



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Electronics & Tele-Communication Engineering)
Programme Structure 2019-23

1. OBJECTIVE	<p>B.Tech is a full-time four year graduation programme, which aims at transforming a student into a technically sound professional. The syllabus contains courses on basic sciences, technical arts, humanities & liberal arts and professional courses. The mix of these courses has been evolved with an aim to produce professionals who have knowledge not only of Engineering but who are good managers to contribute in a cross-functional team and have human values.</p> <p>Being a professional programme it ensures a healthy balance between theoretical foundation and practical exposure to the present day world.</p> <p>The emphasis is to develop all round personality that would enable the students to take up the challenges of the corporate world and also become responsible citizens of the society.</p>			
2. DURATION (IN MONTHS)	48 (Full Time)			
3. INTAKE	120			
4. RESERVATION	I. Within the sanctioned intake	a) SC (In Percentage)	b) ST (In Percentage)	c) Differently abled (In Percentage)
		15	7.5	3
	II. Over and above the sanctioned intake	a) Kashmiri Migrants (In Seats)		b) International Students (In Percentage)
		2		15
5. ELIGIBILITY	<p>Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of Chemistry/ Biotechnology/ Biology/ Technical Vocational subjects. Obtained at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) in the above subjects taken together.</p> <p>B. Tech (Lateral entry to second year) :</p> <p>a) Passed Diploma examination from an AICTE approved Institution; with at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) in appropriate branch of Engineering / Technology.</p> <p>b) Passed B.Sc. Degree from a recognized University as defined by UGC, with at least 45% marks or equivalent grade (40% marks or equivalent grade for Scheduled Caste /Scheduled Tribes) and passed XII standard with mathematics as a subject.</p> <p>c) Provided that in case of students belonging to B. Sc. Stream, shall clear the subjects of Engineering Graphics / Engineering Drawing and Engineering Mechanics of the first year Engineering program along with the second year subjects.</p> <p>d) Provided further that, the students belonging to B. Sc. Stream shall be considered only after filling the supernumerary seats in this category with students belonging to the Diploma stream.</p> <p>e) Provided further that students, who have passed Diploma in Engineering and Technology from an AICTE approved Institution or B. Sc. Degree from a recognized University as defined by UGC, shall also be eligible for admission to</p>			



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		the first year Engineering Degree courses subject to vacancies in the first year class in case the vacancies at lateral entry are exhausted. However the admissions shall be based strictly on the eligibility criteria as mentioned in a, b, c, and d above.			
6.	SELECTION PROCEDURE	Merit list by valid score of Symbiosis Entrance Test (SET) or Joint Entrance Examination (JEE - Main) or Maharashtra Common Entrance Test (MHT-CET)			
7.	MEDIUM OF INSTRUCTION	English			
8.	PROGRAMME PATTERN	Semester			
9.	COURSE & SPECIALIZATION	<p>Annexure A: Bachelor of Technology (Electronics & Tele-Communication Engineering) Students may pursue optional 'Honours' OR 'Minor' specialization in one of the specialization areas by completing additional 20 credits in Semester: 5, 6 and 7 as specified in Annexure B for Honours and Annexure C for Minor in the respective specialization area.</p> <p>Annexure B: Optional 'Honours' specialization area</p> <ol style="list-style-type: none"> 1. Bioelectronics Systems 2. Embedded Systems 3. Mechatronics and Automation 4. Optoelectronics and Communication 5. Signal Processing 6. Sustainable Energy Devices and Systems <p>Annexure C: Optional 'Minor' specialization area</p> <ol style="list-style-type: none"> 1. Artificial Intelligence and Machine Learning (CSE) 2. Data Science (CSE) 3. Internet of Things (CSE) 4. Smart Cities and Urban Analytics (CE) 5. Automobile Engineering with Hybrid and Autonomous Technology (ME) 			
10.	FEE		Academic Fee p.a	Institute Deposit	Total
		Indian Students	260000	20000	280000
		International Students (USD equivalent to INR)	390000	20000	410000
11.	ASSESSMENT	All internal courses will have 100% component as internal evaluation at the institute level. All external courses will have 40% internal component and 60% component as external [University] examination. The internal and external will be separate heads of passing.			
12.	STANDARD OF PASSING	The assessment of the student for each examination is done, based on relative performance. Maximum Grade Point (GP) is 10 corresponding to O (Outstanding). For all courses, a student is required to pass both internal and external examination separately with a minimum Grade Point of 4 corresponding to Grade P. Students securing less than 40% absolute marks in each head of passing will be declared FAIL. The University awards a degree to the student who has achieved a minimum CGPA of 4 out of maximum of 10 CGPA for the programme.			
13.	AWARD OF DEGREE/	Bachelor of Technology (Electronics and Tele-Communication Engineering)			

