

MDC ZOOLOGY SYLLABUS (CCF) DISTRIBUTION

SEMESTER- I		THEORY
TOPIC	ALLOTTED TEACHER	
<p>Unit 1: Plasma Membrane Structure of the Plasma Membrane: Lipid Bilayer (Phospholipids and Cholesterol), Peripheral and Integral Membrane proteins, Glycolipids and Glycoproteins (basic concept of Glycocalyx), Fluid Mosaic Model with special reference to Lipid rafts</p> <p>Mobility of membrane lipids (FRAP assay) and Mobility of Membrane Proteins (Frye-Edidin Experiment); Cell-cell junctions; Transport through plasma membrane</p>	KATHA MISHRA	
<p>Unit 2: Cytoplasmic organelles I Basic concepts on Ultrastructure of ER, Golgi and Lysosome; Overview of Protein sorting; ER Morphology, Targeting proteins to ER, The Signal hypothesis; Insertion of proteins into ER membrane, Protein folding and processing in ER, Export of proteins and lipids from ER; Golgi Apparatus; Morphology, Protein glycosylation within Golgi, Protein sorting and export from Golgi apparatus; Mechanism of Vesicular Transport: Cargo selection, coat proteins and vesicle budding, Vesicle fusion.; Lysosome: Polymorphism, Lysosomal acid hydrolases, Endocytosis and lysosome formation.</p>	RANA ADHIKARY	
<p>Unit 3: Cytoplasmic organelles II</p> <p>Mitochondria: Structure, Semi-autonomous nature, Mitochondrial DNA, Endosymbiotic hypothesis Mitochondrial Respiratory Chain, Chemiosmotic hypothesis and Oxidative Phosphorylation with reference to ATP Synthase and ATP synthesis Peroxisomes: Structure and Functions; Centrosome and its organization</p>	DEBOLINA SAHA	
<p>Unit 4: Cytoskeleton Structure and Types: Microtubules, Actin filaments, and Intermediate filaments; Basic composition and function of ECM; Cell matrix Interactions(Integrins)</p>	RANA ADHIKARY	
<p>Unit 5: Nucleus Nuclear envelope, nuclear pore complex (transport not included), Kinetochore and centromeric DNA; Chromatin and levels of its packaging. Euchromatin & Heterochromatin, Position effect variegation. Chromatin remodeling complex</p>	DEBOLINA SAHA	
<p>Unit 6: Cell Cycle Cell Cycle: Phases of the eukaryotic cell cycle, Protein Kinases and Cell cycle regulation, MPF, Growth factors and regulation of G1-Cdks, S phase and regulation</p>	RANA ADHIKARY	

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of DNA replication, DNA damage checkpoints; Cell Death: Caspases, Bcl-2 family, Intrinsic (Death receptors) and Extrinsic Pathway (apoptosome); Cancer: Basic Concept of Protooncogene [Ras] & Tumor suppressor genes [Rb and p53] Different ways of activation of a protooncogene to Oncogene.	
Unit 7: Cell Signalling Signalling system: Modes of cell-cell signalling; Types of Signalling molecules Signalling receptors: Types and example with special reference to regulation of G protein, Adenyl cyclase-cAMP, Enzyme linked Receptors: RTK (ras-raf) and JAK/STAT	DEBOLINA SAHA
Unit 8: Tools and Techniques in Cell Biology Animal Cell Culture: Primary cell culture and Cell line. • Subcellular fractionation and Ultracentrifugation. • Freeze fracture Replication and Freeze Etching • Principle of Light Microscope: Bright field, Phase contrast microscope, Fluorescence Microscope • with reference to FRET, Principle of SEM & TEM. Cryofixation and use of frozen specimen; Specimen Preparation for Electron Microscopy •	DEBOLINA SAHA
SEMESTER-I	PRACTICAL
TOPIC	ALLOTTED TEACHER
Cell viability study by Trypan Blue Exclusion method	DEBOLINA SAHA AND RANA ADHIKARY
Standardization of Ocular and Stage Micrometer and Measurement of cell or microscopic specimen such as Paramecium sp.	DEBOLINA SAHA
Preparation of squamous epithelial cell with staining	DEBOLINA SAHA
Isolation of Bone Marrow Cells from Rat/Mouse and Giemsa Staining	DEBOLINA SAHA AND RANA ADHIKARY

