Department of Zoology

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOH101/351, Course Title: ZOOLOGY THEORY Approved since session: 2013-14; Total Credits:4, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39	**Course Number: ZOH101/351, Course Title: ZOOLOGY THEORY** Approved since session: 2014-15	**Change in year**
UNIT 1: TAXONOMY AND CYTOLOGY [9 pds] Outline classification of animal kingdom; Branches of Zoology; Cell and Protoplasm-RNA and DNA and their role in heredity; Cell division-Amitosis, Mitosis and Meiosis.	**UNIT 1: TAXONOMY AND CYTOLOGY** [9 pds] (a) Outline classification of animal kingdom (b) Branches of Zoology (c) Cell and Protoplasm-RNA and DNA and their role in heredity (d) Cell division-Amitosis, Mitosis and Meiosis.	**Addition**
UNIT 2: TYPE STUDY [6 pds] Structure, physiology and life cycle of the following: (a) Entamoeba (b) Ascaris.	**UNIT 2: TYPE STUDY** [6 pds] Structure, physiology and life cycle of the following: (a) *Frog* (b) *Ascaris*.	**Addition and Deletion** **Addition**
UNIT 3: MAMMALIAN PHYSIOLOGY [6 pds] Physiology of (a) Digestion (b) Respiration (c) Excretion.	**UNIT 3: MAMMALIAN PHYSIOLOGY** [6 pds] Physiology of: (a) Digestion (b) Respiration (c) Excretion.	
UNIT 4: GENETICS, EUGENICS AND EVOLUTION [9 pds] (a) Mendelian theories, (b) Determination of sex-linked inheritance, (c) Eugenics-Positive and Negative, (d) Evolution: Evidences, Darwinism, Lamarckism.	**UNIT 4: GENETICS, EUGENICS AND EVOLUTION** [9 pds] (a) Mendelian principle (b) Determination of sex-linked inheritance, (c) Eugenics-Positive and Negative, (d) Evolution: Evidences, Darwinism, Lamarckism.	**Addition**
UNIT 5: ECOLOGY [9 pds] Definition, branches, Different factors-Physical, chemical and biological; Concept of Ecosystem; Population and Community; Destruction of fertile land and pollution of water and air resources; Balance of Nature.	**UNIT 5: ECOLOGY** [9 pds] (a) Definition, branches, Different factors-Physical, chemical and biological (b) Concept of Ecosystem (c)Population and Community (d) Destruction of fertile land and pollution of water and air resources (e) Balance of Nature.	**Addition**

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOH102/352, Course Title: ZOOLOGY PRACTICAL Approved since session: 2013-14; Total Credits:2, Periods(50 mts.each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOH102/352, Course Title: ZOOLOGY PRACTICAL** Approved since session: 2014-15	**Change in year**
Course Number: ZOW101, Course Title: BIOLOGICAL TECHNIQUES I Approved since session: 2012-13; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW101, Course Title: BIOLOGICAL TECHNIQUES I** Approved since session: 2014-15	**Change in year**
Course Number: ZOW102, Course Title: CELL BIOTECHNOLOGY I Approved since session: 2006-07; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW102, Course Title: CELL BIOTECHNOLOGY I** Approved since session: 2014-15	**Change in year**
Course Number: ZOW103, Course Title: BIOINFORMATICS I Approved since session: 2013-14; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW103, Course Title: BIOINFORMATICS I** Approved since session: 2014-15	**Change in year**
Course Number: ZOM101, Course Title: LOWER INVERTEBRATES Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 COMPREHENSIVE BIOLOGY OF LOWER INVERTEBRATES UNIT 1: PHYLUM-PROTOZOA [10 pds] (a) *Paramecium* (b) *Taenia solium* (c) *Trypanosoma.*	**Course Number: ZOM101, Course Title: LOWER INVERTEBRATES** Approved since session: 2014-15 sem.:39 LOWER INVERTEBRATES INTRODUCTION, SYMMETRY, COELOM, ACOELOM AND PARASITISM **UNIT 1: PHYLUM-PROTOZOA** [10 pds] (a) *Paramecium* (b) *Plasmodium* (c) *Trypanosoma.*	**Change in year** **Addition** **Addition and deletion**

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOM102, Course Title: HIGHER INVERTEBRATES Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 COMPREHENSIVE BIOLOGY OF HIGHER INVERTEBRATES UNIT 1: PHYLUM-ANNELIDA [9 pds] (a) Hirudinaria (b) Pheretima. UNIT 2: PHYLUM-ARTHROPODA [9 pds] (a) Palaemon (b) Palamnaeus. UNIT 3: PHYLUM-ARTHROPODA [8 pds] Mosquito: (a) Anopheles (b) Culex (c) Aedes. UNIT 4: PHYLUM-MOLLUSCA [9 pds] (a) Unio (b) Pila. UNIT 5: PHYLUM-ECHINODERMATA [4 pds] (a) Star fish: External features, Water vascular system.	**Course Number: ZOM102, Course Title: HIGHER INVERTEBRATES** Approved since session: 2014-15 Unit I-IV - COMPREHENSIVE BIOLOGY OF HIGHER INVERTEBRATES- GENERAL FEATURES OF EACH PHYLUM, CLASSIFICATION OF EACH TYPE, MORPHOLOGY, ANATOMY, HABIT, HABITAT ECOLOGY, FEEDING MECHANISM, CIRCULATION, EXCRETION SYSTEM, NERVOUS SYSTEM, REPRODUCTION, ECONOMIC IMPORTANCE **UNIT 1: PHYLUM-ANNELIDA** [10pds] (a) *Hirudinaria* (b) *Pheretima*. **UNIT 2: PHYLUM-ARTHROPODA** [8pds] (a) *Palaemon* (b) *Palamnaeus*. **UNIT 3: PHYLUM-ARTHROPODA** [8 pds] Mosquito: (a) *Anopheles* (b) *Culex* (c) *Aedes*. **UNIT 4: PHYLUM-MOLLUSCA** [8pds] (a) *Unio*(b) *Pila*. **UNIT 5: PHYLUM-ECHINODERMATA** [8pds] External features, Water vascular system of Star fish: (a) Asteria (b) Pentaceros	**Change in year** **Addition** **Change in the no. of pds** **Addition**
Course Number: ZOM103, Course Title: PRACTICAL Approved since session: 2013-14; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52 1. Study of museum specimens from all the important Invertebrate phyla :- Protozoa to Annelida	**Number: ZOM103, Course Title: PRACTICAL** Approved since session: 2014-15 1. Study of museum specimens from all the important Invertebrate phyla: - Protozoa to Echinodermata. 2. Study of Histological and whole mount slides based on the theory course 3. Training in Microscope handling 4. Temporary and permanent slide preparation	**Change in year** **Addition and deletion**

Existing syllabus	Revised syllabus	Addition and deletion
2. Permanent mounting of rectal ciliates (*Nyctotherus, Balantidium and Opalina), Monocystis, Hydra, Obelia* tentaculocyst, *Aurelia*, parapodia of *Neanthes* and *Heteroneanthes*, Nephridia, Ovary & Nerve ring of *Pheretima* 3. Histological whole mount slides based on the theory course 4. Training in Microscope handling 5. Temporary and permanent slide preparation 6. Ethical Practices 7. Virtual Demonstration of dissection of Pheretima-Reproductive, Digestive and Nervous Systems 8. Practical Record 9. Viva voce	5. Dissection of *Pheretima*-Reproductive, Digestive and Nervous Systems 6. Paramecium Culture 7. Practical Record 8. Viva voce	
Course No.: ZOM104, Course Title: SEMINAR & GROUP DISCUSSION Approved since session: 1997-98 Total Credits: 0.5, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-),Min.pds./sem.:52	**Course No.: ZOM104, Course Title: SEMINAR & GROUP DISCUSSION** Approved since session: 2014-15	**Change in year**
Course Number: ZOH231/251, Course Title: ZOOLOGY THEORY Approved since session: 2013-14; Total Credits:4, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: INTRODUCTION, TAXONOMY AND EVOLUTION [11 pds] What is Biology? Scientific study of living beings; Difference between living and non-living; main branches of Zoology. Outline classification of Animal kingdom (Taxonomy); Evolution-Evidences; Darwinism; Lamarckism.	**Course Number: ZOH231/251, Course Title: ZOOLOGY THEORY** Approved since session: 2014-15 sem.:39 **UNIT 1: INTRODUCTION, TAXONOMY AND EVOLUTION** [10 pds] (a) What is Biology? Scientific study of living beings (b) Difference between living and non-living (c) Main branches of Zoology (d) Taxonomy of Animal kingdom (e) Evolution-Evidences (f) Darwinism and Lamarckism.	**Change in year** **Addition & deletion**

Existing syllabus	Revised syllabus	Addition and deletion
UNIT 2: PHYSIOLOGY [7 pds] Digestion; Respiration; Excretion.	**UNIT 2: MAMMALIAN PHYSIOLOGY** [8 pds] (a) Digestion (b) Respiration (c) Excretion.	**Addition**
UNIT 3: CYTOLOGY, GENETICS AND EUGENICS [8 pds] The cell-structure and different types of cell divisions. Difference between animal cell and plant cell; Mendelism; Inheritance of Sex; Sex Determination; Eugenics.	**UNIT 3: CYTOLOGY, GENETICS AND EUGENICS** [8 pds] (a) The cell-structure and different types of cell divisions (b) Difference between animal cell and plant cell (c) Mendelism (d) Inheritance of Sex (e) Sex Determination (f) Genetic engineering	**Addition**
UNIT 4: ECOLOGY [7 pds] Definition, branches and different factors viz. physical, chemical and biological; Ecosystem; Population; Community; Pollution of vital resources of water and air, Balance of nature.	**UNIT 4: ECOLOGY** [8pds] (a) Definition, branches and different factors viz. physical, chemical and biological (b) Ecosystem (c) Population (d) Community (e) Pollution of water and air	**Addition and deletion**
UNIT 5: GENERAL BIOLOGY [6 pds] Disease causing animals and micro organisms; Insects as carrier of disease; Food, cloth and leather from animals; Medicines from the animals.	**UNIT 5: GENERAL BIOLOGY** [8pds] Introduction to: (a) Disease causing animals and micro organisms (b) Economic importance of animals: Honey bees, Fishes, Cattle's, Poultry, Earthworm	**Addition and deletion**
Course Number: ZOH232/252, Course Title: ZOOLOGY PRACTICAL Approved since session: 2013-14; Total Credits:4, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./ sem.:65	**Course Number: ZOH232/252, Course Title: ZOOLOGY PRACTICAL** Approved since session: 2014-15	**Change in year**
(d) Virtual demonstration of Dissection of Pheritatics: Digestive and Reproductory system	(d) Virtual demonstration of Dissection of *Pheretima*: Digestive and Reproductory system	**Addition and deletion**

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOW201, Course Title: BIOLOGICAL TECHNIQUES II Approved since session: 1998-1999; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW201, Course Title: BIOLOGICAL TECHNIQUES II** since session: 2014-15	**Change in year**
Course Number: ZOW202, Course Title: CELL BIOTECHNOLOGY II Approved since session: 2006-07; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW202, Course Title: CELL BIOTECHNOLOGY II** Approved since session: 2014-15	**Change in year**
Course Number: ZOW203, Course Title: BIOINFORMATICS II Approved since session: 2013-14; Total Credits:2, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course Number: ZOW203, Course Title: BIOINFORMATICS II** Approved since session: 2014-15	**Change in year**
Course Number: ZOM201, Course Title: CHORDATA I Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1 [8 pds] Hemichordata: *Balanoglossus* and its affinities.	**Course Number: ZOM201, Course Title: CHORDATA I** Approved since session: 2014-15 CLASSIFICATION, MORPHOLOGY, ANATOMY, HABIT AND HABITAT, FEEDING MECHANISM, CIRCULATION, EXCRETION, NERVOUS SYSTEM, REPRODUCTION **UNIT 1 TAXONOMY AND OTHER GENERAL TOPIC** [8 pds] (a) Classification of Chordata-up to order (b) Perching mechanism in birds; Flight and migration in birds (b) Biting mechanism in snakes (c) Poisonous and non-poisonous snakes (d)Parental care in Invertebrates (e) Fish migration.	**Change in year** **Addition and deletion**

Existing syllabus	Revised syllabus	Addition and deletion
UNIT 2 [7 pds] Urochordata: *Herdmania* and its Affinities UNIT 3 [8 pds] Cephalochordata: Branchiostoma (*Amphioxus*) UNIT 4 [8 pds] Cyclostomata: *Petromyzon* UNIT 5: CLASSIFICATION & GENERAL TOPICS [8 pds] Classification of Chordata; Perching mechanism in birds; Flight & migration in birds; Biting mechanism in snakes; Poisonous & non-poisonous snakes; Parental care in Invertebrates; Fish migration.	**UNIT 2 Hemichordata** [7 pds] *Balanoglossus* and its affinities. **UNIT 3 Urochordata** [8 pds] *Herdmania* and its Affinities **UNIT 4 Cephalochordata** [8 pds] *Branchiostoma* (*Amphioxus*) and its affinities. **UNIT 5: Cyclostomata** [8 pds] *Petromyzon* and its affinities.	
Course Number: ZOM202, Course Title: CHORDATA II Approved since session: 1998-1999; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Comparative Vertebrate anatomy of the following systems: UNIT 1 [8 pds] (a) Integumentary (b) Musculature. UNIT 2 [8 pds] (a) Skeletal (b) Digestive. UNIT 3 [7 pds] (a) Respiratory (b) Circulatory. UNIT 4 [8 pds] (a) Nervous (b) Receptor. UNIT 5 [8 pds] (a) Urino-genital (b) Endocrine.	**Course Number: ZOM202, Course Title: CHORDATA II** Approved since session: 2014-15 COMPARATIVE VERTEBRATE ANATOMY OF THE SYSTEMS WITH RESPECT TO PISCEAN, AMPHIBIAN, REPTILIAN, AVIAN AND MAMMALIAN: **UNIT 1: INTEGUMENTARY SYSTEM** [10pds] Structure and derivatives of integument: (a) Structure of Skin (b) Epidermal Derivatives (c) Dermal Derivatives **UNIT 2: DIGESTIVE SYSTEM** [8 pds] (a) Alimentary canal and associated glands (b) Dentition in mammals **UNIT 3: CIRCULATORY AND RESPIRATORY SYSTEMS** [8pds] (a) Evolution of heart and respiratory organs – skin, gills, air bladder and lungs **UNIT 4: UROGENITAL SYSTEM** [8 pds] (a) Evolution of kidney (b) genital organs **UNIT 5: NEURO-ENDOCRINE SYSTEM** [8 pds] (a) Central nervous system (b) sensory organs (c) endocrine glands	**Change in year** **Complete new syllabus**

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOM203, Course Title: PRACTICAL Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 1. Study of museum specimens from all major lower Chordata, Pisces and Amphibia. 3. Virtual demonstration of dissection of vertebrates. 4. Permanent slide preparation of body parts, tissues and cells.	**Course Number: ZOM203, Course Title: PRACTICAL** Approved since session: 2014-15 1. Study of museum specimens from all major lower Chordata, Pisces and Amphibia, Reptiles, Aves and Mammals. 3. Dissection of commercial fishes-Cranial nerves, ear ossicles. 4. Permanent slide preparation of various fish scales-Placoid, ganoid, ctenoid and Cycloid.	**Change in year** **Addition and deletion**
Course No.: ZOM204, Course Title: SEMINAR AND GROUP DISCUSSION , Approved since session: 1997-98; Total Credits: 0.5, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course No.: ZOM204, Course Title: SEMINAR AND GROUP DISCUSSION** Approved since session: 2014-15	**Change in year**
Course Number: ZOM301, Course Title: ANIMAL ECOLOGY Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: HISTORY, INTRODUCTION AND NATURE OF ECOSYSTEM [8 pds] (a) Introduction: Brief history, its branches and relationship with other sciences, biological spectrum (b) Nature and constituents of ecosystem: (i) Concepts of ecosystem, pond as an ecosystem,	**Course Number: ZOM301, Course Title: ANIMAL ECOLOGY** Approved since session: 2014-15 **UNIT 1: HISTORY, INTRODUCTION AND NATURE OF ECOSYSTEM** [10pds] (a) Nature and constituents of ecosystem: (i) Concepts of ecosystem, types of ecosystem-fresh water marine water, aerial, dissert and terrestrial ecosystem, (ii) Abiotic components (iii) Biotic component (iv) Trophic levels (v) Intra and interspecific relationships	**Change in year** **Addition and deletion** **Addition**

