

Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF ~~M.A./M.Sc./M.Com./M.H.Sc~~ Zoology - I SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

Syllabus opted by the board of studies in Zoology Chhindwara University
in the meeting held on 18/10/2019

| Session | Course | Title of papers | Max. Marxs Theory/CCE | Max. Marxs Practical | Minimum Passing Marxs Theory/CCE/ Practical | Total Marxs |
|---------|-------------|---|--------------------------|-------------------------|---|----------------|
| First | Paper-I | <u>B/S system, TAXO. and Evolution.</u> | <u>40/10</u> | | <u>15/4</u> | |
| | Paper-II | | | | | |
| | Paper-III | | | | | |
| | Paper-IV | | | | | |
| | Paper-V(if) | | | | | |
| | | | | | | |

Board of Studies:

- I. Chairman- Adelkam
- II- Subject Expert -
1. Dr. R.K. Shivastava - [Signature]
 2. Dr. P.K. Mishra - [Signature]
 3. Dr. M. Madhu Pawar - [Signature]
 4. Dr. M.S. Mankam - [Signature]
 - 5.

5/2/2020

1. Dr. P.R. Chandekar - chairman -

Sub.exp. 2. Dr. R.K. Shivastava

3. Dr. P.K. Mishra

4. Dr. Vinod Krishna

5. Dr. Sunita Singh

[Signature]
5-2-2020

Chhindwara University, Chhindwara (M.P.)


SYLLABUS OF M.A./M.Sc./M.Com./MHSc M.Sc. I sem SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

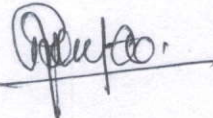
Syllabus opted by the board of studies in Zoology Chhindwara University
in the meeting held on 18/10/2019


| Session | Course | Title of papers | Max. Marxs Theory/CCE | Max. Marxs Practical | Minimum Passing Marxs Theory/CCE/ Practical | Total Marxs |
|---------|-------------|--|--------------------------|-------------------------|---|----------------|
| First | Paper-I | | | | | |
| | Paper-II | | | | | |
| | Paper-III | Quantitative, Biodiversity & wildlife | 40/10 | | 15/4 | |
| | Paper-IV | | | | | |
| | Paper-V(if) | | | | | |
| | | | | | | |


Board of Studies:

I. Chairman- Dr. P. R. Chandelkar - 

II- Subject Expert -

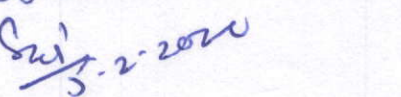
1. Dr. R. K. Shrivastava - 

2. Dr. P. K. Mishra - 

3. Dr. M. Mahapatra - 

4. Dr. V. K. Krishan - 

5.

6. Dr. Sunila Singh - 
05.02.20
5.2.2020

Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF M.A./M.Sc./M.Com./MHSc M.Sc. I SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

Syllabus opted by the board of studies in Zoology Chhindwara University
in the meeting held on 18/10/2019

| Session | Course | Title of papers | Max. Marxs Theory/CCE | Max. Marxs Practical | Minimum Passing Marxs Theory/CCE/ Practical | Total Marxs |
|---------|--------------|----------------------|--------------------------|-------------------------|---|----------------|
| First | Paper-I | | | | | |
| | Paper-II | <u>Structure and</u> | <u>40/10</u> | | <u>15/4</u> | |
| | Paper-III | <u>Function of</u> | | | | |
| | Paper-IV | <u>Invertebrates</u> | | | | |
| | Paper-V (if) | | | | | |
| | | | | | | |

Board of Studies:

I. Chairman- Walekars

II- Subject Expert -

1. [Signature]
2. [Signature]
3. [Signature]
4. [Signature]
5. [Signature]
05.02.20
6. [Signature]
5.2.2020

Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF M.A./M.Sc./M.Com./MHSc M.Sc. I sem SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

Syllabus opted by the board of studies in Zoology-----Chhindwara University
in the meeting held on 18/10/2019

| Session | Course | Title of papers | Max. Marxs Theory/CCE | Max. Marxs Practical | Minimum Passing Marxs Theory/CCE/ Practical | Total Marxs |
|---------|-------------|--------------------|-----------------------|----------------------|---|-------------|
| First | Paper-I | | | | | |
| | Paper-II | | | | | |
| | Paper-III | | | | | |
| | ✓ Paper-IV | Bio molecules and | 40/10 | 50 | 15/04/20 | |
| | Paper-V (H) | Structural Biology | | | | |
| | | | | | | |

Board of Studies:

I. Chairman-

Adelkar
18.10.2019

II- Subject Expert -

(Dr. P.R. Chandekar)

1. Dr. R.K. Shivastava
2. Dr. P.K. Mishra
3. Dr. Manjira Mahurpawar
4. Dr. M.S. Markam
5. Dr. V.K. Krishan
6. Dr. Sunita Singh

* Note. There are early two $(I+II) \leftarrow (III+IV)$

Practicals - will be held according to schedule.

