

LESSON PLAN FOR MDC ZOOLOGY SYLLABUS (CCF)

SEMESTER- I THEORY			
TOPIC	ALLOTTED CLASS/CLASSES	TEACHING METHOD	ASSESSMENT METHOD
<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 Mobility of membrane lipids (FRAP assay) and Mobility of Membrane Proteins (Frye-Edidin Experiment); Cell-cell junctions; Transport through plasma membrane</p>	3	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D DIAGRAM • ANIMATION 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.
<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</p>	4	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D DIAGRAM • ANIMATION • DIAGRAM BY USING CHALK AND BOARD 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.

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proteins and vesicle budding, Vesicle fusion.;Lysosome: Polymorphism, Lysosomal acid hydrolases, Endocytosis and lysosome formation.			
Unit 3: Cytoplasmic organelles II 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	2	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D ANIMATION • CHALK AND BOARD USE 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.
Unit 4: Cytoskeleton Structure and Types: Microtubules, Actin filaments, and Intermediate filaments; Basic composition and function of ECM; Cell matrix Interactions(Integrins)	1	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D DIAGRAM • ANIMATION DIAGRAM BY USING CHALK AND BOARD	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.
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	2	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D DIAGRAM • ANIMATION • DIAGRAM BY USING CHALK AND BOARD 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.

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<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 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.</p>	2	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • 3D DIAGRAM • ANIMATION 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.
<p>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</p>	2	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • ANIMATION 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.
<p>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,</p>	3	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • ANIMATION 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST.

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Fluorescence Microscope• with reference to FRET, Principle of SEM & TEM. Cryofixation and use of frozen specimen; Specimen Preparation for Electron Microscopy•			
SEMESTER-I PRACTICAL			
TOPIC	ALLOTTED CLASS/CLASSES	TEACHING METHOD	ASSESSMENT METHOD
Cell viability study by Trypan Blue Exclusion method	1 PRACTICAL CLASS OF 3 PERIODS	LABORATORY WORK ALONGWITH RAT DISSECTION	PRACTICE CLASS BEFORE EXAM AND STUDENTS GIVE DEMONSTRATION IN THIS CLASS
Standardization of Ocular and Stage Micrometer and Measurement of cell or microscopic specimen such as Paramoecium sp.	1 PRACTICAL CLASS OF 2 PERIODS	LABORATORY WORK	PRACTICE CLASS BEFORE EXAM AND STUDENTS GIVE DEMONSTRATION IN THIS CLASS
Preparation of squamous epithelial cell with staining	1 PRACTICAL CLASS OF 2 PERIODS	LABORATORY WORK	PRACTICE CLASS BEFORE EXAM AND STUDENTS GIVE DEMONSTRATION IN THIS CLASS
Isolation of Bone Marrow Cells from Rat/Mouse and Giemsa Staining	1 PRACTICAL CLASS OF 3 PERIODS	LABORATORY WORK ALONGWITH RAT DISSECTION	PRACTICE CLASS BEFORE EXAM AND STUDENTS GIVE DEMONSTRATION IN THIS CLASS

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SEMESTER- II		THEORY	
TOPIC	ALLOTED CLASS/CLASSES	TEACHING METHOD	ASSESSMENT METHOD
<p>Unit 1: <u>Carbohydrates</u> 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</p>	1	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • STUDY MATERIALS 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
<p>Unit 2: <u>Proteins</u> 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.</p>	1	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • STUDY MATERIALS 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
<p>Unit 3: <u>Lipids</u> Classification of lipids; Saturated and unsaturated fatty acids, essential and non – essential fatty acids. Structure and formation of Triglyceride.; Iodine</p>	1	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • STUDY MATERIALS 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST

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number and saponification number of fats.			
<p>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 Vmax and Km</p>	2	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • ANIMATION • STUDY MATERIALS 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
<p>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)</p>	1	<ul style="list-style-type: none"> • LECTURE • POWERPOINT PRESENTATION • STUDY MATERIALS 	<ul style="list-style-type: none"> ✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST

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Unit 6: Protein Metabolism Transamination, Deamination and its types (Pathways with name of enzymes and significance) Fate of Cskeleton of Glucogenic and Ketogenic amino acids.	1	<ul style="list-style-type: none"> LECTURE POWERPOINT PRESENTATION STUDY MATERIALS 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
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	1	<ul style="list-style-type: none"> LECTURE POWERPOINT PRESENTATION STUDY MATERIALS 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
Unit 8: Nucleic acid Metabolism Degradation of purine; Purine Salvage pathway and significance.	1	<ul style="list-style-type: none"> LECTURE POWERPOINT PRESENTATION STUDY MATERIALS 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST
Unit 7: Free radicals and Antioxidants Concepts of free radicals and antioxidants with examples.	1	<ul style="list-style-type: none"> LECTURE POWERPOINT PRESENTATION STUDY MATERIALS 	✓ QUESTION ANSWER ASKING ✓ INTERNAL WRITTEN TEST

SEMESTER-II PRACTICAL			
TOPIC	ALLOTTED CLASSES	TEACHING METHOD	ASSESSMENT METHOD
1.For carbohydrate (Glucose, Fructose, Maltose, Sucrose, Starch) – Molisch test, Barfoed test, Benedict test, Fehling test, Seliwanoff test, Hydrolysis test for sucrose, Iodine test	1 PRACTICAL CLASS OF 3 PERIODS	LABORATORY WORK	PRACTICE CLASSES BEFORE FINAL EXAM . STUDENTS GIVE DEMONSTRATION IN THIS TIME.

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2. For Protein (Albumin, Gelatine, Peptone) –Biuret test, Million’s test, Xanthoproteic test, Ninhydrin test	1 PRACTICAL CLASS OF 2 PERIODS	LABORATORY WORK	PRACTICE CLASSES BEFORE FINAL EXAM . STUDENTS GIVE DEMONSTRATION IN THIS TIME.
3. For lipid – Grease spot tes	1 PRACTICAL CLASS OF 1 PERIOD	LABORATORY WORK	PRACTICE CLASSES BEFORE FINAL EXAM . STUDENTS GIVE A DEMONSTRATION IN THIS TIME.
4. Protein by Lowry’s method	1 PRACTICAL CLASS OF 3 PERIODS	LABORATORY WORK	PRACTICE CLASSES BEFORE FINAL EXAM . STUDENTS GIVE DEMONSTRATION IN THIS TIME.
5.To study activity of amylase	1 PRACTICAL CLASS OF 3 PERIODS	LABORATORY WORK	PRACTICE CLASSES BEFORE FINAL EXAM . STUDENTS GIVE A DEMONSTRATION IN THIS TIME.