S.S. JAIN SUBODH P.G.(Autonomous) COLLEGE, JAIPUR

(Affiliated to University of Rajasthan)

Syllabus

SCHEME OF EXAMINATION AND COURSES OF STUDY

FACULTY OF SCIENCE

DEPARTMENT OF ZOOLOGY

M.Sc. Zoology–NEP 2020 (I -Semester-2023)

Proposedcourse forM.Sc. Zoology

M.Sc.ISemester

Max.Marks(Theory):400
Max. Marks (Practical):200

Nomenclature			External/ Theories	Internal/ Theories	Total Mini. Marks	Total Max Marks
MZOC101	PaperI	Principlesof Biosystematics &Taxonomy	70	30	40	100
MZOC102	PaperII	Structure&Functionof Invertebrates	70	30	40	100
MZOC103	PaperIII	Biochemistry	70	30	40	100
MZOC104	PaperIV	EssentialsofCytology	60	40	40	100
MZOC P101Practical I			60	40	40	100
MZOC P102Practical II			60	40	40	100

M.Sc. II Semester

Max. Marks (Theory):400
Max. Marks (Practical):200

Nomenclature			External/ Theories	Internal/ Theories	Total Mini. Marks	Total Max Marks
MZOC201	PaperI	GeneralPhysiology	70	30	40	100
MZOC202	PaperII	EnvironmentalBiology& Ethology	70	30	40	100
MZOC203	PaperIII	MolecularBiology, Biotechnology &Bioinformatics	70	30	40	100
MZOC204	PaperIV	GeneticsandMolecular Evolution	60	40	40	100
MZOC P201Practical I			60	40	40	100
MZOC P202Practical II			60	40	40	100

M.Sc.Semester-I THEORY

Paper-I [Principles of Biosystematics & Taxonomy]

UNITI

1. Taxonomy:Definitionandbasicconceptofbiosystamicsand taxonomy.
2. History, scopeandapplicationofbiosystematics.
3. Taxonomicdiversity:Definitionandtypesofvarioustaxonomiccategories,micro-andmacro-taxonomy.
4. Dimensionsofspeciation:Speciescategory,sub-speciesandotherintra-speciescategories.
5. Kingdomoflife:GeneraloutlineofkingdomincludingMoneraandProtista;Broadoutlineand diversity inkingdom Animalia.

UNITII

Moderntrendsintaxonomy:

1. Behaviouraltaxonomy
2. Chemotaxonomy
3. Karyotaxonomy
4. Moleculartaxonomy
5. Neo-taxonomy
6. Numericaltaxonomy.

UNITIII

1. Taxonomicprocedures:Collection,preservation,curating and:processofidentification.
2. Taxonomiccharacterofdifferentkinds-Quantitativeandqualitativeanalysisofvariation.
3. Theoriesofbiologicalclassification:Hierarchyofcategories.
4. Interpretationandapplicationofimportantrulesandformationofscientific namesofdifferent taxa.

UNITIV

1. Systematicpublication-Differentkindsofpublications
2. InternationalcodeofZoologicalnomenclature(ICZN) –itsoperativeprinciples, interpretation and application of important rules, Zoologicalnomenclature, formation of scientific names of various taxa.
3. Shannonwienerindex

SUGGESTEDREADING:

1. M.Koto-The.Biologyofbiodiversity-Springer
2. MolecularMarkers,NaturalHistory andEvoluation,J.C.Avise.Chapman&hall.New York
3. E.O.Wilson-Biodiversity-AcademicPressWashington.
4. G.G.-Simpson-PrincipleofanimaltaxonomyOxfordIBH PublicationCompany.
5. E-Mayer-ElementsofTaxonomy
6. Bastchelet-F-IntroductiontomathematicsforlifescientistsSpringer Verlag, Berling.
7. SkoalR.R.andF.J.RohiffBiometry-Freeman,San-Francisco.
8. Snecdor, G.W. andW.G.CocharanStatisicalMethodsofaffiliated-East-West Press, New Delhi.
9. MurryJ.D.MathematicalBiology-Springer,Verlag,Berlin.
10. PrincipleofAnimalTaxonomy;G.GSimpson.OxfordIBHPublishingCompany.

