Semester -I
Minor Course 1 (MIC-1)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Diversity of Non-Chordata	3	2	1

Course outcomes: After completion of the course, students should be able to:

CO-1: Learn about the importance of systematics, taxonomy, and structural organization of non-chordates.

CO-2: Critically analyse the organization, complexity and characteristic features of non chordates.

CO-3: Recognize the life functions and the ecological roles of the animals belonging to different phyla.

MIC-1: Diversity of Non-Chordata (Theory: 2credits) 20 hrs		
Unit	**Topics to be covered**	**No. of Lectures**
1	I. Introduction to Non-chordates General characteristics and classification (up to order) of the following Phyla: Protozoa, Porifera, Cnidaria, Ctenophora, Platyhelminthes and Nemathelminths, Annelida, Arthropoda, Mollusca, Echinodermata.	5
2	2. Structure and life history of:- (i) Protozoa - Paramecium (ii) Porifera - Sycon	4
3	3. Structure and life history of:- (iii) Cnidaria - Obelia (iv) Platyhelminthes - Fasciola (v) Aschelminthes - Ascaris	5
4	4. Study of coelomates:- (vi) Annelida - Pharetima (vii) Arthropoda - Palaemon (viii) Mollusca - Pila (ix) Echinodermata - Asteries (x) Hemichordata - Balanoglossus	6
	TOTAL	20

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MIC-1: Diversity of Non-Chordata (Practical) 10 hrs	**(1 credit)**

Practicals:

1. Study of whole mount of *Euglena, Paramecium, Leishmania*
2. Study of Sycon, Spongilla, T.S. of Sycon, L.S. of Sycon.
3. Study of *Obelia, Aurelia, Gorgonia*
4. Study of adult *Fasciola hepatica, Taenia solium*and their life stages
5. Study of *Pheretima, Hirudinaria*
6. Study of T.S. through pharynx, gizzard, and typhlosolar intestine of earthworm.
7. Study of *Limulus*, *Palaemon, Apis.*
8. Mouth parts of Mosquito and Cockroach.
9. Study of *Pila, Unio.*
10. Study of *Asterias.*

Suggested Books :

1. Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.
2. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates:A New Synthesis*, III Edition, Blackwell Science
3. Barrington, E.J.W. (1979). *Invertebrate Structure and Functions*. II Edition, E.L.B.S. and Nelson
4. Verma P S, Jordan E L. (2009). Invertebrate Zoology. S. Chand publishers
5. Brusca R C (2016). Invertebrates. Published by Sinauer Associates, an imprint of Oxford University Press.
6. S.S.Lal, Practical Zoology Invertebrate.

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Semester 2

Minor Course 2 (MIC-2)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Diversity of Chordates	3	2	1

Course Outcomes: After completion of the course, the students will be able to:

CO-1: To understand the General Characteristics and Classification of Hemichordata, Urochordata and Cephalochordata, the Larval forms of Protochordata and Retrogressive Metamorphosis in Urochordata

CO-2: To acquire knowledge about the General Characters and Classification of Agnatha, Pisces and Amphibia.

CO-3: To understand the General Characteristics and Classification of Reptilia, Aves and Mammals, Biting Mechanism in Snakes, Flight Adaptations in Birds and Migration in Birds.

MIC-2: Diversity of Chordates (Theory: 2credits) 20 hrs		
Unit	**Topics to be covered**	**No. of Lectures**
1	**1.**General characteristics and classification (upto Order): Cephalochordata, Urochordata,Pisces, Amphibia, Reptilia, Aves, Mammals, Cyclostomata.	5
2	**2.**Cephalochordata: Amphioxus. **3.** Urochordata: Herdmania (including retrogressive metamorphosis).	4
3	**4.**Pisces: Scoliodon. **5.** Reptilia: Biting and feeding mechanism in snakes.	5
4	**6.**Aves: Flight adaptations, Elementary idea of migration. **7.** Mammals: Characters, distribution and affinities of Prototheria & Metatheria.	6
	TOTAL	**20**

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MIC-2: Diversity of Chodates (Practical) 10 hrs (1 credit)

Practical :

1.Amphioxus: Section through pharyngeal, intestinal, and caudal regions.