DIPLOMA/ CERTIFICATE	<p>OR</p> <p>Bachelor of Technology (Electronics and Tele-Communication Engineering) with Honours in Bioelectronics Systems / Embedded Systems / Mechatronics and Automation / Optoelectronics and Communication / Signal Processing / Sustainable Energy Devices and Systems.</p> <p>OR</p> <p>Bachelor of Technology (Electronics and Tele-Communication Engineering) with Minor in Artificial Intelligence and Machine Learning /Data Science / Internet of Things / Smart Cities and Urban Analytics / Automobile Engineering with Hybrid and Autonomous Technology will be awarded at the end of semester VIII examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA.</p>
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14. CLASSIFICATION OF CREDITS

Semester	Generic Core	Generic Elective	Specialization Core	Specialization Elective	Open Elective	Audit	Total
1	21	0	0	0	0	0	21
2	19	0	0	0	0	0	19
3	19	1	0	0	0	0	20
4	22	2	0	0	0	1*	24
5	20	4	0	0	0	1*	24
6	18	4	0	0	3	0	25
7	8	12	0	0	3	0	23
8	14	0	0	0	0	0	14
Total	141	23	0	0	6	0	170
Optional Additional Courses (Honours)							
Total	0	0			0	0	20
Optional Additional Courses (Minor)							
Total	0	0			0	0	20
Grand Total							190

* Satisfactory completion of the non letter grade course 'Integrated Disaster Management' Certificate in COVID-19 Care for the Community' is mandatory for award of degree.

Note: For additional specializations (optional) as applicable, fees of Rs.25000/- will be charged, additionally in the third year

The revised programme structure supersedes the previously approved programme structure dated 22/08/2022 for the programme.

This Programme Structure is aligned with the norms laid down by the University and is approved by the Academic Council.
Hereafter changes (if any) which conform to the policy on "Curriculum Development and Review" would be permissible, subject to revision of the Programme Structure, following the specified processes.

Director - Academics

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Annexure A

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Semester : 1									
Generic Core Courses									
TE7168	070123101	Engineering Mathematics -I		4	40	60	0	0	100
T7391	070123102	Physics		3	30	45	0	0	75
T7383	070123103	Communication Skills		2	20	30	0	0	50
TE7188	070123104	Environmental Science		2	20	30	0	0	50
TE7286	070123105	Programming and Problem Solving		2	20	30	0	0	50
TE7300	070123106	Tinker Lab		2	0	0	50	0	50
TE7310	070123107	Computational Techniques I		2	50	0	0	0	50
T7384	070123108	Communication skills lab		1	0	0	10	15	25
T7392	070123109	Physics lab		1	0	0	10	15	25
TE7287	070123110	Programming and Problem Solving Lab		1	0	0	10	15	25
T6773	070123111	Creative Thinking		1	25	0	0	0	25
Total				21	205	195	80	45	525
Semester : 2									
Generic Core Courses									
TE7169	070123201	Engineering Mathematics -II		4	40	60	0	0	100
T7540	070123202	Basic Electrical and Electronics Engineering		3	30	45	0	0	75
T7381	070123203	Chemistry		3	30	45	0	0	75
TE7311	070123204	Computational Techniques II		3	75	0	0	0	75
T7924	070123205	Engineering Graphics		2	0	0	20	30	50
T7593	070123206	Basic Electrical and Electronics Engineering Lab		1	0	0	10	15	25
T7382	070123207	Chemistry Lab		1	0	0	10	15	25
T6732	070123208	Critical Thinking		1	25	0	0	0	25
TE7396	070123209	Software Tools		1	0	0	25	0	25
Total				19	200	150	65	60	475
Semester : 3									
Generic Core Courses									
F7011	070123301	Digital Circuits and Logic Design		4	100	0	0	0	100
TE7083	070123302	Signals and Systems		3	30	45	0	0	75
TE7170	070123303	Engineering Mathematics-III		3	30	45	0	0	75
TE7320	070123304	Electronic Devices and Circuits		3	30	45	0	0	75
TE7336	070123305	Network Theory		3	30	45	0	0	75



