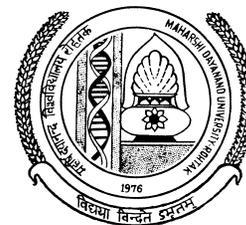


Maharshi Dayanand University Rohtak



Ordinance, Syllabus and Courses of Reading for M.Sc. (Zoology) III and IV Semesters

Session - 2009-2010

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**Department of Biosciences,
M.D. University, Rohtak
Scheme of Examination
M.Sc. Zoology w.e.f. Session 2008-09**

Semester	Course No.	Course Title	Marks
I	Zoo-801	Mammalian Physiology	80
	Zoo-802	Population Genetics	80
	Zoo-803	Techniques in Animal Sciences	80
	Zoo-804	Animal Cell Biology	80
	Zoo-805	Biomolecules	80
	Zoo-806	Laboratory Course	150
	Zoo-SC-1	Seminar	50
	Zoo-IA-I	Internal Assessment	20 in each Theory paper
Total Marks (Semester I)			700
II	Zoo-807	Developmental Biology	80
	Zoo-808	Applied Physiology	80
	Zoo-809	Molecular Biology	80
	Zoo-810	Cell Function & Metabolic regulation	80
	Zoo-811	Evolutionary Biology	80
	Zoo-812	Laboratory Course	150
	Zoo-SC-2	Seminar	50
	Zoo-IA-II	Internal Assessment	20 in each Theory paper
	Total Marks (Semester II)		

Semester	Course No.	Course Title	Marks
III	Zoo-813	Computer, Biostatistics and Bioinformatics	80
	Zoo-814	Environmental & Animal Differentiation	80
	Zoo-815	Environmental Biology	80
	Zoo-816	Animal Diversity of Invertebrates	80
	Zoo-817	Molecular Cytogenetics	80
	Zoo-818	Laboratory Course	150
	Zoo-SC-3	Seminar	50
	Zoo-IA-III	Internal Assessment	20 in each Theory paper
Total Marks (Semester III)			700
IV	Zoo-819	Immunology	80
	Zoo-820	Microbial Genetics	80
	Zoo-821	Animal Biotechnology	80
	Zoo-822	Animal Diversity of Vertebrates	80
	Zoo-823	Endocrinology	80
	Zoo-824	Laboratory Course	150
	Zoo-SC-4	Seminar	50
	Zoo-IA-IV	Internal Assessment	20 in each Theory paper
Total Marks (Semester IV)			700

M.Sc. - ZOOLOGY
Semester- III

Course no.: Zoo-813

M.M. : 80

**Course Title : Computer, Biostatistics and Bioinformatics
Zoology**

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

1. Computer peripherals and hardware description-computer system design, recognition and structure of different components of a computer system and their respective usage. Input/Output and storage devices. Introduction of Internet.
2. Office application : MS Office 2000 including MS word, MS excel and MS powerpoint.
3. Overview of windows XP. Number system and flow charts in computing language. DOS internal and external commands.
4. Generation of programming languages, system and application software, Introduction of programming in BASIC and C.

Unit-II

1. Role of bioinformatics in biotechnology.
2. The virtual library : Searching Midline on PubMed system from NCBI.
3. Patents and searching databases : Types of sequences in nucleotide sequence database and Bibliographic databases; Protein structure prediction in Bioinformatics.

Unit-III

1. Basics of sequence analysis : Dot Matrix method, Needleman-Wunsch Algorithm and Smith-Waterman algorithm.
2. Alignments using BLAST and FASTA multiple sequence alignment (CLUSTAL-X and CLUSTAL-W).
3. Analysis tools : Analysis by Tree view, Genedoc and Lasergene.
4. Introduction to GCG, Seq Lab and Seq Web.

5. ORF and human genome project.

Unit-IV

Basic statistics-average, statistics of dispersion, coefficient of variation; Standard error; confidence limits; Probability distributions (Binomial, Poisson and normal) and their properties; Hypothesis testing; Analysis of variance; Correlation; Regression; Non-parametric tests.

