

13. Courses of Study and Scheme of Assessment

BTECH BIOTECHNOLOGY

(2019 Regulations)
(Minimum credits to be earned: 165)

Course Code	Course Title	Periods / week				Maximum Marks			
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 1									
19B101	Calculus and Geometry	3	1	0	4	50	50	100	BS
19B102	Physics	3	0	0	3	50	50	100	BS
19B103	Chemistry	3	0	0	3	50	50	100	BS
19B104	Basics of Electrical and Electronics Engineering	3	0	0	3	50	50	100	ES
19G105	English Language Proficiency	2	1	0	3	50	50	100	HS
19B110	Engineering Graphics	0	0	4	2	50	50	100	ES
19B111	Physics Laboratory	0	0	2	1	50	50	100	BS
19B112	C Programming Laboratory	0	0	4	2	50	50	100	ES
19IP15	Induction Programme **	0	0	0	0	-	-	-	MC
Total 26 periods		14	2	10	21	400	400	800	
SEMESTER 2									
19B201	Linear Algebra and Transforms	3	1	0	4	50	50	100	BS
19B202	Applied Physics	3	0	0	3	50	50	100	BS
19B203	Organic Chemistry	3	0	0	3	50	50	100	BS
19B204	Process Calculations	2	1	0	3	50	50	100	ES
19_____	Language Electives	0	0	4	2	50	50	100	HS
19B210	Chemical Engineering Laboratory	0	0	4	2	50	50	100	ES
19B211	Chemistry Laboratory	0	0	2	1	50	50	100	BS
19B212	Python Programming Laboratory	0	0	4	2	50	50	100	ES
19B215	Activity Point Programme *	0	0	0	0	-	-	-	MC
Semester 2- Summer Term									
19B214	Internship €	0	0	0	2 [£]	100	0	100	EEC
Total 27 periods		11	2	14	22	500	400	900	

** As per norms

* As per AICTE Norms; Total 60 hrs; Grade: Completed / Not Completed; Not counted for CGPA

CA Continuous Assessment

FE Final Examination

€ This course will be conducted prior to the commencement of the third semester for a period of 3 weeks

£ For internship, one credit is equivalent to minimum 40 hours of work as per norms

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Course Code	Course Title	Periods / week			Maximum Marks				
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 3									
19B301	Numerical Methods	2	1	0	3	50	50	100	BS
19B302	Biochemistry	4	0	0	4	50	50	100	PC
19B303	Cell Biology	3	0	0	3	50	50	100	PC
19B304	General Microbiology	3	0	0	3	50	50	100	PC
19B305	Fluid Mechanics and Heat transfer	3	1	0	4	50	50	100	ES
19B310	Biochemistry Laboratory	0	0	4	2	50	50	100	PC
19B311	Microbial and Cell Biology Laboratory	0	0	4	2	50	50	100	PC
19K312	Environmental Science **	2	0	0	0	-	-	-	MC
19O306	Economics for Engineers	3	0	0	3	50	50	100	HS
19B315	Activity Point Programme *	0	0	0	0	-	-	-	MC
Total 30 periods		20	2	8	24	400	400	800	
SEMESTER 4									
19B401	Biostatistics	2	1	0	3	50	50	100	BS
19B402	Chemical and Biochemical Thermodynamics	2	1	0	3	50	50	100	ES
19B403	Industrial Biotechnology	3	0	0	3	50	50	100	PC
19B404	Molecular Biology	3	0	0	3	50	50	100	PC
19B405	Analytical Methods and Instrumentation	3	0	0	3	50	50	100	PC
19B406	Mass Transfer Operations	3	1	0	4	50	50	100	ES
19B410	Molecular Biology Laboratory	0	0	4	2	50	50	100	PC
19B411	Analytical Methods and Instrumentation Laboratory	0	0	4	2	50	50	100	PC
19O412	Indian Constitution **	2	0	0	0	-	-	-	MC
19Q413	Soft Skills Development	0	0	2	1	100	0	100	EEC
19B415	Activity Point Programme *	0	0	0	0	-	-	-	MC
Total 31 periods		18	3	10	24	500	400	900	

