



Master of Science (Botany)
M. Sc Botany Semester I

Course Code	PS01CBOT53	Title of the Course	Cell and Molecular Biology
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	To expose the students to various microscopy techniques used for cell studies with details understanding of the structure and function of various cell organelles, their organization and interaction with the environment. This will also enlighten them on the regulation of cell cycle and programmed cell death explaining the bases of cancer.
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Course Content		
Unit	Description	Weightage* (%)
1.	An overview of cell organization; Structure of pro-and eukaryotic cell: Salient similarities and differences. Experimental approaches for studying cells. Structure and functions of biological membranes. Structure and functions of cellular organelles: nucleus, Chloroplast, Mitochondria, Endoplasmic reticulum, Golgi complex, ribosomes, lysosomes, peroxisomes and glyoxysomes. Role of endomembrane system in transport of biomolecules.	25
2.	The cytoskeleton and cell motility – Structure, organization and functions of Microtubules, microfilaments and intermediate filaments. Cell-cell interaction and cell signaling. Cell cycle and cell division: Stages of Mitosis and meiosis. Cell cycle regulation: cell cycle check points and their control; significance of cell cycle control in growth and differentiation in plants..	25
3.	Nucleic acids as carriers of genetic information: Physical properties and structure of DNA and RNA. Denaturation and renaturation of DNA. T _m value and CoT analysis. Organization of nucleic acids: nucleosome and chromatin structure and chromatin remodeling. Replication of DNA : Enzymes and proteins involved in replication and control of DNA replication. DNA repair mechanisms. .	25
4.	Transcription of DNA: Promoters and Initiation of transcription; elongation and termination. post transcriptional modifications of RNA: chemical modifications; mRNA splicing and mRNA end modifications. Control of transcription in eukaryotes. Genetic code and its properties. Translation of RNA in eukaryotes: structure of	25





SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25))
Syllabus with effect from the Academic Year 2021-2022

	tRNA and rRNA; Stages of translation. Control of translation in eukaryotes.	
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Teaching-Learning Methodology	Topics will be taught and discussed in interactive sessions using conventional black board and chalk as well as ICT tools such as power point presentations and videos. Practical sessions will be conducted in a suitably equipped laboratory either individually or in groups depending on the nature of exercise as well as availability of infrastructure. Course materials will be provided from primary and secondary sources of information.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand various techniques for observing cells, cell organelles and the functioning of the cell.
2.	Explain various cell organelles with their function and importance for the cell in its physiology.
3.	Understand how cell interacts with outside environment especially for its energy need, energy generation and interaction with the environment and other cells.
4.	Understand how growth of the cell is regulated, factors and process leading to its death and generation of cancerous condition upon failure of cell cycle regulation.





Suggested References:

Sr. No.	References
1.	Krebs, J. E., (2009). Lewin's Genes X. 10 th Edn. Jones & Bartlett Learning Publications, United States
2.	Cooper, G., M., Hausman, R. E., (2015). The Cell: A Molecular Approach. 7 th Edn. Sinauer Associates Inc, United States
3.	Carp, G., (2013). Cell Biology. 7 th Edn. Wiley, United States
4.	Albert, B., Johnson, A., Lewis, J., Raff, M., Robert, K., Walter, P., (2014). Molecular Biology of the Cell. 6 th Edn. Garland Science, United States
5.	Lodish, H., Berk, A., Kaiser, C., A., (2007). Molecular Cell Biology. 6 th Edn. W.H.Freeman & Co Ltd, South Asia

On-line resources to be used if available as reference material

On-line Resources

Relevant review articles/research papers/handouts of latest development in the subject