2. Herdmania: Whole mount, Spicules
2. Cyclostomata: Petromyzon, Myxine
3. Fish: Scoliodon, Torpedo, Chimaera, Labeo, Exocoetus, Echeneis, Hippocampus; Scales of fishes
4. Amphibia: Ichthyophis, Bufo, Hyla, Alytes, Salamandra,Axolotle larva
5. Reptilia: Chelone, Hemidactylus, Varanus, Vipera, Naja, Bungarus, Uromastix, Chamaeleon, Draco,Calotes,Heloderma; Key for Identification of poisonous and non-poisonous snakes
6. Aves: Types of beaks and claws, Study of pecten from fowl head and brain of fowl.
7. Mammalia: *Sorex*, Bat (Insectivorous and Frugivorous), *Funambulus, Loris, Herpestes, Erinaceous.Macropus,Echidna*

Suggested Books :

1. Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
2. Pough H. *Vertebrate life,* VIII Edition, Pearson International.
3. Darlington P.J. *The Geographical Distribution of Animals*, R.E. Krieger Pub Co.
4. Hall B.K. and Hallgrimsson B. (2008). *Strickberger's Evolution*. IV Edition. Jones and Bartlett Publishers Inc.
5. Classification from Young, J. Z. (2004) to be followed.
6. S.S.Lal, Practical Zoology Vertebrates

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Semester III
Minor Course 3 (MIC-3)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physiology	3	2	1

Course Outcomes:

Upon completion of the course, students will be able to:

- Know the principles of normal biological function in human body.
- Outline basic human physiology and correlate with histological structures.
- Comprehend and analyse problem-based questions on physiological aspects.
- Recognize and explain how all physiological systems work in unison to maintain homeostasis in the body; and use of feedback loops to control the same.
- Learn an integrative approach to understand the interactions of various organ systems resulting in the complex overall functioning of the body.

MIC-3: Physiology (Theory: 2 credits) 20 hrs		
Unit	Topics to be covered	No. of lectures
1	1.1. Structure and function of digestive system, 1.2. Digestion and absorption of food.	3
2	2.1. Structure of neuron and propagation of nerve impulse. 2.2. Structure of skeletal muscle and mechanism of muscle contraction.	4
3	3.1. Structure of respiratory organs, pulmonary ventilation. 3.2.Transport of gases in blood.	4
4	4.1. Structure of excretory organs. 4.2. Mechanism of urine formation.	2
5	5.1. Structure and functions of heart. 5.2. Cardiac cycle.	2
6	6.1. Structure and functions of endocrine glands. 6.2. Spermatogenesis and oogenesis.	5
	Total	20

MIC-3: Physiology (Practical: 1 Credit)		10 hrs
End Semester Examination Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Enumeration of red blood cells and white blood cells using haemocytometer,	10
2	Determination of erythrocyte sedimentation rate.	10
3	Estimation of haemoglobin.	10
4	Examination of histological sections of mammalian oesophagus, stomach, duodenum, ileum, rectum, trachea, lung, Testis and Ovary.	20
5	Practical Records/Charts/Models.	10
6	Viva- voce.	10

Suggested Books:

- Tortora, G.J.& Grabowski, S (2006) Principles of Anatomy & Physiology, XI edition. John Wiley & Sons
- Vander A, Sherman J, and Luciano D (2014). Vander's Human Physiology: The mechanism of Body Function. XIII Edition, Mc Graw Hills.
- Guyton, A.C & Hall, J.E. (2006). Textbook of Medical Physiology, XI Edition. Hercourt Asia PTE Ltd/W.B. Saunders Company

Online Tools and Web Resources:

- e portals like SWAYAM
  http://nsdl.niscair.res.in

Multidisciplinary Course 3 (MDC-3)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Physiology	3	2	1

Course Outcomes:

Upon completion of the course, students will be able to:

- Know the principles of normal biological function in human body.
- Outline basic human physiology and correlate with histological structures.
- Comprehend and analyse problem-based questions on physiological aspects.

