

**Kolhapur Institute of Technology's
College of Engineering Kolhapur
(Empowered Autonomous)**



**Department of Biotechnology
Curriculum and Syllabus for
B. Tech. Biotechnology
Scheme: 2023-24 (As Per NEP, 2020)**

ABOUT THE DEPARTMENT

The Department of Biotechnology Engineering was established in 2002 with approval from DTE and AICTE, India, by the dynamic and proactive management of KIT's College of Engineering (Autonomous) Kolhapur. This move was made in recognition of the important role that biotechnology engineers were to play in the future industrial development of biotechnology related processes and products. It has a unique place in the development of Biotechnology Engineering discipline in Maharashtra. We currently offer B. Tech. (Biotechnology Engineering) programme at undergraduate and M.Tech (Biochemical Engineering and Biotechnology) programme at post graduate level. B Tech (Biotechnology Engineering) 4 years UG programme focuses more on studies of fermentative productions of various products such as insulin like biopharmaceuticals, antibiotics, fine chemicals, enzymes etc. Students completing their HSC are to obtain at least 45% for open category and 40% for backward class category/EWS/PwD, with non -zero score in CET(PCM /PCB)/NEET / JEE (MAIN) are eligible for B.Tech Biotechnology Engg. programme.

DEPARTMENT VISION

To be the Center of Excellence in Biotechnology Engineering and the preferred choice of Students, Faculty, Industry and Society at global level

DEPARTMENT MISSION

M1:	To use sophisticated techniques of modern biotechnology to strength and develop human resources and institutional capacity.
M2:	To transfer know how and develop appropriate facility and training in biotechnology related subjects considering safety in biotechnology by assessing management risk.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)	
PEO1:	Preparation: To prepare Biotechnology Engineering students, i) To excel in higher studies in Biotechnology engineering and management ii) To succeed in all Biotechnology industrial areas through global and rigorous education.
PEO2:	Core Competence: To provide students of Biotechnology Engineering with a solid foundation in the thrust areas such as Bioprocesses, Molecular Biology, Genetic Engineering, Pharmaceutical Biotechnology etc. required to work in Biotechnology industries.
PEO3:	Breadth: To train Biotechnology Engineering students with good scientific and engineering breadth particularly in Bioinformatics, Biostatistics, Biomedical Engineering, Food Technology, Medical Biotechnology so as to comprehend, analyze, design and create novel product and solutions to real life problems.
PEO4:	Professionalism: To inculcate in Biotechnology Engineering students i) Professional and ethical attitude, effective communication, teamwork skills, entrepreneurship skills with multidisciplinary approach ii) An ability to relate engineering issues in biotechnology for the welfare of mankind and environment.
PEO5:	Learning Environment: To provide students of Biotechnology Engineering with better social and academic environment aware of excellence, leadership, intellectual property rights, written ethical guidelines, and the life-long learning needed for a successful professional career.

PROGRAMME OUTCOMES (PO)	
PO1:	Apply the knowledge of mathematics, basic science and in-depth technical competence in Biotechnology engineering discipline to meet the solution of complex engineering problems.
PO2:	Apply the knowledge of mathematics, basic science and in-depth technical competence in Biotechnology engineering discipline to meet the solution of complex engineering problems.
PO3:	Design complex processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PO4:	Use research-based knowledge and research methods in the field of Biotechnology engineering to conduct experiments, analyze and interpret the data, design the equipment and processes as per the specifications and needs of biotech industries.
PO5:	Create, select, and apply appropriate techniques, resources, and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6:	Apply reasoning gained from the contextual knowledge of biotechnological engineering to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7:	Apply ethical principles and commit to professional ethics, responsibilities and norms of the biotechnology engineering practice.
PO8:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary environments
PO9:	Communicate effectively on complex biotechnology engineering activities with the engineering community and with society at large, such as being able to make effective presentations, write effective reports and design documentation.
PO10:	Demonstrate knowledge and understanding of the biotechnology engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.
PO11:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of biotechnology engineering and technological change

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1:	Research aptitude: Inculcate the applicative knowledge of engineering & applied science to demonstrate research aptitude/skills in Emerging fields of biotechnology.
PSO2:	Process & Product Development: Display skills of Bioprocess Technology towards development of processes and products in global context
PSO3:	Good Lab Practices (GLP) & Good manufacturing practices (GMP): Exhibit adequate proficiency of GLP and GMP in terms of accuracy & precision, safety, ethics and reproducibility and able to follow standard operating procedures (SOP).

