



**SREE BUDDHA**  
**COLLEGE OF ENGINEERING, PATTOOR**  
**(AUTONOMOUS)**

(Affiliated to APJAK Technological University, Kerala)

**Curriculum**  
**(2024)**  
**B.Tech-Semester I to VIII**

**Biotechnology and Biochemical Engineering**  
**Branch Code: BB**  
**(Group D)**

Pattoor P. O., Nooranad, Alappuzha-690529  
*Website: sbce.ac.in*



### Note

This curriculum adheres to the syllabus prescribed by APJ Abdul Kalam Technological University for the academic year 2024. All courses, credits, and evaluation criteria are implemented as per the regulations and guidelines issued by the university.

The institution ensures full compliance with the university's curriculum framework, ensuring quality education aligned with its standards.



  
Chairman

Academic Council  
CHAIRMAN  
ACADEMIC COUNCIL  
SREE BUDDHA COLLEGE OF ENGINEERING  
PATTOOR, (AUTONOMOUS), NOORAHAD  
ALAPPUZHA-690529

FIRST SEMESTER (July-December):Group D														
10 Days Compulsory Induction Program														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIA	ESE		
1	A	GDMAT101	BSC	GC	Group Specific Mathematics -1	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GZPHT121	BSC	GC	Physics for Engineers	3	0	2	0	5.5	40	60	4	5
		GDCYT122			Chemistry for Engineers									
3	C	GMEST103	ESC	GC	Engineering Graphics and Computer Aided Drawing.	2	0	2	0	4	40	60	3	4
4	D	GDBBT104	ESC	GC	Basic Concepts of Biotechnology and Biochemical Engineering	3	1	0	0	5	40	60	4	4
5	F	UCEST105	ESC	UC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
6	L	GDBBL106	ESC	GC	Fundamentals in Biotechnology Lab	0	0	2	0	1	50	50	1	2
7	I* S1/ S2	UCHWT127	HWP	UC	Health and wellness	1	0	1	0	0	50	0	1	2
		UCHUT128	HMC		Life Skills and Professional Communication	2	0	-	0	3	100	0		
8	S1/ S2	UCSEM129	SE C	UC	Skill Enhancement Course: Digital 101(30 Hours, NASSCOM)	MOOC			2				-	
<b>Total</b>									29/ 31			<b>20</b>	<b>25</b>	
<b>Bridge Course (Mathematics or Introduction to Computer Science) *:</b>										<b>Total 15 Hrs.</b>				

\*Valuation for HMC courses will be done at college level, Question papers will be provided by the University.

\*No Grade Points will be awarded for the MOOC course and I slot course.

- L-T-P-R: Lecture-Tutorial-Practical-Project
- SS (Self Study) Hours= 1.5L+0.5 T+0.5P+R
- CIA: Continuous Internal Assessment, ESE: End Semester Examination

Digital 101 (NASSCOM)		
Sl. No:	Technologies Covered	Hours
1	Artificial intelligence and Big Data Analytics (AI/BDA)	11
2	Internet of Things (IoT)	2.5
3	Cyber Security	2.5
4	Block Chain	2.5
5	Robotic Process Automation	1.5
6	Augmented Reality and Virtual Reality (AR and VR)	2.5
7	Cloud Computing	2.5
8	3 D Printing and Modelling	2
9	Web, Mobile Dev and Marketing	2
10	Responsible AI	1
<b>Total Hours</b>		<b>30</b>

**Note:** Physics, Chemistry, Health and Wellness and Life skill and Professional Communication shall be offered in both S1 and S2. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Physics/ Health and wellness in S1 and Chemistry/ Life Skills and Professional Communication in S2 & vice versa.

