RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY

Changes in SYLLABUS for consideration of the Faculty and Academic Council

Recommended by Board of Studies in ZOOLOGY Faculty of SCIENCE and TECHNOLOGY

B. Sc. ZOOLOGY SEM-I

Subject and SEMESTER	Paper No.	Matter to be DELETED	Matter to SUSTITUTED
B.Sc ZOOLOGY SEM-I	**Paper – I : Life and Diversity of Animals- Nonchordates (Protozoa to Annelida)**	2.4 Obelia: structure and life cycle, corals and coral reef formation. 4.3 Trochophore larva and its significance	2.4 Obelia: structure and life cycle, Polymorphism in hydrozoa. 4.3 Copulation, fertilization and cocoon formation in leech.
	Paper -II : Environment Biology	3.3 Wildlife conservation acts (1972 and 1984), Introductory study of national parks and sanctuaries- Tadoba, Kanha, Bharatpur and Nagzira. 3.4 Hot spots of biodiversity in India.	3.3 Wildlife conservation act 1972, Zoological survey of India: formation and role in animal conservation. 3.4 Hot spots of biodiversity in India. Study of national parks and sanctuaries- Tadoba, Melghat and Nagzira. 4.4 Causes and effects of space pollution

	Practical	4. Mounting: Nereis parapodia, Jaws of Leech, Nephridia of Leech	Section A 1. Study of museum specimens by specimen /Charts /Model (Classification of animals up to orders). 2. Study of permanent slides: by specimen/Charts. 3. Dissection: Virtual dissection by using computer software/ programme. 4. Mounting: Zooplanktons, Spicules and gemmules of sponge.

B. Sc. ZOOLOGY SEM-II

Subject and SEMESTER	**Paper No.**	**Matter to be DELETED**	**Matter to SUSTITUTED**
	Paper - III : Life and Diversity of Animals- Nonchordates (Arthropoda to Hemichordata)	1.2 Cockroach: Mouth parts, digestive system and reproductive system. 1.4. Study of crustacean larvae: Nauplius, Zoea and Megalopa; Social behavior in honey bees. 2.3 Pearl formation in Mollusca 3.3 Water vascular system and locomotion in starfish	1.2 Cockroach: Mouth parts, digestive system and internal male and female reproductive systems. 1.4. Study of crustacean larvae : Nauplius, Zoea and Megalopa; 2.2. Pila: Morphology and digestive system 2.3. Pila: Respiratory and reproductive system 3.3 Water vascular system in starfish

B.SC. **ZOOLOGY** **SEM-II**	**Paper - IV : Cell Biology**	3.1 Nucleus: Ultrastructure of nuclear membrane 4.2 Somatic cell division: Cell cycle and Mitosis	1.2 functions- osmosis, simple diffusion, faciliated diffusion, active transport (Na K pump), endo and exocytosis. 3.1 Nucleus: Ultrastructure of nuclear membrane- Nuclear pore complex. functions of nuclear membrane. 4.2 Somatic cell division: Cell cycle phases and check points. Mitosis
	Practical	4. Demonstration of meiosis in Tradescantia bud/ Grasshopper testis by squash method 5. Demonstration of salivary gland chromosome in Chironomous larva.	Section A 1. Study of museum specimens by specimen /Charts /Model (Classification of animals up to orders). 2. Study of permanent slides: by specimen/Charts. 3. Dissection: Virtual dissection by using computer software/ programme. Section B: Cell Biology 4. Study of meiosis using slides/ charts/model 5. Virtual study of salivary gland chromosome in Chironomous larva using computer software/programme/pictures.

B. Sc. ZOOLOGY SEM-III

Subject and SEMESTER	Paper No.	Matter to be DELETED	Matter to SUSTITUTED
B.Sc. **ZOOLOGY** **SEM-III**	**Paper - V : Life and Diversity of Animals- Chordates**	1.3 Amphioxus: structure, digestive system, circulatory system, sense organs and Protonephridia 4.1 Frog embryology- Cleavage, Blastulation and gastrulation	1.3 Amphioxus: structure, digestive system, circulatory system, sense organs (Ocelli, Infundibular organ and Kollicker's pit), Protonephridia 4.1 Frog embryology- Cleavage, Blastulation and fate map. 4.2 Gastrulation: Morphogenetic movements in gastrula of frog.
	Paper - VI : Genetics	1.1 Mendelian Principles- Dominant recessive relationships, Mendelian laws 1.2 Interaction of genes- Epistasis - dominant and recessive, codominance, incomplete dominance 1.3 Quantitative genetics – Polygenic traits, inbreeding and outbreeding, hybrid vigor 1.4 Extracellular genome – Presence and functions of mitochondrial DNA, plasmids	1.1 Brief introduction to gene, Mendelism and Laws of heredity. 1.2 Interaction of genes- Epistasis: dominant epistasis (12:3:1) e.g. coat colour in dog, and recessive epistasis (9:3:4) e.g. coat colour in mice. Codominance e.g. Roan cattle, Incomplete dominance e.g. Andalusian fowl and *Mirabilis jalapa.* 1.3 Polygenic inheritance: e.g. Skin colour in human, eye colour in human, sickle-cell anaemia. Inbreeding and outbreeding, hybrid vigor. 1.4 Extracellular genome : Mitochondrial DNA-cytoplasmic and petite character inheritance, plasmids-Types and uses.