Semester IV
Minor Course 4 (MIC-4)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Ecology	**3**	**2**	**1**

Course Outcome: Upon completion of the course, students should be able to:

- Demonstrate an understanding of key concepts in ecology with emphasis on historical perspective, role of physical factors and concept of limiting factors.
- Comprehend the population characteristics, dynamics, growth models and interactions.
- Understand the community characteristics, ecosystem development and climax theories.
- Know about the types of ecosystems, food chains, food webs, energy models, and ecological efficiencies.
- Apply the basic principles of ecology in wildlife conservation and management.
- Inculcate scientific quantitative skills, evaluate experimental design, read graphs, and analyse and use information available in scientific literature.

MIC-4: Ecology (Theory: 2 Credits) 20 hrs		
Unit	Topics to be covered	No. of lectures
1	Introduction to Ecology, Scope of ecology, Laws of limiting factors.	2
2	Population dynamics, Demographic indices, Population interactions.	4
3	Community: Biodiversity and study of diversity index.	2
4	Ecosystem: Types of ecosystems, Detailed study of Aquatic ecosystem, Food chain, Food web, Ecological pyramids and Biogeochemical cycle.	7
5	Applied Ecology: Wildlife conservation; Importance, threats and management, Protected areas; National Parks, Bioreserves and Sanctuaries.	5
	Total	**20**

MIC- 4: Ecology (Practical: 1 Credit) 10hrs		
End Semester Examination Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Analysis of Pond Biota	10
2	Determination of dissolved oxygen of different water samples.	15
3	Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided.	15
4	Determination of population density in a natural/ hypothetical community by quadrate method.	10
5	Practical Records/Charts/Models.	10
6	Viva- voce.	10

Suggested Books:

- Odum, E.P. (2008). Fundamentals of Ecology. Indian Edition. Brooks/Cole
- Smith, R. L. (2000). Ecology and field biology. Harper and Row publisher
- Colinvaux, P.A. (1993). Ecology. John Willey $ Sons, Inc
- Krebs, C. J. (2001). Ecology. Benjamin Cummings.

Semester V

Major Course 8 (MJC-8)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Biochemistry	**5**	**3**	**2**

Course Outcome: After the completion of the course, the student will be able:

CO1- To understand the structure, classification and importance of Carbohydrates and Proteins.

CO2- To understand the structure and significance of physiologically important Lipids.

CO3- To understand the basic structure and types of DNA and RNA, Base pairing, denaturation and renaturation of DNA.

CO4- To understand the types of Enzymes, Mechanism of Enzyme Action and Enzyme Kinetics.

Semester V
Minor Course 5 (MIC-5)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Cell Biology	**3**	**2**	**1**

MIC-5: Cell Biology (Theory: 2 Credits) 20 hrs		
Unit	**Topics to be covered**	**No. of lectures**
1	Overview of Prokaryotic and Eukaryotic cells	2
2	Plasma Membrane: Fluid Mosaic Model, Active and passive transport.	3
3	Endomembrane System: Structure and Functions of Endoplasmic Reticulum, Golgi apparatus, Lysosomes and Peroxisomes.	4
4	Mitochondria: Structure, Respiratory chain and ATP production.	4
5	Nucleus: Structure of Nucleus and organization of Chromatin.	3
6	Cell cycle: Mitosis, Meiosis and their regulation in brief.	4
	Total	**20**

MIC-5: Cell Biology (Practical:1 Credit) 10 hrs		
End Semester Examination		
Time – 3 hours		**Full Marks-70**
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Vital staining of mitochondria in buccal epithelium	15
2	Study of various stages of mitosis through permanent slides. (any two)	5x2=10
3	Study of various stages of meiosis through permanent slides (any two)	5x2=10
4	Preparation of temporary stained mount to show the presence of Barr body in human cheek cells.	15
5	Practical Records/Charts/Models.	10
6	Viva- voce.	10

Suggested Books:

- Cooper, G.M., Hausman, R.E. (2009) The Cell: A Molecular Approach. V Edition, ASM Press and Sinauer Associates.
- Karp, G. (2010). Cell and Molecular Biology: Concepts and Experiments,VI Edition, John Wiley & Sons Inc.
- Powar, C. B. (1991) Cell Biology, Himalaya Publishing House.
- Alberts et al: Molecular Biology of the Cell (2008, Garland)

Minor Course 6 (MIC-6)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Genetics	3	2	1

Course Outcome:

- To understand variation, linkage and crossing over.
- To understand sex linked inheritance.
- To understand genetic disorders and mutations.
- To understand extra chromosomal inheritance.

