) | 20 |
| 2. Exercise on mean, mode, & Median. | 5 |
| 3. Cell division preparation of slid on Meiosis & Mitosis. | 5 |
| 4. Preparation of different types of chromosomes. | 5 |
| 5. Viva – Voce | 10 |
| 6. Practical Record and collection. | 5 |

Total Marks

50

[Signature]

[Signature]

[Signature]

[Signature]

[Signature]

[Signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)

0



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

MSc Previous
Subject: Zoology
SEMESTER -II
Paper-I List of Books

SUGGESTED READING MATERIAL

1. EJW Barrington-General & comparative Endocrinology-Oxford, Clarendon Press
2. R.H. Williams-Text Book of Endocrinology-W.B. Saunders
3. C.R. Martin- Endocrine Physiology-Oxford University Press.
4. Molecular CellBiology-J. Darnell, H. Lodish and D. Baltimore-Scientific American Book USA
5. Molecular Biology of the cell-B. Alberts, D-Bray, J.Lewis, M. Raff, K. Roberts and J.D. Watson, Garland Pub. New York.

[Handwritten signature]
[Handwritten signature]
03/12/17

[Handwritten signature]
[Handwritten signature]
3.2.17

[Handwritten signature]

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

मध्यप्रदेश उच्च शिक्षा विभाग
गोवा (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

Class: M.Sc.
SEMESTER - II
Paper: Ist Paper
GENRAL AND COMPARATIVE ANIMAL PHYSIOLOGY AND
ENDOCRONOLOGY

Unit - I

1. Respiratory pigments through different phylogenic groups
2. Transport of oxygen and carbon dioxide in blood and body fluids
3. Regulation of respiration
4. Physiology of impulse transmission through nerves and synapses
5. Autonomic nervous system, neurotransmitters and their physiological functions

Unit - II

1. Patterns of nitrogen excretion in different animal groups
2. Comparative physiology of digestion
3. Osmoregulation in different animal groups
4. Thermoregulation in homeotherms, poikilothermas and hibernation
5. Physiology of pregnancy, placental hormones, pregnancy diagnosis tests, parturition and breast and lactation

Unit - III

1. Comparative study of mechanoreception
2. Comparative study of photoreception
3. Comparative study of phonoreception
4. Comparative study of chemoreception
5. Comparative study of equilibrium reception

Unit - IV

2. Bioluminescence as means of communication among animals
3. Pheromones and other semiochemicals as means of communication among animals
4. Chromatophores and regulation of their function among animals
5. Hormones, their classification and chemical nature
6. Mechanisms of hormone action

[Signature]

[Signature]

[Signature]
3/2/17

[Signature]

[Signature]
30 Feb. 17

[Signature]

[Signature]
3.2.17

[Signature]

[Signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

Unit -V

1. Phylogeny of endocrine glands (pituitary, pancreas, adrenal, thyroid)
2. Ontogeny of endocrine glands
3. Neuroendocrine system
4. Hormone receptors – signal transduction mechanisms
5. Hormones and reproduction
 - a. Seasonal breeders
 - b. Continuous breeders

[Signature]

[Signature]

[Signature]

[Signature]
3.2.17

[Signature]

[Signature]
3 Feb 17

[Signature]
3/2/17

[Signature]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtldcano@mp.gov.in

9893076404

महाराजा छत्रसाल तुलसीराम विश्वविद्यालय
छतरपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

MSc Previous
Subject: Zoology
SEMESTER -II
Paper-I List of Books

SUGGESTED READING MATERIAL

1. EJW Barrington-General & comparative Endocrinology-Oxford, Clarendon Press
2. R.H. Williams-Text Book of Endocrinology-W.B. Saunders
3. C.R. Martin- Endocrine Physiology-Oxford University Press.
4. Molecular CellBiology-J. Darnell, H. Lodish and D. Baltimore-Scientific American Book USA
5. Molecular Biology of the cell-B. Alberts, D-Bray, J.Lewis, M. Raff, K. Roberts and J.D. Watson, Garland Pub. New York.

[Handwritten signature]
3/2/17

[Handwritten signature]
3.2.17

[Handwritten signature]

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराष्ट्र शासन द्वारा प्रमाणित
उत्तराखण्ड विद्यापीठ (म. प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

M. Sc. Previous
Zoology
Semester II
Paper II

Population Ecology and Environmental physiology

Unit I

1. Populations and their characters.
2. Demography : Life tables, generation time, reproductive value.
3. Population growth: Growth of organisms with non-overlapping generations, stochastic and time lag models of population growth, stable age distribution.
4. Population regulation: Extrinsic and intrinsic mechanisms.

Unit II

1. Adaptations : Levels of adaptations, significance of body size.
2. Aquatic environments : Fresh water, marine, shores and estuarine environments.
3. Eco-physiological adaptations to fresh water environments.
4. Eco-physiological adaptations to marine environments.
5. Eco-physiological adaptations to terrestrial environments.

Unit III

1. Environmental limiting factors.
2. Inter and intra-specific relationship.
3. Predatory- prey relationship, predator dynamics, optimal foraging theory (patch choice, diet choice, prey selectivity, foraging time).
4. Mutualism, evolution of plant pollinator interaction.