As per NEP Guidelines											
Scheme of Credit Distribution											
	Year	FY		SY		TY		B. Tech			
Sr. No.	Curriculum Components	I	II	III	IV	V	VI	VII	VIII	Actual	NEP Guidelines
1	Basic Science Course (BSC)	8	8							16	14-18
2	Engineering Science Course (ESC)	10	3							13	12-16
3	Programme Core Courses (PC)		3	16	15	10	11	11		66	44-56
4	Programme Elective Course (PEC)					3	3	3	6	15	20
5	Multi Minor (MM)			2	3	3	3	3		14	14
6	Open Elective (OE)					3	3	2		8	8
7	Vocational And Skill Enhancement Course (VSEC)	1	3		1	1				6	8
8	Ability Enhancement Course (AEC)		3				1			4	4
9	Entrepreneurship / Economics/ Management Courses (MGMT/ Economics/ Marketing/ Finance) (HSSM)			2		2				4	4
10	Indian Knowledge System (IKS)	2								2	2
11	Value Education Course (VEC)			2	2					4	4
12	Research Methodology (Project) (RM)							4		4	4
13	Community Engagement Project/Field Project (PBL/Seminar/Mini Project) (CEP)					1	1			2	2
14	Project (PP)								4	4	4
15	Internship/OJT (PBL/ Seminar/ Mini Project/ Virtual Internship/ Physical) (OJT)			1	1				6	8	12
16	Co-curricular Courses (CC)		1		1		1		1	4	4
		20-22	20-22	20-22	20-22	20-22	20-22	20-22	20-22	174	
		21	21	23	23	23	23	23	17	174	

SEMESTER-I

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme Component			
									ISE1	MSE	ISE2	ESE
1.	BSC	UHSBS0101	Engineering Mathematics-I	3	1	-	4	4	10	30	10	50
												20
2.	BSC	UHSBS0108	General Physics and Optics	3	-	-	3	3	10	30	10	50
												20
3.	ESC	UHSES0109	Engineering Mechanics	3	-	-	3	3	10	30	10	50
												20
4.	ESC	UHSES0110	Basic Mechanical Engineering	2	-	-	2	2	10	30	10	50
												20
5.	ESC	UHSES0111	Introduction to Python Programming	2	-	-	2	2	10	30	10	50
												20
6.	BSC	UHSBS0128	General Physics and Optics Lab	-	-	2	2	1	ISE	50		20
7.	ESC	UHSES0129	Engineering Mechanics Lab	-	-	2	2	1	ISE	50		20
8.	ESC	UHSES0130	Basic Mechanical Engineering Lab	-	-	2	2	1	ISE	50		20
9.	ESC	UHSES0131	Introduction to Python programming Lab	-	-	2	2	1	ISE	50		20
10.	VSEC	UHVS0132	Workshop Practice Lab	-	-	2	2	1	ISE	50		20
11.	IKS	UHSIK0136	Ecology, Energy & Environment	2	-	-	2	2	ISE	100		40
Total:							26	21	Total Marks: 800 Total Credit: 21			

SEMESTER-II

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme			
									Component			
1.	BSC	UHSBS0201	Engineering Mathematics-II	3	1	-	4	4	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
2.	BSC	UHSBS0212	Applied Chemistry	3	-	-	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
3.	AEC	UHSAE0203	Communication Skills	2	-	-	2	2	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
4.	ESC	UHSES0213	Basic Civil Engineering	2	-	-	2	2	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
5.	PC	UHSPC0214	Fundamentals of Electrical Engineering	2	-	-	2	2	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
6.	BSC	UHSBS0233	Applied Chemistry Lab	-	-	2	2	1	ISE	50	20	
7.	AEC	UHSAE0222	Communication Skills Lab	-	-	2	2	1	ISE	50	20	
8.	ESC	UHSES0234	Basic Civil Engineering Lab	-	-	2	2	1	ISE	50	20	
9.	PC	UHSPC0235	Fundamentals of Electrical Engineering Lab	-	-	2	2	1	ISE	50	20	
10.	VSEC	UHSVS0238	Computer Aided Engineering Drawing	-	-	2	2	3	ISE1	25	20	40
									ISE2	25		
									ESE (POE)	50		
11.	CC	UHSCC0239	Co-Curricular Course	1	-	-	-	1	ISE	100	40	
Total:							24	21	Total Marks: 800 Total Credit: 21			