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T2646	070123306	Entrepreneurship Venture		1	25	0	0	0	25
TE7321	070123307	Electronic Devices and Circuits Lab		1	0	0	10	15	25
TE7322	070123308	Electronic Measurements Lab		1	0	0	10	15	25
Total				19	245	180	20	30	475
Generic Elective Courses Group									
T6761	070123309	Foundation of Ethics		1	25	0	0	0	25
T6760	070123310	Introduction to Indian Philosophy		1	25	0	0	0	25
Total Required Credits				1	25	0	0	0	25
Semester : 4									
Generic Core Courses									
T7547	070123401	Control Systems		4	40	60	0	0	100
T7562	070123402	Electromagnetic Field Theory		4	40	60	0	0	100
TE7084	070123403	Analog Circuit Design		3	30	45	0	0	75
F7023	070123404	Data Structures Using C		3	75	0	0	0	75
TE7425	070123405	Principles of Communication		3	30	45	0	0	75
TE7290	070123406	Project Based Learning -I		2	50	0	0	0	50
T7536	070123407	Analog Circuit Design Lab		1	0	0	10	15	25
T7548	070123408	Control Systems Lab		1	0	0	10	15	25
TE7029	070123409	Principles of Communication Lab		1	0	0	10	15	25
T4005	070123410	Integrated Disaster Management *		0	0	0	0	0	Non Letter Grade
Total				22	265	210	30	45	550
Generic Elective Courses Group									
T6184	070123411	Basic German I		2	50	0	0	0	50
T6186	070123412	Basic French I		2	50	0	0	0	50
T6188	070123413	Basic Spanish I		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Semester : 5									
Generic Core Courses									
T7558	070123501	Digital Signal Processing		4	40	60	0	0	100
TE7316	070123502	Digital Communication		3	30	45	0	0	75



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TE7174	070123503	Probability, Random Variables and Stochastic Process		3	30	45	0	0	75
F7026	070123504	Microcontrollers and Applications		2	50	0	0	0	50
TE7291	070123505	Project Based Learning-II		2	50	0	0	0	50
T7559	070123506	Digital Signal Processing Lab		1	0	0	10	15	25
T7552	070123507	Digital Communication Lab		1	0	0	10	15	25
T6749	070123508	Design Thinking		2	50	0	0	0	50
T6774	070123509	Principles of Economics		2	50	0	0	0	50
TH4272	070123536	Certificate in COVID-19 Care for the Community *		0	0	0	0	0	Non Letter Grade
Total				20	300	150	20	30	500
Generic Elective Courses Group- I									
TE7090	070123510	Antenna and Wave Propagation		3	30	45	0	0	75
TE7323	070123511	Electronic System Design		3	30	45	0	0	75
TE7085	070123512	Power Electronics		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group- II									
TE7091	070123513	Antenna and Wave Propagation Lab		1	0	0	10	15	25
TE7324	070123514	Electronic System Design Lab		1	0	0	10	15	25
T7583	070123515	Power Electronics Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Semester : 6									
Generic Core Courses									
T7591	070123601	VLSI Design		4	100	0	0	0	100
T7908	070123602	Computer Networks		3	30	45	0	0	75
T8000	070123603	Service Learning		4	0	0	100	0	100
T7802	070123604	Project Based Learning-III		2	50	0	0	0	50
TE7426	070123605	Electronic Design Workshop		2	0	0	20	30	50
T7802	070123606	Capstone Course		2	50	0	0	0	50
T7482	070123607	Computer Networks Lab		1	0	0	10	15	25
Total				18	230	45	130	45	450
Generic Elective Courses Group- I									
T7580	070123608	Microwaves and Radar		3	30	45	0	0	75