M.Sc.Semester-I THEORY

Paper-II [StructureandFunctionofInvertebrates]

UNIT I

Body Organization

1. OriginofLife:UnicellularandMulticellularorganism
2. Typeofsymmetry:Bodyplane, Asymmerty,Radial,Biradial,Bilateralsymmetry
3. FateofBlastopore:Protostomeand Deuterostome
4. FateofBlastomere:DeterminateandIndeterminateblastomeres
5. TypeofCleavage:Radialand Spiral
6. Segmentation:Pesudo,Superficial,Metameric
7. Organizationofcoelom: Acoelome, Pseudocoelome and coelome (Schizo and enterocoelome)

Locomotion

8. Flagellaandciliarymovementinprotozoa
9. Hydrostaticmovementincoelenterate,annelidaandechinodermata

UNITII

Nutritionanddigestion

10. PatternsofFeedinganddigestioninlowermetazoa,
11. FilterfeedinginPolychaeta,MolluscaandEchinodermata

Respiration

12. Organsofrespiration–Gills,lungsand trachea
13. Mechanismofrespiration
14. Respiratorypigments

UNITIII

Excretion

15. Organs of excretion: Coelomoducts,Nephridia and Malphigian tubules,Organ of Bojanus& Green gland
16. Mechanismofexcretion
17. Excretionandosmoregulation

Nervoussystem

18. PrimitiveNervoussystem:CoelenterataandEchinodermata
19. AdvancedNervoussystem- Annelida, Arthropoda(Crustaceanandinsecta)andMollusca (Cephalopoda)

UNITIV

Reproduction

20. Regeneration,Asexual(Paramecium,obelia)
21. sexualreproduction{Annelida,arthropoda,mollusca)

Invertebratelarvae

22. Larvalformsoffreelivinginvertebrates
23. Larvalformsofparasites
24. Significanceoflarvalforms

MinorPhyla

25. Organization,GeneralCharacterandsignificance(Ctenophora,Rhyncocoela,Entoprocta, Rotifera, Bryozoa, Phoronida)

SUGGESTEDREADING:

1. The Invertebrates. Vol.1. Protozoa through Ctenophora, Hyman, L.H. McGraw Hill Co., New York
2. InvertebrateStructureandFunction.Barrington,E.J.W.ThomasNelsonandSons Ltd.London.
3. EvolutionofMetazonlifecycle,Jagerstain,G.AcademicPress,NewYork&London.
4. TheInvertebrates.Vol.2.Hyman,L.H.McGrawHillCo.,NewYork.
5. TheInvertebrates.Vol.8.Hyman,L.H.McGrawHillCo.,NewYork.andLondon
6. InvertebrateZoologyBarnes,RD. W.B.SaundersCo.,Philadelphia
7. ABiologyofhigherInvertebrates,Russel-Hunter,WD.McMillanCo.Ltd.,London
8. The Invertebrates smaller colomate groups, Vol.5. Hyman, L.H. McGraw Hill Co., New York.
9. AnimalParasitism.Cad.C.P.PrenticeHallInc.,NewJersey.
10. StudentTextBookofZoology.Vol.I.IIandIII.Sedgwick.A. Central Book Depot, Allahabad.
11. TextbookofZoology.Parker,T.J.,Haswell. W.A.MacmillanCo., London.

M.Sc. Semester-I THEORY

Paper-III[Biochemistry]

UNIT-I

PROTEIN

1. Generalpropertiesand classificationofproteins
2. Aminoacidstructureandclassification
3. Structureofprotein-Primary,Secondary,Tertiaryand Quartenary
4. Ramachandranplots
5. Globularandfibrousprotein
6. Proteinsequencing

PROTEINMETABOLISM

7. Aminoaciddegradation:Deaminationreaction-Oxidativeandnonoxidative, transamination and transdeamination, Decarboxylation,
8. Ornithinecycleofureaformation,
9. Fateofcarbonskeletonofaminoacids

UNITII

CARBOHYDRATES:STRUCTUREANDBIOLOGICALIMPORTANCEOF-

1. Monosaccharides
2. Oligosaccharides
3. Polysaccharides(storageandstructuralpolasaccharides,glycosaminoglycans)
4. Glycoconjugates(glycoproteinsandproteioglycans)
5. Carbohydratesmetabolism:Enzymereaction,regulationandimportanceofGlycolysis,Citric acid cycle. Pentose phosphate pathway, glycogenolysis, glycogenesis, gluconeogenesis.