SECOND SEMESTER (January-June): Group D														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIA	ESE		
1	A	GDMAT201	BSC	GC	Mathematics for Life Science-2	3	0	0	0	4.5	40	60	3	3
2	B 1/2	GZPHT121	BSC	GC	Physics for Life Science	3	0	2	0	5.5	40	60	4	5
		GDCYT122			Chemistry for Life Science									
3	C	GDEST203	ESC	GC	Basic Mechanical & Civil Engineering	3	0	0	0	4.5	40	60	3	3
4	D	GZEST204	ESC	GC	Basic Electrical & Electronics Engineering (Part 1: Electrical Engineering)	2	0	0	0	3	20	30	2+2=4	4
					(Part 2: Electronics Engineering)	2	0	0	0	3	20	30		
5	E	PCBBT205	PC	PC	Bioprocess Calculation	3	1	0	0	5	40	60	4	4
6	F	UCEST206	ESC	UC	Engineering Entrepreneurship & IPR	3	0	0	0	4.5	60	40	3	3
7	I*	UCHWT127	HWP	UC	Health and wellness	1	0	1	0	0	50	0	1	2/3
		UCHUT128	HM C		Life Skills and Professional Communication	2	0	1	0	3.5	100	0		
8	L	GZESL208	ESC	GC	Basic Electrical and Electronics Engineering Workshop	0	0	2	0	1	50	50	1	2
9	S <sub>1</sub> / S <sub>2</sub>	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC							1	
<b>Total</b>									<b>31</b>			<b>24</b>	<b>26/27</b>	

*\*No Grade Points will be awarded for the MOOC course and I slot course.*

**Skill Enhancement Course :** Digital 101 is an introductory Massive Open Online Course (MOOC) offered by NASSCOM. It is designed to provide students with foundational knowledge and skills in digital technologies, preparing them for further studies and careers in the digital domain. By incorporating the Digital 101 course into the curriculum, KTU ensures that all students gain valuable digital skills early in their academic journey, enhancing their readiness for advanced courses and future careers in technology.

**Course Registration and Completion:**

- Students have the flexibility to register and complete the Digital 101 course either in their first semester (S1) or second semester (S2).
- The credit for this course (1 credit) will be officially recorded in the second semester grade card.

THIRD SEMESTER (July-December)														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	GDMAT301	BSC	GC	Mathematics for Life Science-3	3	0	0	0	4.5	40	60	3	3
2	B	PCBBT302	PC	PC	Biochemistry	3	1	0	0	5	40	60	4	4
3	C	PCBBT303	PC	PC	Microbiology	3	1	0	0	5	40	60	4	4
4	D	PBBBT304	PC-PBL	PB	PBL1: Industrial Bioprocess Technology	3	0	0	1	5.5	60	40	4	4
5	F	GNEST305	ESC	GC	Introduction to Artificial Intelligence and Data Science	3	1	0		5	40	60	4	4
6	G S3/S4	UCHUT346	HMC	UC	Economics for Engineers	2	0	0	0	3	50	50	2	2
		UCHUT347			Engineering Ethics and Sustainable Development									
7	L	PCBBL307	PCL	PC	Biochemistry Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCBBL308	PCL	PC	Microbiology Lab	0	0	3	0	1.5	50	50	2	3
9	R/M		VAC		Remedial/Minor Course	3	1	0	0	5			4*	4*
<b>Total</b>									<b>31/36</b>			<b>25/29*</b>	<b>27/31*</b>	
<b>Bridge Course for Lateral Entry Students (Mathematics/Programme Core):</b>											<b>Total 15 Hrs.</b>			

FOURTH SEMESTER (January-June)														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	GDMAT401	BSC	GC	Mathematics for Life Science-4	3	0	0	0	4.5	40	60	3	3
2	B	PCBBT402	PC	PC	Molecular Biology	3	1	0	0	5	40	60	4	4
3	C	PCBBT403	PC	PC	Fluid Flow & Particle Technology	3	1	0	0	5	40	60	4	4
4	D	PBBBT404	PC-PBL	PB	Biological Reaction Engineering	3	0	0	1	5.5	60	40	4	4
5	E	PEBBT41N	PE	PE	PE-1	3	0	0	0	4.5	40	60	3	3
6	G S3/S4	UCHUT346	HMC	UC	Economics for Engineers	2	0	0	0	3	50	50	2	2
		UCHUT347			Engineering Ethics and Sustainable Development									
7	L	PCBBL407	PCL	PC	Molecular Biology Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCBBL408	PCL	PC	Fluid Flow & Particle Technology Lab	0	0	3	0	1.5	50	50	2	3
9	R/M/ H		VAC		Remedial/Minor/Honours Course	3	1	0	0	5			4*	4*
<b>Total</b>									<b>31/36</b>			<b>24/28*</b>	<b>26/30*</b>	

**Note:** Economics for Engineers and Engineering Ethics and Sustainable Development shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Economics for Engineers in S3 and Engineering Ethics & Sustainable Development in S4 and vice versa.