Unit IV

Environmental pollution and human health.

1. Conservation management of natural resources.
2. Environmental impact assessment.
3. Sustainable development.

2/3/17

3/2/17

3/2/17

3/2/17

3/2/17

3/2/17

3/2/17

PRINCIPAL Anuppur



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

Unit V

1. Concept of homeostasis.
2. Endothermi and physiological mechanism of regulation of the body temperature.
3. Physiological response to oxygen deficient stress.
4. Physiological response to body exercise.
5. Meditation, yoga and their effects.

Suggested Readings:

1. Cherrett, J.M. Ecological Concepts. Blackwell Science Publication, Oxford, U.K.
2. Elseth, B.D. and K.M. Baumgartner, population Biology, Van Nostrand Co., New York.
3. Jorgensen, S.E. Fundamentals of ecological modeling. Elsevier, New York.
4. Krebs, C.J. Ecology. Harper and Row, New York.
5. Krebs, C.J. Ecological Methodology. Harper and Row, New York.
6. Eckert, R. Animal Physiology: Mechanism and Adaptation. W.H. Freeman and Co., New York.
7. Hochachka, P.W. and G.N., Somero. Biochemical adaptation. Priceton, New Jersey.

[Handwritten signatures and dates]
3 Feb. 17
3/2/17
3. 2. 17

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराजा जयपाल प्रौढविद्यालय
उत्तरपुर (म.प्र.)

Department of Higher education, Govt. of M.P. Semester wise Syllabus for Postgraduates

As recommended by Central board of Studies and
Approved by HE the Governor of M.P.

Session : 08-09

Class: M.Sc.

SEMESTER - II

Paper: IIIrd Paper

Tools and techniques in Biology

Unit - I

1. Microscopy, principle & applications
 - Light microscope and phase contrast microscope
 - Fluorescence microscope
 - Electron microscope
 - Confocal microscopy
2. General Principle and applications of
 - Colorimeter
 - Spectrophotometer
 - Ultra centrifuge
 - Flame photometer
 - Beer and Lambert's law.
3. Microbiological techniques
 - Media Preparation and sterilization
 - Inoculation and growth monitoring.
 - Microbial assays.
 - Microbial identification (cytological staining methods for bacterial and fungal strains)
 - Use of fermentors

Unit - II

1. Computer aided techniques for data presentation data analysis, statistical techniques.
2. Cryotechniques
 - Cryopreservation of cells, tissues, organs and organisms.
 - Cryosurgery
 - Cryotomy
 - Freeze fracture and freeze drying.
3. Separation techniques. Chromatography, principle type and applicants.
 - Electrophoresis, Principles, types and applications PAGE and agarose gel electrophoresis.
 - Organelle separation by centrifugation.

Unit - III

1. Radioisotope and man isotope techniques in biology.

[Handwritten signatures and dates]
3/2/17
3 Feb 17
3. 2. 17
3/2

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

- a. Sample preparation for radioactive counting
- b. Autoradiography.
2. Immunological techniques
 - Immunodiffusion (Single & Double)
 - Immuno electrophoresis
3. Techniques immuno detection
 - Immunocyto / histochemistry
 - Immunoblotting, immunodetection, immunofluorescence.
4. Surgical techniques.
 - Organ ablation (eg. Ovariectomy, adrenalectomy)
 - Perfusion techniques
 - Stereotaxy
 - Indwelling catheters
 - Biosensors.

Unit –IV

1. Histological techniques
 - Principles of tissue fixation
 - Microtomy
 - Staining
 - Mounting
 - Histochemistry
2. Cell culture techniques.
 - Design and functioning of tissue culture laboratory
 - Culture media, essential components and Preparation
 - Cell viability testing.

Unit – V

1. Cytological techniques
 - Mitotic and meiotic chromosome preparations from insects and vertebrates.
 - Chromosome banding techniques (G.C.Q. R. banding)
 - Flowcytometry.
2. Molecular cytological techniques
 - In site hybridization (radio labeled and non-radio labeled methods)
 - Fish
 - Restriction banding
3. Molecular biology techniques
 - Southern hybridization
 - Northern hybridization
 - DNA Sequencing
 - Polymerase chain reaction (PCR)

[Handwritten signatures and dates]

[Stamp: PRINCIPAL Govt. Tulsi College Anuppur Distt. Anuppur (M.P.)]



