



# SILVER OAK UNIVERSITY

Silver Oak Institute of Science

Bachelor of Science Physics

Course Name: Advanced Biosciences

Course Code: 2050293137

Semester: 2<sup>nd</sup>

## Prerequisite:

1. An introductory background of molecular biology and biomolecules.
2. Beneficial for Advanced knowledge and practical approaches.

## Course Objectives:

1. The fundamental structures and functions of DNA and RNA.
2. The detailed processes of DNA replication and transcription.
3. Comprehensive overview of biochemistry.
4. The importance of nutritional biochemistry.

## Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
2	0	4	6	4

## Contents:

Unit	Topics	Teaching Hours	%Weightage
1	<b>Molecular Biology</b> DNA: DNA structure, types of DNA, types of genetic material. DNA replication (Prokaryotes and eukaryotes): bidirectional replication, semi-conservative, Types of structures of RNA (mRNA, tRNA, rRNA), RNA polymerase- various types; initiation, elongation and termination of RNA chains. Translation of mRNA to protein.	15	50
2	<b>Biochemistry and Biomolecules</b> Carbohydrates, Lipids, Proteins-Definition, Classification, Structure and properties. Significance of acid value, iodine value and saponification value of lipids; Essential and Non-essential amino acids; Enzymes- Definition, Classification, Properties; Coenzymes Vitamins- Fat-soluble and Water-soluble vitamins; their Structure and properties. Minerals- Iron, calcium, phosphorus, iodine, selenium and zinc: their properties.	15	50

**List of Experiments:****Total Hours: 110**

Unit	Practical Name
1	Qualitative analysis of Carbohydrates.
2	Solubility test for amino acids to study their hydrophobicity/ hydrophilicity.
3	Estimation of glucose using 3, 5- dinitrosalicylic acid (DNSA reagent).
4	Qualitative analysis of Proteins.
5	Separation of Amino acids by Paper chromatography technique.

**Course Outcomes:**

Sr. No.	CO Statement	Unit
CO-1	Discussing the concepts in Biotechnology and demonstrate knowledge acquired in interdisciplinary skills in molecular biology and biochemistry.	1
CO-2	Inculcating structure and function of genetic material in growth and development of organisms.	1
CO-3	Explain the structure and properties of biomolecules.	2
CO-4	Understand the roles and properties of essential vitamins and minerals, and explain their biochemical significance.	2

**Teaching and Learning Methodology:**

1. Problem - based Learning
2. Design Thinking
3. Cooperative-based Learning
4. Competency-based Learning

**Books Recommended:**

1. A.L. Lehninger, "Principles of Biochemistry", WH Freeman & Co, USA, 2013.
2. J. Berg, L. Stryer, J. Tymoczko, G. Gatto, "Biochemistry", WH Freeman & Co, USA, 2019.
3. G.M. Cooper and R.E. Hausman, "The Cell: A molecular approach", ASM Press and Sinauer Associate

**List of Open-Source Software/learning website:**

1. <http://silveroakuni.ac.in/video-lecture>.

**CO-PO-PSO matrix**

CO No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO-1	3	3	2	2	2	2	2	1	2	2	3	3	3
CO-2	3	3	2	3	2	2	2	1	2	2	3	3	3
CO-3	3	3	2	2	2	2	2	1	2	2	3	3	3
CO-4	3	3	2	2	2	2	2	1	2	2	3	3	3