Suggested Reading Material

1. Batschelet, E. Introduction to mathematics for life scientists. Springer-Verlag, Berlin.
2. Snedecor, G.W. and W.G. Cochran, Statistical Methods. Affiliated East- West Press, New Delhi (Indian Ed.)
3. Green, R.H. Sampling design and statistical methods for environmental biologists. John Wiley & Sons, New York.
4. Computer Fundamentals : Concept, systems and application by P.K. Sinha, BPB Publications.
5. Computer Fundamentals (Paper back) by Ashok Arora, Shefali Bansal and Shefali Bansal Excel Books.
6. Discovering computers : Fundamentals (Paper back) by Grey B Shelly. Pub : Course Technology.
7. Discovering computers : Fundamental, 4th ed. (Shelly cashman (paperback) by Grey B. Shelly Thomas J Cashman and Misty E. Vermaat. Pub : Course technology.
8. Computer fundamentals architecture and organization (paper back) by B. Ram Pub; New age publication (academic)
9. Essential bioinformatics (paper back) by Jin xiong. Cambridge University press.
10. Bioinformatics sequence and genome analysis (hardcover) by David W. Maunt. Cold-spring Harbour laboratory press.
11. Introduction to bioinformatics by (paper back) Arthur M. Lesk Oxford University press.
12. Introduction to bioinformatics : A theoretical and practical approach (paper back) by David Womble, stephen A. Krawetz and David D. Wombel. Human a press USA.
13. Applied bioinformatics an Introduction (paper back) by Paul M. Selzer, Richard Marhofer and Andreas Rohwer. Pub : Springer Verlag Berlin and Heidelberg GmbH and Co. K.

M.Sc. - ZOOLOGY
Semester- III

Course no.: Zoo-814

M.M. : 80

Course Title : Environmental and Animal Differentiation

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Hormones as mediators of development

Amphibian metamorphosis

Insect metamorphosis

Ovarian Luteinization

Mammary gland differentiation

Unit-II

Biology of sex determination :

Chromosomal sex determination - mammals and drosophila

Testis determining genes

Ovarian development

Secondary sex determination in mammals

Environmental sex determination

Environmental evolution and animal development :

Environmental cues and effects

Malformations and disruptions

Unit-III

Cell diversification in early animal embryo :

Xenopus blastomeres

Morphogen gradients

Totipotency & Pluripotency

Embryonic stem cells

Renewal by stem cells - epidermis

Skeletal muscle regeneration

Connective tissues cell family

Concept of Organizer- induction process

Unit-IV

Homeobox concept in different phylogenetic groups

Changing evolution through development modularity

Developmental constraints

Creating new cell types - basic evolutionary mystery

Neoteny

Suggested Reading Material

1. S.F. Gilbert. Developmental Biology. Sinauer Associates inc., Massachusetts.
2. Ethan Bier. 'The Cold Spring'. Cold Spring Harbor Laboratory Press, New York.
3. Sastry K.V. and Shukla V. Text Book of Development Zoology, Rastogi Publication. Meerut.

M.Sc. - ZOOLOGY
Semester- III

Course no.: Zoo-815

M.M. : 80

Course Title : Environmental Biology

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Interactions between environment and biota; concept and types of ecosystem, stability and complexity of ecosystem; Productivity and biodegradation in different ecosystem; Limiting factor; Food chain and energy flow, productivity and biogeochemical cycles (N, P, C and S); Ecological pyramids and recycling, community structure and organization.

Unit-II

Wild life : Speciation and extinctions; Magnitude and distribution of biodiversity, economic value, wildlife, biology, conservation strategies, cryopreservation and sustainable development. Animal trafficking and poaching.

Unit-III

Environmental pollution. Global environmental change; biodiversity, status, monitoring and documentation; Major drivers of biodiversity change, biodiversity management approach. Microbiology of water, air, soil and sewage.

Unit-IV

Characteristics of population : population growth curve. concept of metapopulations : demes and dispersals and interdemec extinctions.

Age structured population

Biogeographical realms of India.

Suggested Reading Material

1. Jorgenson, S.E. Fundamentals of ecological modeling: Elsevier, New York.
2. Lendren, D. Modelling in behavioral ecology, Chapman and Hal, London, U.K.
3. Sokal, R.R. and F.J. Rohlf Biometry. Freeman, San Francisco.
4. Odum : Ecology (Amerind)
5. Odum : Fundamentals of Ecology (W.B. Saunders)
6. Ricklefy : Ecology (W.H. Freeman)
7. Turk and Turk : Environmental Science (W.B. Saunders)
8. J.P. Yadav : A text book of Environmental Education, GVS publisher, New Delhi.

