



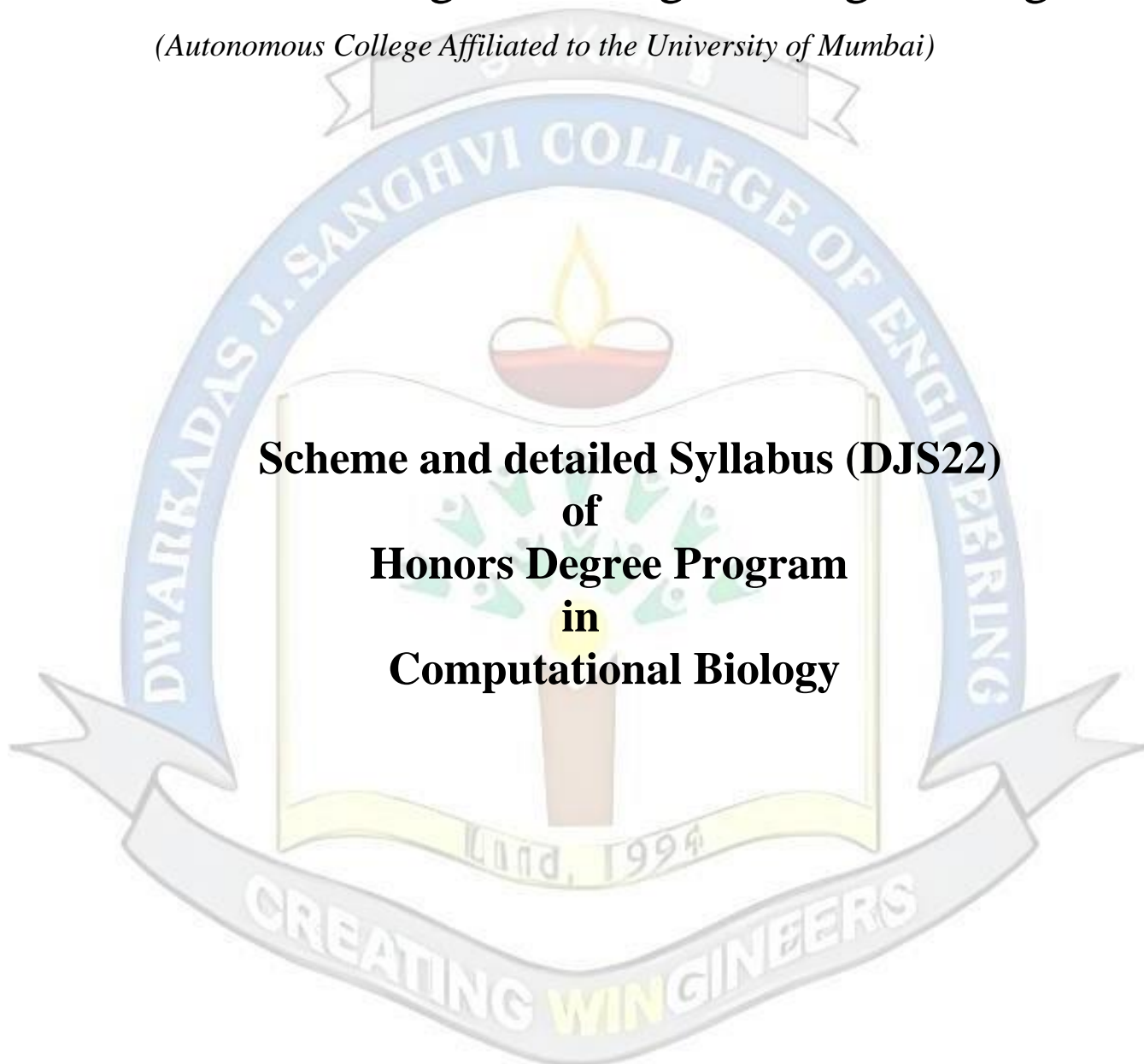
Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)



Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)



With effect from the Academic Year: 2024-2025



Proposed Scheme for Third Year Undergraduate Program in Artificial Intelligence (AI) and Data Science: Semester V (Autonomous)

Sr. No.	Course Code	Course	Teaching Scheme (hrs.)				Continuous Assessment (A) (marks)			Semester End Assessment (B) (marks)					Aggregate (A+B)	Total Credits
			Th.	P	T	Credits	Th.	T/W	Total CA (A)	Th.	O	P	O & P	Total SEA (B)		
SEM V																
1	DJS22ADHN1C1	Introduction to Biological Science	4	--	--	4	35	--	35	65	--	--	--	65	100	4
SEM VI																
2	DJS22ADHN1C2	Algorithms for Computational Biology	4	--	--	4	35	--	35	65	--	--	--	65	100	4
3	DJS22ADHN1L1	Algorithms for Computational Biology Laboratory	--	2	--	1	--	25	25	--	--	--	--	--	25	1
SEM VII																
4	DJS22ADHN1C3	Bigdata in Bioinformatics	4	--	--	4	35	--	35	65	--	--	--	65	100	4
5	DJS22ADHN1L2	Bigdata in Bioinformatics Laboratory	--	2	--	1	--	25	25	--	--	--	--	--	25	1
SEM VIII																
7	DJS22ADHN1C4	Genomic Data Science	4	--	--	4	35	--	35	65	--	--	--	65	100	4
Total			16	4	-	18	140	50	190	260	0	0	0	260	450	18