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TE7089	070123609	Modern Control Theory		3	30	45	0	0	75
TE7427	070123610	Embedded System Design		3	30	45	0	0	75
TE7088	070123611	Digital Image Processing		3	30	45	0	0	75
TE7315	070123612	Digital CMOS VLSI Design		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group- II									
T7579	070123613	Microwave and Radar Lab		1	0	0	10	15	25
TE7039	070123614	Modern Control Theory Lab		1	0	0	10	15	25
T7567	070123615	Embedded System Design Lab		1	0	0	10	15	25
T7094	070123616	Digital Image Processing Lab		1	0	0	10	15	25
TE7132	070123617	CAD for VLSI Design Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Open Elective Courses Group									
T7574	070123618	MATLAB		3	30	45	0	0	75
TE7335	070123619	Introduction to Robotics		3	30	45	0	0	75
TE7339	070123620	Renewable Energy Systems		3	30	45	0	0	75
TE7428	070123621	Introduction to Image Processing		3	30	45	0	0	75
TE7223	070123622	Smart Urban Planning		3	30	45	0	0	75
TE7240	070123623	Water Resource Planning and Management		3	30	45	0	0	75
T7499	070123624	Java		3	30	45	0	0	75
TE7265	070123625	Introduction to Data Science		3	30	45	0	0	75
TE7263	070123626	Introduction to AI and Machine Learning		3	30	45	0	0	75
TE7388	070123627	Quality Management Techniques		3	30	45	0	0	75
TE7319	070123628	Electrical and Electronics Materials		3	30	45	0	0	75
TE7351	070123629	3D Printing and Prototyping		3	30	45	0	0	75
TE7387	070123630	Project Management		3	30	45	0	0	75
TE7698	070123631	Nanotechnology		3	30	45	0	0	75
T7393	070123632	Computer Based Statistical Packages		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 7									
Generic Core Courses									
T7804	070123701	B.Tech Project		4	0	0	40	60	100



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T7674	070123702	Cyber Security		2	50	0	0	0	50
F7047	070123703	Electric Vehicle		2	50	0	0	0	50
Total				8	100	0	40	60	200
Generic Elective Courses Group- I									
T7473	070123704	Artificial Intelligence		3	30	45	0	0	75
TE7045	070123705	IoT and Applications		3	30	45	0	0	75
TE7326	070123706	Fiber Optics And Satellite Communication		3	30	45	0	0	75
TE7340	070123707	Scientific Computing		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group- II									
TE7014	070123708	Artificial Intelligence Lab		1	0	0	10	15	25
TE7048	070123709	IoT and Applications Lab		1	0	0	10	15	25
TE7327	070123710	Fiber Optics And Satellite Communication Lab		1	0	0	10	15	25
TE7341	070123711	Scientific Computing Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group- III									
TE7306	070123712	Biomedical Electronics		3	30	45	0	0	75
TE7317	070123713	Digital Control System		3	30	45	0	0	75
TE7342	070123714	Speech and Audio Signal Processing		3	30	45	0	0	75
TE7347	070123715	Wireless Communication		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group- IV									
TE7307	070123716	Biomedical Electronics Lab		1	0	0	10	15	25
TE7318	070123717	Digital Control System Lab		1	0	0	10	15	25
TE7343	070123718	Speech and Audio Signal Processing Lab		1	0	0	10	15	25
TE7348	070123719	Wireless Communication Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group- V									
TE7429	070123720	Information Theory and Coding		2	20	30	0	0	50
TE7430	070123721	Computer Architecture		2	20	30	0	0	50
TE7431	070123722	Wireless Sensor Network		2	20	30	0	0	50
Total Required Credits				2	20	30	0	0	50
Generic Elective Courses Group- VI									



