Programme Code: **BB1**

Bachelor of Technology in *Biochemical Engineering and Biotechnology*

Department of Biochemical Engineering and Biotechnology

The overall Credit Structure

Course Category	Credits
Institute Core Courses	
Basic Sciences (BS)	22
Engineering Arts and Science (EAS)	18
Humanities and Social Sciences (HuSS)	15
Programme-linked Courses	11
Departmental Courses	
Departmental Core	69
Departmental Electives	10
Open Category Courses	10
Total Graded Credit requirement	**155**
Non Graded Units	**15**

Institute Core : Basic Sciences

CML100	General Chemistry	3	0	0	3
CMP100	Chemistry Laboratory	0	0	4	2
MTL100	Calculus	3	1	0	4
MTL101	Linear Algebra and Differential Equations	3	1	0	4
PYL100	Electromagnetic Waves and Quantum Mechanics	3	0	0	3
PYP100	Physics Laboratory	0	0	4	2
SBL100	Introductory Biology for Engineers	3	0	2	4
	Total Credits				***22***

Institute Core: Engineering Arts and Sciences

APL100	Engineering Mechanics	3	1	0	4
COL100	Introduction to Computer Science	3	0	2	4
CVL100	Environmental Science	2	0	0	2
ELL100	Introduction to Electrical Engineering	3	0	2	4
MCP100	Engineering Visualization	0	0	4	2
MCP101	Product Realization through Manufacturing	0	0	4	2
	Total Credits				***18***

Programme-Linked Basic/Engineering Arts/Sciences Core

APL102	Introduction to Materials Science and Engineering	3	0	2	4
CLL110	Transport Phenomena	3	1	0	4
MTL102	Differential Equations	3	0	0	3
	Total Credits				***11***

Humanities and Social Sciences

Courses from Humanities, Social Sciences and Management offered under this category **15**

Departmental Core

BBL131	Principles of Biochemistry	3	0	3	4.5
BBL132	General Microbiology	3	0	3	4.5
BBL133	Mass and Energy Balances in Biochemical Engineering	3	0	0	3
BBL231	Molecular Biology and Genetics	3	0	3	4.5
BBL331	Bioprocess Engineering	3	0	0	3
BBP332	Bioprocess Engineering Laboratory	0	0	3	1.5
BBL431	Bioprocess Technology	2	0	0	2
BBL432	Fluid Solid Systems	2	0	0	2
BBL433	Enzyme Science and Engineering	3	0	2	4
BBL434	Bioinformatics	2	0	2	3
BBD451	Major Project Part-I (BB1)	0	0	6	3
BBL731	Bioseparation Engineering	3	0	3	4.5
BBL732	Bioprocess Plant Design	3	0	2	4
BBL733	Recombinant DNA Technology	2	0	3	3.5
CLL122	Chemical Reaction Engineering-I	3	1	0	4
CLL231	Fluid Mechanics for Chemical Engineers	3	1	0	4
CLL251	Heat Transfer for Chemical Engineers	3	1	0	4
CLL252	Mass Transfer-I	3	0	0	3
CLL261	Process Dynamics and Control	3	1	0	4
CLP301	Chemical Engineering Laboratory-I	0	0	3	1.5
CLP302	Chemical Engineering Laboratory-II	0	0	3	1.5
	Total Credits				***69***

Departmental Electives

BBL341	Environmental Biotechnology	3	0	0	3
BBL342	Physical and Chemical Properties of Biomolecules	2	1	0	3
BBL343	Carbohydrates and Lipids in Biotechnology	2	1	0	3
BBV350	Special Module in Biochemical Engineering and Biotechnology	1	0	0	1
BBD351	Mini Project (BB)	0	0	6	3
BBL441	Food Science and Engineering	3	0	0	3
BBL442	Immunology	3	0	2	4
BBL443	Modeling and Simulation of Bioprocesses	3	0	2	4
BBL444	Advanced Bioprocess Control	3	0	0	3
BBL445	Membrane Applications in Bioprocessing	3	0	0	3
BBL446	Biophysics	3	0	0	3
BBL447	Enzyme Catalyzed Organic Synthesis	2	0	2	3
BBD452	Major Project Part-II (BB1)	0	0	16	8
CLL477	Materials of Construction	3	0	0	3
BBL734	Metabolic Regulation and Engineering	3	0	0	3
BBL735	Genomics and Proteomics	2	0	2	3
BBL736	Dynamics of Microbial Systems	3	0	0	3
BBL737	Instrumentation and Analytical Methods in Bioengineering	2	0	2	3
BBL740	Plant Cell Technology	2	0	2	3
BBL741	Protein Science and Engineering	3	0	0	3
BBL742	Biological Waste Treatment	3	0	2	4
BBL743	High Resolution Methods in Biotechnology	2	0	2	3
BBL744	Animal Cell Technology	3	0	2	4
BBL745	Combinatorial Biotechnology	3	0	0	3
BBL746	Current Topics in Biochemical Engineering and Biotechnology	3	0	0	3
BBL747	Bionanotechnology	3	0	0	3
BBL748	Data Analysis for DNA Microarrays	3	0	2	4
BBL749	Cancer Cell Biology	3	0	3	4.5
BBL750	Genome Engineering	2	0	2	3
CLL728	Biomass Conversion and Utilization	3	0	0	3