MIC - 6 Genetics (Theory: 2 credits) 20 hours		
Unit	**Topics to be covered**	**No. of Lectures**
1	1.1 Principles of Genetic inheritance, Incomplete dominance and co-dominance. 1.2 Concept of Linkage and crossing over.	5
2	2.1 Gene mutation - Chemical and Physical mutagenesis. 2.2 Chromosomal aberrations – Structural and Numerical.	4
3	3.1 Chromosomal mechanisms of sex determination. 3.2 Sex-linked inheritance, sex-influenced and sex-limited characters.	6
4	4.1. Extra-chromosomal Inheritance. 4.2 Kappa particles in *Paramoecium* and Maternal effects (Shell spiralling in *snail*).	5
	TOTAL	**20**

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MIC-06 : Genetics (Practical: 1 Credit) 10 hrs		
End Semester Examination Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Preparation of Polytene chromosomes from Chironomous/Drosophila.	20
2	Identification of various mutants of Drosophila in the given photograph.	15
3	Study of pedigree analysis of human inherited traits.	15
4	Practical Records/Charts/Models.	10
5	Viva- voce.	10

Suggested Books:

- Gardner, E. J., Simmons, M. J., Snustad, D. P. (2008). *Principles of Genetics*. VIII Edition. Wiley, India
- Snustad, D. P., Simmons, M. J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc
- Klug, W. S., Cummings, M. R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings
- Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings
- Fletcher H. and Hickey I. (2015). *Genetics.* IV Edition. G S, Taylor and Francis Group, New York and London.

Semester VI

Major Course 10 (MJC-10)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Developmental Biology	**4**	**3**	**1**

Course Outcome: After the completion of the course, the student will be able:

CO 1- To describe the mechanism of gametogenesis, fertilization and blocks to polyspermy.

CO 2- To explain early embryonic development in frog and chick.

CO 3- To understand the concepts of late embryonic development in model organisms.

CO4 - To describe post embryonic development such as metamorphosis and regeneration with suitable examples and apply important experiments and project work.

MJC-10: Developmental Biology (Theory: 3 credits) 30 hours		
Unit	**Topics to be covered**	**No. of Lectures**
1	1. Introduction: 1.1 Principles and Basic concepts of development biology - Phases of development, Cell-Cell interaction, Differentiation and growth 1.2 Gametogenesis: Spermatogenesis and Oogenesis.	10

Suggested Books:

- David McFarland, Animal Behaviour, Pitman Publishing Limited, London, UK.
- Manning, A. and Dawkins, M. S, An Introduction to Animal Behaviour, Cambridge,University Press, UK.
- John Alcock, Animal Behaviour, Sinauer Associate Inc., USA.
- Paul W. Sherman and John Alcock, Exploring Animal Behaviour, Sinauer Associate Inc., Massachusetts, USA.
- Biological Rhythms: Vinod Kumar (2002) Narosa Publishing House, Delhi/ Springer-Verlag, Germany.

Semester VI
Minor Course 7 (MIC-7)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Evolution	3	2	1

MIC-7: Evolution (Theory: 2 Credits) 20 hours		
Unit	**Topics to be covered**	**No. of Lectures**
1	Origin of Life: Chemogeny and Biogeny	4
2	Evolutionary concepts: A brief account of evolutionary theories: Lamarckism, Darwinism and Neo- Darwinism.	8
3	Evidences of Evolution, Evolution of man.	6
4	Population Genetics: Hardy-Weinberg Law	2
	TOTAL	20