M.Sc. - ZOOLOGY
Semester- III

Course no.: Zoo-816

M.M. : 80

Course Title : Animal diversity of Invertebrates

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Definition and basic concepts of biosystematics and taxonomy

Species concepts-species category, different species concepts; sub-species and other infra-specific categories.

Principles and theories of biological classification, hierarchy of categories.

Unit-II

Classification of Non-chordates (Protozoa to helminthes) : Salient Features and classification up to classes with reference to diversity in animal form and function, like :

- i. Habit and habitat
- ii. Support and Movement
- iii. Nutrition
- iv. Gas exchanges & transport
- v. Excretory organs
- vi. Sensory system
- vii. Reproductive patterns
- viii. Development and Larval Characters

General account : Aquiferous and skeleton system in Porifera; Polymorphism in cnidarians; parasitic adaptation in helminthes; Larval form and their significance.

Unit-III

Classification of Non-chordates (Arthropoda to Echinodermata) : Salient Features and classification up to classes with reference to diversity in animal form and function, like :

- i. Habit and habitat
- ii. Support and Movement
- iii. Nutrition
- iv. Gas exchanges & transport
- v. Excretory organs
- vi. Sensory system
- vii. Reproductive patterns
- viii. Development and Larval Characters

General account : Larval form and their significance in Arthropoda to Echinodermata; Coelom; Torsion and detorsion in Mollusca; Ambulacral system.

Unit-IV

Brief accounts of life history, mode of infection and pathogenicity of the following pathogens with reference to man prophylaxis and treatment :

- a) Pathogenic protozoans : Trypanosoma, Leishmania and Plasmodium.
- b) Pathogenic helminths : Fasciolopsis, Schistosoma and Wuchereria.
Molecular, cellular and physiological basis of host-parasite interaction i.e. changes in organs.

Suggested Reading Material

1. Kettle, D.S : Medical Veterinary Entomology (CAB International).
2. Cheng, T.C. General Parasitology, (Academic Press)
3. Boolotian and Stiles : College Zoology (Macmillan)
4. Campbell : Biology (Benjamin)
5. Marshall and Williams : Text Book of Zoology
6. Wolfe : Biology the Foundations (Wadsworth)
7. Parker & Haswell : Text Book of Zoology Vol. II (Macmillan)
8. Prescott : Cell (Jones and Bartlett).
9. M.Kato. The Biology of Biodiversity, Spinger.
10. J.C. Avise. Molecular Markers, Natural History and Evolution, Chapman & Hall, New York.
11. E.O. Wilson. Biodiversity, Academic Press, Washington.
12. G.G. Simpson, Principle of animal taxonomy, Oxford IBH Publishing Company.
13. E.Mayer, Elements of Taxonomy.
14. E.O. Wilson, The Diversity of Life (The College Edition), W.W. Northern & Co.
15. B.K. Tikadar. Threatened Animals of India, ZSI Publication, Calcutta.

M.Sc. - ZOOLOGY
Semester- III

Course no.: Zoo-817

M.M. : 80

Course Title : Molecular Cytogenetics

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Biology of Chromosomes :

Molecular anatomy of eukaryotic chromosomes.

Metaphase chromosome : Centromere, Kinetochore, Telomere and its maintenance Heterochromatin and Euchromatin

Giant chromosomes : Polytene and Lampbrush chromosomes.

Sex chromosomes, sex determination and dosage compensation in *C. elegans*, *Drosophila* and Humans.

Unit-II

Imprinting : Genes, Chromosomes and genomes.

Cytogenetic implications and consequences of structural changes and numerical alterations of chromosomes.

Human Cytogenetics :

Techniques in Human chromosome analysis - molecular cytogenetics approach.

Human Karyotype- banding -nomenclature

Numerical and structural abnormalities of human chromosomes-

syndromes.

Mendelian and chromosome based heritable diseases in humans.

Unit-III

Molecular mapping of genome

Genetic and physical maps

Physical mapping and map-based cloning

Choice of mapping population; Simple repeat loci

Southern and fluorescence *in situ* hybridization, DNA fingerprinting, Flow cytometry.