Adelkar
18/10/2019

M.Sc. Zoology
SEMESTER - I

Paper - I

Paper Title - Bio Systematics, Taxonomy and Evolution

MM-40

Course Rationale

Based on Central Board of Studies Higher Education Madhya Pradesh

Unit- I

Definition and basic concepts of biosystematics taxonomy and classification.
History of Classification.
Trends in biosystematics: Chemotaxonomy, Cytotaxonomy and molecular taxonomy.
Types of speciation: Allopatric, Sympatric, Parapatric and Peripatric.
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
Taxonomic procedures: taxonomic collections, preservation, curation, 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
Evaluation of Shannon - Weiner Index
Evaluation of Dominance Index
Similarity and Dissimilarity Index

Unit- IV

Concepts of evolution and theories of organic evolution
Lamarckism, Darwinism, Neo Darwinism and modern synthetic theory of evolution
Population genetics: Hardy-Weinberg law of genetic equilibrium
A detailed account of
i - Natural selection as a destabilizing force in Hardy-Weinberg law of equilibrium
ii - Mutation as a destabilizing force in Hardy-Weinberg law of equilibrium
iii - Genetic Drift as a destabilizing force in Hardy-Weinberg law of equilibrium
iv - Migration as a destabilizing force in Hardy-Weinberg law of equilibrium
Meiotic Drive
Molecular Evolution: Gene evolution (molecular clock), Evolution of gene families (beta globin clusters)

Unit- V

Origin of higher categories:-
a) Phylogenetic, gradualism and punctuated equilibrium
b) Major trends in the origin of higher categories
c) Micro and macro evolution
Molecular population genetics:-
a) Pattern of changes in nucleotide and amino acid sequence.
b) Ecological significance of molecular variations (genetic polymorphism)
Evolutionary Genetics & Speciation:-
a) Phylogenetic and biological concept of species
b) Origin, patterns and mechanism of reproductive isolation

Dr. P. P. Singh
1
2

Suggested Readings :-

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

The scheme of examination and the allotment of marks shall be as under

| Sections/Part | Questions Type | Marks Distribution | Remark |
|---------------|---|--------------------|--------|
| Section -A | Objective Type Questions(At least one question to be set from each unit) | 1x5=05 Marks | |
| Section -B | Short Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 2x5=10 Marks | |
| Section -C | Long Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 5x5=25 Marks | |
| Total | | 40 Marks | |

Board of Studies: 1. Chairman-

Adelkan

II- Subject Expert -

1.

3.

2.

4.

G. Dr. Sunitasinh
Sui
5-2-2020

Dr. P.K. Mishra - 2)

Dr. P.K. Mishra

M.Sc. Zoology
SEMESTER - I
Paper - II
Paper Title - Structure and Function of Invertebrates

MM-40

Course Rationale

Based on Central Board of Studies Higher Education Madhya Pradesh

Unit- I

Origin of Metazoa

Organization of Coelom:- a) Acoelomates b) Pseudo coelomates c) Coelomates

Locomotion:-

a) Amoeboid , Flagellar and Ciliary movements in Protozoa

b) Hydrostatic movements in Coelenterata , Annelida and Echinodermata

Unit- II

Nutrition and digestion:-

a) Patterns of Feeding and digestion in Lower Metazoans , Mollusca and Echinodermata

b) Filter feeding in Polychaeta

Respiration:-

a) Organs of Respiration : Gills, Lungs and Trachea

b) Respiratory pigments

c) Mechanism of Respiration.