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराजा छत्रसाल उन्नीसलखमंड विश्वविद्यालय
छत्तरपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates
As recommended by Central board of Studies and
Approved by HE the Governor of M.P.
Session : 08-09

MSc Previous
Subject Zoology
SEMESTER -II
Paper-III Tools & Technique Books

SUGGESTED READING MATERIAL

1. Introduction to instrumental analysis-Robert Braun-McGraw Hill.
2. A biologist Guide to principles and Techniques of Practical Biochemistry-K, Wilson and K.H. Goulding EIBS Edn.
3. Clark & Swizer. Experimental Biochemistry. Freeman, 2000.
4. Locquin and Langeron. Handbook of Microscopy. Butterwaths, 1983
5. Boyer. Modern Experimental Biochemistry. Benjamin, 1993
6. Freifelder. Physical Biochemistry. Freeman, 1982.
7. Wilson and Wlaker. Practical Biochemistry. Cambridge, 2000.
8. Cooper. The Cell-A Molecular Approach. ASM, 1997
9. John R.W. Masters. Animal Cell culture- A practical approach. IRL Press.
10. Robert Braun. Introduction to instrumental analysis. McGraw Hill

[Handwritten signatures and dates: 3.2.17, 3.2.17, 3.2.17, 3.2.17]

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराजा छत्रसाल मुन्देलखण्ड विश्वविद्यालय
छत्तरपुर (म.प्र.)

Department of Higher education, Govt. of M.P.
Semester wise Syllabus for Postgraduates

As recommended by Central board of Studies and
Approved by HE the Governor of M.P.

Session : 08-09

M.Sc. Previous Zoology

II Sem IV Paper

Topic – Molecular Cell Biology and genetics

Unit – I Biomembrane

- Molecular composition arrangement and functional consequences
- Transport across cell membrane diffusion active transport, pumps, uniports, symports and antiports
- Micro filaments and microtubules structure and dynamics
- Cell movements intracellular transport, role of kinesin and dynein

Unit – II Cell – Cell signaling

- Cell surface receptors
- Second messenger system
- Signaling from plasma membrane to nucleus
- Gap junctions and connexins
- Integrins

Unit – III Cell – Cell adhesion and communication

- Ca^{++} dependant homophilic cell – cell adhesion
- Ca^{++} independant homophilic cell – cell adhesion
- Gap junctions and connexins
- Genome organization, hierarchy in organization

[Signature]
3/2/17

[Signature]
3 Feb. 17

[Signature]
3/2

[Signature]
3.2.17

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)

OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

 9893076404

- Chromosomal organization of genes and non-coding DNA

Unit –IV Sex determination

- Sex determination in *Drosophila*
- Sex determination in mammals
- Basic concept of dosage compensation
- Cytogenetic of human chromosomes
- Human genome project (HGP) purpose 2 Implications


Unit – V Genetic Diseases and Genomics


- Human gene therapy
- Prenatal diagnosis & genetic counseling
- Genetic screening
- Structural Genomics
- Functional Genomics
- Gene libraries
- Transgenic animals & their applications


Suggested Readings


- J. Darnell, H. Lodish and D. Baltimore molecular cell biology scientific American book. Inc. USA
- B. Alberts D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson. molecular biology of the cell. Garland Publishing Inc. New York.
- John R. W. animal cell culture A practical approach masters. Irl. Press
- Alberts et. al Essentials cell biology garland publishing Inc. New York 1998
- J.M. Barry molecular biology
- Philip E. Hartman Gene Action
- L.C. Dunn, principals of Genetics
- A.M. Winchester genetics


A.M. Winchester genetics



3/2/17


3 Feb. 17


3/2


3.2.17


3/2/17


Govt. Tulsi College Anuppur
Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

- Edgar Alterbrg Genetics
- L.C. Dunn genetics and the oregon of species
- Bengt A. Kihlman actions of chemicals of dividing cells

[Handwritten signatures and dates]
8/2/17
3/2/17
8.2.17
8.2.17

[Handwritten signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

मध्यप्रदेश उच्च शिक्षा विभाग
उज्जैन (म.प्र.)

Department of Higher education, Govt. of M.P.

Semester wise Syllabus for Postgraduates

As recommended by Central board of Studies and

Approved by HE the Governor of M.P.

Session : 08-09

**Class: M.Sc.
SEMESTER - II
Practical : Ist**

M.M, 50

General & Comarative Physiology and Endocrinology
Population Ecology and Environmental Physiology.

Exercise :

- | | |
|--|-----------|
| 1. Experiment on Hematology Blood group, Total and different counts. | 5 |
| 2. Demonstration of Enzyme Action, and chromatography | 10 |
| 3. Estimation of pH. | 5 |
| 4. Detection of protein carbohydrate and fats. | 5 |
| 5. Endocrinological spots comments on prepared histological slides. | 10 |
| 6. Detection of Nitrogenous products in given samples. | 5 |
| 7. Viva Voce | 5 |
| 8. Practical Records and collection. | 5 |
| | <u>50</u> |

Total Marks

[Signature]

[Signature]

[Signature]

[Signature]
3.2.17

[Signature]

[Signature]
3/2/17

[Signature]
3/2/17

[Signature]
3/2/17

[Signature]

**PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)**



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

महाराज उच्चतराध्ययन विद्यापीठम्
उज्जयिनी (म.प्र.)

Department of Higher education, Govt. of M.P.

Semester wise Syllabus for Postgraduates

As recommended by Central board of Studies and

Approved by HE the Governor of M.P.

Session : 08-09

Class: M.Sc.

