Proposed Structure for

B.Tech. in Biotechnology Engineering

(To be implemented w.e.f. Academic Year 2022-23)

Department of Biotechnology Engineering

**Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur,
Maharashtra, INDIA**

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for
Second Year B. Tech. Program in Biotechnology Engineering Semester-III

Course Code	Course Name	Curriculum Component	L	T	P	Credits	Component	Max	Min for Passing	
UBTC0301	Fluid Mechanics	PC	3	-	-	3	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0302	Microbiology	PC	4	-	-	4	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0303	Biochemistry	PC	4	-	-	4	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0304	Enzyme Technology	PC	3	-	-	3	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0305	Cell and Molecular Biology	BS	4	-	-	4	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTA0361	Constitution of India (Audit Course III)	HS	2	-	-	-	ESE	100	40	40
UBTC0331	Fluid Mechanics Laboratory	PC	-	-	2	1	ISE	25	10	
UBTC0332	Microbiology Laboratory	PC	-	-	2	1	ISE	50	20	
							ESE (POE)	25	10	
UBTC0333	Biochemistry Laboratory	PC	-	-	2	1	ISE	50	20	
							ESE (POE)	25	10	
UBTC0334	Cell and Molecular Biology Laboratory	BS	-	-	2	1	ISE	50	20	
							ESE (POE)	25	10	
			20	-	8	22	500 + 250 = 750 + Audit Course			

Total Credits - 22, Total Contact hours – 28

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for
Second Year B. Tech. Program in Biotechnology Engineering Semester-IV

Course Code	Course Name	Curriculum Component	Hours/Week				Evaluation Scheme			
			L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
UBTC0401	Biostatistics	PC	3	1	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0402	Heat Transfer	PC	4	-	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0403	Immunology	BS	3	-	-	**3**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0404	Genetic Engineering	PC	3	-	-	**3**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0405	Bioinformatics	PC	3	-	-	**3**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTA0461	Environmental Studies (Audit Course IV)	BS	2	-	-	**-**	ESE	100	40	40
UBTC0431	Heat Transfer Laboratory	PC	-	-	2	**1**	ISE	50	20	
UBTC0432	Immunology Laboratory	BS	-	-	2	**1**	ISE	25	10	
							ESE (POE)	25	10	
UBTC0433	Genetic Engineering Laboratory	PC	-	-	2	**1**	ISE	25	10	
							ESE (POE)	25	10	
UBTC0434	Bioinformatics Laboratory	PC	-	-	2	**1**	ISE	50	20	
UBTC0441	Mini Project I	PW	-	-	2	**1**	ISE	50	20	
			18	**1**	**10**	**22**	**500 + 250 = 750 + Audit Course**			

Total Credits - 22, Total Contact hours – 29

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for

Third Year B. Tech. Program in Biotechnology Engineering Semester- V

Course Code	Course Name	Curriculum Component	L	T	P	Credits	Component	Max	Min for Passing	
									Marks	
UBTC0501	Mass Transfer	PC	4	-	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0502	Bioreaction Engineering	PC	4	-	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTC0503	Fermentation Technology	PC	4	-	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTE05**	Program Elective I	PE	3	1	-	**4**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTO05**	Open Elective I	OE	3	-	-	**3**	ISE I	10	20	40
							MSE	30		
							ISE II	10		
							ESE	50	20	
UBTA0561	Biological Thermodynamics (Audit Course V)	PC	3	-	-	**-**	ESE	100	40	40
UBTC0531	Bioreaction Engineering Laboratory	PC	-	-	2	**1**	ISE	50	20	
							ESE (POE)	50	10	
UBTC0532	Fermentation TechnologyLaboratory	PC	-	-	2	**1**	ISE	50	10	
							ESE (POE)	50	10	
UBTC0541	Mini Project II	PW	-	-	2	**1**	ISE	50	20	
			21	**1**	**6**	**22**	**500 + 250 = 750 + Audit Course**			

Total Credits - 22, Total Contact hours – 28

Program Elective I (PE-I)		Open Elective I (OE-I)	
UBTE0521	Cell Culture Technology**(PE-I)**	UBTO0501	Introduction to Bioinformatics**(OE-I)**
UBTE0522	Vaccine Technology**(PE-I)**	UBTO0502	Bioterrorism and National Security**(OE-I)**

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for

Third Year B. Tech. Program in Biotechnology Engineering Semester- VI

Course Code	Course Name	Curriculum Component	L	T	P	Credits	Components	Max	Min for Passing	
UBTC0601	Bioprocess Calculations	PC	4	-	-	**4**	ISE I	10	20	40
							ISE II	10		
							MSE	30		
							ESE	50	20	
UBTC0602	Bioprocess Equipment Design	PC	4	-	-	**4**	ISEI	10	20	40
							ISE II	10		
							MSE	30		
							ESE	50	20	
UBTC0603	Bioseparation Processes	PC	4	-	-	**4**	ISE I	10	20	40
							ISE II	10		
							MSE	30		
							ESE	50	20	
UBTE06**	Program Elective II	PE	3	-	-	**3**	ISE I	10	20	40
							ISE II	10		
							MSE	30		
							ESE	50	20	
UBTO06**	Open Elective II	OE	3	-	-	**3**	ISE I	10	20	40
							ISE II	10		
							MSE	30		
							ESE	50	20	
UBTA0661	Drug Development Process (Audit Course VI)	PC	3	-	-	**-**	ESE	100	40	40
UBTC0631	Bioprocess Equipment Design Laboratory	PC	-	-	2	**1**	ISE	50	20	
							ESE (POE)	25	10	
UBTC0632	Bioseparation Processes Laboratory	PC	-	-	2	**1**	ISE	50	20	
							ESE (POE)	25	10	
UBTE06**	Program Elective II Laboratory	PE	-	-	2	**1**	ISE	25	10	
							ESE (OE)	25	10	
UBTC0641	Mini Project III	PW	-	-	2	**1**	ISE	50	20	
			21	**-**	**8**	**22**	**500 + 250 = 750 + Audit Course**			