MIC-7: Evolutionary Biology (Practical: 1 Credits) 10 hrs		
End Semester Examination		
Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Study of types of fossils (Archaeopteryx- a connecting link)	10
2	Vestigial, Analogous and Homologous organs using suitable specimens.	15
3	Sampling for discrete characteristics (dominant vs recessive) for discontinuous variations e.g., tongue rolling, ear lobe.	10
4	Calculation of genotypic, phenotypic and allelic frequencies from the data provided	15
5	Practical records/ charts/ models	10
6	Viva- voce.	10

Suggested Books:

- Ridley, M. (2004). Evolution III Edition Blackwell publishing
- Hall, B.K. and Hallgrimson, B (2008). Evolution IV Edition. Jones and Barlett Publishers.
- Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
- Pevsner, J (2009). Bioinformatics and Functional Genomics. II Edition Wiley-Blackwell

Minor Course 08 (MIC-08)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Developmental Biology	**3**	**2**	**1**

Course Outcome: After the completion of the course, the student will be able:

CO 1- To describe the mechanism of gametogenesis, fertilization.

CO 2- To explain early embryonic development in frog and chick.

CO 3- To understand the concepts of late embryonic development in model organisms.

CO4 - To describe post embryonic development such as metamorphosis and regeneration with suitable examples and apply important experiments and project work.

MIC-08 : Developmental Biology (Theory: 2 credits) 20 hours		
Unit	**Topics to be covered**	**No. of Lectures**
1	Introduction: 1. Basic concepts of reproduction and development.	4
2	Early and Late Embryonic Development: 2.1 Gametogenesis - Spermatogenesis, Oogenesis. 2.2 Types of eggs, Patterns of cleavage and Blastulation. 2.3 Early development of frog up to gastrulation, 2.4 Extra-embryonic membranes in birds.	6
3	Post Embryonic Development: 3.1 Metamorphosis: Changes, hormonal regulations in amphibians; 3.3 Ageing: Concepts and Theories	5
4	Implications of Developmental Biology: 4.1 Teratogenesis: Teratogenic agents and their effects on embryonic development. 4.2 In vitro fertilization.	5
	TOTAL	20

MIC-08: Developmental Biology (Practical: 1 Credit) 10 hrs		
End Semester Examination Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula.	20
2	Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak 18, 24, 36, 48, 72, and 96 hours of incubation.	20
3	Study of different sections of placenta (Photomicropgraph/ slides)	10
4	Practical/Project report on chick embryo development.	10
5	Viva- voce.	10

Suggested Books:

- Gilbert, S. F. (2010). Developmental Biology, IX Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA
- Balinsky B. I. and Fabian B. C. (1981). An Introduction to Embryology, V Edition, International Thompson Computer Press.
- Carlson, R. F. Patten's Foundations of Embryology.
- Kalthoff (2008). Analysis of Biological Development, II Edition, McGraw Hill Publishers.
- Lewis Wolpert (2002). Principles of Development. II Edition, Oxford University Press.

Semester VII

Major Course 13 (MJC-13)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Molecular Biology	**5**	**3**	**2**

Course Outcome: After the completion of the course, the student will be able:

CO 1- To understand Central dogma of molecular biology. Explain and distinguish mechanism of replication, transcription and translation in prokaryotes and eukaryotes.

CO 2- To understand and explain the post transcriptional modifications in eukaryotes.

- David, M., Jonathan, B., David, R. B. and Ivan R. (2006). *Immunology,* VII Edition, Mosby, Elsevier Edition. Saunders Publication.
- Abbas, K.Abul and Lechtman H. Andrew (2003.) *Cellular and Molecular Immunology.* V
- Owen J A, Punt J, Stanford S A (2013). *Kuby Immunology* W H Freeman & Co;
- Wood P. (2007). Basic Immunology. Pearson publication
- Principles of Microbiology, Ronald M. Atlas, Wm. C. Brown Publishers.
- Microbiology by Pelczar, M. J. Pelczar.

Minor Course 09

(MIC-09)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Animal Behaviour	**3**	**2**	**1**

Course Outcomes: After the completion of the course, the student will be able:

CO 1- To understand various pattern of animal behaviours such as stereotyped, instinct, learnt, associative behaviour along with operant conditioning and habituation imprinting and to explain the concept of social and sexual behaviour.

CO 2- To provide the concept of biological rhythm, photoperiod and regulation of seasonal reproduction of vertebrates and role of melatonin.

