

Biology II (BIO 157)
Tribhuvan University
Soch College of Information Technology
Bachelor of Science in Computer Science and Information Technology

Course Title: Biology II

Course no: BIO-157 ----- Full Marks: 60+20+20

Credit hours: 3 ----- Pass Marks: 24+8+8

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Course Synopsis: Cell Division, DNA structure and function, RNA, transcription and translation process, mutation, gene regulation, recombinant DNA technology.

Goal: The course is aimed at knowing the living organism at the molecular level. It also focused on techniques for gene manipulation by using recombinant DNA technology.

Course Contents:

Unit 1. ----- 5 Hrs.

Cell division: Mitosis, meiosis, mechanism of crossing over, non-disjunction, cell cycle, abnormal cell division, basis of oncology

Unit 2. ----- 9 Hrs.

DNA: Structure of DNA, replication of DNA, Organization of DNA in chromosomes, forms of DNA

Unit 3. ----- 11 Hrs.

3.1 RNA: Overview of gene expression, transcription-synthesis of RNA, process, structure of mRNA

3.2 Protein synthesis: Decoding the message, tRNA, ribosomal rRNA, role of ribosome in protein synthesis

3.3 Genetic code: Introduction of genetic code, wobble hypothesis

Unit 4. -----6 Hrs.

Mutation and DNA repair: Introduction, types of mutation, reversion, mechanism of DNA repair.

Unit 5. ----- 6 Hrs.

5.1 Gene regulation in prokaryotes: Operon concept, transcriptional control of protein synthesis, post transcriptional gene control

5.2 Eukaryotic gene control: Control of transcription, post transcriptional gene control, splicing.

Unit 6. ----- 8 Hrs.

Recombinant DNA technology; introduction, tools for cloning, vectors and restriction endonucleases, gene cloning and expression, application of recombinant DNA in healthcare and agriculture industry

Laboratory Assignments:

- Observation of stages of mitosis by cytological slide preparation from root tip of onion.
- Observation of stages of meiosis by cytological slide preparation from anthers.

- Preparation of models of DNA, RNA and protein synthesis
- Testing for DNA with Geulgen stain.
- Testing fro DNA and RNA with Methyl Green Pyronin stain.
- Counting of WBC and RBC in human blood.

Text Books:

Biology by Vilee, Solomon, Martin, Martion, Gerg, Davis 2nd Edition, Saunders college publishing, USA.

Reference Book: Concepts in Biology by E.D. Enger & F.C. Ross, 9th Ed. Tata McGraw Hill
Biology by P.H. Reven et.al, 5th Ed. WBC McGraw Hill.