SEMESTER - II

Practical : IInd

M.M. 50

Tools and Techniques for biology.
Molecular cell Biology and Genetics

1. Comments upon the structure and application of analytical instruments 10
 - i. Colorimeter
 - ii. Spectrophotometer
 - iii. Ultracentrifuge
 - iv. ESR and NMR spectrometer
 - v. Microtomy
 - vi. Chymographic Instruments
2. Problem and based on genetics 10
3. Estimation techniques based for RNA and DNA 10
4. Estimation of Gene and Genotypic frequencies in light of hardy weinbecey law based on facial traits. 5
5. Demonstration of chromosome polymorphism isozyme polymorphism in some insect population. 5
6. Viva - Voce 5
7. Practical Record 50

Total Marks

[Signature]

[Signature]
3/2/17

[Signature]

[Signature]
3.2.17

[Signature]

[Signature]
3 Feb. 17

[Signature]
3/2

[Signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdcano@mp.gov.in

9893076404

Session
2016-17

M. Sc. Zoology 2011-2012 Onwards

Regular
Msc Zoology
Third semester
Paper-I

Comparative Anatomy of Vertebrates

Max Marks. 42
CCE- 08

Unit-1

1. Origin of Chordata: Concept of Protochordata
2. Development, structure and functions of integument and its derivatives (glands, scales, feathers and hairs)
3. Respiratory system : Characters of respiratory tissue, external and internal respiration. Comparative account of respiratory organs.
4. Comparative account of Digestive System.

Unit-2

1. Evolution of heart.
2. Evolution of aortic arches and portal systems.
3. Blood circulation in various vertebrates groups.
4. Comparative account of jaw suspensorium and vertebral column.

Unit-3

1. Evolution of urinogenital system in vertebrates.
2. Comparative account of organs of olfactory and taste.
3. Comparative anatomy of brain and spinal cord (CNS).
4. Comparative account of peripheral and autonomous nervous system.

Unit-4

1. Comparative account of lateral line system.
2. Comparative account of electroreception.
3. Flight adaptations in vertebrates.
4. Aquatic adaptations in birds and mammals.

Unit-5

1. Origin, evolution general organization and affinities of Ostracoderms .
2. General organization, specialized, generalized and degenerated characters of Cyclostomes.
3. Origin, evolution general organization of early Gnathostomes .
4. General account of Elasmobranchi, Holocephali, Dipnoi and Crossoptergii.

Pratt
24.6.16

20
24 June 2016

(Dr. H. N. Khare)

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

Suggested Reading Materials:

M. Sc. Zoology 2011-2012 Onwards

1. Carter, G.S. Structure and habit in vertebrate evolution – Sedgwick and Jackson, London.
2. Kingsley, J.S. Outlines of Comparative Autonomy of Vertebrates, Central Book Depot, Allahabad,
3. Kent, C.G. Comparative anatomy of vertebrates
4. Malcom Jollie, Chordata morphology. East – West Pres Pvt. Ltd., New Delhi.
5. Milton I lildergrand. Analysis of vertebrate structure. IV. Ed. John Wiley and Sons Inc., New York.
6. Smith, H.S. Evolution of Chordata structure. Hold Rinchart and Winstoin Inc. New York.
7. Sedgwick, A.A. Students Text Book of Zoology, Vol.II.
8. Walter, H.E. and Sayles, L.D. Biology of vertebrates, MacMillan & Co. New York.
9. Romer, A.S. Vertebrate Body, IIIrd Ed. W.B. Saunders Co., Philadelphia
10. Young J.Z. life of vertebrates. The oxford University Press, London
11. Parker & Haswell to III Rev. by Marshall willians latested Macmillan Co. ltd.
12. Young J.Z. Life of mammals. The Oxford University Press, London
13. Weichert, C.K. and Presch, W. Elements of chordate anatomy, 4th Edn. McGraw Hall Book Co., New York.

Pushp
24.6.16

Gu.
24 June 16

Dr. V. S. K.

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)

मध्यप्रदेश छात्रसाल कुन्देलखण्ड विश्वविद्यालय
छतरपुर (म. प्र.)

Msc Zoology
Third semester
Paper- II

Limnology



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

M.Sc Zoology
III Semester
Paper-II Limnology
Session Season-16-17
M. Sc. Zoology 2011-2012 Onwards
Max. Mark. 42
(3)

Unit-1

1. Limnology – Definition, historical development and scope of Limnology.
2. Types of freshwater habitats and their ecosystem -
 - (a) Ponds, Streams and rivers.
 - (b) Lakes – Origin and classification.
3. Morphometry – Use of various morphometric parameters and Zonation.

Unit-2

Physico – Chemical Characteristics.

1. Light and Temperature-
 - (a) Light as an ecological parameter in freshwater.
 - (b) Temperature- Radiation, Stratification and Heat Budget.
2. Dissolved Solids – Carbonate, Bicarbonates, Phosphate and Nitrate.

Physico – Chemical characteristics of freshwater with special reference to different parameters-Turbidity, dissolved gases (Oxygen, Carbon dioxide, Hydrogen Sulphide), Seasonal changes in dissolved gases and pH.

Unit-3

1. Study of Biota
 - (a) Phytoplankton, Zooplankton and their inter-relationship.
 - (b) Aquatic insects, birds and their environmental significance.
2. Ecological classification of aquatic fauna higher aquatic plants and their significance.

