

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical 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	As per Annexure A Students can pursue additional specialization in the following areas by completing 20 credits specified in the program structure of that specialization beyond the minimum requirement for the award of degree. 1) CAD/CAM 2) Mechatronics and Manufacturing Automation (Industry 4.0) 3) Design of Heat Exchanger 4) Automobile Engineering			
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/ DIPLOMA/ CERTIFICATE	Bachelor of Technology (Mechanical Engineering) 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.			

14. NATURE WISE DISTRIBUTION OF CREDITS							
Semester	Generic Core	Generic Elective	Specialization Core	Specialization Elective	Open Elective	Audit	Total
1	20	0	0	0	0	0	20
2	20	0	0	0	0	0	20
3	21	2	0	0	0	1*	23
4	21	1	0	0	0	0	22
5	19	7	0	0	0	0	26
6	12	13	0	0	0	0	25
7	12	8	0	0	0	0	20
8	14	0	0	0	0	0	14
Total	139	31	0	0	0	0	170
Optional Additional Courses							
Total	0	0	20	0	0	0	20
Grand Total							190

* Satisfactory completion of the letter grade course 'Integrated Disaster Management' 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

Programme Structure is approved by the Academic Council subject to its norms & conditions. Any provision in the Programme Structure which violates the basic rules & regulations is deemed to be termed "Null & Void".

Head-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	070125101	Engineering Mathematics -I		4	40	60	0	0	100
T7540	070125102	Basic Electrical and Electronics Engineering		3	30	45	0	0	75
T7381	070125103	Chemistry		3	30	45	0	0	75
T7925	070125104	Engineering Graphics Lab		2	0	0	20	30	50
TE7188	070125105	Environmental Science		2	20	30	0	0	50
TE7286	070125106	Programming and Problem Solving		2	20	30	0	0	50
T7593	070125107	Basic Electrical and Electronics Engineering Lab		1	0	0	10	15	25
T7382	070125108	Chemistry Lab		1	0	0	10	15	25
T6732	070125109	Critical Thinking		1	25	0	0	0	25
TE7287	070125110	Programming and Problem Solving Lab		1	0	0	10	15	25
Total				20	165	210	50	75	500
Semester : 2									
Generic Core Courses									
TE7169	070125201	Engineering Mathematics -II		4	40	60	0	0	100
T7414	070125202	Engineering Mechanics		3	30	45	0	0	75
T7391	070125203	Physics		3	30	45	0	0	75
T7383	070125204	Communication Skills		2	20	30	0	0	50
T7658	070125205	Workshop Practice		2	20	30	0	0	50
TE7300	070125206	Tinker Lab		2	0	0	50	0	50
T7384	070125207	Communication skills lab		1	0	0	10	15	25
T7392	070125208	Physics lab		1	0	0	10	15	25
TE7396	070125209	Software Tools		1	0	0	25	0	25
T6773	070125210	Creative Thinking		1	25	0	0	0	25
Total				20	165	210	95	30	500
Semester : 3									
Generic Core Courses									
T7635	070125301	Measurement and Metrology		3	30	45	0	0	75
TE7170	070125302	Engineering Mathematics-III		3	30	45	0	0	75
TE7367	070125303	Engineering Materials and Metallurgy		3	30	45	0	0	75
TE7370	070125304	Fluid Mechanics		3	30	45	0	0	75
TE7390	070125305	Strength of Materials		3	30	45	0	0	75
TE7368	070125306	Engineering Thermodynamics		2	20	30	0	0	50
T7615	070125307	Fluid Mechanics Lab		1	0	0	10	15	25
T7636	070125308	Measurement and Metrology Lab		1	0	0	10	15	25
T7652	070125309	Strength of Materials Lab		1	0	0	10	15	25
T7940	070125310	Engineering Thermodynamics Lab		1	0	0	10	15	25
T4005	070125311	Integrated Disaster Management *		0	0	0	0	0	Letter Grade
Total				21	170	255	40	60	525
Generic Elective Courses Group									
T6184	070125312	Basic German I		2	50	0	0	0	50
T6186	070125313	Basic French I		2	50	0	0	0	50