		3.3 Gene mutations- Spontaneous and induced mutations, mutagenic agents 4.2 Population genetics: Basic concepts in population genetics, Hardy Weinberg equilibrium and its significance	3.3 Gene mutations- Spontaneous and induced mutations. Types of point mutation- deletion, insertion, substitution, transversion, transition, frameshift mutation. Mutagenic agents, base anologs, alkylating agents. 4.2 Basic concepts in population genetics: populations, gene pool, gene frequency, genetic drift. Hardy Weinberg equilibrium and its significance
	Practical		Section A 1. Identification, Classification, distinguishing characters and adaptive features of: study by using specimen/Charts/model. 2. Dissection: Virtual dissection by using computer software/ programme. 3 & 4. Study of permanent slides: by specimen/Charts**.**

B. Sc. ZOOLOGY SEM-IV

Subject and SEMESTER	Paper No.	Matter to be DELETED	Matter to SUSTITUTED
B.Sc. ZOOLOGY SEM-IV	**Paper - VII : Life and Diversity of Animals- Chordates**	2.4 Races in Man (Caucasoid, Negroid, Mongoloid and Australoid)	2.4 Origin and evolution of man-Ardipithecus, Australopithecus and Ramapithecus.
	Paper - VIII: Molecular Biology and Immunology	1.1 DNA as a genetic material 1.2 RNA: structure of RNA, types of RNA, RNA as a genetic material 4.2 Complement system: Basic concepts of complement cascades, classical, alternative and MBL pathways, Implications of complement system in immune defence 4.4 Autoimmunity and immunodeficiencies: Autoimmune diseases and their treatment, AIDS and other immunodeficiencies	1.2 RNA: structure of RNA, types of RNA, Non-genomic and genomic RNA 4.2 Complement system: Basic concepts of complement cascades, classical, alternative and MBL pathways, MAC formation 4.4 Autoimmune diseases and their treatment- Grave's disease, Rheumatoid, Arthritis, Insulin-dependent diabetes. Other immunodeficiencies (Wiskott-Aldrich Syndrome, Interferon-Gamma-Receptor Defect)
		1. Staining of DNA and RNA in blood smear of fish/human by methyl green pyronin technique.	1. Identification, Classification, distinguishing characters and adaptive features of: study by using

	Practical		specimen/Charts/model. 2. Dissection: Virtual dissection by using computer software/ programme. 3 & 4. Study of permanent slides: by specimen/Charts. Section B Molecular Biology 3. Quantitative estimation of DNA using colourimeter (Diphenylamine reagent)

B. Sc. ZOOLOGY SEM-V

Subject and SEMESTER	Paper No.	Matter to be DELETED	Matter to SUSTITUTED
B.Sc. **ZOOLOGY** **SEM-V**	**Paper - IX: General Mammalian Physiology I**	1.1 Enzymes – Distribution and chemical nature of enzymes 1.2 General properties of enzymes 1.3 Classification of enzymes 1.4 Factors affecting enzyme activity 3.4 Respiratory disorders and effects of smoking 4.3 Cardiac cycle	1.1 Nomenclature and Classification of enzymes: IUPAC system, 1.2 Basics of enzymology: Definition, examples of Holoenzyme, apoenzyme, Co-factors. Definition, examples of metal ions, coenzymes, prosthetic group 1.3 Enzyme Kinetics: concept of enzyme catalysis-active site, activation energy and Arrhenius concepts, specificity of enzymes-geometric and stereo specificity with example, lock and key hypothesis, induced fit hypothesis, Derivation of Michaelis-Menten equation, Concept of Km and Vmax. Lineweaver-Burk plot; Multi-substrate reactions 1.4 Factors affecting enzyme activity: (Temperature, pH, Inhibitors, Enzyme concentration, Substrate concentration) 3.4 Respiratory disorders: COPD, Asthama, Bronchitis, SARS with reference to coronavirus infection. Effects of smoking 4.3 Structure of heart and Cardiac cycle
	Paper - X : Applied Zoology I (Aquaculture and Economic	3.2 Biological control – Biological agents – predators and parasites; merits and demerits	3.2 Biological control – Biological agents – predators, parasites and pathogens with examples; merits and

	Entomology)	4.1 Sericulture- Types of Silkworm. Life cycle and rearing of mulberry silkworm, Bombyx mori	demerits 4.1 Sericulture- Types of Silkworm. Life cycle and rearing of mulberry silkworm, Bombyx mori, Important diseases of mulberry silkworm.
	Practical	Section B: Mounting- Scales of fishes (already included in Sem-III)	Section A 8. Recording of blood pressure using sphygmomanometer Section B Economic Entomology Study of beekeeping equipments-Wooden frame hive/Study of mulberry sericulture equipments.

B. Sc. ZOOLOGY SEM-VI

Subject and SEMESTER	Paper No.	Matter to be DELETED	Matter to SUSTITUTED
B.Sc. ZOOLOGY SEM-VI	**Paper - XI : General Mammalian Physiology II**	4.1 Oestrous and menstrual cycle	4.1 Oestrous and menstrual cycle: phases and hormonal regulation
	Paper - XII : Applied Zoology II (Biotechniques, Microtechnique, Biotechnology, Bioinformatics and Biostatistics)		3.1 Basic concepts in recombinant DNA technology. 3.2 Isolation of gene-Shotgun cloning, DNA manupulation enzymes: nucleases, ligases, polymerases 4.4 Probability-Addition and multiplication rules and their applications.
	Practical		

Chairman