Unit- III

Excretion:-

a) Excretion in Lower invertebrates : Simple diffusion ,Contractile vacuole, Protonephridia and Solenocytes

b) Excretion in Higher invertebrates : Coelom, Coelomoduct , metanephridia , Coxal gland, Malpighian tubules , Organ of Bojanus and Green gland

Mechanism of Osmoregulation with special to Protozoa

Unit- IV

Nervous system:-

a) Primitive Nervous system: Coelenterata and Echinodermata

b) Advanced Nervous system: Annelida and Arthropoda (Crustacea and Insecta) and Mollusca (Cephalopoda)

Unit- V

Invertebrate larval forms and their evolutionary significance

a) Trematoda and Cestoda

b) Larval forms of Crustacea

c) Larval forms of Mollusca

d) Larval forms of Echinodermata

Structure ,affinities and life history of the following Non – Coelomate and Coelomate Minor phyla :

a) Rotifera

b) Entoprocta

c) Phoronida

d) Ectoprocta

Adeltans

1 -
2 -
3 -

Suggested Readings :-

1. Hyman, L.H. The invertebrates, Nol. I. 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.

The scheme of examination and the allotment of marks shall be as under

| Sections/Part | Questions Type | Marks Distribution | Remark |
|---------------|--|--------------------|--------|
| Section -A | Objective Type Questions (At least one question to be set from each unit) | 1x5=05 Marks | |
| Section -B | Short Answer Type Question (Two questions to be set from each unit and one from each unit to be attempted) | 2x5=10 Marks | |
| Section -C | Long Answer Type Question (Two questions to be set from each unit and one from each unit to be attempted) | 5x5=25 Marks | |
| Total | | 40 Marks | |

Board of Studies: 1. Chairman-

Aditya

II- Subject Expert -

1.

Aditya

3.

Aditya
5-2-2020

2.

Dr. P.K. Mishra - 9

4.

Aditya

M.Sc. Zoology
SEMESTER - I
Paper - III
Paper Title - Quantitative Biology, Biodiversity and Wildlife

MM-40

Course Rationale

Based on Central Board of Studies Higher Education Madhya Pradesh

Unit- I

Central tendencies- mean, mode and median.
Measures of dispersion: range, mean deviation, standard deviation and coefficient of variation
Chi - square test
Normal distribution
Experimental designing and sample method
Elementary knowledge of matrices

Unit- II

Probability : distribution, properties and probability theory
Completely randomized design and randomized block design
Analysis of variance
Co-relation- types of correlation
Analysis of Karl pearson - coefficient of correlation
Regression

Unit- III

Biodiversity
1. Concept and principal of biodiversity
2. Causes for the loss of biodiversity
3. Biodiversity conservation methods
4. Medicinal uses of forest plant (any five)
5. Biodiversity hot spots

Unit- IV

Wildlife of India according to ecological zones
Values of wildlife : Positive and negative
Wildlife Protection Act and its major amendments
Endangered and threatened species
Wildlife corridors and wildlife translocation

Unit- V

National Parks and Sanctuaries
Project Tiger
Project Gir Lion and Crocodile breeding project
Wildlife in M.P. with references to Reptiles, Birds and mammals
Study of state bird – Paradise fly catcher (Dudhraj) and state animal swamp deer - (Barasingha) - *Cervus duvaucelli*
Biospheres reserves

Adelkan

1
2
3

Suggested Readings :-

- Matschelet. 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. cochran, statical methods, Affilited East, West Press New Delhi (Indian ed.)
- Muray , J.D. Methamatical Biology, Springer Verlag Berlin
- Pelon, E.C. The interpretation of ecological data : A promer on classification and ordivation
- Wild life management – Hossetti
- A. lewis - Biostatics
- B.K. Mahajan - Methods in Biostatics
- 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 Taxonomy & Ecology
- M.P. Arora - An Introduction to prevantology
- P.C. Kotwal - Biodiversity and conservation

The scheme of examination and the allotment of marks shall be as under

| Sections/Part | Questions Type | Marks Distribution | Remark |
|---------------|---|--------------------|--------|
| Section -A | Objective Type Questions(At least one question to be set from each unit) | 1x5=05 Marks | |
| Section -B | Short Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 2x5=10 Marks | |
| Section -C | Long Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 5x5=25 Marks | |
| Total | | 40 Marks | |

Board of Studies: 1. Chairman-

Wadek

II- Subject Expert -

1. *[Signature]*
3. *[Signature]*

2. *Dr. D.S. Mishra*

4. *[Signature]*

Prof 5-2-2020

[Signature]

M.Sc. Zoology
SEMESTER - I
Paper - IV
Paper Title - Biomolecules and Structural Biology

MM-40

Course Rationale

Based on Central Board of Studies Higher Education Madhya Pradesh

Unit- I

Chemical foundation of biology - pH, pK, acids, Bases, Buffers, Weak bonds (Hydrogen bond, Vander waals force, Hydrophobic effects, Electrostatic force)