Unit-4

1. Methods of water quality testing BOD and COD.
2. Sewage – Definition, composition and its treatment.
3. Bioindicators- Aquatic flora and fauna in relation to water quality in an aquatic environment.

Unit-5

1. Causes of pollution of Aquatic Resources, their management and conservation.
2. Resource Conservation – Aquatic pollution, control, legislation, regulation on discharge of industrial effluents and domestic wastes in rivers and reservoirs.
3. Use and misuse of inland waters.

Suggested Reading Materials:

Anathakrishnan : Bioresources Ecology
Goldman : Limnology
Odum : Ecology
Pawlosuske : Physico- chemical methods for water
Wetzel : Limnology
Trivedi & Goyal : Chemical and biological methods for water pollution studies

22

Principals
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



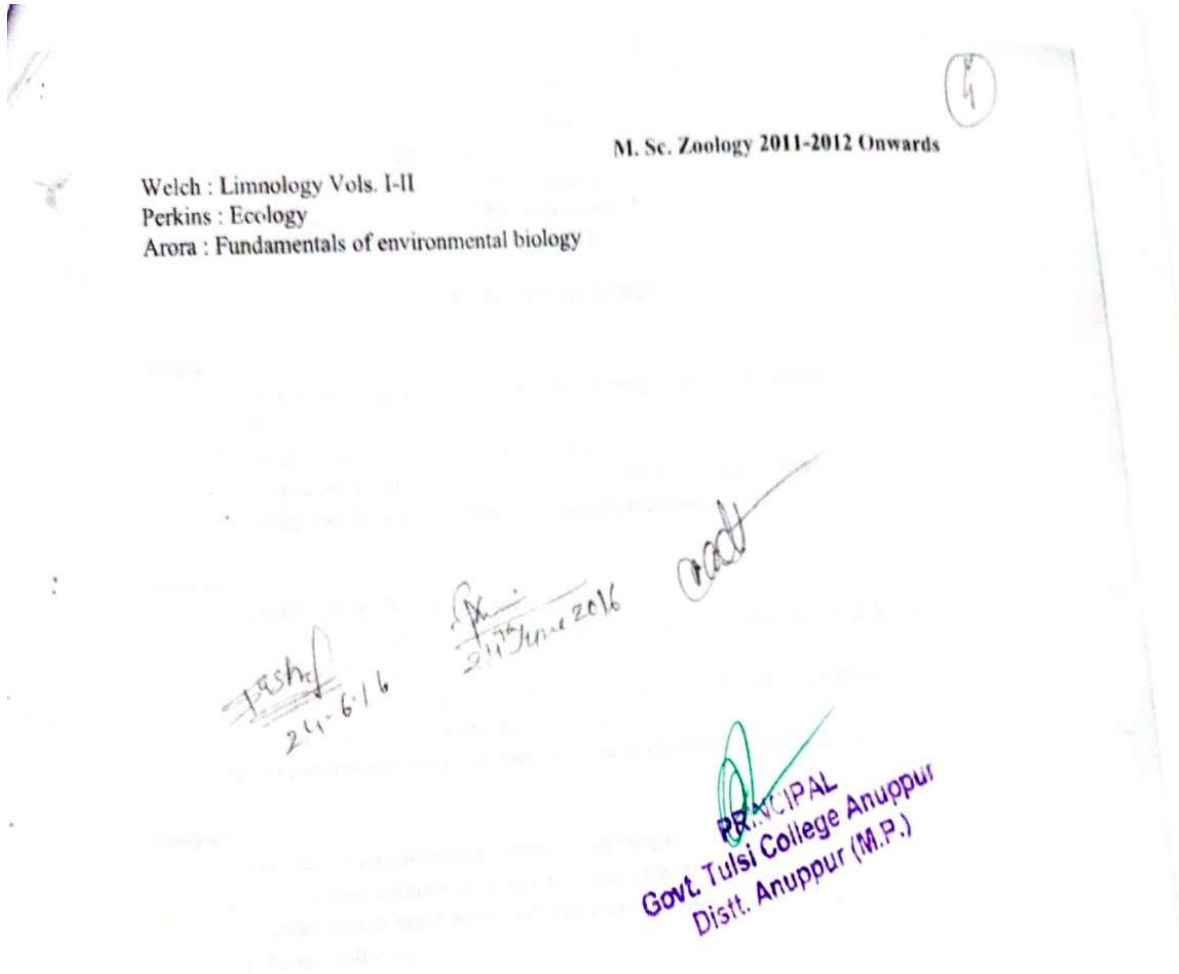
OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404





OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

Session-16-17

महाराजा छत्रसाल विश्वविद्यालय
अनूपुर (म.प्र.)

M. Sc. Zoology 2011-2012 Onwards

Msc Zoology
Third semester
Paper- III

ECO- TOXICOLOGY

Unit-1

1. General principles of Environmental Biology with emphasis on ecosystems.
2. Abiotic and biotic factors of ecosystems.
3. Communities of the environment, their structure & significance.
4. Energy flow in environment: Ecological energetic.

