

OBJECTIVES: To enable the students to –

- Understand the scope of Biotechnology
- Know the principles of microscopy
- Understand the ultra structure of cells & cell division
- Understand the applications of statistics in Biology

COURSE:

UNIT I: INTRODUCTION

1. Scope & applications of Biotechnology
2. Microscopy :
 - i. Compound microscopy – Numerical aperture & its importance, resolving power, oil – immersion objectives & their significance.
 - ii. Principles & Applications of Dark – field, phase – contrast, fluorescent microscopy.
 - iii. Electron microscopy – Principle, Ray diagram & applications of TEM & SEM, comparison between optical and electron microscope.

UNIT II: PROKARYOTIC CELL

1. Bacterial morphology – General morphology of bacteria: shapes and sizes. Generalized diagram of typical bacterial cell.
2. Slime layer & Capsule, Flagella, Pili & Fimbriae.
3. Cell wall – Gram positive & Gram negative
4. Bacterial chromosomal organization, plasmids – types of plasmids.
5. Endospores – Structure, formation germination, basis of resistance.

UNIT III: EUKARYOTIC CELL & CELL DIVISION

1. Structure and functions of nucleus, nuclear membrane, nucleoplasm, nucleolus, golgi complex, mitochondria, chloroplast, endoplasmic reticulum, lysosomes, peroxisomes, glyoxysomes and vacuoles.
2. Plant cell wall
3. Concept of cell cycle, cell division – mitosis & meiosis.

UNIT IV: MENDEL'S LAWS & INHERITANCE

1. Mendel's experiments – Factors contributing to success of Mendel's experiments.
2. Mendel's laws – Law of segregation, Law of Dominance, Law of Independent Assortment.
3. Deviations from Mendel's laws – Incomplete and Co-dominance.
4. Penetration and Pleiotropism.
5. Recessive & Dominant Epistatic gene interactions (9:3:4, 12:3:1, 13:3).
6. Concept of Multiple alleles.

UNIT V: GENETIC INHERITANCE & BIOSTATISTICS

1. Linkage, Recombination frequency factors, Gene maps, Interference & Co-incidence.
2. Mitotic Crossing over
3. Sex determination in *Drosophila*.
4. Transposable elements - Types, Structure, Mechanism and examples – AC-DS elements in *Maize*.
5. Biostatistics: Types of Data, Collection of Data, Primary and Secondary data, Classification and graphical representation of statistical data. Measures of central tendency (Mean, Median and Mode) and Dispersion. Measures of Skewness and Kurtosis.

REFERENCES:

1. Cell and Molecular Biology – By De Robertis – Waverly Publication.
2. Cell biology and Genetics – By P.K. Gupta – Rastogi Publication.
3. Genetics – B.D. Singh, 2003 – Kalyani Publication.
4. Concept of Genetics - Klug and Cummings, 2003 – Pearson Education, New Delhi.
5. Genetics – Strickberger.

I SEMESTER

BIOTECHNOLOGY

Time: 3Hrs/Wk

BTH 1752 (2)

PRACTICAL – I A

Marks: 50

w.e.f. 2016-2019 (16 AD' batch)

CELL BIOLOGY & GENETICS

I. Microscopy - Different parts and their function

II. Methods in Cytology:

A. Cytological Preparation

Fixation, Dehydration and Staining

B. Squash Preparation - Mitosis (Onion Root Tip)

-Meiosis (Onion / Maize flower buds)

- Karyotype (Onion Root Tip)

III. Genetics & Biostatistics

A. Solving problems in

- Monohybrid ratio
- Dihybrid ratio
- Incomplete Dominance
- Linkage and Crossing Over

B. Problems on Mean, Median, Mode, Graphical representation of statistical data,
measures of dispersion.

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