Total Credits - 22, Total Contact hours – 29

Program Elective II (PE-II)		Program Elective II Laboratory		Open Elective II (OE-II)	
UBTE0621	Effluent Treatment**(PE-II)**	UBTE0633	Effluent Treatment Laboratory	UBTO0601	Food Technology **(OE-II)**
UBTE0622	Green Technology**(PE-II)**	UBTE0634	Green Technology Laboratory	UBTO0602	Bioenergy **(OE-II)**

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for
Final Year B. Tech. Program in Biotechnology Engineering Semester-VII

Course Code	Course Name	Curriculum Component	Teaching Scheme				Evaluation Scheme			
			L	T	P	Credits	Components	Max	Min for Passing	
UBTC0701	Bioprocess Modelling and Simulation	PC	3	-	-	3	ISE I	10		
							MSE	30	20	40
							ISE II	10		
							ESE	50	20	
UBTC0702	Analytical Techniques in Biotechnology	PC	3	-	-	3	ISE I	10		
							MSE	30	20	40
							ISE II	10		
							ESE	50	20	
UBTC0703	Bioprocesses	PC	4	-	-	4	ISE I	10		
							MSE	30	20	40
							ISE II	10		
							ESE	50	20	
UBTC0704	Good Manufacturing Practices	PC	3	-	-	3	ISE I	10		
							MSE	30	20	40
							ISE II	10		
							ESE	50	20	
UBTE07**	Program Elective III	PE	3	-	-	3	ISE I	10		
							MSE	30	20	40
							ISE II	10		
							ESE	50	20	
UBTA0761	Professional Certifications (Audit Course V)*	PC	-	-	2	-	ISE	100	40	40
UBTC0731	Bioprocess Modelling and Simulation Laboratory	PC	-	-	2	1	ISE	50	20	
							ESE (POE)	25	10	
UBTC0732	Analytical Techniques in Biotechnology Laboratory	PC	-	-	2	1	ISE	50	20	
							ESE (OE)	25	10	
UBTC0751	Project Phase I	PW	-	-	4	2	ISE I	50	20	
							ISE II	50	20	
			17	-	10	20	500 + 250 = 750 + Audit Course			

Total Credits – 20, Total Contact hours – 27

Program Elective III (PE-III)	
UBTE0721	Biopharmaceuticals **(PE-III)**
UBTE0722	Biomedical Engineering**(PE-III)**

*Note – Minimum 12 weeks certifications courses (single or multiple courses with summation of minimum 12 weeks) to be completed by each students and submit the final certificates and scores to exam cell. The average scores of all certifications should be above 40% for passing. These certification courses offering agencies can be NPTEL, Coursera etc.

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation scheme for
Final Year B. Tech. Program in Biotechnology Engineering Semester-VIII

Course Code	Course Name	Curriculum Component	L	T	P	Credits	Components	Max	Min for Passing	
UBTE08**	Program Elective IV	PE	3	-	-	3	ISE-I	10	20	40
							ISE-II	10		
							MSE	30		
							ESE	50	20	
UBTE08**	Program Elective V	PE	3	-	-	3	ISE-I	10	20	40
							ISE-II	10		
							MSE	30		
							ESE	50	20	
UBTC0841	Internship	PW	-	-	4	2	ISE I	50	20	
							ISE II	50	20	
UBTC0851	Project Phase II	PW	-	-	8	4	ISE I	50	20	
							ISE II	50	20	
							ESE (OE)	100	40	
			6	-	12	12	200 + 300 = 500			

Total Credits-12, Total Contact hours – 18

Program Elective IV (PE-IV)		Program Elective V (PE-V)	
UBTE0821	Industrial Management and Process Costing**(PE-IV)**	UBTE0823	Food and Nutrition Technology**(PE-V)**
UBTE0822	Plant Biotechnology**(PE-IV)**	UBTE0824	Biosensors**(PE-V)**

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
B. Tech. Program in Biotechnology Engineering

Total Credits Distribution from F.Y.B.Tech to Final Year B.Tech in Biotechnology Engineering

Curriculum Component	F.Y.B.Tech		S.Y.B.Tech		T.Y.B.Tech		Final Year B.Tech		Total Credits	~Percentage Distribution
	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Sem VII	Sem VIII		
Humanities (HS)	3	-	-	-	-	-	3	-	6	4
Basic Sciences (BS)	8	8	5	4	-	-	-	-	25	15
Engineering Sciences (ES)	9	12	-	-	-	-	-	-	21	13
Program Core (PC)	-	-	17	17	14	14	12	-	74	46
Program Elective (PE)	-	-	-	-	4	4	3	6	17	11
Open Elective (OE)	-	-	-	-	3	3	-	-	6	4
Project Work (PW)	-	-	-	1	1	1	2	6	11	7
Mandatory Audit Course	ED	UHV	CI	EVS	BT	DDP	PC	-	Non-Credit Courses	-
Total Credits	**20**	**20**	**22**	**22**	**22**	**22**	**20**	**12**	**160**	**100**

Note for Mandatory Audit Courses (MAC):

ED: Entrepreneurship Development, UHV: Universal Human Values, EVS: Environmental Studies, IC: Indian Constitution,

BT: Biological Thermodynamics, DDP: Drug Development Process, PC : Professional Certifications

Credits Distribution with Percentage of Curriculum Component