Existing syllabus	Revised syllabus	Addition and deletion
(ii) abiotic components (iii) biotic component (iv) trophic level (v) energy flow.		**Addition & deletion**
UNIT 2: BIOGEOCYCLES & LAWS [8 pds]	**UNIT 2: BIOGEOCYCLES AND LAWS** [8 pds] (c) Energy Flow	
UNIT 3: ECOLOGY OF POPULATION [7 pds] (a) Concepts of population: (i) Its definition (ii) population density and methods of its determination (iii) factors affecting population growth (iv) population growth form concept of community: (1) biotic community (2) ecological succession and climax (3) periodicity.	**UNIT 3: POPULATION ECOLOGY** [8pds] (a) Concepts of population: (i) Its definition (ii) Characteristics of population: mortality, dispersal, natality (iii) Population growth and factors affecting growth (iv) Population dynamics	**Addition and deletion**
UNIT 4: ORGANIZATION AND DYNAMICS OF COMMUNITIES [8 pds] (a) Intra and interspecific relationship (b) Habitat ecology: (i) fresh water, marine, aerial and terrestrial ecosystems (ii) adaptations.	**UNIT 4: COMMUNITY ECOLOGY** [8 pds] (a) Community structure and attributes-density dependant and independent: diversity (b) Ecological succession (c) Adaptations (d) Indicators	**Addition and deletion**
UNIT 5: APPLIED AND HUMAN ECOLOGY [8 pds] (a) Applied ecology: (i) natural resources and conservation (ii) public health and welfare (iii) radiation ecology (iv) biological warfare (b) Ecology and man: (i) desertification (ii) water pollution (iii) air pollution (iv) balance of nature (v) environment conservation and management.	**UNIT 5: APPLIED AND HUMAN ECOLOGY** [8 pds] (a) Applied ecology: (b) Natural resources and conservation (c) Public health and welfare (d) Ecological homeostasis (e) Radiation ecology	**Addition**
SUGGESTED READINGS: Kimball JW: MAN AND NATURE-PRINCIPLES OF HUMAN AND ENVIRONMENTAL BIOLOGY Budyko ML: ECOLOGY Singh SP: ECOLOGY Kotpal RL: A CONCEPT OF MODERN ECOLOGY Elton C: ANIMAL ECOLOGY Kumar D: MODERN CONCEPT OF ECOLOGY Gegun M: POPULATION ECOLOGY Cates DM: BIOPHYSICAL ECOLOGY Kendeigh SC: ANIMAL ECOLOGY	**SUGGESTED READINGS:** ELTON C: ANIMAL ECOLOGY EP ODUM: FUNDAMENTALS OF ECOLOGY	

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOM302, Course Title: ANIMAL PHYSIOLOGY Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 sem.:39	**Course Number: ZOM302, Course Title: ANIMAL PHYSIOLOGY** Approved since session: 2014-15	**Change in year and pds**
UNIT 1: DIGESTION [8 pds] (a) Intra-cellular and extra-cellular digestion (b) Physiology of digestion, digestive glands and enzymes (c) Absorption and assimilation (d) Role of vitamins and minerals.	**UNIT 1: DIGESTION** [10pds] (a) Glands and hormones, endocrine with relation to gut, intra and extracellular digestion Glands, (b) Intra-cellular and extra-cellular digestion (c) Physiology of digestion, digestive glands and enzymes (d) Absorption and assimilation (e) Role of vitamins and minerals.	**Addition and deletion**
UNIT 2: CIRCULATION [7 pds] (a) Haemopoiesis and composition of blood; (b) Blood coagulation and coagulation factors; (c) Myogenic and neurogenic Heart; Physiology and regulation of heart beat.	**UNIT 2: CIRCULATION** [8pds] (a) Haemopoiesis and composition of blood (b) Physiology and Regulation of cardiac cycle (Neural and Chemical), diastole, systole, ECG, cardiac cycle, blood pressure (c) Myogenic and neurogenic Heart (d) Physiology and regulation of heart beat.	**Addition and deletion**
UNIT 3: NERVOUS AND ENDOCRINE SYSTEM [8 pds] (a) Neurons and neuronal transport (b) Central and peripheral nervous system (c) Propagation of nerve impulses (d) Reflex and reflex arc (e) Endocrine physiology (f) Integration theory.	**UNIT 3: NERVOUS PHYSIOLOGY** [8 pds] (a) Concept of nerve, neuron,nuclei, ganglion, glia (b) Difference between neuron and other cells (c) Propagation of nerve impulse (d) Types of nervous systems: PNS, CNS and ANS (e) Reflex action (f) Neuro-endocrine Integration	**Addition and deletion** **Addition and deletion**
UNIT 4: RESPIRATION [8 pds] (a) Types of respiration (cutaneous, branchial, pulmonary, and tracheal); (b) Respiratory pigments (haemoglobin, haemocyanin,	**UNIT 4: RESPIRATION** [8 pds] (a) Breathing (b) Types of respiration (External-cutaneous Internal- branchial, pulmonary, and tracheal); (b) Respiratory pigments (haemoglobin, haemocyanin, haemoerythrin and chlorocruorin); (c) Oxygen transport, gaseous	

haemoerythrin and chlorocruorin); (c) Oxygen removal and dissociation of carbon dioxide; (d) Factors affecting respiration and respiratory sites. UNIT 5: EXCRETION [8 pds] (a) Nitrogenous wastes and their biochemical synthesis;	transport, Oxygen removaland dissociation of carbon dioxide (d) Factors affecting respiration and respiratory sites. **UNIT 5: EXCRETION** [8 pds] (a) Nitrogenous wastes and its types and their biochemical synthesis	**Addition and deletion**
Course Number: ZOM303, Course Title: GENETICS I Approved since session: 2004-05; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: MENDELIAN INHERITANCE [8 pds] (a) Mendel and his experiments (b) The principle of segregation and crossing over (c) Test cross (d) Probability concept (e) Pedigree analysis. UNIT 2: TYPES OF GENE EXPRESSION [8 pds] (a) Intermediate and incomplete dominance (b) Codominance (Also blood group in man) (c) Multiple alleles (d) Lethal genes (e) Pleiotropic genes (f) Gene interaction and phenotypes (Epistasis) (g) Degree of gene expression. UNIT 3: GENE LINKAGE AND MUTATION [7 pds] (a) Linkage and crossing over (b) Cytological basis of crossing over (c) Cytological evidences on mutation (d) Concept of gene-mutation.. UNIT 4: GENE CHROMOSOME SYSTEMS [8 pds] (a) XX/XO, XX/XY, ZZ/ZW and Haploidy/Diploidy types (b) Gene,	**Course Number: ZOM303, Course Title: GENETICS I** Approved since session: 2014-15 **UNIT 1: MENDELISM AND EXTENSION OF MENDELISM** [10pds] (a) Mono-, di- and trihybrid crosses and its application (b) Test cross (c) Probability concept (d) Pedigree analysis. **UNIT 2: GENE ACTION** [8 pds] (a) Codominance (b) Multiple alleles (c) Lethal genes (d) Pleiotropic genes (e) Gene interaction and Epistasis (f) Linkage and crossing over (g) Linkage mapping. **UNIT 3: MUTATION, MUTAGENESIS AND REPAIR** [8pds] (a) Cytological evidences on mutation (b) Concept of gene-mutation (c) Chemical and radiation mutagenesis (d) DNA repair mechanism. **UNIT 4: SEX DETERMINIG SYSTEMS AND DOSAGE COMPENSATION** [8pds] (a) XX/XO, XX/XY, ZZ/ZW and Haploidy/Diploidy types (b) Chromosome anomalies (c) Dosage	**Change in year**

chromosome anomaly in Man. UNIT 5: NUCLEIC ACIDS [8 pds] (a) Experimental evidences of DNA as genetic material (b) RNA as genetic material (c) DNA structure and Genetic code (d) Introduction to genetic engineering SUGGESTED READING: Strickberger: GENETICS Farnsworth: GENETICS Burns: THE SCIENCE OF GENETICS Sinnod, Don and Dobzansky: GENETICS De Robertis & De Robertis: CELL BIOLOGY	compensation – Lyons hypothesis. (d) Barr bodies and inactivation. **UNIT 5: GENE EXPRESSION AND APPLICATIONS** [8 pds] (a) Replication (b) Eukaryotic – transcription (c) Prokaryotic - transcription (d) Recombinant DNA Technology. **SUGGESTED READING:** GENETICS : Strcikberger. John Wiley and sons. CONCEPTS OF GENETICS : Klug, Cummings, Spencer and Palladino; Pearson Publication. GENETICS : Snustand and Simmons. John Wiley and sons. MODERN GENETIC ANALYSIS: Griffiths, Gelbert, Lewontin, and Miller. W.H. Freeman and Company. GENETICS: Russel, Benjamin-Cummings Publ. company	
Course Number: ZOM304, Course Title: PRACTICAL , Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 1. Museum specimens from all major important higher invertebrate phyla from Arthropoda to Echinodermata. 2. Histological slides based on above mentioned phyla. 3. Physiological / Genetical Exps (a) Barr body test (b) Blood group test (c) Haemoglobin Percentage test (d) Animal Adaptation Excercises (e) Haemin Crystal preparation. 4. Virtual demonstration of dissection of Pila: Nervous System. 5. Blood Pressure measurement 6. Practical Record 7. Viva voce.	**Course Number: ZOM304, Course Title: PRACTICAL** Approved since session: 2014-15 1. Ecological experiments- (a) biomass measurement (b) pH measurement of soil, water (c) Animal Adaptation Exercises 2. Physiological Exps – (a) Haemoglobin Percentage test (b) Haemin Crystal preparation (c) Blood Pressure measurement 3. Genetical Exps – (a) Preparation of metaphase Chromosome from Grasshopper gonads (b) Preparation of Polytene Chromosome from Chironomid larvae (c) Study of Barr body from buccal smear/ hair buds (d) Blood group genetic testing. 4. Practical Record 5. Viva voce.	**Change in year** **Complete new syllabus**

Existing syllabus	Revised syllabus	Addition and deletion
Course No.: ZOM305, Course Title: SEMINAR AND GROUP DISCUSSION Approved since session: 1997-98; Total Credits: 0.5, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:52	**Course No.: ZOM305, Course Title: SEMINAR AND GROUP DISCUSSION** Approved since session: 2014-15	**Change of year**
Course Number: ZOM401, Course Title: CYTOLOGY 2005-06; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: CELL [8 pds] (a) Cell theory and units of measurements of cells (b) Structure and organisation of Prokaryotes and Eukaryotes. UNIT 2: CELL INCLUSIONS [7 pds] (a) Detailed structure and general function: Plasma membrane and Cell Junctions (b) Mitochondria, Ribosomes, Endoplasmic Reticulum and Golgi Complex (c) Membrane transport (d) Nucleus. UNIT 3: CELL DIVISION AND FUNCTION [8 pds] (a) Cell cycle, cell division, Amitosis, mitosis and Meiosis (b) Mechanism of synapsis, Synaptonemal Complex, Crossing Over, Anaphase movement (c) Nucleoprotein organisation (d) Cancer. UNIT 4: CHROMOSOME [8 pds] (a) Chromosomes; Structure (b) Type and Aberrations (c) Polytene and Lampbrush chromosomes.	**Course Number: ZOM401, Course Title: CYTOLOGY** Approved since session: 2014-15 **UNIT 1: OVERVIEW OF CELL** [10pd] (a) Cell concept and theory (b) Types of cells- eukaryotic, prokaryotic and Mycoplasma (c) Tools and techniques of cell biology- microscopic, analytical and separation **UNIT 2: PLASMA MEMBRANE** [8pd] (a) Structure (b) Dynamics (c) Transmembranal transport (d) Cell junctions and communication **UNIT 3: CELL ORGANELLES AND INCLUSIONS: STRUCTURE, FUNCTIONS AND INTERACTIONS** [8pd] (a)Nucleus (b) Mitochondria (c) ER (d) Lysosomes (e) Golgi bodies (f) Cytoskeleton **UNIT 4: CELL DIVISION** [8pd] (a) Cell cycle checkpoints and its regulation (b) Mitosis (c) Meiosis	**Complete new syllabus**

UNIT 5: HISTOLOGY [8 pds] (a) Histology: Epithelial, Contractile (b) Supporting: Glandular and Nervous Tissue (c) Microtomy. SUGGESTED READINGS: Bellairs R Adams C & Cranham D: CELL BEHAVIOUR Martin W Steer: UNDERSTANDING CELL Eric Reid: CELL POPULATIONS Braude: MICROBIOLOGY	**UNIT 5: CHROMOSOMES** [8pd] (a) Nucleosome model (b) Euchromatin and heterochromatin (c) Lampbrush chromosomes (d) Polytene chromosomes (e) Chromosomal aberrations **SUGGESTED READINGS:** Molecular Biology of the Cell – Bruce Alberts Molecular Biology of the Cell – Lodish Cell Biology - Gerald Karp The World of the Cell- WM Becker, L J Kleinsmith, J Hardin	**Additions of these books and deletion of rest other books**
Course Number: ZOM402, Course Title: EVOLUTION & ZOOGEOGRAPHY Approved since session: 2012-13; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: ORIGIN [7 pds]	**Course Number: ZOM402, Course Title: EVOLUTION & ZOOGEOGRAPHY** Approved since session: 2014-15 sem.:39 **UNIT 1: ORIGIN** [10pds]	**Change in year** **Change in the no. of pds**
Course Number: ZOM403, Course Title: MICROBIOLOGY Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: INTRODUCTION [7 pds] (a) History and development of microbiology (b) Application and culture techniques (c) Staining techniques of bacteria. UNIT 2: VIRUS [8 pds] (a) Virus- Discovery, UNIT 3: BACTERIA [8 pds] (a) Classification, structure, morphology and nutrition (b) Bacterial genetics - Asexual and sexual Reproduction, Transposable elements (c)	**Course Number: ZOM403, Course Title: MICROBIOLOGY** Approved since session: 2014-15 sem.:39 **UNIT 1: INTRODUCTION AND CLASSIFICATION** [10pds] (a) Introduction and branches of microbiology (b) Culture methods and various types of media (b) Application and culture techniques **UNIT 2: VIRUS** [8 pds] (e) Prions **UNIT 3: BACTERIA** [8 pds] (a) Classification, structure, nutrition and growth curve (b) Reproduction-Asexual, Sexual-Transformation, transduction, conjugation (c) Archaebacteria	**Change in year** **Addition and deletion** **Addition** **Addition and deletion** **Addition and deletion**

Transformation, transduction and conjugation (d) Generalized and specialised transduction. UNIT 4: RICKETTSIA [8 pds] Rocky Mountain spotted fever, host and vectors, pathogenicity and fever chart. UNIT 5: APPLIED MICROBIOLOGY [8 pds] (a) Bacteria diseases – Hepatitis, Tuberculosis, (b) Role of microbes in biotechnology (c) Bacteria in mineral cycles (d) Microbial control of pests. SUGGESTED READINGS: Goodheart,WB etal: MICROBIOLOGY Straine etal: MICROBIOLOGY Cheesbrough M: MICROBIOLOGY Debe S: MICROBIOLOGY	**UNIT 4: MICROBIAL DISEASES** [8 pds] (a)Micro bacterium diseases-tuberculosis (b) Hepatitis (c) RMS Host, Vectors and pathogenicity (d) Typhoid (e) Venereal Disease **UNIT 5: APPLIED MICROBIOLOGY** [8 pds] (a) Role of microbes in biotechnology-fermentation technology and downstream processing (b) Bt genes (c) Soil microbiology **SUGGESTED READINGS:** Mayer and Mayer: ENVIRONMANTAL MICROBIOLOGY Prescott: TEXT BOOK OF MICROBIOLOGY	**Addition and deletion** **Addition**
Course Number: ZOM404, Course Title: PRACTICAL Class: B.Sc., Status of Course: MAJOR COURSE, Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 1. Museum specimens from Reptilia, Aves and Mammalia. 2. Histological slides from above phyla. 3. Permanent slide preparation of tissues, body parts. 4. Osteology of Fowl and Rabbit. 5. Virtual demonstration of dissection of Leech: Digestive and Reproductive system. 6. Chromosome slide preparation from Grasshopper testis 7. Aseptic culture techniques, Identification of bacteria	**Course Number: ZOM404, Course Title: PRACTICAL** Class: B.Sc., Status of Course: MAJOR COURSE, Approved since session: 2014-15 1.Aseptic culture techniques 2.Bacteria- (a) Culture media preparation (b) Staining and Identification of gram positive and gram negative Bacteria (c) CFU counting and growth curve 3.Fungi: (a) Culture media preparation (b) Slide preparation (c) Determination of fungal spore 4.Observation of histological slides of Tissues and body parts	