CO 3- To understand the relevance of biological clock in terms of chronopharmacology, chronomedicine and chronotherapy.

CO 4- To develop the skill in this course by performing practical works such as studying nest and nesting habitat of birds and social insects and other significant experiments.

MIC-09 : Animal Behaviour (Theory: 2 credits) 20 hours		
Unit	**Topics to be covered**	**No. of Lectures**
1	Introduction to Animal Behaviour: 1.1 Definition and types of behaviour 1.2 Origin and history of ethology.	5
2	Patterns of Behaviour: 2.1 Instinct behaviours. 2.2 Learned behaviours.	5
3	Biological Rhythm: 3.1 Biological clocks in animals and its adaptive significance. 3.2 Types of biological rhythms- Tidal, Lunar, Circadian and Circannual.	5
4	Social Behaviour: 4.1 Social behaviour in insects (Honey bee). 4.2 Parental care in fishes.	5
	TOTAL	**20**

MIC-09: Animal Behaviour (Practical: 1 Credit) 10 hrs		
End Semester Examination Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Study of the pattern of Behaviour (any one of the followings) a) Photo Tactile Response in Earthworm or Pest. b) Geotactic Response of Earthworm or Pest.	15
2	Comment upon the given specimen with response to parental care - Ichthyophis, Hippocampus etc.	15
3	Submit and write up on any one of the given topic. a) Courtship in Peacock /Pigeons b) Study of nests and nesting behavior of the birds and social insects	20
4	Practical/Project report on chick embryo development.	10
5	Viva- voce.	10

Suggested Books:

- David McFarland, Animal Behaviour, Pitman Publishing Limited, London, UK.
- Manning, A. and Dawkins, M. S, An Introduction to Animal Behaviour, Cambridge,University Press, UK.
- John Alcock, Animal Behaviour, Sinauer Associate Inc., USA.
- Paul W. Sherman and John Alcock, Exploring Animal Behaviour, Sinauer Associate Inc., Massachusetts, USA.
- Biological Rhythms: Vinod Kumar (2002) Narosa Publishing House, Delhi/ Springer-Verlag, Germany.

Minor Course 10 (MIC-10)

Course Title	Credit	Credit Distribution	
		Theory	Practical
Endocrinology	**3**	**2**	**1**

Course Outcome:

After completion of the course the students will be able to:

• Understand endocrine system and the basic properties of hormones.
• Appreciate the importance of endocrine system and the crucial role it plays along with the nervous system in maintenance of homeostasis.
• Know the of hormone action and its regulation.
• Know the regulation of physiological process by the endocrine system and its implicationin diseases.

MIC-10: Endocrinology (Practical: 1Credits) 10 hrs		
End Semester Examination		
Time – 3 hours		Full Marks-70
Sl. No.	**Name of Practicals/Experiments**	**Marks**
1	Display of gonads, thyroid, adrenal, pancreas in mammal through videos or virtual dissection.	15
2	Study of the permanent slides of Pituitary, Adrenal, Ovary, Testes, Islets of Langerhan's, Thymus, Thyroid, Parathyroid.	4X5=20
3	Working principles of ELISA/RIA	15
4	Practical/Project report on chick embryo development.	10
5	Viva- voce.	10

MIC-10: Endocrinology (Theory: 3 credits) 20 hrs		
Unit	**Topics to be covered**	**No. of lectures**
1	1. Overview of the endocrine system – Glands and their hormone.	5
2	2. Hypothalamus: Structure and its functions.	5
3	3. Pituitary: Structure, Hormones and their function.	5
4	4.1 Peripheral Endocrine Glands: Histophysiology of Thyroid, Parathyroid and Adrenal. 4.2. Gonads: Hormones and functions.	5
	Total	20

Suggested Books:

• J. Larry Jameson Leslie De Groot (2010). Endocrinology. VI Edition.

• David O. Norris. Vertebrate Endocrinology. V Edition, Elsevier Academic press.
• Franklin F. Bolander. Molecular Endocrinology. III Edition, Academic Press, USA.

Online Tools and Web Resources:

• https://www.endocrine.org/topics