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T6188	070125314	Basic Spanish I		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Semester : 4									
Generic Core Courses									
T8000	070125401	Service Learning		4	100	0	0	0	100
T7632	070125402	Manufacturing Technology		3	30	45	0	0	75
T7700	070125403	Theory of Machines - I		3	30	45	0	0	75
T7960	070125404	Statistics, Probability and Numerical Methods		3	30	45	0	0	75
TE7372	070125405	Heat Transfer		3	30	45	0	0	75
T2646	070125406	Entrepreneurship Venture		1	25	0	0	0	25
T7619	070125407	Heat Transfer Lab		1	0	0	10	15	25
T7633	070125408	Manufacturing Technology Lab		1	0	0	10	15	25
T7656	070125409	Theory of Machines-I Lab		1	0	0	10	15	25
T7961	070125410	Statistics, Probability and Numerical Methods lab		1	0	0	10	15	25
Total				21	245	180	40	60	525
Generic Elective Courses Group									
T6761	070125411	Foundation of Ethics		1	25	0	0	0	25
T6760	070125412	Introduction to Indian Philosophy		1	25	0	0	0	25
Total Required Credits				1	25	0	0	0	25
Semester : 5									
Generic Core Courses									
T7620	070125501	I.C. Engines		3	30	45	0	0	75
T7625	070125502	Machine Design - I		3	30	45	0	0	75
T7640	070125503	Mechatronics		3	30	45	0	0	75
TE7353	070125504	Advanced Manufacturing Technology		3	30	45	0	0	75
F0002	070125505	Flexi-Credit Course		2	50	0	0	0	50
T6749	070125506	Design Thinking		2	50	0	0	0	50
TE7290	070125507	Project Based Learning -I		2	0	0	20	30	50
T7621	070125508	I.C. Engines Lab		1	0	0	10	15	25
Total				19	220	180	30	45	475
Specialization Core Courses for Optional Additional Specialization : Automobile Engineering (Major)									
TE7355	070125509	Basics of Automotive Engineering	Automobile Engineering	3	30	45	0	0	75
TE7435	070125510	Automotive Engine and Transmission System	Automobile Engineering	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : CAD/CAM (Major)									
TE7434	070125511	Basic and Advanced CATIA Lab	CAD/CAM	3	0	0	30	45	75
T7125	070125512	Computer Aided Manufacturing Lab	CAD/CAM	1	0	0	10	15	25
TE7380	070125513	Manufacturing Engineering	CAD/CAM	1	25	0	0	0	25
Total				5	25	0	40	60	125
Specialization Core Courses for Optional Additional Specialization : Design of Heat Exchanger (Major)									
TE7352	070125514	Advanced Fluid Mechanics	Design of Heat Exchanger	3	30	45	0	0	75

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TE7356	070125515	Basics of Heat Exchanger	Design of Heat Exchanger	3	30	45	0	0	75
TE7381	070125516	Materials and Fabrication Processes for Heat Exchanger	Design of Heat Exchanger	3	30	45	0	0	75
Total				9	90	135	0	0	225
Specialization Core Courses for Optional Additional Specialization : Mechatronics and Manufacturing Automation (Industry 4.0) (Major)									
F0002	070125517	Flexi-Credit Course	Mechatronics and Manufacturing Automation (Industry 4.0)	2	50	0	0	0	50
TE7389	070125518	Sensors and Transducers Technology	Mechatronics and Manufacturing Automation (Industry 4.0)	2	20	30	0	0	50
TE7364	070125519	Digital Signal Processing	Mechatronics and Manufacturing Automation (Industry 4.0)	1	25	0	0	0	25
TE7382	070125520	Microcontrollers and Embedded Systems	Mechatronics and Manufacturing Automation (Industry 4.0)	1	25	0	0	0	25
Total				6	120	30	0	0	150
Generic Elective Courses Group									
T7653	070125521	Theory of Machines - II		3	30	45	0	0	75
T7612	070125522	Fluid Machinery		3	30	45	0	0	75
T7647	070125523	Production Management		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
T7654	070125524	Theory of Machines - II Lab		1	0	0	10	15	25
T7613	070125525	Fluid Machinery Lab		1	0	0	10	15	25
TE7386	070125526	Production Management Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group									
TE7366	070125527	Engineering Design Optimization		3	30	45	0	0	75
TE7373	070125528	Industrial Fluid Power		3	30	45	0	0	75
TE7359	070125529	Composite Materials		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 6									
Generic Core Courses									
TE7357	070125601	CAD & CAM		3	30	45	0	0	75
F0002	070125602	Flexi-Credit Course		2	50	0	0	0	50
TE7291	070125603	Project Based Learning-II		2	0	0	20	30	50
T7802	070125604	Capstone Course		2	50	0	0	0	50
T6774	070125605	Principles of Economics		2	50	0	0	0	50