Unit-2

1. Productivity, Production and analysis.
2. Recycling and reuse technologies for solid and liquid wastes and their role in environmental conservation.
3. Remote sensing –basic concepts and applications of remote sensing techniques in environmental conservation.
4. Environmental indicators and their role in environmental balance.

Unit-3

1. Kinds of environmental pollution and their control methods.
2. Radioactive compounds and their impact on the environment.
3. Vehicular exhaust pollution causes and remedies.
4. Noise pollution.

Unit-4

1. Toxicology- Basic concepts, Principles and various types of toxicological agents.
2. Toxicity testing principles, hazards, risks and their control methods.
3. Food toxicants and their control methods.
4. Public Health Hazards due to environmental disasters.

Unit-5

1. Pesticides, types, nature and their effects on environment.
2. Important heavy metals and their role in environment.
3. Agrochemical use and misuse, alternatives.
4. Occupational Health Hazards and their Control.

Suggested Reading Materials:

1. Clark : Elements of ecology
2. Odum : Fundamentals of Ecology

24

(Dr. H.N. Khare)

Fishy
24.6.16

Am

oat

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

M.Sc. - Zoology
Third Semester
Paper IV: Aquaculture
Session 16-17 (7)

Unit-1
Aquaculture history definition M.Sc. Zoology 2011-2012 Onwards
2. Fishery resources of India in general & Madhya Pradesh in particular.
3. Abiotic & biotic factors of water necessary for fish life.
4. Ecological characteristics of lakes & rivers.
5. General ecological characteristics of reservoirs of India.

Unit-2

1. Fish culture :- Mono, Poly, mixed and composite Fish culture.
2. Fresh water prawn culture and its prospects in India.
3. Culture of Mussels, clams, oysters & pearl culture.
4. Sewage fed fish culture, paddy cum fish culture
5. Frog culture.

Unit-3

1. Fish breeding in natural conditions, bundh breeding, hypophysation & stripping.
2. Transport of live fish & seed.
3. Different types of crafts & gears used for fish catching.
4. Plankton- its definition, culture & identification.
5. Common weeds of fish ponds and methods of their eradication.

Unit-4

1. Fresh water fish farm engineering: selection of site, construction of fish farm & soil chemistry.
2. Designing, layout & construction of different types of fish ponds.
3. Setting and management of fresh water aquarium.
4. Preservation & processing of fish.
5. By products of fish Industry & their utility.

Unit-5

1. Water pollution, its effects on fisheries and methods of its abatement.
2. Common fish diseases & their control.
3. Biochemical composition and nutritional value of fish.
4. Fisheries economics and marketing.
5. Fisheries managements and extension.

(Dr. H.N. Khanna)

Suggested Reading Materials:

1. C.B.L. Shrivastava : Fishes of India
2. Jhingran : Fish and fisheries of India
3. S.S. Khanna : An Introduction to fishes
4. R.S. Rath : Fresh water Aquaculture
5. Gopalji Shrivastava : Fishes of U.P. & Bihar
6. H.D. Kumar : Sustainability & Management of Aquaculture & Fisheries
7. A.J.K. Mainan : Identification of fishes
8. R. Sanatani : A Manual of fresh water Aquaculture
9. S.K. Gupta : Fish & Fisheries

26

PRINCIPAL
Govt Tulsi College Anuppur
Dist. Anuppur (M.P.)

Fishing
24-6-16

24-June-16



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

10. P.D. Pandey : Fish & Fisheries
11. K.P. Vishwas : Fish & Fisheries

M. Sc. Zoology 2011-2012 Onwards

Fish
24.6.16

For
24 June 16

all

PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtdcano@mp.gov.in

9893076404

Session 2016-17 (1)

M.Sc. Zoology 2011-2012 Onwards
M.Sc Zoology
Semester-IV
Paper- I (Compulsory)

ANIMAL BEHAVIOUR AND NEUROPHYSIOLOGY

Max. Marks- 42
CCE- 08

Unit-1

1. Introduction:
 - Ethology as a branch of biology.
 - Animal psychology, classification of behavioural patterns, analysis of behaviour (ethogram)
2. Reflexes and complex behaviour.
3. Perception of the environment: mechanical, electrical, chemical, olfactory, auditory and visual.
4. Evolution and ultimate causation: Inheritance behaviour and relationships.

Unit-2

1. Neural and hormonal control of behaviour.
2. Genetic and environmental components in the development of behaviour.
3. Motivation: Drive, timing and interaction of drives, physiological basis of motivation, hormones and motivation, aggregation.
4. Communication: Chemical, visual, light and audio, evolution of language (primates).

Unit-3

1. Ecological aspects of behaviour: Habitat selection, food selection, optimal foraging theory, anti-predator defences, aggression, homing territoriality, dispersal, host parasite relations.
2. Biological rhythms: Circadian and circannual rhythms, orientation and navigation, migration of fishes, turtles and birds.
3. Learning and memory: Conditioning, habituation, insight learning, association learning and reasoning.

Unit-4

1. Reproductive behaviour. Evolution of sex and reproductive strategies, mating systems, courtship, sexual selection, parental care.
2. Social behaviour. aggregations, schooling in fishes, flocking in birds, herding in mammals, group selection, kin selection, altruism, reciprocal altruism, inclusive fitness, social organization in insects and primates.