SEMESTER III

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs. / Wee k	Credit s	Evaluation Scheme			
									Compone nt	Marks		
										Max	Min for Passing	
1.	PC	UBTPC0301	Fluid Mechanics	3	1	0	4	4	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
2.	PC	UBTPC0302	Microbiology	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
3.	PC	UBTPC0303	Biochemistry	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
4.	PC	UBTPC0304	Cell and Molecular Biology	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
5.	VEC	UBTVE0305	Constitution of India	2	0	0	2	2	ISE	50	20	
6.	HSSM	UBTEM0306	Industrial Organization and Management	2	0	0	2	2	ESE	50	20	
7.	PC	UBTPC0331	Microbiology Laboratory	0	0	2	2	1	ISE	50	10	30
									ESE (POE)	25		
8.	PC	UBTPC0332	Biochemistry Laboratory	0	0	2	2	1	ISE	25	10	
9.	PC	UBTPC0333	Cell and Molecular Biology Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
10.	OJT	UBTIL0371	Mini Project-I	0	0	2	2	1	ISE	50	20	
11.	MM	UBTMM03**	Multidisciplinary Minor	2	0	0	2	2	ESE	100	40	
							27	23	Total Marks: 800 Total Credit: 23			

Multi Disciplinary Minor - I (Data Analytics)		Multi Disciplinary Minor –II (Finance)	
UBTMM0341	Computational statistics	UBTMM0342	Fundamentals of Financial Accounting

DEPARTMENT OF BIOTECHNOLOGY

SEMESTER IV

Sr. No .	Category	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme			
									Component	Marks		
										Max	Min for Passing	
1	PC	UBTPC0401	Heat Transfer	2	0	0	2	2	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
2	PC	UBTPC0402	Genetic Engineering	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
3	PC	UBTPC0403	Immunology	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
4	PC	UBTPC0404	Enzyme Technology	2	0	0	2	2	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
5	PC	UBTPC0405	Bioinformatics	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
6	VEC	UBTVE0406	Environmental Studies	2	0	0	2	2	ISE	50	20	
7	PC	UBTPC0431	Heat Transfer Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
8	PC	UBTPC0432	Genetic Engineering Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (POE)	25		
9	VSEC	UBTVS0433	Immunology Laboratory	0	0	2	2	1	ISE	25	10	
10	CC	UBTCC0434	Co-Curricular Activities - II	0	0	2	2	1	ISE	50	20	
11	OJT	UBTIL0471	Mini Project II	0	0	2	2	1	ISE	25	10	
12	MM	UBTMM04**	Multidisciplina ry Minor	3	0	0	3	3	ESE	100	40	
			Total:				28	23	Total Marks: 850 Total Credit: 23			

Multi Disciplinary Minor - I (Data Analytics)		Multi Disciplinary Minor –II (Finance)	
UBTMM0441	Python and R language for data science (MM-I)	UBTMM0442	Cost and Management accounting(MM-II)

SEMESTER V

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme			
									Component	Marks		
										Max	Min for Passing	
1	PC	UBTPC0501	Bioreaction Engineering	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
2	PC	UBTPC0502	Mass Transfer	2	0	0	2	2	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
3	PC	UBTPC0503	Fermentation Technology	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
4	PEC	UBTPE05**	Program Elective I	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
5	OE	UBTOE05**	Open Elective I	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
6	AEC	UBTAE0501	Business Communication and Value Science	0	0	2	2	1	ISE	50	20	
7	PC	UBTPC0531	Bioreaction Engineering Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
8	VSEC	UBTVS0532	Fermentation Technology Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (POE)	25		
9	PC	UBTPC0533	Bioinformatics Laboratory	0	0	2	2	1	ISE	25	10	
10	CEP	UBTIL0571	Mini Project III	0	0	2	2	1	ISE	25	10	
11	MM	UBTMM05**	Multidisciplinary Minor	3	0	0	3	3	ESE	100	40	
			Total:				28	22	Total Marks: 800 Total Credit: 22			

Multi Disciplinary Minor - I (Data Analytics)		Multi Disciplinary Minor –II (Finance)	
UBTMM0541	Fundamentals of data science (MM-I)	UBTMM0542	Taxation and Audit (MM-II)

Program Elective- I	
UBTPE0511	Cell Culture Technology (PE-I)
UBTPE0512	Biological Thermodynamics (PE-I)