** As per norms

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Course Code	Course Title	Periods / week			Maximum Marks				
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 5									
19B501	Immunology	3	0	0	3	50	50	100	PC
19B502	Bioprocess Engineering	3	1	0	4	50	50	100	PC
19B503	Genetic Engineering	3	0	0	3	50	50	100	PC
19B504	Enzyme Engineering and Technology	2	0	0	2	50	50	100	PC
19B505	Bioreaction Engineering	3	1	0	4	50	50	100	PC
19B510	Genetic Engineering Laboratory	0	0	4	2	50	50	100	PC
19B511	Bioprocess Laboratory	0	0	4	2	50	50	100	PC
19B520	Industrial Visit Cum Lecture	0	0	4	2	50	50	100	EEC
19Q513	Business and Managerial Communications	0	0	2	1	100	0	100	EEC
19B515	Activity Point Programme *	0	0	0	0	-	-	-	MC
Total 30 periods		14	2	14	23	500	400	900	
SEMESTER 6									
19B601	Bioinformatics	3	0	0	3	50	50	100	PC
19B602	Genomics	3	0	0	3	50	50	100	PC
19B603	Downstream Processing	3	0	0	3	50	50	100	PC
19B604	Bioprocess Design and Economics	2	0	0	2	50	50	100	PC
19B---	Professional Elective I	3	0	0	3	50	50	100	PE
19B610	Bioinformatics Laboratory	0	0	4	2	50	50	100	PC
19B611	Downstream Processing Laboratory	0	0	4	2	50	50	100	PC
19B620	Innovation Practices	0	0	4	2	50	50	100	EEC
19Q613	Quantitative and Reasoning Skills	0	0	2	1	100	0	100	EEC
19B615	Activity Point Programme *	0	0	0	0	-	-	-	MC
Total 28 periods		14	0	14	21	500	400	900	

At the end of 6th semester, the students are required to earn the minimum number of activity points from the AICTE mandated ACTIVITY POINT PROGRAMME to qualify for the award of BE/BTech degree (Refer Section 4 (vii) (c) of 2019 Regulations)

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CA Continuous Assessment

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Course Code	Course Title	Periods / week			Maximum Marks				
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
SEMESTER 7									
19B701	IPR, Biosafety and Bioethics	3	0	0	3	50	50	100	HS
19____	Open Elective I	3	0	0	3	50	50	100	OE
19____	Open Elective II	3	0	0	3	50	50	100	OE
19B--	Professional Elective II	3	0	0	3	50	50	100	PE
19B__	Professional Elective III	3	0	0	3	50	50	100	PE
19B__	Professional Elective IV	3	0	0	3	50	50	100	PE
19B720	Project Work I	0	0	4	2	50	50	100	EEC
Total 22 periods		18	0	4	20	350	350	700	
SEMESTER 8									
19B__	Professional Elective V	3	0	0	3	50	50	100	PE
19B__	Professional Elective VI	3	0	0	3	50	50	100	PE
19B820	Project Work II	0	0	8	4	50	50	100	EEC
Total 14 periods		6	0	8	10	150	150	300	

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PROFESSIONAL ELECTIVES

19B001	Plant Biotechnology
19B002	Environmental Biotechnology
19B003	Pharmaceutical Technology
19B004	Food Science and Technology
19B005	Animal Biotechnology
19B006	Bioprocess Plant Design, Economics and Biosafety
19B007	Medical Genetics
19B008	Nanomaterials for Bioapplicatons
19B009	Smart Nano Particles in Cancer Therapy
19B021	Research Topics in Cancer Biology
19B022	Molecular Pathogenesis
19B023	Developmental Biology
19B024	Protein Engineering
19B025	Immunotechnology
19B026	Biofuel Technology
19B027	Studies in Paradigmatic Developments in Biology
19B028	Advances in Genomics
19B029	Systems Biology
19B030	Introduction to Biopolymers
19B031	Microbial Ecogenomics
19B032	Biotransformation in Drug Synthesis
19B033	Synthetic Biology

LANGUAGE ELECTIVES

19G001	Communication Skills for Engineers
19G002	German- Level A1.1
19G003	French Language Level 1
19G004	Basic Japanese

One Credit Courses

ENGLISH

19GF01	Interpersonal and Organizational Communication
19GF02	Human Values Through Literature

HUMANITIES

19OFA1	Export – Import Practices
19OFA2	Insurance - Concepts and Practices
19OFA3	Public Finance
19OFA4	Public Finance and Taxation
19OFA5	Social Entrepreneurship

Summary of Credit Distribution

B.TECH BIOTECHNOLOGY										
S. No	Course Category	Credits Per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1	HS	3	2	3	0	0	0	3	0	11
2	BS	11	11	3	3	0	0	0	0	28
3	ES	7	7	4	7	0	0	0	0	25
4	PC	0	0	14	13	20	15	0	0	62
5	PE	0	0	0	0	0	3	9	6	18
6	OE	0	0	0	0	0	0	6	0	6
7	EEC	0	0+2 [£]	0	1	3	3	2	4	15
8	MC	-	-	-	-	-	-	-	-	-
	TOTAL	21	20+2[£]	24	24	23	21	20	10	165

£ Summer Term Course(s)

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