C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Science & Life sciences**
Course: **Bachelor of Science(Microbiology)**
Semester**: II**
Subject Code**:** MIM203-1C
Subject Name: **Cell Biology**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
									Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks	Marks	Marks	Duration	Marks	Duration	Marks	Duration	
3	MAJOR	MIM 203-1C	Cell Biology	3	-	2	5	4	10 10 05	Assignment Quiz Attendance	50	2	50	2	50	2	100

AIM:

- Basic concepts related to cell and its function.
- Acquaint the basic concept of cell organelles.
- Gain basic knowledge regarding cell signaling.
- Learn basic concept about protein sorting and transport.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	• **Structure and organization of Cell:** Cell Organization – Eukaryotic (Plant and animal cells) and prokaryotic, Plasma membrane: Structure and transport of small molecules, Cell Wall: Eukaryotic cell wall, Extra cellular matrix and cell matrix interactions, Cell-Cell Interactions - adhesion junctions, tight junctions, gap junctions, and plasmodesmata (only structural aspects) Mitochondria, chloroplasts and peroxisomes, Cytoskeleton: Structure and organization of actin filaments, association of actin filaments with plasma membrane, cell surface protrusions, intermediate filaments, microtubules	**15**
II	• **Nucleus:** Nuclear envelope, nuclear pore complex and nuclear lamina, Chromatin – Molecular organization, Nucleolus	**05**
III	• **Protein Sorting and Transport**: Ribosomes, Endoplasmic Reticulum – Structure, targeting and insertion of proteins in the ER, protein folding, processing and quality control in ER, smooth ER and lipid synthesis, export of proteins and lipids, Golgi Apparatus – Organization, protein glycosylation, protein sorting and export from Golgi Apparatus, Lysosomes.	**15**
IV	• **Cell Signaling:** Signaling molecules and their receptors, Function of cell surface receptors, Pathways of intra-cellular receptors – Cyclic AMP pathway, cyclic GMP and MAP kinase pathway.	**10**

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Course Outline for Practical

SR. NO	COURSE CONTENT	HOURS
1	Study a representative plant and animal cell by microscopy	**30**
2	Study of the structure of cell organelles through electron micrographs	
3	Study of the structure of cell organelles through electron micrographs	
4	Demonstration of the presence of mitochondria in striated muscle cells/ cheek epithelial cell using vital stain Janus Green B	
5	Study of polyploidy in Onion root tip by colchicine treatment	
6	Identification and study of cancer cells by photomicrographs	
7	Identification and study of cancer cells by photomicrographs	
8	Identification and study of cancer cells by photomicrographs	
9	Identification and study of cancer cells by photomicrographs	
10	Study of nucleus	

TEACHING METHODOLOGY:

- Conventional method (classroom blackboard teaching)
- ICT Techniques
- Teaching through the classroom, laboratory work
- Variety of learning styles and tools (PowerPoint presentations, audio-visual resources, e-resources, seminars, workshops, models)
- Teaching through laboratory work

LEARNING OUTCOME:

- Expand the microbiology knowledge using various fundamental aspects of different branches of sciences.
- To gain knowledge about contribution of scientist in microbiology filed
- Obtain significant knowledge about sterilization methods.
- Understanding the importance of laboratory work and laboratory safety
- To gain a knowledge about an application of microorganism in different field .
- Acquire knowledge about types of glassware and their calibration
- To understand the working system of various microscope

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15	30	3	1	45+30	3+1
Unit – 2	05					
Unit – 3	15					
Unit – 4	10					
TOTAL	**45**	**30**	**3**	**1**	**75**	**4**

Evaluation:

Theory Marks	Practical Marks	Total Marks
75	**25**	**100**

REFERENCE BOOKS:

1. . **Hardin J, Bertoni G and Kleinsmith LJ. (**2010). Becker's World of the Cell. 8th edition. Pearson.
2. **Karp G. (2010) Cell and Molecular Biology**: Concepts and Experiments. 6th edition. John Wiley & Sons. Inc
3. **De Robertis, EDP and De Robertis EMF.** (2006). Cell and Molecular Biology. 8th edition. Lipincott Williams and Wilkins, Philadelphia
4. **Cooper, G.M. and Hausman, R.E.** (2009). The Cell: A Molecular Approach. 5 th Edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.