Sr. No.	Open Elective – I T.Y.B.Tech (Sem-V)	Course Code	Credits
1	Sales and Distribution Management	UILOE0521	03
2	Global Marketing Management	UILOE0522	03
3	Customer Relationship Management	UILOE0523	03
4	Water Resources Management	UILOE0524	03
5	Agile Project Management	UILOE0525	03
6	Product Design and Manufacturing	UILOE0526	03
7	Leadership and Corporate Strategy	UILOE0527	03
8	Human Resource Development	UILOE0528	03
9	Corporate Finance	UILOE0529	03
10	Green Buildings	UILOE0530	03
11	Ethics in Engineering Practices	UILOE0531	03

SEMESTER VI

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs./ Week	Credits	Evaluation Scheme			
									Component	Marks		
										Max	Min for Passing	
1	PC	UBTPC0601	Bioseparations	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
2	PC	UBTPC0602	Process Calculations	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
3	PC	UBTPC0603	Bioprocess Equipment Design	2	0	0	2	2	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
4	PEC	UBTPE06**	Program Elective II	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
5	OE	UBTOE06**	Open Elective II	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
6	HSS M	UBTEM0601	Biotech Industry: Practices and Entrepreneurship	2	0	0	2	2	ESE	50	20	
7	PC	UBTPC0631	Bioseparations Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (POE)	25		
8	PC	UBTPC0632	Bioprocess Equipment Design Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
9	PC	UBTPC0633	Effluent Treatment Laboratory	0	0	2	2	1	ISE	25	10	
10	CC	UBTCC0634	Co-Curricular Activities - III	0	0	2	2	1	ISE	50	20	
11	FP	UBTIL0671	Mini project IV	0	0	2	2	1	ISE	25	10	
12	MM	UBTMM06**	Multidisciplinary Minor	3	0	0	3	3	ESE	100	40	
							28	24	Total Marks: 850 Total Credit: 24			

Multi Disciplinary Minor - I (Data Analytics)		Multi Disciplinary Minor –II (Finance)	
UBTMM0641	Data Mining (MM-I)	UBTMM0642	Financial Management(MM-II)
Program Elective- II			
UBTPE0611		Plant Biotechnology (PE- II)	
UBTPE0612		Bioprocesses (PE- II)	

Sr. No.	Open Elective – II T.Y.B.Tech (Sem-VI)	Course Code	Credits
1	Intellectual Property	UILOE0621	03
2	Engineering Econometrics	UILOE0622	03
3	Entrepreneurship Development	UILOE0623	03
4	Positive Psychology	UILOE0624	03
5	Landscape Design	UILOE0625	03
6	Microeconomics	UILOE0626	03
7	Waste Management	UILOE0627	03
8	Social Entrepreneurship	UILOE0628	03
9	Industrial Health & Safety	UILOE0629	03
10	Appropriate Technology	UILOE0630	03
11	Six Sigma	UILOE0631	03

SEMESTER VII

Sr. No .	Category	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme			
									Component	Marks		
										Max	Min for Passing	
1	PC	UBTPC0701	Analytical Techniques in Biotechnology	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
2	PC	UBTPC0702	Good Manufacturing Practices	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
3	PC	UBTPC0703	Process Engineering Costing and Plant design	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
4	PEC	UBTPE07**	Program Elective III	3	0	0	3	3	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
5	OE	UBTOE07**	Open Elective III	2	0	0	2	2	ISE1	10		40
									MSE	30		
									ISE2	10		
									ESE	50	20	
6	PC	UBTPC0731	Analytical Techniques Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
7	PC	UBTPC0732	Animal And Plant Tissue Culture Laboratory	0	0	2	2	1	ISE	25	10	20
									ESE (OE)	25		
8	RM	UBTIL0771	Project –I	0	0	8	8	4	ISE	50	20	40
									ESE (OE)	50		
9	MM	UBTMM07**	Multidisciplinary Minor	3	0	0	3	3	ESE	100	40	
			Total:				29	23	Total Marks: 800 Total Credit: 23			

Multi Disciplinary Minor - I (Data Analytics)		Multi Disciplinary Minor –II (Finance)	
UBTMM0741	Data Visualization and analytics (MM- I)	UBTMM0742	Banking and Financial Services (MM-II)

Program Elective- III	
UBTPE0711	Biopharmaceuticals (PE- III)
UBTPE0712	Food Technology (PE- III)