**PROGRAM ELECTIVE I: PEBBT41N**

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>E</b>	PEBBT411	Plant And Animal Cell Technology	3-0-0-0	<b>3</b>	<b>3</b>
	PEBBT412	Food Process Technology	3-0-0-0		<b>3</b>
	PEBBT413	Bioenergy and Biofuels	3-0-0-0		<b>3</b>
	PEBBT414	Bio chemical Thermodynamics	3-0-0-0		<b>3</b>
	PEBBT416	Biomaterials& Tissue Engineering	3-0-0-0		<b>3</b>
	<b>PEBBT415</b>	<b>Analytical Techniques in Biotechnology</b>	3-0-0-0	<b>3</b>	<b>5/3</b>

*Note : Level 5 courses in the B. Tech curriculum carry a total of 5 credits, consisting of 3 credits for the Programme Elective and 2 additional credits. The additional 2 credits shall be awarded only if the student meets the eligibility conditions specified in the B. Tech. -2024 regulations. If those conditions are not fulfilled, the student will receive only 3 credits for the course.*

**FIFTH SEMESTER (July-December)**

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	PCBBT501	PC	PC	Heat Transfer Operation	3	1	0	0	5	40	60	4	4
2	B	PCBBT502	PC	PC	Bioprocess Engineering	3	1	0	0	5	40	60	4	4
3	C	PCBBT503	PC	PC	Mass Transfer Operations	3	0	0	0	4.5	40	60	3	3
4	D	PBBBT504	PC-PBL	PB	Enzyme Kinetics and Technology	3	0	0	1	5.5	60	40	4	4
5	E	PEBBT52N	PE	PE	PE-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution Of India(MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCBBL507	PCL	PC	Heat & Mass Transfer Operations Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCBBL508	PCL	PC	Bioprocess Engineering Lab	0	0	3	0	1.5	50	50	2	3
9	R/M/H		VAC		Remedial/Minor/Honours Course	3	1	0	0	5			4*	4*
	S <sub>5</sub> / S <sub>6</sub>	Industrial Visit (Maximum 10 Days are permitted, Not Exceeding more than 5 Working Days) /Industrial Training												
<b>Total</b>										<b>30/35</b>			<b>23/27*</b>	<b>24/28*</b>

*\*No Grade Points will be awarded for the MOOC course and I slot course.*

**Industrial Training:**

*Students who are not participating in the industrial visit must attend industrial training during that period.*

**PROGRAM ELECTIVE 2: PEBBT 52N**

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>E</b>	PEBBT 521	Cancer Biology	3-0-0-0	<b>3</b>	<b>3</b>
	PEBBT 522	Bioethics and safety	3-0-0-0		<b>3</b>
	PEBBT 523	Biophysics	3-0-0-0		<b>3</b>
	PEBBT 524	Genetic Engineering	3-0-0-0		<b>3</b>
	PEBBT 526	Biological Waste Water Treatment	3-0-0-0		<b>3</b>
	<b>PEBBT 525</b>	<b>Bio separation Technology</b>	3-0-0-0		<b>5/3</b>

**SIXTH SEMESTER (January-June)**

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	PCBBT601	PC	PC	Process Dynamics Control & Instrumentation	3	0	0	0	4.5	40	60	4	3
2	B	PCBBT602	PC	PC	Process Plant Design	3	1	0	0	4.5	40	60	3	4
3	C	PEBBT63N	PE	PE	PE-3	3	0	0	0	4.5	40	60	3	3
4	D	PBBBT604	PC-PBL	PB	Bioinformatics	3	0	0	1	5.5	60	40	4	4
5	F	GYEST605	ESC	GC	Design Thinking and Product Development (Group Specific Syllabus)	2	0	0	0	3	40	60	2	2
6	O	OE/IE /IEBBT61N	OE/IE	OE/IE	OE/IE-1	3	0	0	0	4.5	40	60	3	3
7	L	PCBBL607	PCL	PC	Reaction Engineering & Process Control Lab	0	0	3	0	1.5	50	50	2	3
8	P	PCBBP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	0	0	0	5			3*	3*
S5/ S6	Industrial Visit (Maximum of 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training													
<b>Total</b>									<b>29/ 34</b>			<b>23/26*</b>	<b>26/29*</b>	

Note: Open Electives are such courses which will be offered by other departments. Like CSE department students have to opt open electives from ECE/ME/EEE etc. departments.