Automated karyotyping, Chromosome painting for genome analysis

Chromosome microdissection and microcloning

Unit-IV

Molecular markers in genome analysis :

RFLP, RAPD and AFLP analysis

Molecular markers linked to disease resistance genes

Application of RFLP in forensic, disease prognosis, genetic counselling, pedigree, varietal analysis

Genome analysis - *Humans, Drosophila*, yeast, microbial genomes.

Suggested Reading Material

1. Atherly, A.G., J.R. Girton and J.F. McDonald. The Science of Genetics. Saunders College Publishing, Harcourt Brace College Publishers, NY.

2. Brooker, R.J. Genetics : Analysis and Principles. Benjamin/Cummings, Longman Inc.
3. Fairbanks, D.J. and W.R. Anderson, Genetics- The Continuity of Life. Brooks/ Cole Publishing Company ITP, NY, Toronto.
4. Gardner, E.J., M.J. Simmons and D.P. Snustad. Principles of Genetics. John Wiley and Sons. Inc., NY.
5. Griffiths, A.J.F., J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. An Introduction to genetic analysis. W.H. Freeman and Company, New York.
6. Lewin, B. Genes. VI Oxford University Press, Oxford, New York, Tokyo.
7. Snustad, D.P., and M.J. Simmons Principles of Genetics. John Wiley and Sons. Inc. NY.
8. Watson, J.D., N.H. Hopkins, J.W. Roberts, J.A. Steitz and A.M. Weiner. Molecular Biology of Genes. The Benjamin.Cummings Publishibng Company Inc. Tokyo.

M.Sc. - ZOOLOGY
Semester- IV

Course no.: Zoo-819

M.M. : 80

Course Title : Immunology

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Antigen; Structure and functions of different classes of immunoglobulins; Primary and secondary immune response; Organization and structure of lymphoid organ. Cells of the immune system and their differentiation and Lymphocyte traffic Innate and Acquired Immunity; Humoral and cell mediated immunity.

Unit-II

Major Histocompatibility Complex in mouse and HLA system in human : MHC haplotypes, Class I and Class II molecules, Cellular distribution, Peptide binding Expression and diversity and Disease susceptibility and MHC/HLA.

Mechanism of immune response and generation of immunological diversity; Genetic control of immune response, Effector mechanisms; Application of immunological techniques.

Unit-III

Complement System : Cytokines : Structures and functions, Cytokine receptors and Cytokines and Immune response; Immunological tolerance

and Anti-immunity; Hypersensitivity and immune responses to infection agents especially intracellular parasites; Antigen-Ab interactions *in vitro* and *in vivo*.

Unit-IV

Disorders of Immune system, self tolerance and autoimmunity.

Immunosuppression, Immunodeficiency involving only B cells, only T cells, Severe combined immunodeficiency (SCID), AIDS.

Primary antigen, antibody reactions, radioimmune assay, ELISA, secondary antigen-antibody reaction, precipitations and agglutinations, Immunoelectrophoresis.

Suggested Reading Material

1. Kuby. Immunology, W.H. Freeman, USA.
2. W. Paul. Fundamentals of Immunology
3. Totota et al. Microbiology
4. Pelczar. A Text book of microbiology
5. I.M. Roitt. Essential Immunology, ELBS Edition.

M.Sc. - ZOOLOGY
Semester- IV

Course no.: Zoo-820

M.M. : 80

Course Title : Microbial Genetics

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be set two from each unit. Students are required to attempt one from each unit.

Unit-I

Structure classification, reproduction and physiology of bacteria, viruses and protozoa (a general accounts only)

Bacteria : transformation, transduction, conjugation and Bacterial chromosome.

Bacteriophages : Types, structure and morphology of T₄ phage.

Unit-II

Somatic cell genetics

Cell fusion, cybrids and hybrids - agents and mechanism of fusion

Heterokaryon- Selecting hybrids and chromosome segregation

Radiation hybrids, hybrid panels and gene

mapping

Cytogenetic effects of ionising radiations.

Unit-III

Regulation of gene expression in prokaryotes and eukaryotes; Attenuation and antitermination; Operon concept; DNA methylation; Heterochromatization; Regulatory sequences and transacting factors.

