BACHELOR OF SCIENCE (GENERAL)
3rd SEMESTER
DISCIPLINE SPECIFIC COURSE (CORE)
CLB320C: CLINICAL BIOCHEMISTRY _ CELL AND MOLECULAR BIOLOGY
CREDITS: THEORY – 4, PRACTICAL – 2
MAXIMUM MARKS: 60, MINIMUM MARKS: 24

THEORY (4 CREDITS: 60 HOURS)

Objectives and Expected Learning Outcomes:

To familiarize the students with basics of cells being structural and functional units of living organisms and their intricate organization. The course also provides basic understanding of nucleic acids as genetic material, their structure and functional organization. Practical course will impart hands-on skills in basic techniques of DNA isolation, PCR and nucleic acid estimation. The students are expected to get thorough exposure to the genetic foundations of the cellular systems

UNIT-1 (15 Hours)

Structure and Function of cell wall, cell membrane, nucleus, Nucleolus, endoplasmic reticulum, Golgi bodies, lysosomes, peroxisomes, mitochondria, cytoskeleton, General principles of cell communication; Introduction to membrane Transport; Cell division and Cell cycle- Mitosis and Meiosis and their regulation.

UNIT-2 (15 Hours)

Experimental evidences & proof of DNA being the genetic material, Structure of chromatin, chromosomes, DNA and its various forms, Heterochromatin, Euchromatin, General features of Replication: Origin of Replication & its organization, Mechanism of Replication in Prokaryotes and Eukaryotes

UNIT -3 (15 Hours)

Fine structure of gene in Eukaryotes & Prokaryotes. Operon concept (Lac Operons), Transcription - Formation of initiation complex in Eukaryotes& Prokaryotes. RNA polymerases in Eukaryotes & Prokaryotes. Termination of transcription in Eukaryotes vis-à-vis Prokaryotes. RNA processing- an overview.

UNIT -4 (15 Hours)

Translation: Structure & function of different types of RNA. Genetic Code- General features and Wobble hypothesis. Basic features of Translation Machinery – Ribosomes and protein involved in translation, tRNA structure, amino-acyl t-RNA synthetase, Mechanism of translation, post-translational modification of proteins.

PRACTICAL (2 CREDITS: 60 Hours) **MAXIMUM MARKS: 30, MINIMUM MARKS: 12**

1. Isolation of DNA from blood and plant tissue
2. Quantitative estimation of DNA
3. Quantitative estimation of RNA
4. Demonstration of thermal cycler and PCR
5. Electrophoretic analysis of isolated DNA