B.Tech. in Biochemical Engineering and Biotechnology

BB1

Semester	Course-1	Course-2	Course-3	Course-4	Course-5	Course-6	Course-7	Course-8	Course-9	L	T	P	Credits	Non-Graded Units	Contact Hours
I	ELL100 Introduction to Electrical Engineering 3 0 2 4	MCP100 Introduction to Engineering Visualization 0.5 0 3 2	PYL100 Electromagnetic Waves and Quantum Mechanics 3 0 0 3	MTL100 Calculus 3 1 0 4	PYP100 Physics Laboratory 0 0 4 2	MCP101 Product Realization through Manufacturing 0 0 4 2	NIN100 Introduction to Engineering (Non-graded) 0 0 2 1	NEN100 Professional Ethics and Social Responsibility-1 (Non-graded) 0 0 1 0.5	NLN100 Language and Writing Skills-1 (Non-Graded) 0 0 2 1	9.5	1	13	17.0	2.5	28.5
II	APL100 Engineering Mechanics 3 1 0 4	COL100 Introduction to Computer Science 3 0 2 4	CML100 Introduction to Chemistry 3 0 0 3	MTL101 Linear Algebra and Differential Equations 3 1 0 4	CMP100 Chemistry Laboratory 0 0 4 2			NEN100 Professional Ethics and Social Responsibility-2 (Non-graded) 0 0 1 0.5	NLN100 Language and Writing Skills-2 (Non-Graded) 0 0 2 1	12	2	6	17.0	1.5	23.0
Note: Courses 1-6 above are attended in the given order by half of all first year students. The other half of First year students attend the Courses 1-6 of II semester first.															
III	APL102 Introduction to Materials Science and Engineering 3 0 2 4	CLL110 Transport Phenomena 3 1 0 4	SBL100 Introductory Biology for Engineers 3 0 2 4	BBL131 Principles of Biochemistry 3 0 3 4.5	BBL132 General Microbiology 3 0 3 4.5	BBL133 Mass and Energy Balances in Biochemical Engg. 3 0 0 3	BBN101 Introduction to Biochem. Engg. And Biotech. (Non-graded) 0 0 2 1			18	1	10	24.0	1	31.0
IV	CLL251 Heat Transfer for Chemical Engineers 3 1 0 4	CLL122 Chemical Reaction Engineering I 3 1 0 4	CLL231 Fluid Mechanics for Chemical Engineers 3 1 0 4	CVL100 Environmental Science 2 0 0 2	MTL102 Differential Equations 3 0 0 3	HUL2XX Humanities Elective-1 3 1 0 4				17	4	0	21.0		21.0
V	BBL231 Molecular Biology and Genetics 3 0 3 4.5	CLL252 Mass Transfer I 3 0 0 3	CLL261 Process Dynamics and Control 3 1 0 4	CLP301 Chemical Engineering Laboratory I 0 0 3 1.5	BBP332 Bioprocess Engineering Laboratory 0 0 3 1.5	BBL331 Bioprocess Engineering 3 0 0 3	HUL2XX Humanities Elective-2 3 1 0 4			15	2	9	21.5		26.0
VI	CLP302 Chemical Engineering Laboratory II 0 0 3 1.5	HUL2XX Humanities Elective-3 3 1 0 4	BBL432 Fluid Solid Systems 2 0 0 2	BBL434 Bioinformatics 2 0 2 3	BBL433 Enzyme Science and Engineering 3 0 2 4	BBL431 Bioprocess Technology 2 0 0 2				12	1	7	16.5		20.0
VII	HUL3XX Humanities Elective-4 3 0 0 3	OC1 (4) 3 0 2 4	BED451 B.Tech. Project 0 0 6 3	BBL731 Bioseparation Engineering 3 0 3 4.5	BBL732 Bioprocess Plant Design 3 0 2 4	BBL733 Recombinant DNA Technology 2 0 3 3.5				14	0	16	22.0		30.0
VIII	DE1 (4) 3 0 2 4	DE 2 (3) 3 0 0 3	DE 3 (3) 3 0 0 3	OC 2 (3) 3 0 0 3	OC 3 (3) 3 0 0 3					15	0	2	16.0		17.0

TOTAL=155.0