

---

# BT 101

## Introductory Biology

---

### Description/Preamble

The course is designed to get students acquaintance with the basic biological principles, and develop new engineering solutions for medicine, industry, environment, and many other fields inspired from the field of biology. The syllabus covered, unifies the life sciences with engineering and the physical sciences. Modern biology will help the engineering students to explore and understand the way living cells, tissues, organs and diverse organisms build, control, synthesize, process, and adapt to the environment during the long evolutionary period. Basic knowledge of biology will help to develop new technologies inspired by the stably adapted system (biological resources) existing in the nature and translate them into products that meet real world challenges.

### Objective

To empower the engineering students with the basic knowledge of biological sciences and its applications. Inspired from the field of biology, engineering student should be able to translate their theoretical and practical knowledge gained during enrollment in various subjects.

### Pre-requisites

This course is designed for undergraduates having reasonably less biology background or those who did

---

## L T P C

3 0 0 6

Semester 2, JAN- MAY

Lectures: 40-42

---

not study biology in secondary school.

### Syllabus

Evolution of life: Origin of Life; Darwin's concepts of evolution; Biodiversity.

Cell, the structural and functional unit of life: Three domains of life; cell types, cell organelles and structure; Basic biomolecules of cell.

Nutrients, bioenergetics and cell metabolism: Essential nutrients to sustain life; biological energy and laws of thermodynamics, basics of aerobic and anaerobic glycolysis and citric acid cycle.

Genes and chromosomes: DNA, DNA replication; Central dogma of molecular biology: Transcription and translation; Mendelian Genetics; Genetic engineering/Cloning and its applications.

Biological systems: Body systems required to sustain human physiology, special sense organs including hearing, taste, smell and visual receptors.

### Text Books

1. J. L. Tymoczko, J. M. Berg and L. Stryer, Biochemistry, 8th Ed, W. H. Freeman & Co, 2015.

2. D. L. Nelson and M. M. Cox, Lehninger Principles of Biochemistry, 7th Ed, Macmillan Worth, 2017.

### **References**

1. N. Hopkins, J. W. Roberts, J. A. Steitz, J. Watson and A. M. Weiner, Molecular Biology of the Gene, 7th Ed, Benjamin Cummings, 1987.

2. C. R. Cantor and P. R. Schimmel, Biophysical Chemistry (Parts I, II and III), W.H. Freeman & Co., 1980.

3. C. C. Chatterjee, Human Physiology, Vol 1 & 2, 11<sup>th</sup> Ed, Medical Allied Agency, 1987.

4. Hall, B.K., Evolution: Principles and Processes, 1<sup>st</sup> Ed, Jones & Bartlett, 2011.

### **Evaluation & Grading**

Evaluation will be based on marks scored during written exam in the two quizzes, mid semester and end semester examinations. Grading from AS to DD and F, as per standard grading system followed by institute.