Unit-5

1. Thermoregulation: Homoeothermic animals, poikilotherms &

28

20 June 2016
3 Feb 17
3 Feb 17
3 Feb 17

Principal
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtcdano@mp.gov.in

9893076404

(2)

M. Sc. Zoology 2011-2012 Onwards

Session 2016-17

Hibernation.

2. Receptor physiology a comparative study –

Mechano receptor

Photo receptor

Phono receptor

Chemo receptor

Equilibrium receptor

3. Bioluminescence

[Signature]

[Signature]

Suggested Reading Materials:

1. Eibl-Eibesfeldt, I. Ethology. The biology of Behaviour. Holt, Rinehart & Winston, New York.
2. Gould, J.L. The mechanism and Evolution of Behaviour.
3. Kerbs, J.R. and N.B. davies : Behaviourable Ecology. Blackwell, Oxford, U.K.

29

[Signature]

[Signature]
24-6-16

[Signature]

[Signature]
3-2-17

[Signature]
3/2/17

[Signature]
PRINCIPAL
Govt. Tulsi College Anuppur
Distt. Anuppur (M.P.)



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

③

M. Sc. Zoology 2011-2012 Onwards

Session 2016-17

4. Hinde, R.A. Animal Behaviour : A Synthesis of Ethology and Comparative Psychology. McGraw Hill, New York.
5. Alcock, J. Animal Behaviour : An Evolutionary approach. Sinauer Assoc. Sunderland, Massachsets, USA.
6. Bradbury, J.W. and S.L. Vehrencamp. Principles of Animal Communication. Sinauer Assoc. Sunderland, Massachsets, USA.

मध्यप्रदेश शासन तुलसीखण्ड विश्वविद्यालय
अनूपुर (म.प्र.)

**M.Sc Zoology
Semester-IV
Paper- II(compulsory)**

**Gamete Biology, Development and
Differentiation in vertebrates**

Max. Marks= 1/2

Unit-1

1. Comparative account of differentiation of gonads in mammals.
2. Spermatogenesis : Morphological basis in rodents.
Gamete specific gene expression and genomics

30

[Handwritten signatures and dates]
30/12/17
24-6-16
30/12/17
30/12/17
30/12/17



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

Session 2016-17

M. Sc. Zoology 2011-2012 Onwards

3. Biochemistry of Semen : Semen composition and formation, assessment of sperm function.

4. Fertilization: Prefertilization events Biochemistry of fertilization post fertilization events.

Unit-2

1. Ovarian follicular growth and differentiation: morphology, endocrinology, molecular biology oogenesis and vitellogenesis, ovulation and ovum transport in mammals
2. Biology of sex determination and sex differentiation a comparative account.
3. Multiple ovulation and embryo transfer technology : in vitro oocyte maturation, super ovulation.

Unit-3

1. Hormonal regulation of ovulation, pregnancy and parturition.
2. Hormonal regulation of development of mammary gland and lactation.
3. Endocrinology and Physiology of placenta.
4. Cryopreservation of gametes and Embryo.
5. Teratological effects of xenobiotics on gametes.

Unit-4

1. Cell commitment and differentiation.
2. Germ cell determinants and germ cell migration.
3. Development of gonads.
4. Melanogenesis.

Unit-5

1. Creating new cell types, the basic evolutionary mystery.
2. Cell diversification in early Amphibian embryo, totipotency and pluripotency.
3. Embryonic stem cells, renewal by stem cells, epidermis.
4. Connective tissue cell family
5. Haemopoietic stem cells : Blood cells formation, stem cell disorders.

Suggested Reading Materials:

1. Long J.A. Evan H.M. 1922 : the oestrous cycle in the Rat and its associated phenomenon.
2. Nalbandou. A.C. - Reproductive physiology
3. Prakash A.S. 1965-66 Marshall's, Physiology Reproduction (3 Vol.)
4. Gilbert, S.F. Developmental Biology, Sinauer Associated Inc. Massachusetts.
5. Ethan Bier, the cold Spring. The cold spring Harbor laboratory Press, New York.
6. Balinsky B.I. Introduction to Embryology sanders, Philadelphia.
7. Berril N.J. and Karp. G. Development Biology. McGraw Hill New York.
8. Davidson, E.H. Gene Activity During Early Development. Academic Press, New York.

31

Handwritten signatures and dates:

- 3/2/17
- 24.6.16
- 3/2/17
- 3/2/17
- 3/2/17
- 3/2/17



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtldcano@mp.gov.in

9893076404

OPTIONAL (SPECIAL PAPER) GROUP 2

- a. Pisci culture and economic importance of fishes (Icthyology)
Or
b. Cellular organization and molecular organization
Or
c. Applied entomology
Or
d. Environment and Biodiversity conservation
Or
e. Molecular endocrinology and reproductive technology

**** Student has choice to opt for one paper each (special paper) from group 1 and group 2**

महाराजा छत्रसाल बुन्देलखण्ड विश्वविद्यालय
छतरपुर (म.प्र.)