Existing syllabus	Revised syllabus	Addition and deletion
Course No.: ZOM405, Course Title: SEMINAR AND GROUP DISCUSSION Approved since session: 1997-98; Total Credits: 0.5, Periods(50 mts. each)/week: 4(L-0+T-0+P/S-4),Min.pds./sem.:39	**Course No.: ZOM405, Course Title: SEMINAR AND GROUP DISCUSSION** Approved since session: 2014-15	
Course Number: ZOM501, Course Title: BIOCHEMISTRY I Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: BIOENERGETICS [8 pds] (a) Configuration and conformation of biomolecules (b) Properties of water as a biological solvent (c) Hydrophobic and weak chemical interactions (d) Chemical bonds and bond energy. UNIT 2: AMINO ACIDS AND PROTEINS [7 pds] (a) Classification of amino acids and formation of peptides (b) Reactions of amino acids (c) Urea cycle. UNIT 3: ENZYMES [8 pds] (a) Classification (b) Mechanism of action (c) Derivation of Michaelis-Menten equation (d) Coenzyme & isozyme. UNIT 4: CARBOHYDRATES [8 pds] (a) Classification and Structure (b) Glycolysis, Glycogenolysis and Glucogenesis (c) Krebs' cycle (d) HMP Shunt (e) Oxidative Phosphorylation.	**Course Number: ZOM501, Course Title: BIOLOGICAL CHEMISTRY** Approved since session: 2014-15 **UNIT 1: BIOENERGETICS** [10pds] (a) Thermodynamic Principles (b) Concept of Free energy (c) Priming and Coupling (d) ATP as universal energy (e) Electron transport mechanism (f) Buffers and pKa values. **UNIT 2: AMINO ACIDS AND PROTEINS** [8 pds] (a) Structure and Classification (b) Peptide bond formation (c) Ionisation (d) Trans-amination and deamination (e) Urea cycle (f) Architectural levels and classification of proteins **UNIT 3: ENZYMES** [8 pds] (a) Nomenclature and Classification (b) Mechanism of action (c) Derivation of Michaelis-Menten equation and modifications (d) Coenzyme & isozyme. **UNIT 4: CARBOHYDRATES** [8 pds] (a) Glycolysis and Glycogenolysis (b) Krebs' cycle (c) HMP pathway (d) Gluconeogenesis, Glycogenesis	**Complete new syllabus** **Change in year**

UNIT 5: LIPIDS AND NUCLEIC ACIDS [8 pds] (a) Classification and Significance (b) β-Oxidation (c) Lipogenesis (d) DNA chemistry and nucleosome. SUGGESTED READING Conn et al- OUTLINES OF BIOCHEMISTRY Lehninger et al- PRINCIPLES OF BIOCHEMISTRY Mathew and Van Holds- BIOCHEMISTRY Zubay- BIOCHEMISTRY	**UNIT 5: LIPIDS AND NUCLEIC ACIDS**[8 pds] (a) β-Oxidation of unsaturated and saturated fatty acids (b*) de novo* synthesis of Lipid (c) Organisation of DNA in Nucleus **SUGGESTED READING** Lehninger Freeman and company: PRINCIPLES OF BIOCHEMISTRY Zubay:BIOCHEMISTRY Murray, Granner&Rodwell. Harpers: HARPER'S ILLUSTRATED BIOCHEMISTRY. Wilson &Walker:PRACTICAL BIOCHEMISTRY-PRINCIPLE & TECHNIQUE, Cambridge Publn. Donald Voet, Judith G. Voit: BIOCHEMISTRY William H. Elliott, Daphne C. Elliott: BIOCHEMISTRY AND MOLECULAR BIOLOGY	
Course Number: ZOM502, Course Title: PARASITOLOGY Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: LIVING TOGETHER AND SYMBIOSIS [8 pds] UNIT 4: LIFE HISTORIES OF SOME SIGNIFICANT PARASITES WITH GENERAL BIOLOGY [7 pds] (a) Lipeurus squalidus (b) Dermacentor andersoni (c) Xenopsylla cheopsi (d) Dermanyssus gallinae. UNIT 5: APPLIED PARASITOLOGY [8 pds] (a) Malaria parasite (b) Genetic factors and malaria (c) Drug resistance in Malarial parasite (d) Resistance to Helminths (e) Culture methods of Malarial parasite (f) Parasite control.	**Course Number: ZOM502, Course Title: PARASITOLOGY** Approved since session: 2014-15 **UNIT 1: LIVING TOGETHER AND SYMBIOSIS** [8 pds] (d) Cynernetics Parasitism **UNIT 4: LIFE HISTORIES OF SOME SIGNIFICANT PARASITES WITH GENERAL BIOLOGY** [8pds] (a) *Lipeurus squalidus* (b) *Dermacentor andersoni* (c) *Xenopsylla cheopsi* (d) *Dermanyssus gallinae*. **UNIT 5: APPLIED PARASITOLOGY** [8 pds] (a) Malarial parasite- Genetic factors, Drug resistance and Culture methods (b) Resistance to Helminths (c) Parasite control.	**Change in year** **Addition** **Addition and deletion** **Addition and deletion**
Course Number: ZOM503, Course Title: DEVELOPMENTAL BIOLOGY Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-	**Course Number: ZOM503, Course Title: DEVELOPMENTAL BIOLOGY** Approved since session: 2014-15	**Change in year**

0),Min.pds./sem.:39 UNIT 1: BASIC CONCEPTS OF DEVELOPMENT [7 pds] (a) Baer's Law and Biogenetic Law (b) genomic equivalence and cytoplasmic determinants(e) Artificial fertilization techniques-IVF, AI, ICSI. UNIT 4: DEVELOPMENTAL MODEL SYSTEMS-INVERTEBRATES [8 pds] *C. elegans* UNIT 5: DEVELOPMENTAL MODEL SYSTEMS-VERTEBRATES [8 pds] (a) Danio (b) Mammals (c) Placentation in mammals.	**UNIT 1: BASIC CONCEPTS OF DEVELOPMENT** [10pds] (b) Genomic equivalence and cytoplasmic determinants (e) Assisted Reproductive Techniques-IVF, ZIFT, SIFT, GIFT, AI, ICSI . **UNIT 4: DEVELOPMENTAL MODEL SYSTEMS- INVERTEBRATES** [8 pds] (a) *Drosophila* (b) *C.elegans*- life cycle, cell lineage, genetic control of development **UNIT 5: DEVELOPMENTAL MODEL SYSTEMS- VERTEBRATES** [8 pds] (a) *Danio* (b) Chick embryology (c) Placentation in mammals. **SUGGESTED READINGS:** Gilbert: DEVELOPMENTAL BIOLOGY	**Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition**
Course Number: ZOM504, Course Title: ENTOMOLOGY Approved since session: 2012-13; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 UNIT 1: TAXONOMY [7 pds] (a) General Classification (b) Characters (c) Examples and importance of main insect orders. UNIT 2: GENERAL INSECT ANATOMY AND PHYSIOLOGY [8 pds] (a) Feeding and feeding appendages (b) Digestive (c) Respiratory (d) Excretory (e) Circulatory (f) Nervous (g) Reproductive System (h) Development and metamorphosis. UNIT 3: INSECTS OF COMMERCIAL IMPORTANCE AND THEIR CULTURE [8 pds] (a) Honey Bee (b) Silk Moth (c) Lac insect.	**Course Number: ZOM504, Course Title: ENTOMOLOGY** Approved since session: 2014-15 Sem:39 **UNIT 1: TAXONOMY** (a) Classification-up to orders (b) Identifying characters (c) Examples and importance of main insect orders. **UNIT 2: GENERAL INSECT ANATOMY AND PHYSIOLOGY** [8 pds] (a) Feeding, mouth parts and their modifications (b) Digestive (c) Respiratory (d) Excretory (e) Circulatory (f) Nervous (g) Reproductive System. **UNIT 3: INSECTS OF COMMERCIAL IMPORTANCE AND THEIR MASS PRODUCTION**[8 pds] (a) Apiculture (b) Sericulture (c) Lac culture (d) Development and metamorphosis.	**Complete new syllabus** **Change in year and pds** **Addition and deletion** **Addition and deletion** **Addition and deletion**

UNIT 4: COMMON AGRICULTURAL PESTS WITH SPECIAL REFERENCE TO [8 pds] (a) Crops (*Leptocorisa varicornis, Pyrilla Perpusilla, Chilo zonellus, Helicoverpa armigera & Scoliophthalamus micans*) (b) Vegetables (*Raphidopalpa foveicollis, Dacus cucurbita)* (c) Fruits (*Papilo demoleus, Virachola isocrates*) (d) Stored grain pest (*Sitophylus oryzae, Callosobruchus maculatus*) (e) Fibres (*Platyedra gossypiella*) (f) Vectors of human diseases. UNIT 5: APPLICATION OF DIFFERENT METHODS OF PEST CONTROL [8 pds] (a) Mechanical (b) Chemical (c) Biological and Legal control (d) Integrated pest management. SUGGESTED READINGS Rockstein M: THE PHYSIOLOGY OF INSECTS Wigglesworth VB: THE PRINCIPLES OF INSECT PHYSIOLOGY Chapman RF: THE INSECT STRUCTURE AND Snodgrass RE: PRINCIPLES OF INSECT MORPHOLOGY Imms AD, Richards DW & Daviea RG: GENERAL TEXTBOOK OF ENTOMOLOGY Metcalf CL etal: DESTRUCTIVE AND USEFUL INSECTS - THEIR HABITS AND CONTROL Srivastava RP & Saxena RC: A TEXTBOOK OF INSECT TOXICOLOGY Scott W, Patton & Francis William: A TEXT BOOK OF MEDICAL ENTOMOLOGY	**UNIT 4: COMMON AGRICULTURAL PESTS WITH SPECIAL REFERENCE TO** [8pds] (a) Crops pest (*Leptocori savaricornis, Pyrilla perpusilla, Chilopartellus, Helicoverpa armigera and Spodopteralitura*) (b) Vegetables pest (*Raphidopalpa foveicollis, Bactroceracucurbitae)* (c) Fruits pest (*Papilodemoleus, Viracholaisocrates*) (d) Stored grain pest (*Sitophylus oryzae, Calloso bruchusmaculatus*) (e) Fibre pest (*Pectinophora gossypiella*) (f) Polyphagous (Locust and grasshoppers). **UNIT 5: APPLICATION OF DIFFERENT METHODS OF PEST CONTROL** [8 pds] (a) Mechanical, Physical, Chemical, Cultural, Legal and Biological Control. **SUGGESTED READINGS:** Chapman RF: THE INSECT STRUCTURE AND Imms AD, Richards DW &Daviea RG: GENERAL TEXTBOOK OF ENTOMOLOGY Metcalf CL etal: DESTRUCTIVE AND USEFUL INSECTS - THEIR HABITS AND CONTROL Rockstein M: THE PHYSIOLOGY OF INSECTS Scott W, Patton & Francis William: A TEXT BOOK OF MEDICAL ENTOMOLOGY Snodgrass RE: PRINCIPLES OF INSECT MORPHOLOGY	**Addition and deletion** **Addition and deletion**
Course Number: ZOM505, Course Title: SYSTEMATICS, BIO-DIVER. & MOLECU. EVOLUTION Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),	**Course Number: ZOM505, Course Title: WILDLIFE CONSERVATION AND MANAGEMENT** Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2014-15	**(NEW MERGED COURSE) delete old** **Change in year**

UNIT 1: TAXONOMY (a) Taxon (b) Taxonomic keys (c) Mode of Speciation (d) Factor responsible Species Formation.	**UNIT 1: WILDLIFE HABITAT STUDIES** [10pds] (a) Wildlife habitat structure and classification (b) Brief idea of Phyto geographical regions of the world(c) Major vegetation /Forest/Grassland types and their distribution endemism.	
UNIT 2: MODERN TRENDS IN TAXONOMY (a) Numerical Taxonomy (b) Molecular phylogeny (c) Construction of phylogenetic trees using molecular data (d) Use of mitochondrial genes in molecular clock.	**UNIT 2: HABITAT MANAGEMENT** [8pds] (a)Overview and habitat management problems(b)Accidental and Intentional force and its impact on flora and fauna(c)Livestock grazing and its impact, weed eradication.	
UNIT 3: BIODIVERSITY (a) Taxonomic diversity (b) Current status and future of biodiversity (c) Conservation methods-Ex-situ and in-situ (d) Telemetry and GPRS technologies in biodiversity monitoring (e) Wild Life Acts 1976.	**UNIT 3: CONSERVATION** [8pds] (a)Protected Area Network systems in India (b) *in situ* conservation with examples of successful conservation projects(c) *ex-situ* Conservation with examples of captive breeding projects.	
UNIT 4: POPULATION GENETICS AND MOLECULAR EVOLUTION (a) Gene pool and Genetic Equilibrium (b) Application of Hardy Weinberg equation in natural population (c) Genetic drift and Sewell Wright approach (d) Genetic variability assessment.	**UNIT 4:WILDLIFE TRADE** [8pds] (a)Extent and type of trade (b) Species affected by trade, their marketing and misuse by traders and buyers(c) Biological and ecological consequences of wildlife trade.	
UNIT 5: ORIGIN AND DIVERSIFICATION (a) Origin and diversification of bacteria and archea (b) Origin and diversification of Eukaryotes (c0 Evolution of Eukaryotic cell from Prokaryotic cell.SUGGESTED READINGS: Ernst Myre: SYSTEMATICS Subramanyam & Sambamurty: ECOLOGY WWF HANDBOOK: WILDLIFE CONSERVATION & MANAGEMENT ACT 1972	**UNIT 5: WILDLIFE LEGISLATION** [8pds] (a)Wildlife Protection Act 1972 (b) Important conservation agencies-National and International (c) Red Data Book **SUGGESTED READINGS:** WPA-Natraj Publication Rogers and Panwar manual of PAMS/Protected area Management System Wildlife management –Rajesh Gopal Subramanyam&Sambamurty: ECOLOGY WWF HANDBOOK: WILDLIFE CONSERVATION & MANAGEMENT ACT 1972	