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Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
TE7438	070123723	History of Science and Technology		2	50	0	0	0	50
T2585	070123724	Organizational Behaviour		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Open Elective Courses Group									
T7616	070123725	Fundamentals of Automotive Technology		3	30	45	0	0	75
T7529	070123726	Machine Learning		3	30	45	0	0	75
TE7756	070123727	Open Source Technologies		3	30	45	0	0	75
T7584	070123728	Printed Circuit Board (PCB) Design		3	30	45	0	0	75
T7650	070123729	Six sigma		3	30	45	0	0	75
TE7334	070123731	Introduction to Mechatronics		3	30	45	0	0	75
TE7338	070123732	Principles of Modern Communication Systems		3	30	45	0	0	75
TE7376	070123733	Introduction to Operations Research		3	30	45	0	0	75
TE7377	070123734	Introduction to Optimisation		3	30	45	0	0	75
TE7171	070123735	Introduction to Mathematical Modelling		3	30	45	0	0	75
TE7195	070123736	GIS Applications		3	30	45	0	0	75
TE7700	070123730	Smart Materials		3	30	45	0	0	75
TE7203	070123737	Intelligent Transportation Management		3	30	45	0	0	75
TE7264	070123738	Introduction to BIGDATA		3	30	45	0	0	75
T7474	070123739	Basics of Database		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 8									
Generic Core Courses									
T7912	070123801	Internship		12	0	0	120	180	300
T7802	070123802	Seminar		2	0	0	50	0	50
Total				14	0	0	170	180	350



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Semester	Internal Credits	External Credits	Total Credits	Total Marks
Semester 1	5	16	21	525
Semester 2	5	14	19	475
Semester 3	6	14	20	500
Semester 4	7	17	24	600
Semester 5	8	16	24	600
Semester 6	12	13	25	625
Semester 7	6	17	23	575
Semester 8	2	12	14	350
Total	51	119	170	4250



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Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Semester : 5									
Bioelectronics Systems Specialization Core Courses									
TE7333	070123516	Introduction to Computer Vision		4	40	60	0	0	100
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
Total				7	40	60	30	45	175
Semester : 5									
Embedded Systems Specialization Core Courses									
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
TE7298	070123519	System Programming		4	40	60	0	0	100
Total				7	40	60	30	45	175
Semester : 5									
Mechatronics and Automation Specialization Core Courses									
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
TE7330	070123520	Industrial Robotics		4	40	60	0	0	100
Total				7	40	60	30	45	175
Semester : 5									
Optoelectronics and Communication Specialization Core Courses									
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
TE7345	070123521	Theory of Light and Lasers		4	40	60	0	0	100
Total				7	40	60	30	45	175
Semester : 5									
Signal Processing Specialization Core Courses									
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
T7086	070123522	Advanced Digital Signal Processing		4	40	60	0	0	100
Total				7	40	60	30	45	175
Semester : 5									



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Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Sustainable Energy Devices and Systems Specialization Core Courses									
T7801	070123517	Project Phase- I		1	0	0	10	15	25
T7802	070123518	Seminar		2	0	0	20	30	50
TE7344	070123523	Sustainable Energy And Solar Photovoltaic Systems		4	40	60	0	0	100
Total				7	40	60	30	45	175
Semester : 6									
Bioelectronics Systems Specialization Core Courses									
TE7308	070123633	Biomedical Imaging Systems		4	40	60	0	0	100
T7802	070123634	Specialization Project		2	0	0	20	30	50
Total				6	40	60	20	30	150
Semester : 6									
Embedded Systems Specialization Core Courses									
T7802	070123634	Specialization Project		2	0	0	20	30	50
TE7325	070123635	Embedded Linux		4	40	60	0	0	100
Total				6	40	60	20	30	150
Semester : 6									
Mechatronics and Automation Specialization Core Courses									
T7802	070123634	Specialization Project		2	0	0	20	30	50
T7100	070123636	Mechatronics		4	40	60	0	0	100
Total				6	40	60	20	30	150
Semester : 6									
Optoelectronics and Communication Specialization Core Courses									
T7802	070123634	Specialization Project		2	0	0	20	30	50
TE7337	070123637	Optical Devices and Fiber Optics		4	40	60	0	0	100
Total				6	40	60	20	30	150
Semester : 6									
Signal Processing Specialization Core Courses									
T7802	070123634	Specialization Project		2	0	0	20	30	50
T7112	070123638	VLSI Digital Signal Processing System		4	40	60	0	0	100