Unit-IV

Genome analysis

C-value paradox, detailed account of various models of prokaryotic genomes, viral genome and organization of genes in organelle genomes.

Transposable elements in prokaryotes and eukaryotes. Role of transposable elements in genetic regulation.

Gene therapy

Suggested Reading Material

1. Atherly, A.G., J.R. Girton and J.F. McDonald. The Science of Genetics. Saunders College Publishing, Harcourt Brace College Publishers, NY.
2. Brooker, R.J. Genetics : Analysis and Principles. Benjamin/Cummings, Longman Inc.
3. Fairbanks, D.J. and W.R. Anderson, Genetics- The Continuity of Life. Brooks/ Cole Publishing Company ITP, NY, Toronto.
4. Gardner, E.J., M.J. Simmons and D.P. Snustad. Principles of Genetics. John Wiley and Sons. Inc., NY.
5. Tatora et al. Microbiology
6. Griffiths, A.J.F., J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. An Introduction to genetic analysis. W.H. Freeman and Company, New York.

7. Lewin, B. Genes. VI Oxford University Press, Oxford, New York, Tokyo.
8. Pelczar. A text Book of microbiology.
9. Snustad, D.P., and M.J. Simmons Principles of Genetics. John Wiley and Sons. Inc. NY.
10. Watson, J.D., N.H. Hopkins, J.W. Roberts, J.A. Steitz and A.M. Weiner. Molecular Biology of Genes. The Benjamin.Cummings Publishibng Company Inc. Tokyo.

M.Sc. - ZOOLOGY
Semester- IV

Course no.: Zoo-821

M.M. : 80

Course Title : Animal Bitechnology

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be se two from each unit. Students are required to attempt one from each unit.

Unit-I

Cell and tissues cultures in animals : Media preparation and sterilization, Inoculation and growth monitoringl; Biochemical mutants and their use; cell harvesting methods; Primary culture; Cell line; Cell clones; Cell proliferation measurements and Cell viability testing; Micropropagation; Haploidy; Protoplast fusion and somatic hybridization; Cybrides.

Unit-II

Principles and methods of genetics engineering and Gene targeting; Applications in agriculture, health and industry.

Antisense and Ribozyme technology: Molecular mechanisms of antisense molecules; Inhibition of splicing, poluadenylation and translation; Disruption of RNA structure and capping; Biochemistry of ribozyme; hammerhead, hairpin and other ribozymes; Strategies for designing ribozymes; Application of antisense and ribozyme technologies.

Unit-III

Biochemistry and molecular biology of cancer; Genetic and metabolic disorder; Hormonal imbalances; Drug metabolism and detoxification;

Genetic load and genetic counselling.

Genetransfer methods in animals; Transgenic biology; Allopheny; Artificial seeds; Hybridoma technology.

Unit-IV

Industrial processes : Production of organic acids, amino proteins, antibiotics and pharmaceuticals.

Bioreactors : designing and operation.

An Introduction to Genomics; Proteomics; Computational Biology; Biosensors; Biofuels and Biopesticides.

Suggested Reading Material

1. Brooker, R.J. Genetics : Analysis and Principles. Benjamin/Cummings, Longman Inc.
2. Fairbanks, D.J. and W.R. Anderson, Genetics- The Continuity of Life. Brooks/ Cole Publishing Company ITP, NY, Toronto.
3. Griffiths, A.J.F., J.H.Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. An Introduction to genetic analysis. W.H. Freeman and Company, New York.
4. Lewin, B. Genes. VI Oxford University Press, Oxford, New York, Tokyo.
5. Watson, J.D., N.H. Hopkins, J.W. Roberts, J.A. Steitz and A.M. Weiner. Molecular Biology of Genes. The Benjamin.Cummings Publishibng Company Inc. Tokyo.

M.Sc. - ZOOLOGY Semester- IV

Course no.: Zoo-822

M.M. : 80

Course Title : Animal diversity of Vertebrates

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be se two from each unit. Students are required to attempt one from each unit.

Unit-I

Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.

Process of typification and different Zoological types.

International code of Zoological Nomenclature (ICZN) - Its operative principles, interpretation and application of important rule, Zoological momenclature; formation of scientific names of various taxa.