Resonance and Isomerisation

Acid soluble pool of living tissue – General idea of Aminoacids, Monosaccharides, Oligosaccharides, nucleotides and Peptides

Nanoparticles and its biological relevance

Biomaterials

Unit- II

Primary, Secondary, Tertiary and quarternary structures of Proteins, Protein folding and denaturation

DNA and RNA : Double helical structure of DNA, Structure of RNA

Role of RNA in gene expression, protein synthesis in eukaryotes

DNA replication, recombination and repair

Membrane channels -Voltage gated and non- gated ion channels and Sodium - potassium pump

Unit- III

Basic concept of metabolism : coupled and interconnecting reactions of metabolism (Intermediary metabolism), cellular high energy resources and ATP synthesis.

Glycolysis and Gluconeogenesis

Citric acid cycle

Oxidative phosphorylation

Fatty acid metabolism : degradation of fatty acids : Beta oxidation , brief idea of alpha and omega oxidation.

Unit- IV

RNA splicing

Biosynthesis of Non essential amino acids (glutamate and aspartate) from amphibolic compounds

Biosynthesis of purines and pyrimidines

Biosynthesis of Cholesterol

Lipid storage and its functional importance wsr to mobilization of fats from adipose tissue.

Unit- V

Enzymes : Terminologies , classification and basics of Enzyme kinetics

Mechanism of Enzyme catalysis

Regulation of enzyme reaction

Concept of free energy and thermodynamic principles in Biology

Energy rich bonds, compounds and biological energy transducers

Adelt

24

0

1
2
3
4
5
6
7
8
9

Suggested Readings :-

- Voet, D and J.G. Voet. Biochemistry John Wiley and Sons
- Freifelder, D. Physical Biochemistry W.H. Freeman and Co.
- Segal, I.H. Biochemical calculations John Wiley and Sons
- Creighton, T.E. Protein Structure and molecular properties W.H. Freeman and Co.
- Freifelder D. Essentials of molecular biology
- Wilson, K. And K.H. Goulding: A Biologists guide to Principles and techniques of practical biochemistry
- Cooper, T.G. Tools of Biochemistry
- Hawk, Practical physiological chemistry
- Garret, R.H. and C.M. Grisham, biochemistry, Saunders College Publishers
- Lehninger's Biochemistry
- Harper's Biochemistry
- G. P Talwar, Text book of Human biology and biochemistry
- Stryer, Text book of biochemistry.

The scheme of examination and the allotment of marks shall be as under

| Sections/Part | Questions Type | Marks Distribution | Remark |
|---------------|---|--------------------|--------|
| Section -A | Objective Type Questions(At least one question to be set from each unit) | 1x5=05 Marks | |
| Section -B | Short Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 2x5=10 Marks | |
| Section -C | Long Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted) | 5x5=25 Marks | |
| Total | | 40 Marks | |

Board of Studies: 1. Chairman-

Adulcan

II- Subject Expert -

1.

3.

2.

4.

Dr. R.K. Mishra

Dr. R.K. Mishra

Dr.
5-2-2020

24

Chhindwada University chhindwada

M.Sc. 1st sem (zoology) 2020-21

Practical 1st

| | |
|--|----|
| 1. Spotting :- classification and identification of various phyla | 15 |
| 2. Demonstration of various systems of invertebrates:- squilla, prawn, sepia, loligo, grass hopper, honey bee, echinus, aplysia, star fish | 10 |
| 3. Mounting :- Permanent balsum mount | 5 |
| 4. Spotting related with adaptation, homologies, analogies and modification of mouth parts. | 5 |
| 5. Viva-voce | 10 |
| 6. practical records / Collections | 5 |

Total marks 50

[Handwritten signatures and marks in blue ink, including a large signature 'Prakash' and other illegible names and initials.]

Chhindwada University chhindwada

M.Sc. 1st sem (zoology) 2020-21

Practical IIInd

- | | |
|---|----|
| 1. problems based on biodiversity and wildlife (mammals and fishes) spots (5+5) | 20 |
| 2. Exercise on mean mode and median | 5 |
| 3. Cell division -Preparation of slide on meiosis and mitosis | 5 |
| 4. Preparation of different type of chromosomes | 5 |
| 5 viva-voce | 10 |
| 6. Practical records and collections | 5 |

Total Marks 50

Ant

Ant
Ant

Ant

Ant