NIRMA UNIVERSITY
Institute of Pharmacy
(B. Pharm)
(Semester - VIII)

L	T	P	C
3	1	-	4

Course Code	**BP808ET**
Course Title	**Cell and Molecular Biology - Theory**

Scope:

- Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function.
- This is done both on a microscopic and molecular level.
- Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

Objective: At the end of the course, the student shall be able to

1. Summarize cell and molecular biology history.
2. Summarize cellular functioning and composition.
3. Describe the chemical foundations of cell biology.
4. Summarize the DNA properties of cell biology.
5. Describe protein structure and function.
6. Describe cellular membrane structure and function.
7. Describe basic molecular genetic mechanisms.
8. Summarize the Cell Cycle

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to -

16. Recall basics of prokaryotic and eukaryotic cell structure, molecular biology and cellular reproduction.
17. Relate functioning of DNA and RNA and process of transcription and translation.
18. Illustrate amino acids and protein synthesis pathways.
19. Summarize cell division, cell cycle, its regulation and basic techniques of genomic analysis.
20. Explain receptors and cell signaling pathways.

Syllabus: **Teaching hours**: **45 Hours**

UNIT I **10 Hours**

a) Cell and Molecular Biology: Definitions theory and basics and Applications.
b) Cell and Molecular Biology: History and Summation.
c) Properties of cells and cell membrane.
d) Prokaryotic versus Eukaryotic

e) Cellular Reproduction
f) Chemical Foundations – an Introduction and Reactions (Types)

UNIT II **10 Hours**

a) DNA and the Flow of Molecular Information
b) DNA Functioning
c) DNA and RNA
d) Types of RNA
e) Transcription and Translation

UNIT III **10 Hours**

a) Proteins: Definition and Amino Acids
b) Protein Structure
c) Regularities in Protein Pathways
d) Cellular Processes
e) Positive Control and significance of Protein Synthesis

UNIT IV **08 Hours**

a) Science of Genetics
b) Transgenics and Genomic Analysis
c) Cell Cycle analysis
d) Mitosis and Meiosis
e) Cellular Activities and Checkpoints

UNIT V **07 Hours**

a) Cell Signals: Introduction
b) Receptors for Cell Signals
c) Signaling Pathways: Overview
d) Misregulation of Signaling Pathways
e) Protein-Kinases: Functioning

Tutorials **Teaching hours: 15 Hours**

Tutorials will be based on above syllabus.

Suggested Readings^: (Latest edition)

35. Cooper GM, *The Cell, A Molecular Approach.* Sinauer Associates, Sunderland (MA).
36. Licinio J & Wong M (eds). *Pharmacogenomics: The Search for Individualized Therapies*, Wiley, Weinheim Germany.
37. Bradshaw RA and Dennis EA. *Handbook of Cell Signaling*, Elsevier, Netherlands.
38. Dickenson et al., *Molecular Pharmacology: From DNA to Drug Discovery.* Wiley Blackwell, USA.
39. Ausubel et al. Current protocols in molecular biology vol I to VI. Wiley & sons, USA.

L= Lecture, T= Tutorial, P= Practical, C= Credit
^ this is not an exhaustive list