ODD SEMESTER LECTURE PLAN

Name of the college: Government College of Arts, Science and Commerce, Sanquelim Goa

Name of Faculty: Dr. Nisha Kevat | **Subject: Cell Biology and Plant Biochemistry (THEORY)**

Paper code: BOC 106 | **Program/Course: T.Y B.Sc.** | **Division: - --**

Academic year: 2024 - 2025 | **Semester: V** | **Total Lectures: 60 (Theory)**

Course Objectives:

- This course is designed to provide an overview of how cellular structure and function arise as a result of the properties of cellular macromolecules.
- The practical component of the study deals with experiments supporting cell structure and functioning principles as well as applications of bio-analytical techniques

Course Learning Outcome:

- Gain knowledge about the various cell organelles and their role in cell functioning.
- Understand the chemical structure and properties of biomolecules and their role in living organisms.
- Develop skills in various techniques used in cell biology studies.
- Be proficient in handling various instruments used in biochemistry related experiments.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/Assignment	ICT Tools	Reference books
June 2024	28/06/	30/06	02	**Lecture 1-** Unit 1: Techniques in cell biology - Principle, working and applications of: Phase contrast microscope	Identify parts of a phase contrast microscope.	Power point	• Gupta, PK (1999). A

				Lecture 2: Principle, working and applications of Fluorescence microscopy	Label key components of a fluorescence microscope.	presentation, YOUTUBE STUDY videos, DISHTAVO COURSES AND CHALK AND BOARD.	Text Book of Cell and Molecular Biology. Rastogi Publications, Meerut, U.P. 6. Jain, JL, • Jain, S and Jain, N (2007). Elementary Biochemistry. 3rd edition. S. Chand and Company Ltd., New Delhi. • Karp, G (2009). Cell and Molecular Biology: Concepts and
July 2024	01/07/	06/07	04	Lecture 3: Principle, working and applications scanning electron microscopy	Sketch a scanning electron microscope.		
				Lecture 4: Principle, working and applications transmission electron microscopy	Compare SEM and TEM features.		
				Lecture 5: Principle, working and applications micrometry	Measure cell size using micrometry.		
				Lecture 6: photomicrography	Capture an image with a microscope camera		
July 2024	08/07/	13/07	04	Lecture 7: Unit 2 – Cell and its components - Cell - Cell theory; structure of prokaryotic and eukaryotic cells.	Draw prokaryotic and eukaryotic cells.		
				Lecture 8: Cell wall - chemical composition, ultrastructure and functions.	Label the layers of a cell wall.		
				Lecture 9: Cell Membrane - chemical composition, structure (Fluid Mosaic Model)	Draw the Fluid Mosaic Model.		
				Lecture 10: Functions and fluidity of cell membrane.	List membrane functions.		
July 2024	08/07/	13/07	04	Lecture 11: Nucleus - structure of nuclear envelope, nucleoplasm,	Sketch the nuclear envelope.		
				Lecture 12: Chromatin (euchromatin and heterochromatin) and nucleolus.	Differentiate euchromatin and heterochromatin.		
				Lecture 13: Plastids - types of plastids.	Identify plastid types in plant cells.		
				Lecture 14: Morphology, ultrastructure and function of Chloroplast	Draw chloroplast ultrastructure		
July 2024	15/07/	20/07	04	Lecture 15: Mitochondria - origin, morphology, ultrastructure and function.	Label parts of a mitochondrion.		

				Lecture 16: Ribosomes - structure of prokaryotic ribosomes	Draw a prokaryotic ribosome.		Experiments. 6 th edition. John Wiley & Sons Inc., U.S. • Nelson, DL and Cox, MM (2008). Lehninger Principles of Biochemistry. 5 th edition. WH Freeman and Company, New York. • Nigam, A and Ayyagari, A (2007). Lab Manual in Biochemistry,
				Lecture 17: Ribosomes - structure of eukaryotic ribosomes - I	Sketch a eukaryotic ribosome (Part I).		
				Lecture 18: Ribosomes - structure of eukaryotic ribosomes - II	Complete the eukaryotic ribosome sketch (Part II).		
July 2024	22/07/	27/07	04	Lecture 19: Functions of Ribosomes	List ribosome functions.		
				Lecture 20: Cytoskeleton - structure and function of microtubules,	Label parts of a microtubule.		
				Lecture 21: Microfilaments and intermediate filaments.	Compare microfilaments and intermediate filaments.		
				Lecture 22: Structure and functions of Endoplasmic Reticulum	Draw the Endoplasmic Reticulum.		
July/August 2024	22/07/	03/08	04	Lecture 23: Structure and functions of Golgi apparatus	Sketch the Golgi apparatus.		
				Lecture 24: Structure and functions of Lysosomes.	Label lysosome components.		
				Lecture 25: Structure and functions of Peroxisomes.	Identify peroxisome functions.		
				Lecture 26: Structure and functions of Glyoxisomes.	List glyoxisome functions.		
August 2024	05/08/	10/08	04	Lecture 27: Unit 3 –Cell division, Overview of cell cycle	Outline the stages of the cell cycle.		
				Lecture 28: Cell division (Mitosis)	Draw mitosis stages.		
				Lecture 29: Cell division (Meiosis)	Draw meiosis stages.		
				Lecture 30: Significance of Mitosis and Meiosis	Compare mitosis and meiosis.		
August 2024	12/08/	17/08	04	Lecture 31: Unit 4 - Classification of	Classify carbohydrates as		