**Industrial Training:**

Students who are not participating in the industrial visit must attend industrial training during that period.

**PROGRAM ELECTIVE 3: PEBBT 63N**

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>C</b>	PEBBT631	Immunology	3-0-0-0	<b>3</b>	<b>3</b>
	PEBBT632	Nano bioengineering	3-0-0-0		<b>3</b>
	PEBBT633	Innovation & Entrepreneurship	3-0-0-0		<b>3</b>
	PEBBT634	Clinical Research & Drug Design	3-0-0-0		<b>3</b>
	PEBBT636	Biopharmaceutical Technology	3-0-0-0		<b>3</b>
	<b>PEBBT635</b>	<b>Transport Process and Unit Operations in Bio separation</b>	3-0-0-0		<b>5/3</b>

**OPEN ELECTIVE 1: OEGBT 61N**

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>O</b>	OEBBT 611	Fundamentals of Food Processing	3-0-0-0	<b>3</b>	<b>3</b>
	OEBBT 612	Quality Control in Pharmaceutical Industry	3-0-0-0		<b>3</b>
	OEBBT 613	Process design for pollution control	3-0-0-0		<b>3</b>
	OEBBT 614	Energy Engineering and management	3-0-0-0		<b>3</b>
	OEBBT 615	Bioinformatics Techniques and Applications	3-0-0-0		<b>3</b>
	OEBBT 616	Hydrogen Energy: Production, Storage, Transportation and Safety	3-0-0-0		<b>3</b>
	OEBBT 617	Environmental Impact Assessment	3-0-0-0		<b>3</b>

**SEVENTH SEMESTER (July-December)**

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIA	ESE		
1	A	PEBBT74N / PEBBM74N	PE	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PEBBT75N/ PEBBM75N	PE	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OEBBT72N /IEBBT72N/ OEIBM72N	OE/ ILE	OE/IE	OE/ILE-2 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
4	I*	UEHUT704 / UEHUM70N	HM C	UE	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCBBS705	PWS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCBBP706/ PCBBI706	PWS	PC	Option 1: Major Project Option 2: Internship (4-6 Months)	0	0	0	8	8	100	0	4	8
7	R/H		VAC		Remedial/Honours Course	3	0	0	0	4.5			3*	3*
<b>Total</b>										<b>26/31</b>			<b>17/20*</b>	<b>22/25*</b>



\*No Grade Points will be awarded for the I slot courses

\*Students can opt for the internship either in the 7<sup>th</sup> or 8<sup>th</sup> semester.

\* Option 1: Work on a Project in the institute/department under the mentorship of faculty members.

Option 2: Full semester Internship in an Industry/organization (7<sup>th</sup> or 8<sup>th</sup> semester)

Note: Open Electives are such courses which will be offered by other departments.

#### PROGRAM ELECTIVE 4: PEBBT 74N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>A</b>	PEBBT 741	Synthetic Biology	3-0-0-0	<b>3</b>	<b>3</b>
	PEBBT 742	Cell Signaling	3-0-0-0		<b>3</b>
	PEBBT 743	Computational biology	3-0-0-0		<b>3</b>
	PEBBT 744	Patents & IPR	3-0-0-0		<b>3</b>
	PEBBT 746	Metabolic Engineering	3-0-0-0		<b>3</b>
	<b>PEBBT 745</b>	<b>High-Resolution Separation in Biotechnology</b>	3-0-0-0		<b>5/3</b>

#### PROGRAM ELECTIVE 5: PEBBT 75N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>B</b>	PEBBT 751	Developmental Biology	3-0-0-0	<b>3</b>	<b>3</b>
	PEBBT 752	Neurobiology	3-0-0-0		<b>3</b>
	PEBBT 753	Cell Culture Techniques	3-0-0-0		<b>3</b>
	PEBBT 754	Bioremediation	3-0-0-0		<b>3</b>
	PEBBT 756	Proteomics & Protein Engineering	3-0-0-0		<b>3</b>
	<b>PEBBT 755</b>	<b>Next Generation Sequencing Technologies: Data Analysis and Application</b>	3-0-0-0		<b>5/3</b>