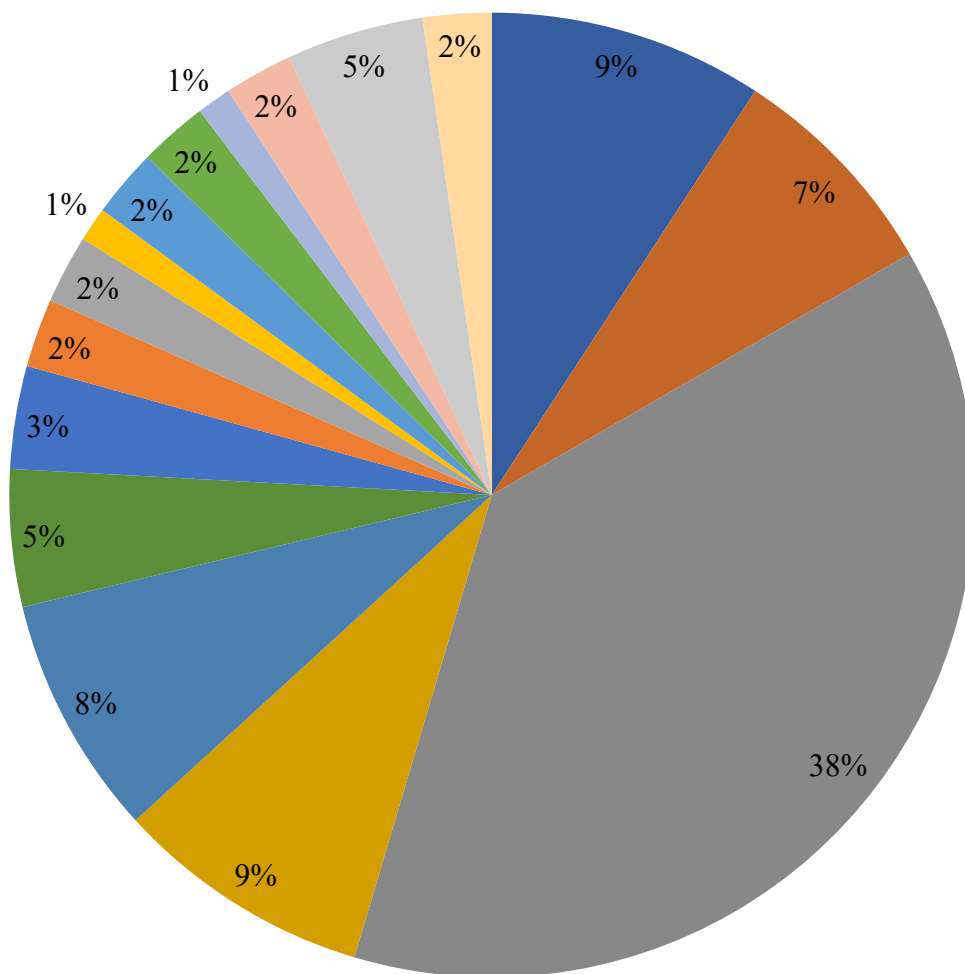
Sr. No.	Open Elective – III Final Year B.Tech (Sem-VII)	Course Code	Credits
1	Effective Paper Writing Skills	UILOE0721	02
2	Desktop Support and Services	UILOE0722	02
3	Healthcare and Technology	UILOE0723	02
4	Industrial Instrumentation	UILOE0724	02
5	Sustainable Energy Systems	UILOE0725	02
6	Urban and Rural Planning	UILOE0726	02
7	Design of Experiments and Research Methodology (DERM)	UILOE0727	02
8	Graphic and Product Design	UILOE0728	02
9	Environmental Policies and Law	UILOE0729	02
10	Environmental Impact Assessment	UILOE0730	02
11	Incubation and Entrepreneurship Enhancement	UILOE0731	02

SEMESTER VIII												
Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs . / Week	Credits	Evaluation Scheme			
									Component	Marks		
										Max	Min for Passing	
1	PEC	UBTPE08**	Program Elective IV	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
2	PEC	UBTPE08**	Program Elective V	3	0	0	3	3	ISE1	10	20	40
									MSE	30		
									ISE2	10		
									ESE	50		
3	RM	UBTIL0871	Project –II	0	0	8	8	4	ISE	50	20	40
									ESE (OE)	50		
4	FP	UBTIL0872	Internship	0	0	12	12	6	ISE I	75	30	
									ISE II	75	30	
5	CC	UBTCC0831	Co-Curricular Activities - IV	0	0	2	2	1	ISE	50	20	
			Total:				28	17	Total Marks: 500 Total Credit: 17			

Program Elective IV		Program Elective V	
UBTPE0811	Tissue Engineering and organ Printing (PE- IV)	UBTPE0813	Next generation Sequencing and Analysis (PE-V)
UBTPE0812	Green Technology (PE-IV)	UBTPE0814	Drug development process (PE-V)