				carbohydrates;	mono-, di-, or polysaccharides.		Immunology and Biotechnology. Tata McGraw-Hill Publishing Company Ltd., New Delhi. • Pollard, TD, Earnshaw, WC and Lippincort-Schwartz, J (2007). Cell Biology. 2nd edition. Elsevier Health Sciences, Philadelphia. • Rao, BR and Deshpande, S (2005). Experimental
				Lecture 32: biological role of carbohydrates;	List biological roles of carbohydrates.		
				Lecture 33: Structure and properties of monosaccharides (glucose and fructose),	Draw glucose and fructose structures.		
				Lecture 34: oligosaccharides (sucrose and maltose) and polysaccharides (starch and cellulose);	Sketch sucrose, maltose, starch, and cellulose.		
August 2024	19/08/	24/08	04	Lecture 35: synthesis and degradation of starch in plants.	Outline starch synthesis steps.		
				Lecture 36: Amino acids and proteins - Amino acids - classification,	Classify amino acids into groups		
				Lecture 37: Structure and properties of amino acids.	Draw a general amino acid structure.		
				Lecture 38: Biological role of amino acids;	List biological roles of amino acids.		
August 2024	26/08/	31/08	04	Lecture 39: Essential and non-essential amino acids;	Identify essential amino acids.		
				Lecture 40: transamination	Define transamination in one sentence.		
				Lecture 41: Proteins - classification, structure (primary, secondary, tertiary and quaternary),	Sketch primary to quaternary protein structures.		
				Lecture 42: properties Biological role of proteins.	List protein properties.		
September , 2024	02/09/	07/09/	02	Lecture 43: protein synthesis (transcription and translation);	Outline steps of transcription and translation.		
				Lecture 44: posttranslational changes	Identify post-translational modifications.		
September , 2024	09/09/	14/09	02	Lecture 45: Lipids - Classification, structure, properties	Classify lipids into main types		

				Lecture 46: Biological role of fatty acids and lipids;	List functions of fatty acids and lipids.		Biochemistry. IK International Pvt. Ltd., New Delhi. • Verma, SK and Verma, M (2007). A Textbook of Plant Physiology, Biochemistry and Biotechnology. 6th edition. S. Chand and Company Ltd., New Delhi. • Wilson, K and Goulding, KH (1986). A Biologists
September , 2024	16/09/	21/09	04	Lecture 47: Synthesis and breakdown of triglycerides;	Outline triglyceride synthesis steps.		
				Lecture 48: β-oxidation.	Define β-oxidation in one sentence.		
				Lecture 49: Nucleic acids - Structure of nucleic acids (nitrogen bases,	Label parts of a nucleotide.		
				Lecture 50: nucleosides and nucleotides	Draw B-DNA and alternate DNA forms.		
September 2024	23/09/	28/09	04	Lecture 51: Structure of B-DNA; alternate forms of DNA (A, C, D and Z);	List types of RNA.		
				Lecture 52: RNA and its types.	Classify vitamins by solubility.		
				Lecture 53: Vitamins - Broad classification of vitamins;	List sources of vitamins A, B, C, D, E, K.		
				Lecture 54: Properties and occurrence of vitamins,	Identify vitamin functions in the body.		
September/ October 2024	30/09	5/10	04	Lecture 55: Functions of vitamins A, B complex, C, D, E and K.	Match deficiency symptoms with vitamins.		
				Lecture 56: Deficiency symptoms of vitamins A, B complex, C, D, E and K.	Classify secondary metabolites		
				Lecture 57: Unit 5: Secondary metabolites - Broad classification of secondary metabolites;	List terpenoid functions.		
				Lecture 58: properties and functions of terpenoids,	Identify sources of alkaloids.		
October 2024	07/10	12/10	04	Lecture 59: properties and functions of alkaloids	Identify sources of alkaloids.		
				Lecture 60: properties and functions of	List functions of phenolics.		

				phenolics			Guide to Principles and Techniques of Practical Biochemistry. Edward Arnold, London.
				Revisions	Unit 1 and 3		
October 2024	14/10	19/10	04	Revisions	Unit 2		
				Revisions	Unit 4		
				Revisions	Unit 4		
				Revisions	Unit 4		
October 2024	21/10	22/10	01	Revisions	Unit 5		

*****Note: Data filled in the above form is sample data.

*** Assessment Rubrics**

Component	**Max Marks**
ISA 1	**10**
ISA 2	**10**
Practical	**NA**
Project	**NA**
Semester End Exam	**80**