UNITIII

LIPIDS

1. Fatty acids: structure,nomenclature,acyl gylcerols,wax,phospholipids,sphingolipids, glycolipids, lipoproteins
2. Terpenoidsandsterols:structure,propertiesandfunctions
3. Functionsof lipids
4. Signaltransducingmolecule
5. Lipidmetabolism:fattyacidoxidation,fattyacidbiosynthesis,biosynthesisoftriglycerides

UNIT-IV

VITAMINS

1. Classification,structure,occurrenceandfunctionsoffatsolublevitamins
2. Classification,structure,occurrenceandbiologicalfunctionsofwatersolublevitamins
3. Phenolicsandalkaloids;structure,biologicalpropertiesandfunctions

ENZYMES

4. Classificationandnomenclatureofenzymes

5. Mechanismofenzyme action
6. Enzymekinetics
7. Isoenzymesandco-enzymes
8. Inhibitionofenzyme
9. AllostericRegulationOfEnzymes
10. EnzymesasbiosensorInbornerrorofmetabolism

SUGGESTEDREADING:

1. Voet,D.and J.G.Voet.BiochemistryJohn Wiley&Sons.
2. Freifelder,D.PhysicalBiochemistryW.H.Freeman&Co.
3. Segal,I.H.BiochemicalcalculationsJohnWileyandSons
4. Creighton,T.E.ProteinStructureandMolecular PropertiesW.H.Freeman&Co.
5. Freifelder, D.EssentialsofMolecularBiology
6. Wilson, K. and K.H. Goulding A Biologists Guide to Principals and Techniques of Practical Biochemistry
7. Cooper,T.G.ToolsofBiochemistry
8. Hawk,PracticalPhysiologicalChemistry
9. Garret,R.H.andC.M.Grisham.Biochemistry.SaunderscollegePublishers.

M.Sc. Semester-I THEORY

Paper-IV[EssentialsofCytology]

UNITI

IMPORTANCEOFCELL&CELLTHEORY

1. Structureofprokaryoticandeukaryoticcellsalong withdifferences
2. MolecularcompositionandarrangementfunctionalconsequencesofBiomembrane
3. Transportacrosscellmembrane:diffusion,activetransportandpumps
4. Co-transportbysymportersorantiporters

UNITII

CYTOSKELETON

1. Microfilaments,intermediatefilamentsandmicrotubulesstructureanddynamics
2. Intracellulartransport,roleofkineninand dynein
3. Cell-Celljunction:Tightjunction,GapJunction,Plasmodesmata

UNITIII

SIGNALTRANSDUCTION,PROTEINTRAFFICKINGANDSORTING

1. Introduction
2. Cellsurfacereceptors
3. Secondmessengersystem
4. MAPkinasepathways
5. Signalingfromplasmamembranetonucleus
6. Proteinsynthesisonfreeandboundpolysomes
7. UptakeintoER
8. Membraneproteins, Golgisorting,Posttranslationalmodifications

UNITIV

CELL CYCLE

1. Eventsincellcycle
2. MitosisandMeosis
3. Cyclinandcyclindependentkinasesandtheirregulation
4. Chromosomeremodelling

SUGGESTEDREADING:

1. CellandMolecularBiology;DeRobertisandDeRobertis;Saunders College
2. CellBiology;Powar,C.B.;HimalayaPublications.
3. Molecular Biologyofthegene;WatsonJ.D;Benzamin/Cummings
4. Molecular Biologyofthe Gene. I.D Watson, N.H.Hopkins, J.W. Roberts, J.A. Steiz and AM Weiner The Benjamin/Cummings Pub. Co., Inc., California.
5. MolecularCellBiology,J.DarnellH.Lodishand D.BaltimoreScientificAmerican Books, Inc., USA.
6. MolecularBiology of thecell.B.Alberts,D.D.Bray,J.Lewis,M.Rafif,K.Robertsand J.D.Watson. Garland Publishing inc., New York.
7. GeneIV,BenjaminLewin.OxfordUniversityPress,UK.
8. MolecularBiologyandBiotechnology.Acomprehensivedeskreference,R.A.Meyers (Ed.), VCH Publishers, Inc., New York.
9. MolecularCloning:ALaboratoryManual,J.Sambrook,E.F.FristschandT.Maniatis, Cold Spring Harbor Laboratory Press, New York.
10. IntroductiontoPractical MolecularBiology,P.D.Dabre,JohnWiley&SonsLtd.New York.
11. MolecularBiologyLabFax,T.A.Brown(Ed.),BiosScientificPublishersLtd.,Oxford.

12CellBiology:GrelarKarp, Internationalstudentversions