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SEMESTER- II		THEORY	
TOPIC		ALLOTTED TEACHER	
Unit 1: Carbohydrates Structure, classification and properties of Monosaccharides (aldose and ketose), Disaccharides, Polysaccharides; Isomerism of monosaccharides (D and L, optical isomers, furanose and pyranose, α and β anomers, epimers); Reducing and non – reducing sugars. Physiological importance of Monosaccharides, Disaccharides, Polysaccharides		DEBOLINA SAHA	
Unit 2: Proteins Amino acids: Structure, Classification, General and Electro chemical properties of α -amino acids; Essential and non-essential amino acids; Structures of Protein: Primary, secondary, tertiary and quaternary) of protein, Classification of proteins.		RANA ADHIKARY	
Unit 3: Lipids Classification of lipids; Saturated and unsaturated fatty acids, essential and non – essential fatty acids. Structure and formation of Triglyceride.; Iodine number and saponification number of fats.		DEBOLINA SAHA	
Unit 4: Enzymes Nomenclature, classification and properties; Cofactors and coenzymes, Effect of Temperature, pH, substrate concentration, enzyme concentration on enzyme action, Isozymes and Proenzyme, Mechanism of enzyme action (Lock and key model, Induced fit model). Enzyme kinetics: Derivation of Michaelis-Menten equation with its significance, Lineweaver-Burk plot and its significance. Enzyme inhibition – competitive, non- competitive, allosteric / feedback and its effect on V_{max} and K_m		DEBOLINA SAHA	
Unit 5: Carbohydrates Metabolism Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis from lactate and glycerate, Glycogenesis and Glycogenolysis. (Pathways with name of enzymes and significance)		KATHA MISHRA	
Unit 6: Protein Metabolism Transamination, Deamination and its types (Pathways with name of enzymes and significance) Fate of Cskelton of Glucogenic and Ketogenic amino acids.		RANA ADHIKARY	
Unit 7: Lipid Metabolism β -oxidation of fatty acids - a. Palmitic acid {saturated (C 16:0)}, b. Linoleic acid {unsaturated (C 18:2)} Fatty acid biosynthesis		DEBOLINA SAHA	

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Unit 8: Nucleic acid Metabolism Degradation of purine; Purine Salvage pathway and significance.	RANA ADHIKARY
Unit 7: Free radicals and Antioxidants Concepts of free radicals and antioxidants with examples.	KATHA MISHRA
SEMESTER-II PRACTICAL	
TOPIC	ALLOTTED TEACHER
1. For carbohydrate (Glucose, Fructose, Maltose, Sucrose, Starch) – Molisch test, Barfoed test, Benedict test, Fehling test, Seliwanoff test, Hydrolysis test for sucrose, Iodine test	DEBOLINA SAHA
2. For Protein (Albumin, Gelatine, Peptone) – Biuret test, Million's test, Xanthoproteic test, Ninhydrin test	DEBOLINA SAHA
3. For lipid – Grease spot test	DEBOLINA SAHA
4. Protein by Lowry's method	DEBOLINA SAHA+RANA ADHIKARY
5. To study activity of amylase	DEBOLINA SAHA+RANA ADHIKARY

ZOOLOGY IDC THEORY	
TOPIC	ALLOTTED TEACHER
Unit 1: Animal Diversity Phylum Characters and example: [Non-chordates-Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca and Echinodermata]; Chordata	DEBOLINA SAHA
Unit 2: Genetics 1. Mendelian Principles and Laws of inheritance 2. Linkage and Recombination basic Concepts 3. Sex Determination with reference to Drosophila [only genic balance theory] 4. Chromosomal Aberration [Structural and Numerical]	DEBOLINA SAHA
Unit 3: Biodiversity and Wildlife 1. Biodiversity: Definition, types and value 2. Biodiversity: Indices [Shannon & Simpson] 3. Conservation: in situ and ex situ [outline idea] 4. Conservation Priority: Hotspot, Megadiversity, Sensitive Ecosystem 5. Indigenous Knowledge and PBR: Basic Concepts	KATHA MISHRA
Unit 4: Insect Vectors 1. Concept of Vector: Biological and Mechanical Vectors with examples 2. Disease cycle & Reservoir Concept 3. Major Vectors: Mosquito (Anopheles sp. & Aedes sp.) Life cycle, control, role as vector.	DEBOLINA SAHA
Unit 5: Laboratory techniques and Instrumentation 1. Basics of Light Microscopy	DEBOLINA SAHA