#### OPEN ELECTIVE 2: OEBBT 72N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>O</b>	OEBBT 721	Microbial Fuel Cell Technology	3-0-0-0	<b>3</b>	<b>3</b>
	OEBBT 722	Advanced materials	3-0-0-0		<b>3</b>
	OEBBT 723	Process Safety Engineering	3-0-0-0		<b>3</b>
	OEBBT 724	Industrial Instrumentation	3-0-0-0		<b>3</b>
	OEBBT 725	Advanced waste water treatment	3-0-0-0		<b>3</b>
	OEBBT 726	Air Pollution Control	3-0-0-0		<b>3</b>
	OEBBT 727	Design of experiments	3-0-0-0		<b>3</b>

SL. No	Course Code	Slot I: HMC Elective
1	UEHUT704	Project Management: Planning, Execution, Evaluation and Control
2	UEHUM701	Proficiency course in French. (MOOC) (B1 level)
3	UEHUM702	Proficiency Course in German (B1 Level). (MOOC)
4	UEHUM703	Proficiency Course in Spanish (B1 Level) (MOOC)
5	UEHUM704	Introduction to Japanese Language and Culture (N5 level). (MOOC)

EIGHTH SEMESTER (January-June)														
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIA	ESE		
1	A	PEBBT86N /PEBBM86N	PE	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OEBBT83N /IEBBT83N /OEBBM83N	OE/ILE	OE/IE	OE/ILE-3 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	I*	UEHUT803 /UEHUM803	HMC	UC	Organizational Behavior and Business Communication (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	1	2
4	P	PCBBP806/ PCBBI806/ PCBBJ806	PWS	PC	Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Major Project Phase -II (For the students who have not opted for internship in S7/S8)	0	0	0	8	8	100	0	4	8
<b>Total</b>										<b>20</b>			<b>11</b>	<b>16</b>

\*No Grade Points will be awarded for the I slot courses

\* Option 2: Full semester Internship in an Industry/organization (7<sup>th</sup> or 8<sup>th</sup> semester)

#### PROGRAM ELECTIVE 6: PEBBT 86N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>A</b>	PEBB861	Cytogenetics	3-0-0-0	<b>3</b>	<b>3</b>
	PEBB862	Drug Delivery Principle & Application	3-0-0-0		<b>3</b>
	PEBB863	Marine Biotechnology	3-0-0-0		<b>3</b>
	PEBB864	Environmental Biotechnology	3-0-0-0		<b>3</b>
	PEBB866	Bioconjugate Technology & Applications	3-0-0-0		<b>3</b>
	<b>PEBBT 865</b>	<b>Advanced Bio separation Engineering</b>	3-0-0-0		<b>5/3</b>

#### OPEN ELECTIVE 3:OEBBT 83N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
<b>O</b>	OEBBT 831	Environment Management Systems	3-0-0-0	<b>3</b>	<b>3</b>
	OEBBT 832	Fuels Engineering	3-0-0-0		<b>3</b>
	OEBBT 833	Nanomaterials and Nano technology	3-0-0-0		<b>3</b>
	OEBBT 834	Food Product Design and Development	3-0-0-0		<b>3</b>
	OEBBT 835	Entrepreneurship development in Biotechnology	3-0-0-0		<b>3</b>
	OEBBT 836	Waste to Energy Technology	3-0-0-0		<b>3</b>
	OEBBT 837	Non-Conventional Energy Systems	3-0-0-0		<b>3</b>

<b>HMC Courses</b>			
<b>Sl. No:</b>	<b>Semester</b>	<b>Course Area</b>	<b>Credits</b>
1	<b>S1/S2</b>	Life Skills and Professional Communication	1
2	<b>S3 /S4</b>	Economics for Engineers	2
3		Engineering Ethics and Sustainable Development	2
4	<b>S5</b>	Constitution Of India. (MOOC)	1
5	<b>S7</b>	Elective (Project Management/Foreign Languages)	2
6	<b>S8</b>	Organizational Behavior and Business Communication	1
<b>Total Credits</b>			<b>9</b>

<b>BSC Courses</b>			
<b>Sl. No:</b>	<b>Semester</b>	<b>Course Area</b>	<b>Credits</b>
1	<b>S1</b>	Mathematics for Life Science-1	3
2	<b>S1/S2</b>	Physics for Life Science	4
3		Chemistry for Life Science	4
4	<b>S2</b>	Mathematics for Life Science-2	3
5	<b>S3</b>	Mathematics for Life Science-3	3
6	<b>S4</b>	Mathematics for Life Science-4	3
<b>Total Credits</b>			<b>20</b>