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOM506, Course Title: PRACTICAL Approved since session: 2013-14; Total Credits:9, Periods(50 mts. each)/week: 24(L-0+T-0+P/S- 24), Min.pds./sem.:312	**Course Number: ZOM506, Course Title: PRACTICAL** Approved since session: 2014-15	**Change in year** **Addition and deletion**
BIOCHEMISTRY 1. Preparation of Buffer using Handerson-Hassalbach equation and determination of its buffering capacity. 2. Preparation of chemical/molecular models with coloured beads and pins. 3. Analysis of a mixture of carbohydrates by their colour reactions. 4. Qualitative tests for lipids. 5. Formal titration of amino acids 6. Separation of amino acids and carbohydrates by paper chromatography.	**BIOLOGICAL CHEMISTRY** 1. Preparation of Buffer using Handerson-Hassalbach equation and determination of its buffering capacity. 2. Preparation of chemical/molecular models with coloured beads and pins. 3. Analysis of a mixture of carbohydrates by their colour reactions. 4. Qualitative tests for lipids. 5. Formal titration of amino acids 6. Separation of amino acids and carbohydrates by paper chromatography and TLC.	
PARASITOLOGY 1. Study of permanent slides of specimens of (a) Protozoan Parasites, (b) Trematodes, (c) Nematodes, (d) Cestodes. 2. Preparation of larvae and eggs of the Cestodes, Trematodes and Nematodes. 3. Examining of snails for Cercaria. 4. Collection and preparation of parasitic mites, ticks from cattles and vectors of disease.	**PARASITOLOGY** 1. Study of permanent slides of specimens of (a) Protozoan Parasites, (b) Trematodes, (c)Nematodes, (d) Cestodes. 2. Preparation of larvae and eggs of the Cestodes, Trematodes and Nematodes. 3. Examining of snails for Cercaria. 4. Collection and preparation of parasitic mites, ticks from cattles and vectors of disease.	
DEVELOPMENTAL BIOLOGY Prepared Embryological slides of various vertebrates. Effect of Thyroxine on tadpole larva of Frog. Observation of various stages of chick development in eggs	**DEVELOPMENTAL BIOLOGY** 1.Prepared Embryological slides of various vertebrates. 3.Observation of various stages of chick development in eggs. 4.To observe the development of *Dictiostelium* 5.To observe the regeneration of earthworm	

ENTOMOLOGY 1. Classification and identification of local insects fauna with special reference to pests. 2. Mounting of salivary gland (cockroach), mouth parts (cockroach, honey-bee, housefly, mosquito), Poison gland (wasp & honey-bee). 3. Study of Permanent slides of wings, mouth parts, genitals, egg, larvae & pupae. 4. Estimation of LC-50 for any pesticide against any common pests. 5. Practical record and insect collection.	**ENTOMOLOGY** 1. Classification and identification of local insects fauna with special reference to pests. 2. Mounting of salivary gland (cockroach), mouth parts (cockroach, honey-bee, housefly, mosquito), Poison gland (wasp & honey-bee). 3. Study of Permanent slides of wings, mouth parts, genitals, egg, larvae & pupae. 4. Dose calculation of pesticide/ insecticide. 5. Practical record and insect collection.	**Addition**
SYSTEMATICS, BIODIVERSITY AND MOLECULAR EVOLUTION 1. Isolation of genomic DNA from bacterium 2. Hands on training on multiple alignments and constructions of phylogenic tree 3. Determination of Shannon index of biodiversity 4. Interpretation (Visual and automated) of remote sensing information for landscape differentiation 5. Application of Taxonomic key to identify Beetle 6. Familarization with IUCN strategies for determining species status (Threatened, Endangered, Vulnerable, Extinct)	**WILDLIFE CONSERVATION AND MANAGEMENT** 1. Plot and plot less methods assessment 2. Point count 3. Call count 4. Identification and Census of wetland water fowl 5. Interpretation (Visual and automated) of remote sensing information for landscape differentiation 6.Familiarization with IUCN strategies for determining species status (Threatened, Endangered, Vulnerable, Extinct) 7. Demonstration of tranquillising techniques	**Deletion and addition**
Course Number: ZOM601, Course Title: LIMNOLOGY & AQUACULTURE Approved since session: 1998-1999; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39	**Course Number: ZOM601, Course Title: HYDROBIOLOGY** Approved since session: 2014-2015	**Change in year**
UNIT 1: INTRODUCTION [7 pds]	**UNIT 1: LIMNOLOGY** [8 pds]	**Addition and deletion**

(a) Definition (b) History (c) Branches of Limnology and importance (d) Water resources and their management (e) Origin and classification of different rivers, lakes and other water bodies. UNIT 2: AQUATIC FLORA AND FAUNA [8 pds] (a) Classification, (b) Identification and importance of local aquatic flora and fauna, (c) Maintenance of fish aquarium, (d) Hydrobiological cycles. UNIT 3: AQUATIC MANAGEMENT [8 pds] (a) Impact of water resources project like dams, sediments in river, lakes & reservoirs, (b) Role of sediments in flood, (c) Origin and impact, (d) Control of floods UNIT 5: AQUACULTURE [8 pds] (a) Culture Practices (b) Catching and Tools (c) Aquatic fauna like fish, crustaceans, Molluscans etc.	(a) Definition (b) History (c) Branches of Limnology and importance (d) Water resources and their management (e) Origin and classification of different rivers, lakes and other water bodies. **UNIT 2: AQUATIC MANAGEMENT** [8 pds] (a) Impact of water resources project like dams, sediments in river, lakes & reservoirs, (b) Role of sediments in flood, (c) Origin and impact, (d) Control of floods **UNIT 3: RAMSAR CONVENTION** [7 pds] (a) Ramsar sites (b) Wetland Policies (c) Origin and classification of different rivers, lakes and other water bodies. **UNIT 5: HYDROBIOLOGY OF RIVER YAMUNA** [8 pds] (a) Characteristics of the stretch of Yamuna from Sikandara to Tajmahal (b) Yamuna action plan-phase I , Phase II for river quality management **SUGGESTED READINGS:** Robert G. Wezel: Limnology (2001)	**Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition**
Course Number: ZOM602, Course Title: IMMUNOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2012-13 UNIT 1: IMMUNITY [7 pds] UNIT 5: IMMUNITY AND HYPERSENSITIVITY [8 pds]	**Course Number: ZOM602, Course Title: IMMUNOLOGY** Approved since session: 2014-15 **UNIT 1: IMMUNITY**[10pds] **UNIT 5: IMMUNITY AND HYPERSENSITIVITY** [8 pds] (d) Immunodeficiency disorders **SUGGESTED READINGS** Kuby's: IMMUNOLOGY Roitt: ESSENTIAL IMMUNOLOGY	**Change in year** **Change in pds** **Addition** **Addition**

Existing syllabus	Revised syllabus	Addition and deletion
Course Number: ZOM603, Course Title: BIOSTATISTICS & COMPUTER APPLICATIONS Approved since session: 2013-14; Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 sem.:39	**Course Number: ZOM603, Course Title: QUANTITATIVE BIOLOGY** Approved since session: 2014-15	**Complete new syllabus** **Change in year**
UNIT 1: STATISTICAL MEASURES [7 pds] (a) Scope, importance and limitations of statistics (b) Populations and Samples, sampling techniques (c) design of experiments (d) collection and tabulation of data (e) Graphical representation of data (f) Frequency distribution.	**UNIT 1: INTRODUCTION** [10 pds] (a) Scope, importance and limitations of biostatistics (b) Samples and Populations (c) Sampling techniques (d) Variables (e) Accuracy and precision (f) Collection and tabulation of data	**Addition and deletion**
UNIT 2: CENTRAL TENDENCY AND DISPERSION [8 pds] (a) Mean and its types (b) Median (c) Mode (d) Absolute & relative measures of dispersion (e) Skewness and Kurtosis.	**UNIT 2: DESCRIPTIVE STATISTICS** [8 pds)] (a) Measures of Central Tendencies - Mean and its types, Mode and Median (b) Concept of variation – measures of dispersion (c) Skewness and Kurtosis.	**Addition and deletion**
UNIT 3: CORRELATION AND REGRESSION (a) Covariance (b) Rank Correlation (c) Correlation Coefficient (d) Regression & Regression Coefficient (e) Graphical Representation of Correlation & Regression [8 Pds]	**UNIT 3: CORRELATION AND REGRESSION** [8 pds] (a) Covariance (b) Rank Correlation (c) Correlation Coefficient (d) Regression and Regression Coefficient	**Addition and deletion**
UNIT 4: STATISTICAL APPLICATIONS [8 pds] (a) Some standard distribution functions (b) Sampling distribution-Chi square, Student's `t' and Snedcor's `F' test.	**UNIT 4: GRAPHICAL REPRESENTATION OF DATA** [8 pds] (a) Graphs like Histograms, ogives and frequency curve (b) Representation of Central Tendencies (c) Graphical representation of correlation, Scatter diagrams and regression lines (d) Applications of software	**Addition and deletion**

UNIT 5: INTRODUCTION TO COMPUTERS & BIOINFORMATICS [8 pds] (a) Hardware (b) Software, Application Software (c) MS Excel (d) Use of inbuilt Statistical function (e) Introduction to MS-Word, Paint (f) Introduction to Power Point (g) Introduction to Bioinformatics SUGGESTED READINGS Daniel: Biostatistics: A FOUNDATION FOR ANALYSES IN HEALTH SCIENCES Brown,Jr & Hollaender: STATISTICS A BIOMEDICAL INTRODUCTION Hunt & Shelly: COMPUTERS AND COMMON SENSE Mahajan: METHODS IN BIOSTATISTICS Sokal & Rohlf: INTRODUCTION TO BIOSTATISTICS	**UNIT 5: HYPOTHESIS TESTING** [8pds] (a) Null and alternative hypothesis (b) Procedure of testing of hypothesis (c) Level of significance (d) Power of test (e) Degree of freedom (f) Tests of simple hypothesis using normal and 't' distribution (g) Types of Errors (h) parametric and non-parametric tests (i) 't' Tests – one sample, two sample and paired t-test (j) Chi-square for goodness of fit (k) 'F' test for comparing variants. **SUGGESTED READINGS** **SUGGESTED READINGS** S.P. Gupta: STATISTICAL METHODS Levin and Reuben: STATISTICS FOR MANAGEMENT Mahajan: METHODS IN BIOSTATISTICS Sokal and Rohlf: INTRODUCTION TO BIOSTATISTICS Zar: Biostatistical analysis	**Addition and deletion**
Course Number: ZOM604, Course Title: GENETICS II Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2013-14 UNIT 1: CHROMOSOMAL GENETICS [8 pds] (a) Chromatin structural and type (b) Histone Structure and function (c) Nucleosome (d) Chromatin territories (e) Y Chromosome. UNIT 2: EXTRA NUCLEAR INHERITANCE AND BREEDING GENETICS [7 pds] (a) Maternal influence and delayed gene effect (b) Plasmone concept (c) Hybridization and Heterosis (d) Inbreding, cross breeding and out breeding. UNIT 3: MUTATIONS AND MUTAGENESIS [8 pds] (a) Spontaneous, induced, Molecular basis of	**Course Number: ZOM604, Course Title: GENETICS II** Approved since session: 2014-15 **UNIT 1: CHROMOSOMAL GENETICS** [10pds] (a) Chromatin structure and types (b) Nucleosome and higher order organsation (c) Chromatin remodelling (d) Y chromosome. **UNIT 2: EXTRA NUCLEAR INHERITANCE AND BREEDING GENETICS** [8pds] (a) Epigenetic inheritance (b) Plasmone concept (c) Hybridization and Heterosis (d) Inbreeding, cross breeding and out breeding. **UNIT 3: GENOME CONCEPT** [8 pds] (a) Mitochondrial genome (b) Plasmids (c) Polytene Chromosome	**Complete new syllabus** **Change in year** **Addition and deletion** **Addition and deletion** **Addition and deletion**

inheritance,(b) DNA damage and repair,(c) Transposable elements, IS elements, Permutation (d) P-element insertional mutagenesis in drosophila.		**Addition and deletion**
UNIT 4: GENE CONCEPT [8 pds] (a) DNA replication (b) RNA polymerase I, II and III (c) Expression-translation and transcription (d) Regulation- Eukaryotes and prokaryotes.	**UNIT 4: GENE CONCEPT** [10pds] (a) DNA replication (b) RNA polymerase I, II and III (c) Initiation– shine Dalgarno equation: Elongation and termination (d) t RNA structure and activation and Ribosome structure(e) Regulation-Eukaryotes and prokaryotes.	**Addition and deletion**
NIT 5: POLYPEPTIDE BIOSYNTHESIS AND TRANSLATION MODIFICATION [8 pds] (a) Genetic code (b) r RNA (c) t RNA structure and activation and Ribosome structure (d) Initiation– shine Dalgarno equation: Elongation and termination (e) Epigenics and proteomics Polypeptide biosynthesis (f) Post translational modification (g) Proteomics	**UNIT 5: MUTATIONS AND MUTAGENESIS** [8 pds] (a) DNA damage and repair,(b) Mutagenesis (c) Transposable elements, IS elements, retrotransposon (d) P-element insertion mutagenesis in *Drosophila*.	**Addition and Deletion**
SUGGESTED READINGS Levin B: GENE Strikberger MW: GENETICS Suzuki etal: GENETIC ANALYSIS Sharma and Sharma: CHROMOSOME TECHNIQUES Ayala F: GENETICS-MODERN APPROACH	**SUGGESTED READINGS** Levin B: GENE IX edition, Pearsons Publn. Strikberger MW: GENETICS, Johns & Barlette Publn. Fitzgerald- Hayes & Reichsman: DNA & Biotechnology, Academic Press. Sharma and Sharma: CHROMOSOME TECHNIQUES, Harper Publn. Ayala F: GENETICS-MODERN APPROACH, Thomsons Publn. Snustad P and Simmons MJ: GENETICS, John Wiley & Sons Inc Suzuki etal: GENETIC ANALYSIS	
Course Number: ZOM605, Course Title: ECOLOGY II Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2013-14 sem.:39 UNIT 1: HABITAT STUDIES	**Course Number: ZOM605, Course Title: NEUROBIOLOGY (NEW COURSE)** Approved since session: 2014-15	**New course delete old course**

[7 pds] (a) Wildlife habitat; definition and importance of habitat studies. Habitat principles and practices with special reference to India (b) Methods of studying free-living animals (birds and mammals) in their natural habitat (c) Ecosystem concept.	**UNIT 1: BRAIN ARCHITECTURE:** [8pds] (a) Neuron: structure, classification and function; nerves: structure, classification and function; (b) Nerves: cranial and spinal nerves. (c) Synapse: chemical and electrical synapses and mechanism (d) Introduction to the structural and functional organization of brain (e) Blood brain barrier and brain CSF barrier.	
UNIT 2: ECOLOGICAL PRINCIPLES AND PRACTICES [8 pds] (a) Principles and practices of Wildlife Management in National parks and sanctuaries in India. Meaning, importance and scope of management (b) Status survey and population estimation/ census techniques (c) Food habit studies- Qualitative/quantitative; direct and indirect methods. Laboratory analysis of droppings.	**UNIT 2: DEVELOPMENTAL NEUROANATOMY:** [8 pds] (a) Development of nerve tissue (b) Development of brain with special emphasis on human brain (c) Genetic and molecular basis of development	
UNIT 3 WILDLIFE TECHNIQUES [8 pds] (a) Animal capture techniques, scope and utility (trapping, netting, noosing, chemical immobilisation, etc) (b) Marking & tagging animals for study; radio-location telemetry; importance, scope and methodology (c) Still and video-photography, recording of calls and study of animal evidences in the field.	**UNIT 3: NEUROPHYSIOLOGY [**10 pds] (a) Sodium potassium pump and restoration of ionic concentration (b) Nerve impulse: generation and conduction of nerve impulse, irritability, conductivity, polarization, action potential, graded potential, depolarization and repolarization; (c) Impulse conduction: direction, voltage, potential and velocity (d) Role of microtubules and microfilaments (e) Influence of juxta-axonal environment on nerve impulse (f) reflex arc and action (g) sensations: general and special (only introduction not tracts)	
UNIT 4: RESOURCE MANAGEMENT [8 pds] (a) Main cause of Wildlife resources and endangered species depletion in India (b)Conflict between man	**UNIT 4: NEURO-ENDOCRINOLOGY:** [8 pds] (a) Neurohormones: location and secretions (b) Chemical composition (c) Inhibitory and excitatory factors	

and wildlife and necessity of conservation (c) The legislative process and provisions in India (d) National and International boards for Wildlife and administrative set-up at National and state levels. UNIT 5: FORESTS AND ITS MANAGEMENT [8 pds] (a) Unprotected forests, protected areas, reserved forests, wastelands (b) Sanctuaries, national parks and biosphere reserves (c) Afforestation, social forestry, wasteland & pasture development projects in India. SUGGESTED READINGS Bailey: WILDLIFE BIOLOGY Giles: WILDLIFE MANAGEMENT TECHNIQUES Teague: A MANUAL OF WILDLIFE CONSERVATION Saharia VB: WILDLIFE IN INDIA Majupuria TC: WILDLIFE WEALTH OF INDIA	for release (d) circadian rhythm related to the hormones (e) Neuro-peptides, Neurotransmitters, Neuro-modulator **UNIT 5: NEUROBIOLOGY OF AGING:** [8 pds] (a)Aging changes in brain (b) Structural changes: neurons and neuroglia (c) Biochemical changes (d) Functional changes (e) reversal of aging Suggested Readings Eric Kandel: PRINCIPLES OF NEURAL SCIENCE Bailey: WILDLIFE BIOLOGY Giles: WILDLIFE MANAGEMENT TECHNIQUES Teague: A MANUAL OF WILDLIFE CONSERVATION Saharia VB: WILDLIFE IN INDIA Majupuria TC: WILDLIFE WEALTH OF INDIA	