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Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Total				6	40	60	20	30	150
Semester : 6									
Sustainable Energy Devices and Systems Specialization Core Courses									
T7802	070123634	Specialization Project		2	0	0	20	30	50
TE7346	070123639	Wind Energy Systems		4	40	60	0	0	100
Total				6	40	60	20	30	150
Semester : 7									
Bioelectronics Systems Specialization Core Courses									
TE7050	070123740	Biomedical Instrumentation		4	40	60	0	0	100
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7309	070123742	Biomedical Instrumentation Lab		1	0	0	10	15	25
Total				7	40	60	30	45	175
Semester : 7									
Embedded Systems Specialization Core Courses									
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7304	070123743	Advanced Microcontrollers and RTOS		4	40	60	0	0	100
TE7305	070123744	Advanced Microcontrollers and RTOS Lab		1	0	0	10	15	25
Total				7	40	60	30	45	175
Semester : 7									
Mechatronics and Automation Specialization Core Courses									
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7125	070123745	Mobile Robotics		4	40	60	0	0	100
TE7056	070123746	Mobile Robotics Lab		1	0	0	10	15	25
Total				7	40	60	30	45	175
Semester : 7									
Optoelectronics and Communication Specialization Core Courses									
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7432	070123747	Optical Communication Systems		4	40	60	0	0	100
TE7433	070123748	Optical Communication Systems Lab		1	0	0	10	15	25



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Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Total				7	40	60	30	45	175
Semester : 7									
Signal Processing Specialization Core Courses									
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7302	070123749	Adaptive Signal Processing		4	40	60	0	0	100
TE7303	070123750	Adaptive Signal Processing Lab		1	0	0	10	15	25
Total				7	40	60	30	45	175
Semester : 7									
Sustainable Energy Devices and Systems Specialization Core Courses									
T7802	070123741	Specialization Project		2	0	0	20	30	50
TE7313	070123751	Devices and Grid Systems for Sustainable Energy		4	40	60	0	0	100
TE7314	070123752	Devices and Grid Systems for Sustainable Energy Lab		1	0	0	10	15	25
Total				7	40	60	30	45	175



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Annexure B

Optional 'Honours' Specialization

Semester	Internal Credits	External Credits	Total Credits	Total Marks
Bioelectronics Systems				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Embedded Systems				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Mechatronics and Automation				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Optoelectronics and Communication				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Signal Processing				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Sustainable Energy Devices and Systems				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500



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Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Semester : 5									
Artificial Intelligence and Machine Learning Specialization Core Courses									
TE7273	070123524	Machine Learning: Classification		3	30	45	0	0	75
TE7274	070123525	Machine Learning: Regression		3	30	45	0	0	75
Total				6	60	90	0	0	150
Semester : 5									
Data Science Specialization Core Courses									
TE7281	070123526	Open Source Tools for Data Science		4	40	60	0	0	100
TE7292	070123527	R Programming		3	30	45	0	0	75
Total				7	70	105	0	0	175
Semester : 5									
Internet of Things Specialization Core Courses									
TE7268	070123528	Introduction to IOT		4	40	60	0	0	100
TE7293	070123529	Raspberry Pi and Python		3	30	45	0	0	75
Total				7	70	105	0	0	175
Semester : 5									
Smart Cities and Urban Analytics Specialization Core Courses									
TE7220	070123530	Smart Cities : Context Policy and Governance		3	30	45	0	0	75
TE7206	070123531	IOT for Smart Cities		3	30	45	0	0	75
TE7207	070123532	IOT for Smart Cities Lab		1	0	0	10	15	25
Total				7	60	90	10	15	175
Semester : 5									
Automobile Engineering with Hybrid and Autonomous Technology Specialization Core Courses									
TE7355	070123533	Basics of Automotive Engineering		3	30	45	0	0	75
TE7665	070123534	Automotive Electronics and Instrumentation		2	50	0	0	0	50
TE7666	070123535	Automotive Vehicle Dynamics and NVH Lab		1	0	0	10	15	25
Total				6	80	45	10	15	150
Semester : 6									