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2. Principles and Application of Colorimetry 3. Principles and application of Ultracentrifugation	
IDC PRACTICAL	
1. Karyotype analysis of Klinefelter, Down, Turner, Edward & Patau Syndrome	DEBOLINA SAHA
2. Identification (Phylum and specimen characters): Amoeba, Paramecium, Sycon, Neptune's Cup, Taenia, Ascaris, Nereis, Pheretima, Pila, Lamellicorn, Penaeus, Macrobrachium, Musca, Anopheles, Culex, Asterias.	DEBOLINA SAHA
3. Project on an Ecosystem	KATHA MISHRA

MDC SEC THEORY	
TOPIC	ALLOTTED TEACHER
Unit I: Agricultural Entomology 6 Pest-definition and types (major and minor pests with example); Lifecycle, nature of damage and control of Pests: Scirpophagaintertulsof paddy, Anomissabuliferaof Jute, Bandicoota–stored house pest; Insect Pest control: Chemical, Mechanical, Cultural and Biological control measures; Integrated Pest Management (IPM).	DEBOLINA SAHA
Unit II: Sericulture 8 Types of Silkworms with special reference to their scientific name, geographical distribution and host plants; Bombyx mori: Silk gland, Composition of silk, Uses of silk; Lifecycle; Rearing, Extraction and Reeling of mulberry silk; Silkworm diseases, pests and their control.	DEBOLINA SAHA
Unit III: Apiculture 7 Various domesticated species of Honeybee; Social organization of Honeybee; Bee keeping: Langstroth Box for rearing of honey bee, Extraction and processing of honey; Composition of honey, apiculture by products and their uses; Pests and Diseases of bees and their control measures	DEBOLINA SAHA
Unit IV: Vermiculture Scope of Vermiculture; Habit categories of earthworms; methodology of vermicomposting: containers for culturing, raw materials required, preparation of bed, environmental prerequisites, feeding, harvesting and storage of vermicompost; Advantages of vermicomposting; Diseases and pests of earthworms..	DEBOLINA SAHA
Unit V: Aquaculture 8 Principles, definition and scope; Prawn culture: Penaeid and Palaemonid	DEBOLINA SAHA

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features with examples; Semi-intensive method of prawn culture; Application of prawn culture; Difference between major and minor carps with examples; Composite fish farming: General concepts, advantages and disadvantages; Induced breeding: method and advantages; Integrated fish farming	
Unit VI: Live Stock Management & Dairy: Introduction to common dairy animals: Types of Cattle breeds and their distribution in India; Exotic cattle breeds; Artificial insemination and MOET in breeding; Cattle feed: Roughage and Concentrate; dairy by products, preservation and uses. Dairy pathology and vaccination programme. Poultry: Types of breeds (fowl) with features and examples; Rearing method: Deep litter system; feed formulation for chicks; poultry by products with economic importance; Diseases of poultry and their control measures	DEBOLINA SAHA
Unit VII: Lac Culture Life cycle, host plants and strains of Lac insect; Lac cultivation: Local practice, improved practice, propagation of Lac insect, inoculation period, harvesting of Lac; Lac composition, processing, products and uses; Natural enemies of lac insect and their management	DEBOLINA SAHA

SEC PRACTICAL	
TOPIC	ALLOTTED TEACHER
1. Identification of various castes of Honey bee, life stages of Bombyx mori, various life stages of Kerrialacca, various earthworm species used in vermiculture and ectoparasites of Poultry birds	DEBOLINA SAHA
2. Identification of the following fish and prawn specimens (Specimen characters only): Labeorohita, Catlacatla, Cirrhinusmrigela, Cyprinuscarpio, L. bata, Penaeusmonodon, Macrobrachium rosenbergi	DEBOLINA SAHA
3. Collection of any two pests and submission of specimen it along with a small report on its identifying features, life cycle, nature of damage and control: Sitophilusoryzae, Triboliumcastaneum, Nilaparvatalugens, Anomissabulifera and Leucinodesorbonalis	DEBOLINA SAHA

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<p>4. Visit to any one of the following and submission of report on the visit a) Apiary b) Freshwater fish farm c) Any agricultural field d) Poultry farm e) Sericulture farm f) Lac culture farm</p>	<p>DEBOLINA SAHA</p>
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