Course Number: ZOM606, Course Title: PRACTICAL Total Credits:9, Periods(50 mts. each)/week: 24(L-3+T-0+P/S-24),Min.pds./sem.:312 Approved since session: 2012-13 LIMNOLOGY & AQUA CULTURE IDENTIFICATION (b) Aquatic Plants: *Lemna, Wolffia, Trapa, Typha leaf, Vallisneria, Ceratophyllum, Pistia, Utricularia, Arolla, Nymphaea, Eichornea* (c) Fish. WATER QUALITY ANALYSIS (a) Determination of MPN & Plankton (b) To test the presence of chloride, carbonate and total hardness & BOD in given water sample (c) Study of Physical parameters like TON, TTN, Conductivity & Transparency. IMMUNOLOGY (i) Lysis of RBCs (ii) Counting of WBC (c) Dot Blot assay: Detection method of Ag-Ab specificity. WILDLIFE CONSERVATION AND MANAGEMENT (a) Tranquilising methods (b) Zoo designing- ex-situ and in-situ conservation techniques (d) Habitat evaluation methods.	**Course Number: ZOM606, Course Title: PRACTICAL** Approved since session: 2014-15 **HYDROBIOLOGY** (b) Identification and biometry of Fish. (c) water quality analysis-Qualitative tests of chloride, carbonate and total hardness & BOD and COD in given water sample WATER QUALITY ANALYSIS (a) Determination of MPN & Plankton (b) To test the presence of chloride, carbonate and total hardness & BOD in given water sample (c) Study of Physical parameters like TON, TTN, Conductivity & Transparency **IMMUNOLOGY** (i) Lysis of RBCs (ii) Counting of WBC (c) Titer determination by double diffusion method (d)Dot Blot assay: Detection method of Ag-Ab specificity. **NEUROBIOLOGY** (a) Observation of permanent slides of neural components (b) Slide preparation with differential staining to identify- neuro, and glial cells (c) To measure conductance in nerves of cockroach	**Change in year** **Deletion and addition** **Deletion** **Deletion** **Addition and deletion** **Deletion and Addition**
Course Number: ZOM701, Course Title: CELL & MOLECULAR BIOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2004-05 UNIT 1: CELL MEMBRANE [7 pds] (a) Fluid-Mosaic model (b) Transport (c) Diffusion,	**Course Number: ZOM701, Course Title: CELL & MOLECULAR BIOLOGY** Approved since session: 2014-15 **UNIT 1: CELL MEMBRANE** [8pds] (a) Recapitulation of Plama membrane - Fluid-Mosaic model (b) Donan's Equilibrium and ion	**Change in year**

Donan's Equilibrium (d) Osmosis and measurement of Osmotic Pressure (e) Mechanism of active transport (f) Cytoskeletal elements and microfilaments.	movements (c) Mechanism of active transport (d) Bulk transport (f) Cytoskeletal elements- microtubules and microfilaments (e) Cell motility, interactions and gap Junctions	**Addition and deletion**
UNIT 2: NUCLEIC ACIDS [8 pds] (a) Organisation of DNA in Chromatin; Role of histones and Nucleosomes (b) Active Choromatin (c) Denaturation and Renaturation Kinetics (d) RNA-Types and origin.	**UNIT 2: GENOME ORGANISATION** [10pds] (a) Chromatin organisation and remodeling (b) Role of histones on structure and function of Chromatin. (c) C value paradox and genome size (d) Cot curve - Cot1/2 and Rot ½ value (e) Repetetive and non repetitive DNA (f) Overlapping Genes, split genes and oncogenes	**Addition and deletion**
UNIT 3: GENES [8 pds] (a) Overlapping genes, split genes, transposons and oncogenes (b) DNA binding protein and trans-active factors and DNA methylation (c) Expression and regulation in Pro- and Eukaryotes.	**UNIT 3: DNA REPLICATION AND REPAIR** [10pds] (a) DNA replication in *E. coli* (b) Eukaryotic DNA replication (c) Multiple replicons (d) Origin recognition Complex (ORC) (f) Nucleotide excision repar, base excision repair, mismatch repair and transcriptional coupled repair.	**Addition and deletion**
UNIT 4: RNA PROCESSING [8 pds] (a) Cutting and trimming stable RNA (b) Mechanism of RNA splicing (c) Control of RNA processing.	**UNIT 4: RNA PROCESSING** [8 pds] (a) Mechanism of RNA splicing (b) micro RNA and non coding RNA (c) Translational machinery and translational control (d) tRNA and its modifications (e) Regulation of initiation of translation in eukaryotes; elongation and inhibitors.	**Addition and deletion** **Addition and deletion**
UNIT 5: CELLULAR AND HUMORAL IMMUNITY [8 pds] (a) B Lymphocytes and Humoral immunity: (i) Production and diversity of antibody (ii) Structure and function of antibody (iii) Monoclonal antibody (b) T Lymphocytes and cell mediated immunity (c) Interleukins.	**UNIT 5: MOBILE DNA ELEMENTS** [8 pds] (a) Transposable elements in bacterial. (b) IS elements (c) Composite transposon (d) Replicative and non replicative transposon (e) retrovirus and retrotransposon **SUGGESTED READINGS** DeRobertis and DeRobertis: CELL AND MOLECULAR BIOLOGY Geise: CELL PHYSIOLOGY Levin: GENE V Lodishetal: MOLECULAR CELL BIOLOGY Suzuki et.al.: AN INTRODUCTION TO GENETIC ANALYSES	

Course Number: ZOM702, Course Title: ECOLOGICAL STRATEGIES & RESOURCE MNGT. Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 1998-1999	**Course Number: ZOM702, Course Title: RESOURCE MANAGEMENT STRATEGIES** Approved since session: 2014-15	**Change in year** **Addition and deletion**
UNIT 1: HABITAT ECOLOGY [8 pds] (a) Aquatic habitat: Lentic, lotic and marine (b) Terrestrial habitat: Biomes-desert, grassland, mountain tundra and Antarctic.	**UNIT 1: ENVIORNMENTAL CHALLENGES** [8pds] (a) Environmental Challenges and sustainable development (b) environmental challenges confronting India and developing countries (c) Global Environmental Monitoring and assessment	**Addition and deletion**
UNIT 2: POPULATION AND COMMUNITY ECOLOGY [7 pds] (a) Population ecology (b) Community ecology and dynamics (c) Ecological energetics: Energy flow.	**UNIT 2: CLIMATE CHANGE** [8pds] (a) An introduction to climate change (b) Effect of climate change on natural resources (c) World strategy to combat Climate change	
UNIT 3: BIO-RESOURCES: CONSERVATION AND MANAGEMENT [8 pds] (a) Definition, types and need of conservation (b) Forest resources (c) Wildlife resources (d) World conservation strategy (e) National conservation strategy.	**UNIT 3: ALTERNATIVE RESOURCES** [8 pds] (a) Bio-inspired alternative resources (b) Bio-fertilizer, Biogas, Bio diesel (c) Rain water harvesting (d) Solar resources	**Addition and deletio**
UNIT 4: BIO-REMEDIATION [8 pds] (a) What is bio-remediation (b) Need-scope and future outlook (c) Phyto-remediationbiotechnology of cleaning up the environment by plantS	**UNIT 4: BIO-REMEDIATION** [8 pds] (a)Concept , need and future outlook (b) Biodegredation (c) Bioremidiation (d) Bioaccumulation (e) Phyto-remediation-Biotechnology of cleaning environment by plants	**Addition and deletion**
UNIT 5: ENVIRONMENTAL MONITORING AND IMPACT ASSESSMENT [8 pds] (a) Biological monitoring programme, bioindicators and environmental	**UNIT 5: RESORCE MANAGEMENT AND CONSERVATION POLICIES** [10pds] (a)Introduction to international policies and legal instruments for conservation of natural resources (b)	**Addition and deletion**

monitoring (b) Environmental impact assessment (c) Biological diversity and its measurement (d) Causes of extinction, IUCN Red Data Book, Germplasm bank (e) Man and biosphere programme. SUGGESTED READINGS Odum E: FUNDAMENTALS OF ECOLOGY ADVANCES IN ECOLOGICAL SCIENCES Andrewartha: FUNDAMENTAL OF ECOLOGY Ito S: ECOLOGY Clarke: FUNDAMENTALS OF ECOLOGY Kormondy: ECOLOGY	Nature and formation, Participation and interpretation of Treaties and Reservations (c) NBSAP (Natural Biodiversity Strategy and Planning) **SUGGESTED READINGS** NBSAP document of ministry of Env.	**Addition**
Course Number: ZOM703, Course Title: ENVIRONMENTAL POLLUTION & TOXICOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2013-14 UNIT 1: TOXICANTS [7 pds] (a) Sources of pollutants with reference to Industries, Agro, vehicular, and Municipal waste (b) Classification of toxic agents (c) Heavy metal toxicity-hg, Arsenic. UNIT 2: ENVIRONMENTAL IMPACT [8 pds] (a) Impact of pollutant on general fauna and flora and ecosystem (b) Biodegradation (c) Bio-Transformation (d) Bio-magnification (e) Acid rain and Nuclear winter (f) Global warming. UNIT 3: POLLUTION MANAGEMENT TECHNIQUES [8 pds] (a) Bio-filtration (b) Recharging river systems (c) Waste disposal	**Course Number: ZOM703, Course Title: TOXICOLOGY** Approved since session: 2014-15 **UNIT 1**: **APPLICATION OF TOXICOLOGY** [10pds] (a) Scope and branches of Toxicology(b)Forensic toxicology, Bioassay(c) Toxicity testing (Acute and chronic concept of LD_{50}/LC_{50}) **UNIT 2: MECHANISM OF TOXICITY(XENOBIOTIC METABOLISM**) [8 pds] (a)Route of exposure; absorption and Excretion (b) Metabolic transformation of Toxicants (c) Detoxification **UNIT 3: ORGAN TOXICITY** [8 pds] (a)Liver(b) Respiration (c) Nephrotoxicity(c) Circulation/ Endocrine (d) Immunotoxicity (e) Reproductive	**Complete new syllabus** **Change in year**

management (d) Rain water harvesting (e) Renewable energy resources. UNIT 4: GENOTOXICOLOGY [8 pds] (a) Environmental mutagens (b) Mutagenicity (c) Carcinogens and Teratogens and their impact (d) Measuring Genotoxicity. UNIT 5: RESIDUAL LEVEL OF POLLUTANTS [8 pds] Heavy metal toxicity (a) Mercury (b) Cadmium (c) Arsenic (d) Aluminium.	**UNIT 4: SPECIFIC RESPONSES OF TOXICITY MUTAGENECITY** [8 pds] (a) Genetic toxicology: DNA damage DNA repair (b) carcinogenesis (c) Teratogenesis (d) Measuring Genotoxicity. **UNIT 5: CLASSIFICATION OF TOXIC SUBSTANCES** [8 pds] (a)Industrial solvents and their biological affect (Alcohols, Xylol, Methanol, Acetone and formalin (b) Radiation and nano-toxicity (c) Metals (Mercury and lead) **SUGGESTED READINGS** Haytes, AS: PRINCIPLES AND METHODS OF TOXICOLOGY Iron RD & Gibson JE: TOXICOLOGY OF BLOOD Kimmel CA &Rudka-Sam: DEVELOPMENTAL TOXICOLOGY Bruscik D: PRINCIPLES OF GENETIC TOXICOLOGY Cassarette Douls: PRINCIPLES OF TOXICOLOGY	
Course Number: ZOM704, Course Title: INSTRUMENTATION & STATISTICAL APPLS. Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2012-13 UNIT 1: MICROSCOPY [7 pds] (d) Cytometry and flow cytometry. UNIT 2: SEPARATION TECHNIQUES [8 pds] (b) Ion exchange, affinity and HPLC UNIT 3: SPECTROMETRY [8 pds] (b) Fluorescence, UV, Visible NMR and ESR Spectroscopy UNIT 4: BIOSTATISTICS & COMPUTERS	**Course Number: ZOM704, Course Title: INSTRUMENTATION & STATISTICAL APPLICATIONS.** Approved since session: 2014-15 **UNIT 1: MICROSCOPY** [8pds] (d) Confocal microscopy **UNIT 2: SEPARATION TECHNIQUES** [8pds] (b) Ion exchange, affinity, TLC, GLC and HPLC **UNIT 3: SPECTROSCOPY** [8 pds] (b) Fluorescence, UV, Visible NMR, ESR, AAS Spectroscopy **UNIT 4: IMMUNOLOGICAL TECHNIQUES** [8pds] (a) Immuno diffusion (b) Immunoelectrophoresis (c) Immunocytochemistry (d) flow cytometry **UNIT 5: BIOSTATISTICAL**	**Complete new syllabus**

(a) Measures of central tendencies (b) measures of dispersion (c) correlation & regression (d) MS Excel. UNIT 5: BIOSTATISTICAL APPLICATIONS (c) Student's 't' test, Chisquare test and snedcore test (d) ANOVA.	**APPLICATIONS** [10pds] (c) Design of experiment (d) Student's 't' test, Chisquare test and Snedecor test (e) ANOVA – one way and two way (f) Man-Whitney test & Kruskal-Wallis test. **SUGGESTED READINGS:** Albertsetal: MOLECULAR BIOLOGY OF CELLS Freifelder: PHYSICAL BIOCHEMISTRY Plummer: AN INTRODUCTION TO PRACTICAL BIOCHEMISTRY Work & Work: LAB TECHNIQUES IN BIOCHEMISTRY S.P. Gupta: STATISTICAL METHODS Levin and Reuben: STATISTICS FOR MANAGEMENT	
Course Number: ZOM705, Course Title: ENVIRONMENTAL PARASITOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2013-14 UNIT 1: PARASITISM [7 pds] UNIT 2: ENVIRONMENTAL PROTOZOOLOGY [8 pds] (c) A scotospora and myxozoa ciliophora UNIT 3: TREMATODES [8 pds] (a) Monogene The monogenetic trematodes-Biology, Cyclic physiology and Biochemistry (b) Digenea- The digenetic trematodes, morphology, nutrition and cercaria, Host specificity (c) Biology of Trematodes, physiology UNIT 4: CESTODES [8 pds] UNIT 5: ENVIRONMENTAL ENTOMOLOGY [8 pds]	**Course Number: ZOM705, Course Title: ENVIRONMENTAL PARASITOLOGY** Approved since session: 2014-15 **UNIT 1: PARASITISM** [8pds] **UNIT 2: ENVIRONMENTAL PROTOZOOLOGY** [8 pds] (c) *Ascotospora and myxozoa ciliophora* **UNIT 3: TREMATODES** [10pds] (a) Monogenia - Biology, Cyclic physiology and Biochemistry (b) Digenea- morphology, nutrition, Host specificity (c) Physiology of Trematodes, **UNIT 4: CESTODES AND NEMATODS** [8 pds] **UNIT 5: PARASITIC ARTROPODS** [8 pds] (d) Dipterans- house fly, mosquito, their diseases and control	**Change in year** **Addition and deletion** **Space correction** **Addition and deletion** **Addition** **Addition and deletion**
Course Number: ZOM706, Course Title: PRACTICAL Total Credits:9, Periods(50 mts. each)/week: 3(L-3.5+T-0+P/S-0.5),Min.pds./sem.:312 Approved since session: 2012-13	**Course Number: ZOM706, Course Title: PRACTICAL** Approved since session: 2014-15 **RESOURCE MANAGEMENT STRATEGIES** **TOXICOLOGY**	**Change in year**