Unit-II

Trends in biosystematics :

Chemotaxonomy

Cytotazonomy

Molecular taxonomy

Taxonomic procedures-taxonimic collections, preservation, curretting process of identification.

Taxonomic characters : different kinds and their significance.

Systematic publications : different kinds of publications.

Unit-III

Principles of classification

Classification of Chordates (Hemi-chordates to amphibians) : Salient Features and classification up to classes with reference to diversity in animal form and function, like :

- i. Habit and habitat
- ii. Support and Movement
- iii. Nutrition
- iv. Gas exchanges & transport
- v. Excretory organs
- vi. Sensory system
- vii. Reproductive patterns
- viii. Development and Larval Characters

General account : Dipnoi; Migration of fishes; Parental care in fishes and amphibians.

Unit-IV

Principles of classification

Classification of chordates (reptilians to mammals) : Salient Features and classification up to classes with reference to diversity in animal form and function, like :

- i. Habit and habitat
- ii. Support and Movement
- iii. Nutrition
- iv. Gas exchanges & transport

- v. Excretory organs
 - vi. Sensory system
 - vii. Reproductive patterns
 - viii. Development and Larval Characters
- Flight adaptation in birds; Migration of birds.
Evolution of Horse and man.

Suggested Reading Material

1. Boolotian and Stiles : College Zoology (Macmillan)
2. Campbell : Biology (Benjamin)
3. Marshall and Williams : Text Book of Zoology
4. Wolfe : Biology the Foundations (Wadsworth)
5. Parker & Haswell : Text Book of Zoology Vol. II (Macmillan)
6. Prescott : Cell (Jones and Bartlett).
7. M.Kato. The Biology of Biodiversity, Spinger.
8. J.C. Avise. Molecular Markets, Natural History and Evolution, Champman & Hall, New York.
9. E.O. Wilson. Biodiversity, Academic Press, Washington.
10. G.G. Simpson, Principle of animal taxonomy, Oxford IBH Publishing Company.
11. E.Mayer, Elements of Taxonomy.
12. E.O. Wilson, The Diversity of Life (The College Edition), W.W. Northern & Co.
13. B.K. Tikadar. Threatened Animals of India, ZSI Publication, Calcutta.

M.Sc. - ZOOLOGY
Semester- IV

Course no.: Zoo-823

M.M. : 80

Course Title : Endocrinology

Time : 3 Hrs.

Note : There shall be nine questions in total. One question will be compulsory (short answer Type) covering the entire syllabus and remaining eight questions will be two from each unit. Students are required to attempt one from each unit.

Unit-I

Definition and scope of endocrinology, Structure of various endocrine glands; Hormones : Classification, structure and function; Ontogeny and phylogeny of endocrine glands.

Unit-II

Chemical nature of hormones

Purification and characterization of hormones

Production of hormones by biochemical and rDNA technologies

Unit-III

Hormone action and regulation.

Hormone receptors- Identification, purification and physico-chemical properties

Membrane receptors- structure and signal transduction mechanisms

G- Proteins

Nuclear receptors- structure and function. Orphan receptors

Metabolic and developmental hormones

Unit-IV

Biosynthesis and secretion of hormones

Biosynthesis of steroid hormones de novo.

Biosynthesis and amino-acid derived small size hormones (eg : T₄, Epinephrine, etc.)

Biosynthesis and simple peptide hormones-Pre and Prohormones.

Neuroendocrine regulation

Suggested Reading Material

1. E.J.W. Barrington. General and Comparative Endocrinology, Oxford, Clarendon Press.
2. P.J. Bentley. Comparative Vertebrate Endocrinology. Cambridge University Press.
3. R.H. Williams. Text Book of Endocrinology, W.B. Saunders.
4. C.R. Marlin, Endocrine Physiology, Oxford Univ. Press.
5. A. Gorbman et al. Comparative Endocrinology, John Wiley & Sons.
6. Benjamin Lewin, Genes VII, Oxford University Press.
7. L.P. Freedman. Molecular Biology of steroid and Nuclear Hormone Receptors, Birkhauser.
8. Gnyton. A Text Book of Human Physiology.
9. G. Litwack. Biochemical Action of Hormones, Academic Press.