**M.Sc Zoology
Semester-IV
Paper- III A (optional paper)**

Icthyology (Fish) Structure and Function

Max. Marks. 42

Unit-1

1. Origin and evolution of fishes
2. Classification of fishes as proposed by Berg
3. Fish integument
4. Locomotion

Unit-2

1. Alimentary canal and digestion
2. Accessory respiratory organs
3. Air bladder and its functions
4. Weberian ossicles their homologies and functions

3/2/17

33

24 June 2016

24-6-16

3/2/17

3/2/17
3.2.17



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

(6)

M. Sc. Zoology 2011-2012 Onwards

Unit-3

1. Excretion and osmoregulation
2. Acoustico-lateral line system
3. Luminous organs
4. Colouration in fishes

Unit-4

1. Sound producing organs
2. Deep sea adaptations
3. Hill stream adaptations
4. migration in fishes

Unit-5

1. Sexual cycle and fecundity
2. parental care in fishes
3. Early development and hatching
4. Poisonous and venomous fishes.

M.Sc Zoology
Semester-IV
Paper- III B (Optional)
Cell Biology

Unit-1

1. Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
2. specialized chromosomes: structural organization and functional significance of polytene chromosomes
3. DNA methylation and DNA Aase-I Hypersensitivity in relation to gene activity and chromatin organization.
4. specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
5. Organisation and significance of heterochromatin.

Unit-2

1. Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
2. Gene families: organization, evolution and significance
3. Transposable genetic elements of prokaryotes and eukaryotes Gene imitation and molecular mechanism of occurrence of mutation repair mechanism

Unit-3

1. Organisation of eukaryotic transcriptional machinery promoter enhancers transcription factors polymerase activators and repressors.
2. DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.
3. Eukaryotic transcription of Eukaryotic transcriptional control.

34



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

7

M. Sc. Zoology 2011-2012 Onwards

Session 2016-17

Unit-1

1. Tissues of Immune system- Primary lymphoid organs, structure and functions (Thymus and Bursa of Fabricius)
2. tissues of Immune system- Secondary lymphoid organs, structure and functions (Spleen, lymphnode and Payers patches)
3. Antigen processing
4. Antigen presentation

Unit-2

1. T-cell lineage and receptors
2. T-cell activation
3. B-cell lineage and receptors
4. B-cell activation

Unit-3

1. Immunoglobulin structure, Biological and physical properties of immunoglobulin
2. Gene model for Immunoglobulin gene structure
3. Generation of antibody diversity (Light and heavy chain)
4. Immunization

Unit-4

1. Immediate type of hypersensitivity reaction of Anaphylectic type-I.
2. Antibody dependent cytotoxic type II reaction.
3. Complex mediated type III reaction
4. Delayed type cell mediated hypersensitivity type IV reaction.

Unit-5

1. Enzyme linked immunosorbent assay (ELISA) technique and its applications.
2. Immunofluorescence technique(Direct & Indirect and Sandwich antibody labelling techniques .
3. Immunodiffusion techniques (Mancini and Ouchterlony immunodiffusion techniques) Monoclonal antibody technology (Hybridoma technology)

सहस्रराजा अशोकसिंह प्रवेशिका विद्यालय
अनूपुर (म.प्र.)

M.Sc Zoology
Semester-IV
Paper- IV A (Optional)

Max. Marks = 42

Pisci Culture and Economic Importance of Fishes (Ichthyology)

Unit-1

1. Collection of fish seed from natural resources.
2. Dry bundh breeding of carps.

41

24.6.16

3/2/17

3/2/17



OFFICE, PRINCIPAL GOVERNMENT TULSI COLLEGE, ANUPPUR

Affiliated to Awadhesh Pratap Singh University Rewa (MP)

Registered Under Section 2 (F) & 12 (B) of UGC Act

E-mail: hegtddcano@mp.gov.in

9893076404

8

M. Sc. Zoology 2011-2012 Onwards

Session 2016-17

3. Wet bundh breeding of carps.
4. Hypophysation and breeding of Indian major carps.

Unit-2

1. Drugs useful in induced breeding of fish
2. Types of ponds required for fish culture farms
3. Management of hatcheries, nurseries and rearing ponds
4. Management of stocking ponds

Unit-3

1. Composite fish culture
2. Prawn culture and pearl industries in India.
3. Fisheries resources of MP
4. Riverine fisheries.

Unit-4

1. Coastal fisheries in India
2. Offshore and deep sea fishery's in India
3. Role of fisheries in rural development
4. Sewage fed fisheries

Unit-5

1. Methods of fish preservation
2. Marketing of fish in India.
3. Economic importance and by product of fishes
4. Shark liver oil industry in India
- Transport of live fish & fish seed.

Suggested Reading Materials : Paper III A & IV A

1. JR. Norman - The History of fishes.
2. Nagaraja Rao - An introduction to fisheries.
3. Lagler Ichthyology.
4. Herclen Jones Fish migration.
5. Marshal The life of fishes.
6. Thomas - Diseases of fish.
7. Greenwood - Inter relationship of fishes.
8. Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
9. Brown - Physiology of fishes Vol. I & II.