ECOLOGICAL STRATEGIES & RESOURCE MANAGEMENT ENVIRONMENTAL POLLUTION ENVIRONMENTAL PARASITOLOGY (c) Study of cysts of cestodes from the rat population and determination of wormland and carrying capacity (d) Study of Helminthological, Arthropodal parasites, including Lice etc. from local environment (e) Parasite egg collection by concentration method.	**ENVIRONMENTAL PARASITOLOGY** (c)Study of permanent slides Helminthological, (d)Arthropodal parasites Study of permanent slides Helminthological, Arthropodal parasites (e)Parasite egg collection by concentration method (f)Collection of Monocystis from earthworm (g)Collection of *Trichonympha* from termites (h)Collection of nematode eggs from soil by Baerman's method.	**Addition and deletion** **Deletion and addition** **Addition and deletion**
Course Number: ZOM801, Course Title: APPLIED ECOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2013-14 sem.:39 UNIT 1: BASIC ECOLOGY TECHNIQUES [8 pds] (a) Planning ecological investigations and projects (b) Wildlife Management: The practices of Management (c) Making observation and records (d) Writing a scientific report. UNIT 2: WORKING WITH WILD ANIMALS [7 pds] (a) Capturing and marking wild animals (b) Post-mortem analysis (c) Physiological indices (d) Wildlife nutrition and Bioenergetics (e) Procedures for Food habit analysis.	**Course Number: ZOM801, Course Title: WILDLIFE TECHNIQUES** Approved since session: 2014-15 **UNIT 1: BASIC RESEARCH TECHNIQUES** [10pds] (a) Planning wild life investigations and projects (b) Wildlife Management: The practices of Management (c) Making observations and records (d) Writing a scientific report. **UNIT 2: POPULATION ANALYSIS-** [8pds] (a) Sex and age determination (b) Life table (c) Population Vulnerability analysis	**Change in year** **Addition and deletion** **Addition and deletion** **Addition and deletion**

UNIT 3: POPULATION ANALYSIS [8 pds] (a) Criteria of sex and age (b) Computer Application in Wildlife management (c) Mathematical modelling in wildlife management (d) Estimating population (e) Statistics applications.	**UNIT 3: NUTRITION AND BIOENERGETICS** [8 pds] a) Nutrition content of foods (b)Feeding Strategies : Field Methods(c)Chemical analysis of Food (d)Energy Partitioning (e) Feacal matter analysis	**Addition and deletion**
UNIT 4: THE ENVIRONMENTAL (HABITAT) MANAGEMENT [8 pds] (a) Habitat analysis and evaluation (b) Habitat improvement techniques (c) Sustained yield management (d) Wildlife damage and control (e) Wildlife programme planning (f) Preparing and evaluating environmental assessment and related documents.	**UNIT 4: HABITAT MANAGEMENT** [8pds] (a) Habitat improvement techniques (b) Wildlife damage assessment and control (c) Effect of Invasive species on native flora and fauna	**Addition and deletion**
UNIT 5: SPECIALIZED TECHNIQUES [8 pds] (a) Sampling Techniques: scan, focal, one zero, line transect, etc. (b) Radio-location telemetry: Methodology and application (c) Instrumentation: Audio-instrumentations; visual instruments; activity recording instruments, weight measurement and estimation (d) Collection and field preservation of biological materials.	**UNIT 5: WILDLIFE HEALTH AND DISEASES MONITORING** [8 pds] (a)Importance of Wildlife Health monitoring(b) Monitoring Protocols for wild animals (i) Free living animals (ii) Chemical capture Techniques(iii) Post mortem analysis (c) Infectious and Non infectious diseases. **SUGGESTED READINGS:** Robert H Giles: WILDLIFE MANAGEMENT TECHNIQUES Black, JD: THE MANAGEMNT AND CONSERVATION OF BIOLOGICAL RESOURCES Mosby, HS: WILDLIFE INVESTIGATION TECHNIQUES Stacey PD: WILDLIFE IN INDIA; ITS CONSERVATION & MANAGEMENT	
Course Number: ZOM804, Course Title: ADVANCED ANIMAL PHYSIOLOGY Total Credits:3, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:39 Approved since session: 2012-13	**Course Number: ZOM804, Course Title: ADVANCED PHYSIOLOGY** Approved since session: 2014-15	**Change in year** **Addition and deletion**
UNIT 1: HOMEOSTASIS [7 pds] (a) Thermoregulation (e) Light and electrical energy production in	**UNIT 1: THERMOREGULATION**[8pds] (a) Homeostatis (e) Light and electrical energy production in animals.	**Deletion**

animals. UNIT 2: PHYSIOLOGY OF NERVOUS SYSTEM AND SENSORY RESPONSE [8 pds] (a) Functional organization of various topographical parts of the mammalian brain (b) Neurotransmitter (c) Memory (d) Vision, hearing and tactile response. UNIT 4: PHYSIOLOGY DISORDERS [8 pds] (f) Digestive system and associated glands disorders. UNIT 5: HORMONES [8 pds] (a) Sources, types, action, control and role in different body functions (b) Reproduction and hormones (c) Estrus cycle, Menstruation and Fertilization. SUGGESTED READINGS: Bell,GH, Davidson,JN and Emsk-Smith,D: TEXTBOOK OF PHYSIOLOGY AND BIO-CHEMISTRY Thiman, KV, Prossor, CL and Brunn EA: COMPARATIVE ANIMAL PHYSIOLOGY Bargmann, W & Scharrer,B: ASPECTS OF NEUROENDOCRINOLOGY Barrington, EJW and Jorgensen, CB: PERSPECTIVES OF ENDOCRINOLOGY Bourne,GH: THE STRUCTURE AND FUNCTION OF MUSCLES Florey,E: GENERAL AND COMPARATIVE ANIMAL PHYSIOLOGY Gergely, J: BIOCHEMISTRY OF MUSCULAR CONTRACTION Hoar, WS: GENERAL AND COMPARATIVE PHYSIOLOGY Johnson,FH: THE LUMINESCENCE OF BIOLOGICAL SYSTEMS Eccles,JC: THE SYNAPSE Huxley,HE: THE MECHANISM OF MUSCULAR CONTRACTION Pincus, G: THE HORMONES VOL I TO V Karlson,P: THE MECHANISM OF HORMONE ACTION Hoyle, G: MUSCULAR CONTRACTION Samson Wright: APPLIED PHYSIOLOGY Harvey, EN: BIOLUMINESCENCE William RH: TEXTBOOK OF ENDOCRINOLOGY	**UNIT 2: STRESS PHYSIOLOGY** [8 pds] (a) Chronic and acute stress (b) Neurons and endocrine control of stress(c) ACTH pathway **UNIT 4: PHYSIOLOGICAL DISORDERS AND THEIR DETECTION** [10pds] (f) Digestive system disorders. **UNIT 5: HORMONES** [8 pds] (a) Endocrine glands (b) hormone, Sources, types, mechanism of action, control and role in different body functions (c) Estrus cycle, Menstruration (d) Fertilization. **SUGGESTED READINGS**: Bell,GH, Davidson,JN and Emsk-Smith,D: TEXTBOOK OF PHYSIOLOGY AND BIO-CHEMISTRY Thiman, KV, Prossor, CL and Brunn EA: COMPARATIVE ANIMAL PHYSIOLOGY Bourne,GH: THE STRUCTURE AND FUNCTION OF MUSCLES Florey,E: GENERAL AND COMPARATIVE ANIMAL PHYSIOLOGY Gergely, J: BIOCHEMISTRY OF MUSCULAR CONTRACTION Hoar, WS: GENERAL AND COMPARATIVE PHYSIOLOGY	**Addition and deletion** **Addition and deletion** **Addition and deletion**
Course Number: ZOM806, Course Title: PRACTICAL	**Course Number: ZOM806, Course Title: PRACTICAL** Approved since session: 2014-15	**Change in year**

Total Credits:9, Periods(50 mts. each)/week: 24(L-3.5+T-0+P/S-0.5),Min.pds./sem.:312 Approved since session: 2013-14 **Ecology estimation techniques** **Biochemistry II:** (a) Preparation of Buffer (b) Estimation of sugar using anthrone method (c) Estimation of amino acid using Ninhydrin reagent (d) Estimation of Protein using modified Biuret method (e) Estimation of Protein using Folin-reagent (f) Estimation of cholesterol (g) Effect of pH on enzyme activity (h) Effect of time on enzyme activity (I) Effect of Substrate Concentration of enzyme activity (j) Determination of Km and Vmax of enzyme by a Michaelis-Menten and Lineweaver- Burk plots. **Advanced Animal Physiology:** (a) Determination of oxygen consumption of an insect in improvised respiration (b) Effect of temperature on amylase activity (c) Effect on pH on amylase activity (d) Determination of calcium of blood serum (e) Measurement of arterial blood pressure (f) Effect of posture and exercise on blood pressure (g) Study of electrocardiograph (h) To determine metabolic rate of an animal.	**Wild life techniques**: **Biochemistry** (a) Preparation of acidic and basic Buffer (b) Estimation of sugar using anthrone method (c) Estimation of amino acid using Ninhydrin reagent (d) Estimation of Protein using Folin-reagent (e) Saponification of fat (f) Effect of pH on enzyme activity (g) Effect of time on enzyme activity (h) Effect of Substrate Concentration of enzyme activity (i) Determination of Km and Vmax of enzyme by Michaelis-Menten and Lineweaver- Burk plots. **Advanced Physiology** (i) Experiments with 'BIOPAC' (j)Urine tests- protein, sugar, ketone	**Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition and deletion**
Course Number: ZOM902, Course Title: MOLECULAR TECHNIQUES Total Credits:4, Periods(50 mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39	**Course Number: ZOM902, Course Title: MOLECULAR TECHNIQUES** Approved since session: 2014-15	**Addition and deletion**

Approved since session: 2007-08		
UNIT 1: DNA TOOLS DNA isolation and purification from eukaryote and prokaryote, Isolation and purification of plasmid DNA, Qualitative detection of DNA by electrophoresis, Quantitative assay of DNA, DNA-RNA Hybridization.	**UNIT 1: DNA ANALYSIS AND SYNTHESIS** [10pd] (a) DNA isolation and purification from eukaryote and prokaryote, (b) Isolation and purification of Plasmid DNA, (c) Qualitative detection of DNA by electrophoresis, (d) Quantitative assay of DNA, (e) DNA-RNA Hybridization, (f) Chemical Synthesis of DNA; Solid phase automated synthesis of DNA.	**Addition and deletion**
UNIT 2: MOLECULAR VARIATION AND GENETIC POLYMORPHISM Allozyme variation and genetic polymorphism analysis, Restriction site variations, RFLP, DNA fingerprinting, Mitochondrial DNA variation.	**UNIT 2: DNA FINGERPRINTING TOOLS AND TECHNIQUES** [10pd] (a) DNA enzymes: Gyrases, Restriction Endonucleases, Polymerases, Ligases &Lyases, (b) PCR (c) RFLP, (d) RAPD, (e) AFLP, (f) Southern and Northern blotting, (g) Autoradiography	**Addition and deletion**
UNIT 3: RECOMBINANT DNA TECHNOLOGY Southern and Northern Blotting, DNA libraries, Transgenesis, Cloning, Gene targeting.	**UNIT 3: CLONING AND EXPRESSION VECTORS** [10pd] (a) Plasmids: Structural and Functional Organization, (b) Replication, (c) Classification, (d) Incompatibility Groups, (e) pBR322 and pUC series of Vectors, (f) Shuttle Vectors, (g) λ, M13 and P2 phage based vectors, (h) Cosmids, phagemids, YAC, BAC.	**Addition and deletion**
UNIT 4: PCR DNA amplifications, Electrophoretic methods, Autoradiography, Site directed Mutagenesis, Nucleotide sequencing.	**UNIT 4: RECOMBINANT DNA TECHNOLOGY** [10pd] (a)Transgenesis, Transfection, Transformation, Competence, Electroporation, Microinjection, (b) Site Directed Mutagenesis and RNA Editing, (c) Nucleotide Sequencing Techniques	**Addition and deletion**
UNIT 5: MOLECULAR TECHNIQUE APPLICATIONS Genome mapping, Crop improvement, Building Phylogenetic tree, Molecular clock, Building genetic database.	**UNIT 5: APPLICATIONS** [12pd] (a) Genetically Modified Organisms (GMOs), (b) Gene Silencing, (c) Gene therapy, (c) Basic idea of Drug Designing, (d) Cloning and Expression of Human Interferon Gene, (e) Detection of Genetic Disorders (Diagnostics in rDNA Technology) **SUGGESTED READINGS**: Sambrook, Russell, Maniatis – MOLECULAR CLONING VOL. 1,2,3. T. A. Brown – GENE CLONING. Winnacker, VCH – AN INTRODUCTION TO GENE TECHNOLOGY-FROM GENES TO CLONES. Primrose, Twyman, Old – PRINCIPLES OF	**Addition**

	GENE MANIPULATION. Wilson & Walker – PRINCIPLES AND TECHNIQUES OF BIOCHEMISTRY AND MOLECULAR BIOLOGY Primrose and Twyman – PRINCIPLES OF GENE MANIPULATION.	
Course Number: ZOM903, Course Title: GENETIC DIVERSITY ASSESSMENTS Total Credits:4, Periods(50 mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39 Approved since session: 2007-08	**Course Number: ZOM903, Course Title: GENETIC DIVERSITY ASSESSMENTS** Class: M.Sc., Status of Course: MAJOR COURSE, Approved since session: 2014-15	**Change in year** **Addition**
UNIT 1: GENETIC VARIATION Mathematical models, Allele frequencies and Polymorphism, Molecular sequence variations, Hardy-Weinberg application, Genetic Drift measurement.	**UNIT 1: GENETIC VARIATION** [10pds] (a) Mathematical models, Allele frequencies and Polymorphism (b) Molecular sequence variations (c) Hardy-Weinberg application (d) Genetic Drift measurement.	
UNIT 2: ACCESSING MOLECULAR DATA ON GENETIC DIVERSITY DNA technologies and Genome mapping, Ex-situ Conservation, DNA libraries and sequence data in conservation, DNA libraries and sequence data in assessment, Application of other DNA technique.	**UNIT 2: ACCESSING MOLECULAR DATA ON GENETIC DIVERSITY** [10 pds] (a) DNA technologies and Genome mapping (b)Ex-situ Conservation (c) DNA libraries and sequence data in conservation (d) DNA libraries and sequence data in assessment (e) Application of other DNA technique.	**Addition**
UNIT 3: APPLICATION & UTILIZATION OF MOLECULAR TECHNIQUES IN GENETIC DIVERSITY Molecular markers for rapid selection and improvement of crop plant, Disease screening, Genetic Engineering applications, Bioremediation process, technologies and tracking, Success and achievements in bioremediation.	**UNIT 3: APPLICATION AND UTILIZATION OF MOLECULAR TECHNIQUES IN GENETIC DIVERSITY** [12pds] (a) Molecular markers for rapid selection and improvement of crop plant (b) Disease screening (c) Genetic Engineering applications (d) Bioremediation process (e) technologies and tracking (f) Success and achievements in bioremediation.	**Addition**
UNIT 4: MOLECULAR TECHNOLOGIES IMPACT ON GENETIC DIVERSITY GMOs - Gene-transfer to non-target groups; species	**UNIT 4: MOLECULAR TECHNOLOGIES IMPACT ON GENETIC DIVERSITY** [10pds] GMOs - Gene-transfer to non-target groups; species invasiveness,	**Addition**