Curriculum Components and Credit Distribution

■ BSC ■ ESC ■ PC ■ PEC ■ MM ■ OE ■ VSEC ■ AEC
 ■ HSSM ■ IKS ■ VEC ■ RM ■ CEP ■ PP ■ OJT ■ CC



Multi-Disciplinary Minor - I Data analytics

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs./ Week	Credits
1	MM-I	UBTMM0341	Computational statistics	2	0	0	2	2
2	MM-I	UBTMM0441	Python and R language for data science	3	0	0	3	3
3	MM-I	UBTMM0541	Fundamentals of data science	3	0	0	3	3
4	MM-I	UBTMM0641	Data Mining	3	0	0	3	3
5	MM-I	UBTMM0741	Data Visualization and analytics	3	0	0	3	3
Total:							14	14

Multi-Disciplinary Minor-II Finance

Sr. No.	Category	Course Code	Course Name	L	T	P	Hrs./ Week	Credits
1	MM-II	UBTMM0342	Fundamentals of Financial Accounting	2	0	0	2	2
2	MM-II	UBTMM0442	Cost and Management accounting	3	0	0	3	3
3	MM-II	UBTMM0542	Taxation and Audit	3	0	0	3	3
4	MM-II	UBTMM0642	Financial Management	3	0	0	3	3
5	MM-II	UBTMM0742	Banking and Financial Services	3	0	0	3	3
Total:							14	14

Emerging minor- I Bioinformatics

Sr. No	Course Code	Course Name	L	T	P	Hrs. / Week	Credits	Evaluation Scheme			Category
								Component	Marks		
									Max	Min for Passing	
1	UBTMN0361	Biology for Engineers	3	1	0	4	4	ESE	100	40	MN
2	UBTMN0461	Fundamentals of Biomolecules	3	1	0	4	4	ESE	100	40	MN
3	UBTMN0561	Basics of Bioinformatics	3	1	0	4	4	ESE	100	40	MN
4	UBTMN0661	Structural Bioinformatics and Proteome based Technology	3	1	0	4	4	ESE	100	40	MN
5	UBTMN0761	Genomics and Proteomics	2	0	0	2	2	ESE	100	40	MN
Total:						18	18	Total Marks: 500 Total Credit: 18			

**B. Tech (Hons.) Biotechnology Engineering with Specialization in
Biosimilar Technology**

Sr. No.	Course Code	Course Name	L	T	P	Hrs./ Week	Credits	Evaluation Scheme			Category
								Component	Marks		
									Max	Min for Passing	
1	UBTHN0351	Biosimilar Therapeutics: Introduction	3	1	0	4	4	ESE	100	40	HN
2	UBTHN0451	Biosimilar: Manufacturing Technology-I	3	1	0	4	4	ESE	100	40	HN
3	UBTHN0551	Biosimilar Manufacturing Technology-II	3	1	0	4	4	ESE	100	40	HN
4	UBTHN0651	Biosimilar Therapeutics: Characterization	3	1	0	4	4	ESE	100	40	HN
5	UBTHN0751	Biosimilar Therapeutics: Regulatory Approval Processes	2	0	0	2	2	ESE	100	40	HN
		Total:				18	18	Total Marks: 500 Total Credit: 18			

DEPARTMENT OF BIOTECHNOLOGY

EXIT COURSES-Courses after Second year exit

Sr. No.	Course Code	Course Name	L	T	P	Hr s./ Week	Credits	Evaluation Scheme	Marks		Category
								Component	Max	Min	
1	UBTEX0491	Agricultural Biotechnology	3	0	0	3	3	ISE	50	20	MEES
2	UBTEX0492	Introduction to Plant tissue culture	3	0	0	3	3	ISE	50	20	MEES
3	UBTEX0493	Training	0	0	2	2	2	ISE	50	20	MEES
Total:						8	8	Total Marks: 150		Total Credit: 8	

EXIT COURSES-Courses After Third year exit

Sr. No.	Course Code	Course Name	L	T	P	Hr s./ Week	Credits	Evaluation Scheme	Marks		Category
								Component	Max	Min	
1	UBTEX0691	Upstream Processing	3	0	0	3	3	ISE	50	20	MEES
2	UBTEX0692	Downstream Processing	3	0	0	3	3	ISE	50	20	MEES
3	UBTEX0693	Training	0	0	2	2	2	ISE	50	20	MEES
Total:						8	8	Total Marks: 150		Total Credit: 8	