<b>ESC Courses (Group D)</b>			
<b>Sl. No:</b>	<b>Semester</b>	<b>Course Area</b>	<b>Credits</b>
1	<b>S1</b>	Engineering Graphics and Computer Aided Drawing	3
2		Introduction to Biotechnology/Food Technology/Agriculture Engineering	4
3		Algorithmic Thinking with Python	4
4		Foundations of Biotechnology/Food Technology Lab	1
5	<b>S2</b>	Basic Mechanical Engineering and Civil Engineering	3
6		Basic Electrical and Electronics Engineering	4
7		Engineering Entrepreneurship and IPR	3
8		Basic Electrical and Electronics Engineering Workshop	1
9	<b>S3</b>	Introduction to Artificial Intelligence and Data Science	4
7	<b>S6</b>	Design Thinking and Product Development	2
<b>Total Credits</b>			<b>29</b>

Programme Core Courses (PC)			
Sl. No:	Semester	Course Area	Credits
1	S2	Bioprocess Calculation	4
2	S3	Biochemistry	4
3		Microbiology	4
4		Biochemistry Lab	2
5		Microbiology Lab	2
6	S4	Molecular Biology	4
7		Fluid Flow & Particle Technology	4
8		Molecular Biology Lab	2
9		Fluid Flow & Particle Technology Lab	2
10	S5	Heat Transfer	4
11		Bioprocess Engineering	4
12		Mass Transfer Operations	3
13		Heat & Mass Transfer Operations	2
14		Bioprocess Engineering	2
15	S6	Process Dynamics Control & Instrumentation	4
16		Process Plant Design	3
17		Reaction Engineering and Process Control Lab	2
<b>Total Credits (Theory -10, Lab-7)</b>			<b>52</b>

Programme Core-Project Based Learning (PBL)			
Sl. No:	Semester	Course Area	Credits
1	S3	Industrial Bioprocess Technology	4
2	S4	Biological Reaction Engineering	4
3	S5	Genetic Engineering	4
4	S6	Bioinformatics	4
<b>Total Credits</b>			<b>16</b>

Programme Elective Courses (PE)			
Sl. No:	Semester	Course Type	Credits
1	S4	PE-1	3
2	S5	PE-2	3
3	S6	PE-3	3
4	S7	PE-4	3
5		PE-5	3
6	S8	PE-6	3
<b>Total Credits</b>			<b>18</b>

Project/ Internship and Seminar			
Sl. No:	Semester	Course Type	Credits
1	S6	Mini Project	2
2	S7	Seminar	2
3		Major Project/Internship	4
4	S8	Major Project/Internship/Research Project	4
<b>Total Credits</b>			<b>12</b>

Activity Points				
Sl. No.	Group	Courses	Credits	Minimum Credit Requirements
1	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		Short Term Internship (Minimum 2 weeks), Clinical Exposure/Training (Minimum 2 weeks), Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities, Participation in University level/State Level/ National Level Hackathons		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		<b>Skilling Certificates</b> (Approved by the University)		

- *Students are required to acquire a minimum of 120 activity points, with at least 40 points per group, to fulfill the curriculum requirement of 3 activity credits.*
- *For B. Tech Lateral Entry students, 30 points per group are required. A minimum of 90 activity points must be acquired to obtain the 3 activity credits mandated by the curriculum.*

Course classifications of the B. Tech Programmes and Overall Credit Structure			
Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management Courses	HMC	9
2	Basic Science Courses	BSC	20
3	Engineering Science Courses	ESC	29
4	Programme (Professional) Core Courses	PCC	52
5	Programme (Professional) Core Courses-Project Based Learning	PBL	16
6	Programme Elective Courses	PEC	18
7	Open Elective Courses/Industry Linked Elective	OEC/ILE	9
8	Mini Project,Project Work/Internship and Seminar	PWS	12
9	Health and Wellness	HWP	1
10	Skill Enhancement Courses (Digital 101)	SEC	1
11	Mandatory Student Activities	MSA	3
<b>Total Credits</b>			<b>170</b>