invasiveness, Measures of minimizing direct impacts, Inventories and monitoring, Risk assessments. UNIT 5: TECHNOLOGY AND ETHICS Human genome project, Genomics and Proteomics, Bioinformatics, Issues on Environmental Health, Guidelines on Bioethics.	Measures of minimizing direct impacts, Inventories and monitoring, Risk assessments. **UNIT 5: TECHNOLOGY AND ETHICS** [10pds] Human genome project, Genomics and Proteomics, Bioinformatics, Issues on Environmental Health, Guidelines on Bioethics. Suggested Readings **SUGGESTED READING:** GENETICS :Strcikberger. John Wiley and sons. CONCEPTS OF GENETICS : Klug, Cummings, Spencer and Palladino; Pearson GENETICS :Snustand and Simmons. John Wiley and sons. MODERN GENETIC ANALYSIS: Griffiths, Gelbert, Lewontin, and Miller. W.H. Freeman GENETICS: Russel, Benjamin-Cummings Publ. company	**Addition** **Addition**
Course Number: ZOM904, Course Title: ADVANCES IN PARASITOLOGY Total Credits:4, Periods(50 mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39 Approved since session: 2007-08	**Course Number: ZOM904, Course Title: ADVANCES IN PARASITOLOGY** Approved since session: 2014-15	**Addition and deletion**
Course Number: ZOM905, Course Title: ADVANCED TECHNIQUES IN PARASITOLOGY Total Credits:4, Periods(50 mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39 UNIT 1: [11 pds] Standardization of microscope; methods of scaling; Recovery of parasites; Methods to obtain fresh materials, Computer interfacing and data recording . UNIT 2: [11 pds] Slide preparation in parasitology; Killing, fixing, staining, labelling, smears and whole mount of	**Course Number: ZOM905, Course Title: ADVANCED TECHNIQUES IN PARASITOLOGY** Approved since session: 2014-15 **UNIT 1: METHODS** [10pds] (a) Methods of scaling (b) Recovery of parasites (c) Methods to obtain fresh materials (d) Computer interfacing and data recording . **UNIT 2: PREPARATION** [10pds] (a) Slide preparation in parasitology (b) Killing, fixing, staining, labelling, smears and whole mount of parasites (c) Special techniques for	**Change in year** **Addition and deletion** **Addition and deletion** **Addition and deletion**

parasites; Special techniques for trematodes, cestode & nematode Larval stages; Eggs, Isolation and sedimentation. UNIT 3: [10 pds] Measurements of pH, conductivity, liquid and ion-exchange chromatography, centrifugation; Culture & innoculation filteration techniques**.** UNIT 4: [10 pds] Analysis of body fluids, routine tests in haematology, automation, Role of computers, Statistical softwares: SPSS, MATLAB UNIT 5: [10 pds] Quantitative and qualitative measurements of ion transport in parasites across parasitological membranes and vectors, Flux studies in free living parasites and their larvae	trematodes, cestode& nematode Larval stages (d) Eggs, Isolation and sedimentation. **UNIT 3: MOLECULAR TECHNIQUES** [10 pds] (a) Molecular markers for parasite identification (a) RAPD (b) RFLP (c) DNA BAR coding of parasites **UNIT 4: ANALYSIS** [10 pds] (a) Analysis of body fluids (b) routine tests in haematology (c) Statistical softwares: SPSS, MATLAB **UNIT 5: CULTURE OF PARASITE** [10 pds] (a) Invitro culture of Protozoan-Plasmodium (b) invitro culture of cestode- Echiococcus (c) invitro culture of Nematode:*C. elegance* (d) *Invitro* culture of trematoda – Fasciola **SUGGESTED READINGS:** Cheng, TC: FUNDAMENTAL OF PARASITOLOGY Chandler, AC: INTRODUCTION TO PARASITOLOGY Roy Chaudhary: HELMINTHOLOGY Schmidt, GD: ESSENTIAL OF PARASITOLOGY Scientific Material from WHO Bhalerao, GD: HELMINTHES, PARASITES OF THE DOMESTICATED ANIMALS IN INDIA	**Addition and deletion** **Addition and deletion** **Addition and deletion**
Course Number: ZOM906, Course Title: EXPERIMENTAL ENTOMOLOGY Total Credits:4, Periods(50 mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39 Approved since session: 2007-08 UNIT 1: PROCUREMENT OF EXPERIMENTAL INSECTS Tools for insect collection, their taxonomical status by keys, preservation, display and photography.	**Course Number: ZOM906, Course Title: EXPERIMENTAL ENTOMOLOGY** Approved since session: 2014-15 **UNIT 1: PROCUREMENT OF INSECTS** [11 pds] (a) Method of Sampling and Collection (b) Categorization based on taxonomic keys (c) preservation (d) display and Photography.	**Change in year** **Addition and deletion**

UNIT 2: FORMULATIONS Types of formulations, additives (synergists), binders and baits, encapsulation, bioassay under field, simulated field conditions and selection of tools for pesticide application..	**UNIT 2: FORMULATION & PESTICIDE APPLICATION** [11 pds] (a) Types of formulation, additives (synergists) (b) binders and baits (c) encapsulation (d)bioassay (e) simulated field conditions and selection of tools for pesticide application.	**Addition and deletion** **Addition and deletion**
UNIT 3: FRACTIONAL ANALYSIS Extraction methods, isolation of fractions, qualitative analysis of bioactive phytochemical groups.	**UNIT 3:MICROBIAL EXPERIMENTATION**[10 pds] (a) Preparation of culture media (b) isolation and identification of entomopathogenic fungi and bacteria (c) Cox postulation (d) extraction and screening of mycotoxins.	
UNIT 4: MICROBIAL EXPERIMENTATION Preparation of culture media, isolation and identification of entomophagus fungi and moulds, extraction and screening of mycotoxins.	**UNIT 4: BIOCHEMICAL EXAMINATION** [10 pds] (a) Qualitative and quantitative estimation of different enzymes (b) growth hormones and regulators.	**Addition and deletion**
UNIT 5: BIOCHEMICAL EXAMINATION Qualitative and quantitative estimation of different enzymes, growth hormones and haemolymphatic studies.	**UNIT 5: PESTICIDE RESIDUE** [10 pds] (a) Collection of pesticides residues and their examination (Qualitative and quantitative methods-Chromatographical and Colorometric).	**Addition and deletion**
SUGGESTED READINGS: Rockstein M: THE PHYSIOLOGY OF INSECTS ED 2 VOLI-V Wigglesworth VB: THE PRINCIPLES OF INSECT PHYSIOLOGY Chapman RF: THE INSECT STRUCTURE AND FUNCTION Snodgrass RE: PRINCIPLES OF INSECT MORPHOLOGY Imms AD, Richards DW & Daviea RG: GENERAL TEXTBOOK OF ENTOMOLOGY Metcalf CL et.al.: DESTRUCTIVE AND USEFUL INSECTS: THEIR HABITS AND CONTROL Srivastava RP & Saxena RC: A TEXTBOOK OF INSECT TOXICOLOGY Scott W, Patton & Francis William: A TEXT BOOK OF MEDICAL ENTOMOLOGY	**SUGGESTED READINGS:** Busnne JR: A CRITICAL REVIEW OF THE TECHNIQUES FOR TESTING INSECTICIDE DG Boucias and JC Pendland: PRINCIPLES OF INSECT PATHOLOGY Lawrence Lacey: MANNUAL OF TECHNIQUES IN INSECT PATHOLOGY (Biological techniques series) Metcalf CL et.al.: DESTRUCTIVE AND USEFUL INSECTS: THEIR HABITS AND CONTROL N Raaman: PHYTOCHEMICAL TECHNIQUES Pradhan S &Jotwani MG: PRINCIPLES OF BIOASSAY OF INSECTICIDES	**Deletion and Addition**
Course Number: ZOM907, Course Title: TOXICOLOGY Total Credits:4, Periods(50	**Course Number: ZOM907, Approved since session 2014-15**	**Change in year**

mts. each)/week: 4(L-3.5+T-0+P/S-0.5),Min.pds./sem.:39 Approved since session: 2007-08 UNIT 1: GENERAL PRINCIPLES & CLASSIFICATION [11 pds] Scope and branches of toxicology; Toxicity-Acute, subacute, chronic; Toxicity testing & test animal; Classification of toxic agents (a) Agricultural and industrial chemicals (b) Heavy metals (c) Drugs & chemicals. UNIT 2: METABOLISM OF TOXIC AGENTS [11 pds] General principle; Route of exposure & distribution; Absorption; Excretion; Metabolic transformation. UNIT 3: ENVIRONMENTAL POLLUTION [10 pds] Air; Water; Soil. UNIT 4: IMPACT OF POLLUTANTS [10 pds] Ecosystem; Bioaccumulation; Biotransformation; Biodegradation. UNIT 5: INDUSTRIAL & REPRODUCTIVE TOXICOLOGY [10 pds] Industrial chemicals-pathological effect on man . SUGGESTED READINGS: Haytes AS: PRINCIPLES AND METHODS OF TOXICOLOGY Iron RD & Gibson JE: TOXICOLOGY OF BLOOD Kimmel & Rudka-Sam: DEVELOPMENT TOXICOLOGY Buscik D: PRINCIPLE OF GENETIC TOXICOLOGY **Course**	**Course Title: ENVIRONMENTAL TOXICOLOGY** Approved since session: 2014-15 **UNIT 1: ECOTOXICOLOGY** [11pds] (a) Air pollution (b) Soil pollution(c) Aquatic pollution **UNIT 2: ENVIRONMENTAL IMPACT** [10 pds] (a)Hazardous waste (Industrial wastage ,Leather, paper and its management(Chemical, Hospital)(c)EIA **UNIT 3: ECOLOGICAL IMPACTS** [10 pds] (a) Environmental, Biotranformation, Bioremediation, Bioaccumulation (b)Biomagnifications (c)Risk assessment **UNIT 4: ENVIORNMENTAL POLLUTION AND THEIR TOXICITY** [11 pds] (a)Metals: Hg, Pb, Zn, Ni, Ar, Cd (b) Agrochemicals: Pesticides, Fertilizers(C) Non-ionizing radiation:(Microwaves, Mobile tower, Mobile phones. **UNIT 5: WILDLIFE TOXICOLOGY** [10 pds] (a)Analytical Toxicology (b)Biomonitoring of pollutants(c) International and National Regulations(special reference to Env. Toxicants) **SUGGESTED READINGS:** Haytes AS: PRINCIPLES AND METHODS OF TOXICOLOGY Iron RD & Gibson JE: TOXICOLOGY OF BLOOD Kimmel &Rudka-Sam: DEVELOPMENT TOXICOLOGY Buscik D: PRINCIPLE OF GENETIC TOXICOLOGY	**Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition and deletion** **Addition and deletion**
Course Number: ZOM908, Course Title: INSECT PESTS MANAGEMENT Total Credits:4, Periods(50 mts. each)/week: 4(L-	**Course Number: ZOM908, Course Title: PESTS MANAGEMENT** Approved since session: 2014-15	**Change in year**

3.5+T-0+P/S-0.5),Min.pds./sem.:39 Approved since session: 2013-14		**Addition and deletion**
UNIT 1: INSECT PEST [11 pds] Identification, Systematic position, Life cycle and Control of important local pests.	**UNIT 1: INSECT PESTS** [11 pds] (a) Principles and methods of IPM, IPM components (b) biological control agents (insect parasitoid and predators (c) non- insect predators and microbes).	**Addition and deletion**
UNIT 2: PEST POPULATION AND CROP LOSS [11 pds] Measurement of Pest population, Factors affecting pest population, studies on crop losses and methods for estimating crop losses.	**UNIT 2: PEST POPULATION AND CROP LOSS** [11 pds] Measurement of Pest population, Factors affecting pest population, methods for estimating crop losses.	**Addition and deletion**
UNIT 3: PEST CONTROL [10 pds] Knowledge of I, II, & III generations of pesticides including attractants, pheromones, repellents and antifeedents and their mode of action.	**UNIT 3: ARACHNIDS** [10 pds] Introduction, General morphology, economic importance of spiders and mites.	**Addition and deletion**
UNIT 4: BIOASSAY OF PESTICIDES [10 pds] Methods for bioefficacy of Pesticides, Extraction & dose preparation for biopesticides and Determination of LC_{50} by Graphical, probit method.	**UNIT 4: CLIMATE CHANGE & PEST DYNAMICS** [10 pds] Introduction, impact of pollution, global warming on crop pests and their natural enemies.	**Addition and deletion**
UNIT 5: PESTICIDES RESIDUE [10 pds] Collection of Pesticides residues & their examination (Qualitative & Quantitative methods-Chromatographical & Colorimetric).	**UNIT 5: ECONOMIC IMPORTANCE OF INSECTS** [10 pds] Biological indicators, pollinators, biocontrol agents, raisin & dye producer, food & medicine for human beings and application in forensic science.	**Addition and deletion**
SUGGESTED READINGS: Atwal AS & Singh B: PEST POPULATION & ASSESSMENT OF CROP LOSSES Busnne JR: A CRITICAL REVIEW OF THE TECHNIQUES FOR TESTING INSECTICIDE Melnikov NN: CHEMISTRY OF PESTICIDES Murphy SD: "PESTICIDES" BASIC SCIENCE OF POISON O'Brien RD: INSECTICIDES, ACTIONS & METABOLISM Pradhan S & Jotwani MG:	**SUGGESTED READINGS:** Atwal AS & Singh B: PEST POPULATION & ASSESSMENT OF CROP LOSSES Chapman RF: THE INSECT STRUCTURE AND FUNCTION Gautam R.D.: BIOLOGICAL PEST SUPPRESSION Imms AD, Richards DW &Daviea RG: GENERAL TEXTBOOK OF ENTOMOLOGY Melnikov NN: CHEMISTRY OF PESTICIDES Murphy SD: "PESTICIDES" BASIC SCIENCE OF POISON	**Addition and deletion**

PRINCIPLES OF BIOASSAY OF INSECTICIDES Pritam Singh: ARTIFICIAL DIETS FOR INSECTS, MITES & SPIDERS Finney DJ: PROBIT ANALYSIS-A STATISTICAL TREATMENT OF THE SIGNOID RESPONSE CURVE. Gupta PK & Solunkhe DK: MODERN TOXICOLOGY Paget GE: METHODS IN TOXICOLOGY		
	Course Number: ZOM 909: ADVANCED NEUROBIOLOGY 1 (NEW COURSE) Class: M.Sc., Status of Course: MAJOR COURSE, Approved since session: 2014-15 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:39 **UNIT-1: NEURONAL TRACTS AND AUTONOMIC NERVOUS SYSTEM:** [10 pds] (a) Somato-sensory system, (b) motor system, (c) sensory system, (d) cerebellum, (e) autonomic nervous system: components, central & peripheral parts, cortical control, distribution and function. **UNIT-2: NEUROTRANSMITTERS AND THEIR RECEPTORS:** [10pds] [10 pds] [7pds] (a) small molecule neurotransmitters - Glu, GABA, Gly, ACh, dopamine and serotonin (b) neuropeptides - substance P, opioids, hypothalamic and posterior pituitary hormones (c) hypothalamic and posterior pituitary hormones (c) unconventional "poorly understood" neurotransmitters - ATP and other purines, endocannabinoids, nitric oxide (d) Ionotropic receptor activation substances - nicotinic acetylcholine receptors, AMPS, NMDA, GABA (e) metabotropic receptors - muscarinic acetylcholine receptors, metabotropic glutamate receptors α and β adrenergic receptors. **UNIT-3: LIMBIC SYSTEM AND SLEEP:** [12 pds] (a)Limbic system, (b) emotions (as associative learning and as states of the body, (c) mirror neurons, (d)	**(NEW COURSE)**

	addiction and mood disorders, (e) Sleep (stages, dreams, brain wave, conversion of neural circuitry during changes in the stages of sleep). **UNIT-4: MOLECULAR BASIS OF NEUROLOGICAL DISEASES:** [10 pds] (a)Parkinson's model, (b) Epilepsy and channelopathies (c) Alzheimer's disease, (d) Schizophrenia,(e) stroke and demyelinating diseases. **UNIT 5: TECHNIQUES:**[10 pds] **(a)Histology:**Nerve cell body- H & E, Thionin, Toluidine blue , Cresyl violet, Golgi;Nissl granules – Nissl stain; Neurofibrlis- Bielschowsky; Neuroglia - Cajal gold sublimate, Hortega; Axons - Holm's; Myelin – Weigert, Marchi; Nerve endings - Zin& Morin. (b) **Histochemistry** for localisation of neurotransmitters, neuromodulators, neuromediators. (c) **Immunological** techniques with the help of monoclonal antibodies. **SUGGESTED READINGS** **Kandell et.al: PRINCIPLES OF NEURAL SCIENCE, MCGRAW HILL PUBLN.** **Shepered: NEUROBIOLOGY, OXFORD PRESS** **Barr's: THE HUMAN NERVOUS SYSTEM, LIPPINCOT RAVEN PUBLN.** **Campbell & Reece: BIOLOGY, PEARSON BENJAMIN CUMMINS PUBLN.**	
	Course Number: ZOM910, Course Title: ADVANCED NEUROBIOLOGY 2 (NEW COURSE) Class: M.Sc., Status of Course: MAJOR COURSE, Approved since session: 2014-15 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0), Min.pds./sem.:39 **UNIT-1: NEUROPLASTICITY**: [08pds] (a) Concept of plasticity and long term synaptic plasticity, (b) Characteristics and molecular basis of long-term potentiation and depression (LTP and LTD) (c) Cellular mechanisms for synaptic change (d) Spike- timing dependant plasticity (STDP), (e) Hebb's postulate, (f) Circuit plasticity, (g) Mirror neuron: concept, distribution, function, (h) Role of glial cells.	**New course addition**

