SILVER OAK UNIVERSITY

Silver Oak Institute of Science

Bachelor of Science Physics

Course Name: General Biosciences

Course Code: 2050293136

Semester: 1st

Prerequisite:

1. Basic understanding of cell biology and genetics.

Course Objectives:

1. To explore the discovery and theory of cells.
2. To understand the phases and significance of cell division.
3. To comprehend Mendelian genetics and laws of inheritance.
4. To investigate genetic linkage, mutation, and sex determination.

Teaching Scheme:

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

Contents:

Unit	Topics	Teaching Hours	% Weightage
1	**Cell Biology & Organelles** Discovery of cell, the cell theory; Chromosomes and cell division: discovery, morphology and structural organization: Centromere, secondary constriction, telomere, chromonema, euchromatin and heterochromatin, chemical composition and karyotype, nucleosome models, Special type of chromosomes: Salivary gland chromosome and lampbrush chromosomes. Cell cycle, phases of cell division, mitosis and meiosis.	14	50
2	**Genetics** Mendelian Genetics: Introduction and brief history of genetics. Mendelian theory: Laws of inheritance-dominance, segregation, incomplete dominance, codominance with an example. Law of independent assortment, test cross, back cross, Linkage and mutation:General introduction, coupling and repulsion hypothesis, linkage in maize and Drosophila, mechanism of crossing over and its importance, Sex determination in plants and animals. Concept of allosomes and autosomes, XX-XY, XX-XO, ZW-ZZ, ZO-ZZ types. Allosomal (Klinefelter syndrome and Turner's syndrome), autosomal (Down's syndrome and Cri-Du-Chat syndrome) conditions.	14	50

List of Experiments: **Total Hours: 56**

Sr. No.	Practical Name
1	Study of Laboratory Equipment.
2	Operation and working principle of simple and compound microscope.
3	Mounting of polytene chromosomes.
4	Karyotype analysis – human (normal & abnormal).
5	Isolation and staining of stomata.
6	Staining of barr-body.
7	Staining of nucleus and observation.
8	Preparation and submission of 5 permanent slides of mitosis. (By each student).

Course Outcomes:

Sr. No.	CO statement	Unit
CO-1	Demonstrate knowledge of cell discovery and cell theory.	1
CO-2	Analyze the structure and function of chromosomes and special chromosome types.	1
CO-3	Apply Mendelian laws and concepts of genetic linkage and mutation.	2
CO-4	Analyze the concepts of sex determination and understand genetic conditions.	2

Teaching & Learning Methodology:

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

Books Recommended:

1. Ambrose, E.J., and Easty, D.M. “Cell Biology”, ELBS Publications, 1970.
2. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., and Walter, P. “Molecular Biology of the Cell”, Garland Science, 2014.
3. De Robertis, E.D.P., and De Robertis, E.M.F, “Cell Biology & Molecular Biology”, EDP Saunders College, 1980.
4. Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D., and Darnell, J. “Molecular Cell Biology”, Scientific American Books, 2000.
5. Hartl, D.L., and Jones, E.W. “Genetics: Analysis of Genes and Genomes”, Jones & Bartlett Learning, 2005.
6. Gupta, P.K. “Genetics”, Rastogi Publications, 2018-2019.
7. Primrose, S.B., and Twyman, R. “Principles of Gene Manipulation”, Blackwell Scientific Publications, 2006.
8. Powar, C.B. “Cell Biology”, Himalaya Publication, 2019.
9. Gardner, E.J., Simmons, M.J., and Snustad, D.P. “Principles of Genetics”, John Wiley & Sons, 1991.
10. Lewin, B. “Genes II”, Wiley & Sons, 1985.
11. Lewin, B. “Genes III”, Wiley & Sons, 1987.
12. Lewin, B. “Genes V”, Oxford University Press, 1994.

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	2	1	1	2	1	1	1	1	2	2	2	2
CO-2	3	2	2	2	2	1	1	1	1	2	2	3	3
CO-3	3	3	2	3	2	1	1	1	1	2	3	3	3
CO-4	3	3	2	3	2	1	2	1	1	2	3	3	3