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Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
Artificial Intelligence and Machine Learning Specialization Core Courses									
TE7266	070123640	Introduction to Deep Learning		4	40	60	0	0	100
TE7271	070123641	Machine Learning Clustering and Retrieval		3	30	45	0	0	75
Total				7	70	105	0	0	175
Semester : 6									
Data Science Specialization Core Courses									
TE7247	070123642	Business Analytics		3	30	45	0	0	75
TE7284	070123643	Power BI		3	30	45	0	0	75
Total				6	60	90	0	0	150
Semester : 6									
Internet of Things Specialization Core Courses									
TE7269	070123644	IOT Security and Privacy		3	30	45	0	0	75
TE7295	070123645	Software Defined Networking		3	30	45	0	0	75
Total				6	60	90	0	0	150
Semester : 6									
Smart Cities and Urban Analytics Specialization Core Courses									
T7802	070123646	Specialization Project		2	0	0	50	0	50
T7802	070123647	Specialization Seminar		2	0	0	50	0	50
TE7177	070123648	Application of Sensor Technology to Smart Cities		3	30	45	0	0	75
Total				7	30	45	100	0	175
Semester : 6									
Automobile Engineering with Hybrid and Autonomous Technology Specialization Core Courses									
TE7669	070123649	Hybrid Technology		2	20	30	0	0	50
F7036	070123650	Autonomous Technology (Self Driven Cars)		2	50	0	0	0	50
TE7435	070123651	Automotive Engine and Transmission System		3	30	45	0	0	75
Total				7	100	75	0	0	175
Semester : 7									
Artificial Intelligence and Machine Learning Specialization Core Courses									



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Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Specialization	Credits	Internal Marks	External Mark	Internal Practical Marks	External Practical Marks	Total Marks
T7805	070123753	Specialization Project		5	0	0	50	75	125
T7802	070123754	Specialization Seminar		2	0	0	20	30	50
Total				7	0	0	70	105	175
Semester : 7									
Data Science									
Specialization Core Courses									
T7805	070123753	Specialization Project		5	0	0	50	75	125
T7802	070123754	Specialization Seminar		2	0	0	20	30	50
Total				7	0	0	70	105	175
Semester : 7									
Internet of Things									
Specialization Core Courses									
T7805	070123753	Specialization Project		5	0	0	50	75	125
T7802	070123754	Specialization Seminar		2	0	0	20	30	50
Total				7	0	0	70	105	175
Semester : 7									
Smart Cities and Urban Analytics									
Specialization Core Courses									
T7803	070123755	Specialization Project		3	0	0	30	45	75
Total				3	0	0	30	45	75
Specialization Elective : Smart Cities and Urban Analytics									
TE7205	070123756	Intelligent Transportation Systems		3	30	45	0	0	75
TE7234	070123757	Urban Hydrology and Hydraulics		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 7									
Automobile Engineering with Hybrid and Autonomous Technology									
Specialization Core Courses									
T7805	070123753	Specialization Project		5	0	0	50	75	125
T7802	070123754	Specialization Seminar		2	0	0	20	30	50
Total				7	0	0	70	105	175



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Annexure C
Optional 'Minor' Specialization

Semester	Internal Credits	External Credits	Total Credits	Total Marks
Artificial Intelligence and Machine Learning				
Semester 5	0	6	6	150
Semester 6	0	7	7	175
Semester 7	0	7	7	175
Total	0	20	20	500
Data Science				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Internet of Things				
Semester 5	0	7	7	175
Semester 6	0	6	6	150
Semester 7	0	7	7	175
Total	0	20	20	500
Smart Cities and Urban Analytics				
Semester 5	0	7	7	175
Semester 6	4	3	7	175
Semester 7	0	6	6	150
Total	4	16	20	500
Automobile Engineering with Hybrid and Autonomous Technology				
Semester 5	2	4	6	150
Semester 6	2	5	7	175
Semester 7	0	7	7	175
Total	4	16	20	500



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Annexure-D

For students who have been selected for INTERNSHIP DRIVE, AICTE - MITACS

The following would be applicable for the 7th & 8th Semester:

Semester: 7								
Catalog Course Code	Course Code	Course Title	Credits	Internal Marks	External Marks	Internal Practical Marks	External Practical Marks	Total Marks
T7912	070123758	Internship	12	0	0	120	180	300
T7802	070123759	Seminar	2	0	0	50	0	50
Total Required Credits			14	0	0	170	180	350
Semester: 8								
Generic Core Courses								
T7804	070123803	B. Tech Project	4	0	0	40	60	100
T7674	070123804	Cyber Security	2	50	0	0	0	50
F7047	070123805	Electric Vehicle	2	50	0	0	0	50
Total Required Credits			8	100	0	40	60	200
Generic Elective Courses Group- I								
T7473	070123806	Artificial Intelligence	3	30	45	0	0	75
TE7045	070123807	IoT and Applications	3	30	45	0	0	75
TE7326	070123808	Fiber Optics And Satellite Communication	3	30	45	0	0	75
TE7340	070123809	Scientific Computing	3	30	45	0	0	75
Total Required Credits			3	30	45	0	0	75
Generic Elective Courses Group- II								
TE7014	070123810	Artificial Intelligence Lab	1	0	0	10	15	25
TE7048	070123811	IoT and Applications Lab	1	0	0	10	15	25
TE7327	070123812	Fiber Optics And Satellite Communication Lab	1	0	0	10	15	25
TE7341	070123813	Scientific Computing Lab	1	0	0	10	15	25
Total Required Credits			1	0	0	10	15	25
Generic Elective Courses Group- III								
TE7306	070123814	Biomedical Electronics	3	30	45	0	0	75
TE7317	070123815	Digital Control System	3	30	45	0	0	75
TE7342	070123816	Speech and Audio Signal Processing	3	30	45	0	0	75
TE7347	070123817	Wireless Communication	3	30	45	0	0	75
Total Required Credits			3	30	45	0	0	75



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Generic Elective Courses Group- IV								
TE7307	070123818	Biomedical Electronics Lab	1	0	0	10	15	25
TE7318	070123819	Digital Control System Lab	1	0	0	10	15	25
TE7343	070123820	Speech and Audio Signal Processing Lab	1	0	0	10	15	25
TE7348	070123821	Wireless Communication Lab	1	0	0	10	15	25
Total Required Credits			1	0	0	10	15	25
Open Elective Courses Group								
TE7171	070123822	Introduction to Mathematical Modelling	3	30	45	0	0	75
TE7195	070123823	GIS Applications	3	30	45	0	0	75
TE7203	070123824	Intelligent Transportation Management	3	30	45	0	0	75
TE7264	070123825	Introduction to BIGDATA	3	30	45	0	0	75
T7474	070123826	Basics of Database	3	30	45	0	0	75
T7616	070123827	Fundamentals of Automotive Technology	3	30	45	0	0	75
T7529	070123828	Machine Learning	3	30	45	0	0	75
TE7756	070123829	Open Source Technologies	3	30	45	0	0	75
T7584	070123830	Printed Circuit Board (PCB) Design	3	30	45	0	0	75
T7650	070123831	Six Sigma	3	30	45	0	0	75
TE7700	070123832	Smart Materials	3	30	45	0	0	75
TE7334	070123833	Introduction to Mechatronics	3	30	45	0	0	75
TE7338	070123834	Fundamentals of Automotive Technology	3	30	45	0	0	75
TE7376	070123835	Introduction to Operations Research	3	30	45	0	0	75
TE7377	070123836	Introduction to Optimisation	3	30	45	0	0	75
Total Required Credits			3	30	45	0	0	75
Generic Elective Courses Group - V								
TE7429	070123837	Information Theory and Coding	2	20	30	0	0	50
TE7430	070123838	Computer Architecture	2	20	30	0	0	50
TE7431	070123839	Wireless Sensor Network	2	20	30	0	0	50
Total Required Credits			2	20	30	0	0	50
Generic Elective Courses Group - VI								
TE7438	070123840	History of Science and Technology	2	50	0	0	0	50
T2585	070123841	Organizational Behaviour	2	50	0	0	0	50
Total Required Credits			2	50	0	0	0	50