List of Programme Compulsory Courses

S. No	Course Name	Semester	L-T-P	Contact Hours	Credit
1	Biochemistry	III	3-0-0	3	3
2	Microbiology	III	3-0-2	5	4
3	Data Structures and Algorithms	IV	3-0-2	5	4
4	Concepts and Dynamics: Molecular Cell Biology	IV	2-0-2	4	3
5	The Human Immune System: Mechanisms to detect, defend and Attack	IV	3-0-0	3	3
6	Biochemistry Laboratory	IV	0-0-2	2	1
7	Computational and Systems Biology	V	3-0-2	5	4
8	The Human Machine for Engineers: Quantitative Physiology	V	3-0-0	3	3
9	Biophysics and Structural Biology	VI	3-0-1	4	3.5
10	Genetics and Gene manipulation	V	3-0-2	5	4
11	Biosensors	V	3-0-2	5	4
12	Bioimaging	VI	3-0-0	3	3
13	Introductory Omics	VI	3-0-0	3	3
14	Biomaterials Engineering	VI	3-0-0	3	3
15	Deep Learning	VI	3-0-3	6	4.5
				Total	50

 Table 4 Programme Compulsory Courses

Area-wise Programme Elective Courses

Table 5 Stream-wise Programme Electives Courses				
	S	Stream	Courses	

S. No.	Stream	Courses	L-T-P	Credit
1	Omics	 Microbiomes and metagenomics (level 4) Computational methods for multi-omics (level 4) Microarray data analysis (level 4) 	3-0-0 3-0-2 3-0-0	3 4 3
2	Biomaterials Engineering	 Cell-material interactions (level 3) Tissue engineering (level 4) Therapeutic delivery systems (level 4) Principles of biomechanics (level 4; from ME) Additive manufacturing (level 7; from ME) Bio-transport phenomena (level 4) 	3-0-0 3-0-0 2-0-0 3-0-0 3-0-0 3-0-0	3 3 2 3 3 3 3
3	Computational and Systems Biology	 Mathematical biology (level 7; from MA) Algorithms in biology (level 6) Modelling of biological systems (level 3) Design of experiments (level 4; from MA) 	3-0-0 3-0-0 2-0-2 3-0-0	3 3 3 3

4	Bioimaging	 Electron microscopy for biology (level 4/6; from CY) 	3-0-0	3
		 Special topics on biomedical imaging (level 4) 	3-0-0	3
		 Digital Image processing (level 4; from CS) Bio-image computing (level 7; CS) 	3-0-0	3
5	Biosensors	- Whole cell based biosensors (level 4)	3-0-0	3
		- Special topics in biosensors (level 4)	3-0-0	3
		 Microsystems fabrication technology (level 7; from EE) 	3-0-0	3
		- Chemosensors (level 6; from CY)	3-0-0	3
6	Microbial systems for	 Microbial remediation and environmental biotechnology (level 4) 	3-0-0	3
	sustainable development	 Microbes in food and sustainable agriculture (level 4) 	3-0-0	3
		- Bioenergy (level 4)	3-0-0	3
7	Drug design	- Principles of drug discovery (level 4)	3-0-0	3
	and	- Medicinal chemistry (level 4)	3-0-0	3
	development	 Viral infection and antiviral drug development (level 4) 	3-0-0	3

Specialization to be offered by the department

Table 6 Specialization and courses

S. No.	Name of Specialization	Specialization Core (8 credits)	Specialization Elective (12 Credits)
1	Therapeutic engineering and drug discovery	 Modern approaches of drug designing (3-0-0) Introduction to Precision Medicine (3-0-0) AI based drug discovery (2-0- 0) 	 Principles of drug discovery (3-0-0) Medicinal chemistry (3-0-0) Viral infection and antiviral drug development (3-0-0) Antimicrobial drugs and drug resistance (2-0-0) Anticancer drug discovery and development (3-0-0) Modern approaches for immunotherapy (3-0-0) Novel Drug Delivery Systems (3-0-0) Theranostic Systems (3-0-0) Industry collaborated project 4 credit (0-0-6) x 1
2	Microbial systems engineering	 Engineering Microbes (3-0-0) Bioprocess Engineering and Fermentation (3-0-0) Mathematical modelling of microbes (1-0-2) 	 Microbial nanotechnology (3- 0-0) Metabolic engineering for biofuels (2-0-0) Microbial remediation and environmental biotechnology (3-0-0) Microbes in food and sustainable agriculture

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	-	bioenergy (3-0-0)
	-	Soil microbiome & microbial
		technology (2-0-0)
	-	Biofilms: Bacterial
		communities (3-0-0)
	-	Gut microbiomes in health
		and diseases (3-0-0)
	-	Downstream processing
		(3-0-0)
	-	Industry collaborated project
		4 credit (0-0-6) x 1