	UNIT-2: COGNITION: [12 pds] (a)Attention, recognition (including agnosias and prosopagnosia), integration, planning, selection and execution. (b) Memory: different category (declarative and procedural), immediate, working, long term. (c)Language (ability to associate arbitrary symbols with specific meanings, Wernike'sarea, Broka's area, lateralisation of language. (d) Music and executive functions (role of music training in increasing intelligence quotient of learners and enhancing executive functions; difference in increase of intelligence quotient due to learning music viz. effect of different kinds of music on different types of intelligences including Mozart effect; effect on intelligence quotient / scholastic performance.	
	UNIT-3: NEUROSYSTEMS: [10pds] (a)Visual, (b) Auditory, (c) Olfactory, (d) Reticular formation (e) Vibration & equilibrium). **UNIT-4: BIOLOGY OF CONSCIOUSNESS:** [10 pds) (a)Consciousness states, (b) Different theories of consciousness from the perspective of neurology, psychology and cognitive neuroscience , (c) Systems neuroscience approach to conscious perspective experience, (d) Effect of medication on the human body **UNIT 5: TECHNIQUES:** [12 pds] ***Only general principles, video-demonstration and interpretation of data. Comparison and significance of different techniques*** (a) **Marker studies** for racing neuronal pathway with enzyme Horse radish peroxide (HRP) and some fluorochrome dyes (b) **Cell lineage** studies using fluorescent dyes ; (c) Stem cell culture. (e) **Neuronal implant** studies to replace dead neurons, (f) Cerebro Spinal Fluid **(CSF)** studies. (g) **Evoked potential**, microelectrode recordings of potential changes in individual neuron / nerve fibre. (h) **Scan** studies: CT, MRI, PET, SPECT scans. (g) **Meditation**: Electromagnetic, biochemical	

	studies.(i) Electro Encephalography (EEG), (j) Electro Myography (EMG), (k) Magneto Encephalography (MEG). **Suggested Readings:** **Kandell et.al: PRINCIPLES OF NEURAL SCIENCE, MCGRAW HILL PUBLN.** **Shepered: NEUROBIOLOGY, OXFORD PRESS** **Barr's: THE HUMAN NERVOUS SYSTEM, LIPPINCOT RAVEN PUBLN.** **Zigmond : FUNDAMENTAL OF NEUROSCIENCES**	
Course Number: ZOM955, Course Title: GENE, GENOME & BIOINFORMATICS Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2009-10 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 UNIT 1: DNA AND RNA (a) Replication, repair and recombination (b) Transcription, RNA modification and translation (c) Genes, Mutation and Mutagenesis (d) Transposons. UNIT 2: GENETIC SYSTEM (a) Bacterial and Virus genetic system (b) Extra chromosomal inheritance (c) Oncogenes and Tumor suppressor genes (d) Micro-array Technology. UNIT 3: DNA FINGERPRINTING AND GENOME ANALYSIS (a) DNA Fingerprinting (b) Southern and Fluorescence in situ hybridization for genome analysis (c) Molecular markers-RFLP, RAPD, AFLP, and their applications (d) Genome size and Genomic libraries. UNIT 4: BIOINFORMATICS-GENE DATA MINING (a) Gene bank data base (b) NCBI genome resources (c) Sequence alignment (d) Data mining techniques and tools UNIT 5: BIOINFORMATICS-APPLICATIONS	**Course Number: ZOM955, Course Title: GENE, GENOME & BIOINFORMATICS** Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2014-15 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 **UNIT 1: GENETIC SYSTEMS** [10pds] (a) Microbial genetic systems (b) Life at 110^0C, at pH 1 or 5MKCl (c) Oncogenes and Tumor suppressor genes (d) c DNA applications (e) mi RNA and Si RNA target genes **UNIT 2: PROTEOMICS & TRANSCRIPTOMICS**[10pds] (a) Proteins - Heat Shock proteins (b) Scaffolding (c) Protein – Protein interaction (d) Genomic browsers (e) Chromosomal rRNA operons **UNIT 3: GENOME FUNCTIONS** [11pds] (a) Technology of sequencing and assembly (b) Orthology predictions (c) Transcription factor binding sites (TFBs) (d) Array technologies and its uses **UNIT 4: BIOINFORMATICS-GENE DATA MINING** [11pds] (a) Gene bank data base (b) NCBI genome resources (c) Sequence alignment (d) Data mining techniques and tools **UNIT 5: BIOINFORMATICS-APPLICATIONS** [10pds]	**Change in year** **Addition and deletion**

(a) Blast algorithm (b) Phylogenetic analysis-building Trees and Motif (c) Popular comprehensive analysis packages (d) Submitting genetic sequence to the global gene data base.	(a) Genetic algorithm (b) Phylogenetic analysis-building Trees and Motif (c) Using BLAST for similarity searches and comparing two sequences (d) Working with single gene and annotation work flow (e) Submition gene sequences to database. **Suggested Readings** Sambrook, Russell, Maniatis – Molecular Cloning vol. 1,2,3. T. A. Brown – Gene Cloning. Winnacker, VCH – An Introduction to gene Technology-from genes to clones. Primrose, Twyman, Old – Principles of Gene Manipulation. Wilson & Walker – Principles and Techniques of Biochemistry and Molecular Biology Primrose and Twyman – Principles of Gene manipulation.	
Course Number: ZOM956 Course Title: MOLECULAR PARASITOLOGY & VECTOR CONTROL Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2009-10 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 UNIT 1 Confocal Microscopy, Real Time-PCR Techniques, Cloning techniques of microbes and parasites. UNIT 2 Vector control Biotechnology, Green Larvicides, Biological Larvicides, Nanobiology and Larvicides. UNIT 3 Development and Testing of Larvicides, Insecticides, Adulticides, System Biology in Parasitology. UNIT 4 Chitinase Biotechnologies, Gel Techniques, DNA Analysis and DNA Fingerprinting of Parasites,	**Course Number: ZOM956 Course Title: MOLECULAR PARASITOLOGY & VECTOR CONTROL** Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2014-15 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 **UNIT 1 INSTRUMENTATION and TECHNIQUES** [11 pds] (a)Confocal Microscopy (b) Real Time-PCR Techniques (c) Cloning techniques of microbes and parasites. **UNIT 2 LARVICIDES CONTROL** [11 pds] (a)Vector control Biotechnology (b) Green Larvicides (c)Biological Larvicides (d)Nanoparasitology biology and nanolarvicides. **UNIT 3 DEVELOPMENT AND TESTING** [10pds] (a) Larvicides, (b) Adulticides (c) Insect resistance **UNIT 4: APPLICATIONS** [10pds] (a) Chitinase Biotechnologies (b) DNA Analysis (c) DNA Fingerprinting of Parasites (d)Microbiology of Fermentation Technology for	**Change in year** **Addition and deletion** **Addition and deletion**

Microbiology of Fermentation Technology. UNIT 5: ADVANCES IN PEST AND VECTOR CONTROL TECHNOLOGIES (a) Various types of Pests and Vectors: Their Behaviour, Ecology and Adaptations (b) Estimation of Pest Population and Crop Loss-Methods and Factors (c) Control Technologies-General, Microbial and Combitorial Approaches.	parasitology **UNIT 5: VACCINE TECHNOLOGY** [10pds] (a) RNA editing (b) Parasitic immunity (c) Vaccine development (d) Control of diseases – NTD, malaria **SUGGESTED READINGS:** AN Clements: BIOLOGY OF MOSQUITOES AR Walker, A Bouattour, JL Camicas, AE Pena, IE Horak, AA Latif, RG Pegram, PM Preston: TICKS OF DOMESTIC ANIMALS IN AFRICA: A GUIDE TO IDENTIFICATION OF SPECIES Belding DL: TEXT BOOK OF PARASITOLOGY III EDITION, APPLENTER CENTRUEY CNOFF, NEW YORK	
Existing syllabus	**Revised syllabus**	**Addition and deletion**
Course Number: ZOM957 Course Title: RESTORATION ECOLOGY, CONSRV. & MNGT. Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2009-10 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 UNIT 1: ABIOTIC ENVIRONMENT (a) Problems of vital life sustainable system of Air, Water, and Land (b) Remedial measures for clean air, water and land (c) Habitat loss, fragmentation and its restoration. UNIT 2: BIOTIC ENVIRONMENT (a) Depletion of Bio-resources (b) Anthropogenic pressures (c) Monitoring and recent trends in research (d) Capacity Building efforts. UNIT 3: *Ex Situ* CONSERVATION EFFORTS Genetic resource Centres, Zoos, Botanical gardens (b) Gene/seed/sperm banks (c) Care in captivity (d) Nutrition (e) Environment enrichment. UNIT 4: *In Situ* CONSERVATION EFFORTS	**Course Number: ZOM957 Course Title: RESTORATION ECOLOGY CONSRVERVATION & MANAGEMENT** Class: M.Phil., Status of Course: MAJOR COURSE, Approved since session: 2014-15 Total Credits:4, Periods(50 mts. each)/week: 4(L-4+T-0+P/S-0),Min.pds./sem.:52 **UNIT 1: ABIOTIC ENVIRONMENT [11pds]** (a) Problems affecting vital life support system (b) Remedial measures (c) Habitat loss, Fragmentation and restoration **UNIT 2: CAPCITY BULIDING [10pds]** (a) Introduction (b) human capacity (c) Infrastructural capacity (d) funding capacity **UNIT 3: MONITORING AND RECENT TRENDS IN RESEARCH [10pds]** Genetic resource Centers, Zoos, Botanical gardens (b) Gene/seed/sperm banks (c) Care in Captivity(d) Nutrition (e) Environment enrichment. **UNIT 4: ENVIORNMENT EDUCATION AWARENESS AND**	**Change in year** **Addition and deletion**

(a) Conservation efforts within natural system (b) National Parks (c) Sanctuaries (d) Nature reserves (d) Biosphere reserves. UNIT 5: MASS AWARENESS AND LEGISLATIONS (a) Education and awareness (b) Domestic legislation and conventions (c) Media communication (d) Agencies.	**PARTICIPATION [10pds]** (a) Conservation efforts within natural system (b) National Parks (c) Sanctuaries (d) Nature reserves (d) Biosphere reserves. **UNIT 5: MASS AWARENESS AND LEGISLATIONS [11pds]** (a) Education and awareness (b) Domestic legislation and conventions (c) Media communication (d) Agencies. **SUGGESTED READINGS:** WPA-Natraj Publication Rogers and Panwar manual of PAMS/Protected area Management System Wildlife management –Rajesh Gopal Subramanyam&Sambamurty: ECOLOGY WWF HANDBOOK: WILDLIFE CONSERVATION & MANAGEMENT ACT 1972	
	Course Number: ZOM 958, Course Title: VECTOR BIOLOGY AND MANAGEMENT Class: M.Phil., Status of Course: MAJOR COURSE, Total Credits: 4, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:52 **UNIT 1. VECTORS** [11 pds] (a) Common vectors (Mosquito, Ticks & mites, Housefly and bed bugs, white flies, aphids and mealy bugs), their life cycle, adaptations and diseases transmission. **UNIT 2. EXPERIMENTAL REARING OF VECTORS** [11 pds] (a) Rearing of mosquito, housefly, ticks & mites, artificial diet. **UNIT 3. VECTOR MONITORING** [10 pds] (a) Population dynamics in relation to pest, natural enemies and weather conditions, maintenance of data, modelling and forecasting. **UNIT 4. MANAGEMENT OF VECTORS** [10 pds] (a) Physical, Chemical, Biological, cultural and legal control. **UNIT 5. PESTICIDES USED IN VECTOR CONTROL** [10 pds] (a) Plant and microbial based pesticides, Synergists (b) Nano-pesticides (c) Phyto-nano-pesticides. **SUGGESTED READINGS:**	**New course addition**

	AN Clements: BIOLOGY OF MOSQUITOES AR Walker, A Bouattour, JL Camicas, AE Pena, IE Horak, AA Latif, RG Pegram, PM Preston: TICKS OF DOMESTIC ANIMALS IN AFRICA: A GUIDE TO IDENTIFICATION OF SPECIES Belding DL: TEXT BOOK OF PARASITOLOGY III EDITION, APPLENTER CENTRUEY CNOFF, NEW YORK Burton J Bogitsh and Thomas C Cheng: HUMAN PARASITOLOGY ACADENAC PRESS. G. Geevarghese and A.C. Mishra: *Haemaphysalis* Ticks of India JB Silver: MOSQUITO ECOLOGY, FIELD SAMPLING METHODS Marquardt WC, Demaree RS, Gruieve B. 2000: PARASITOLOGY ANA VECTOR BIOLOGY, HARCORT AP	
Existing syllabus	**Revised syllabus**	**Addition and deletion**
	Course Number: ZOM 959, Course Title: ANIMAL COGNITION Class: M.Phil., Status of Course: MAJOR COURSE, Total Credits: 4, Periods(50 mts. each)/week: 3(L-3+T-0+P/S-0),Min.pds./sem.:52 **UNIT 1. INTRODUCTION** (a) Meaning and scope of animal cognition (b) Categorization of objects and stimuli : Lab v/s nature (c) Concepts of same – different (d) Number concepts (e) Spatial concepts **UNIT 2. LEARNING & MEMORY** (a) Caching and episodic memory in scrub jays (b) Insightful behaviour (c) Imitative behaviour (d) Bird song : a cognitive process (e) Transitive inference **UNIT 3. COGNITION IN INVERTEBRATES** (a) Cognition in ant colonies (b) Flexible behavior in spiders (c) Cognition in honey bees **UNIT 4. COGNITION IN VERTEBRATES** (a) Skill development in archer fish (b) Social Cognition in tortoises (c) Cognitive abilities of parrots (c) Event Related Potential and cognition in dolphins (d) Cognition in elephants **UNIT 5. ANIMAL LANGUAGE** (a) Language skill development in-Chimpanzees, Bonobos, Parrots, Sea lion (b)intelligence v/s rationality and consciousness	**New course addition**

	SUGGESTED READINGS: The Cognitive Animal – Empirical and Theoretical Perspectives on Animal Cognition, edited by Bekoff, Allen and Burghardt. MIT Press, 2002 Animal Minds, Beyond Cognition to Consciousness - Donald Griffin. University of Chicago Press. 2001 Cognition, Evolution, and Behaviorby Sara J. Shettleworth. Oxford University Press. 2009 Animal Cognition: The Mental Lives of Animals – Clive D.L. Wynne. Palgrave MacMillan, 2002 Animal learning and cognition: An introduction (3rd ed.) - John M. Pearce. Psychology Press, UK. 2008 Animal Thinking: Contemporary Issues in Comparative Cognition - Menzel and Fischer. MIT Press, 2011	