Th	Theory	T/W	Termwork
P	Practical	O	Oral
T	Tutorial		

Prepared by

Checked by

Head of the Department

Vice Principal

Principal

**Syllabus for Third Year B.Tech. Program in Artificial Intelligence (AI) and Data Science- Semester V (Autonomous)
(Academic Year 2024-25)**

Program: Third Year B.Tech. in Artificial Intelligence(AI) & Data Science				Semester : V					
Course: Introduction to Biological Science				Course Code: DJS22ADHN1C1					
Teaching Scheme (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)		Total marks (A+ B)
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	
				65			20	15	35
3	--	--	3	Laboratory Examination			Term work		Total Term work
				Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	
				--	--	--	--	--	--

Objectives:

1. Analyze cell structure and its functions
2. Understand the concepts of cellular transportation systems and cell signaling
3. Familiarization to Molecular Biology

Outcomes: On completion of the course, learner will be able to:

1. Define and recall the cell structure and functions
2. Classify the cell constituents and biomolecules
3. Elaborate the principles and regulations of replication, transcription and translation mechanism
4. Develop knowledge on genome-level cellular organization

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	Cell Types, their Structure and Function, Cell - Unit of life, Cell morphology, Difference between bacterial, Plant and Animal cells, Structure and function of membranes, Membrane organization and composition, Structure and functions of cell organelles - Nucleus, Mitochondria, Ribosome, Golgi bodies, Lysosomes, Endoplasmic reticulum, Peroxisomes, Chloroplast and vacuoles.	5
2	Cytoskeleton and Cell Division, Cytoskeletal elements and architecture - Intermediate filaments, Microtubules, and Microfilaments, Micro trabecular system (lattice) of cytoplasm, shaping of the cells and mechanical support - Cell to cell integration, Extracellular matrix, Cell locomotion (amoeboid, flagella, ciliary movement), Types of cell division, Mitosis and Meiosis, Cell cycle and Molecules that control cell cycle.	6
3	Cellular Transport Systems Transport types - Passive and Active transport, Permeases, Na ⁺ /K ⁺ , Ca ²⁺ - ATPase pumps, ATP dependent proton pumps Cotransport, Symport, Antiport, Role of lysosomal and vacuolar membrane in cellular transport, Transport into prokaryotic cells, Endocytosis and Exocytosis, Entry of viruses and toxins into the cells.	8
4	Cell Signaling, Types - Autocrine, Paracrine, and Endocrine signaling molecules, Secondary signaling molecules G-protein coupled signal transduction pathways involving cAMP, cGMP, IP3, DAG and Ca ²⁺ as second messengers.	6

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(Academic Year 2024-25)**

5	Genome Organization Structure of DNA - Nucleotides, Nucleosides, Sugar, Bases, Bonds involved in double stranded DNA; Chargaff's rule; Genome organization in prokaryotes and eukaryotes; Chromosome structure – Different types of histones and chromosome packing; Central dogma of life; DNA, RNA, proteins as genetic material; Differences between DNA and RNA.	6
6	DNA Replication Classical experiments to understand mechanism of DNA replication; Proteins involved in replication, Replication in prokaryotes; End replication problem; Different models of DNA replication; Differences between prokaryotic and eukaryotic replication; Inhibitors of DNA replication Techniques in Molecular Biology and Applications Plasmid/Genomic DNA isolation, PCR, Restriction Enzyme digestion, SDS-PAGE, Electrophoretic mobility-shift assay, DNase footprinting assay, Transcription and Translation	8
	Total	39

Books Recommended:

Text books:

1. Lodish H, Berk A Kaiser CA Krieger M, Bretscher A, Ploegh H, Amon A, Martin KC (2012) Molecular Cell Biology, 7th edition, W.H. Freeman. USA.

Reference Books:

1. Cooper GM and Hausman RE (2013) The Cell: A Molecular Approach. 6th edition. Sinauer Associates, Inc. USA
2. Alberts B, Johnson A, Lewis J, Morgan D, Raff M, Roberts K, and Walter P (2014) Molecular Biology of the Cell. 6th edition. Garland Science, USA.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 65 marks.
2. Total duration allotted for writing the paper is 2 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 20 marks and 15 marks will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Sum of the marks scored in both the two tests will be considered for final grading.

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