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T7607	070125606	CAD& CAM Lab		1	0	0	10	15	25
Total				12	180	45	30	45	300
Specialization Core Courses for Optional Additional Specialization : Automobile Engineering (Major)									
TE7375	070125607	Instrumentation and Automotive Electronics	Automobile Engineering	3	30	45	0	0	75
TE7395	070125608	Vehicle Dynamics and NVH	Automobile Engineering	3	30	45	0	0	75
Total				6	60	90	0	0	150
Specialization Core Courses for Optional Additional Specialization : CAD/CAM (Major)									
TE7362	070125609	Computer Aided Design II Lab	CAD/CAM	3	0	0	30	45	75
TE7391	070125610	Structural Dynamic Analysis Lab	CAD/CAM	2	0	0	20	30	50
T7802	070125611	Seminar	CAD/CAM	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Design of Heat Exchanger (Major)									
TE7384	070125612	Numerical Methods for Heat Exchanger	Design of Heat Exchanger	3	30	45	0	0	75
TE7371	070125613	Heat Exchanger Simulation Lab	Design of Heat Exchanger	1	0	0	10	15	25
Total				4	30	45	10	15	100
Specialization Core Courses for Optional Additional Specialization : Mechatronics and Manufacturing Automation (Industry 4.0) (Major)									
TE7363	070125614	Computer, System, Technologies For Enabling Industry 4.0	Mechatronics and Manufacturing Automation (Industry 4.0)	3	30	45	0	0	75
TE7374	070125615	Industrial Internet of Things	Mechatronics and Manufacturing Automation (Industry 4.0)	2	20	30	0	0	50
TE7436	070125616	Industrial Robotics	Mechatronics and Manufacturing Automation (Industry 4.0)	2	20	30	0	0	50
Total				7	70	105	0	0	175
Generic Elective Courses Group									
TE7369	070125617	Finite Element Methods		3	30	45	0	0	75
TE7360	070125618	Computational Fluid Dynamics		3	30	45	0	0	75
TE7378	070125619	Jigs and Fixtures		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
T7611	070125620	Finite Element Methods Lab		1	0	0	10	15	25
T7686	070125621	Computational Fluid Dynamic Lab		1	0	0	10	15	25
TE7063	070125622	Jigs and Fixtures Lab		1	0	0	10	15	25
Total Required Credits				1	0	0	10	15	25
Generic Elective Courses Group									
TE7379	070125623	Machine Design II		3	30	45	0	0	75

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TE7385	070125624	Power Plant Engineering		3	30	45	0	0	75
T7644	070125625	Operations Research		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
TE7335	070125626	Introduction to Robotics		3	30	45	0	0	75
T7574	070125627	MATLAB		3	30	45	0	0	75
TE7339	070125628	Renewable Energy Systems		3	30	45	0	0	75
TE7428	070125629	Introduction to Image Processing		3	30	45	0	0	75
TE7223	070125630	Smart Urban Planning		3	30	45	0	0	75
TE7240	070125631	Water Resource Planning and Management		3	30	45	0	0	75
T7499	070125632	Java		3	30	45	0	0	75
TE7265	070125633	Introduction to Data Science		3	30	45	0	0	75
TE7263	070125634	Introduction to AI and Machine Learning		3	30	45	0	0	75
TE7388	070125635	Quality Management Techniques		3	30	45	0	0	75
TE7319	070125636	Electrical and Electronics Materials		3	30	45	0	0	75
TE7351	070125637	3D Printing and Prototyping		3	30	45	0	0	75
T2618	070125638	Project Management		3	30	45	0	0	75
T7020	070125639	Nanotechnology		3	30	45	0	0	75
T7393	070125640	Computer Based Statistical Packages		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
T7650	070125641	Six sigma		3	30	45	0	0	75
T7616	070125642	Fundamentals of Automotive Technology		3	30	45	0	0	75
TE7376	070125643	Introduction to Operations Research		3	30	45	0	0	75
T7394	070125644	Smart Materials		3	30	45	0	0	75
TE7171	070125645	Introduction to Mathematical Modelling		3	30	45	0	0	75
TE7377	070125646	Introduction to Optimisation		3	30	45	0	0	75
TE7338	070125647	Principles of Modern Communication Systems		3	30	45	0	0	75
T7584	070125648	Printed Circuit Board (PCB) Design		3	30	45	0	0	75
T7529	070125649	Machine Learning		3	30	45	0	0	75
TE7334	070125650	Introduction to Mechatronics		3	30	45	0	0	75
TE7195	070125651	GIS Applications		3	30	45	0	0	75
TE7204	070125652	Intelligent Transportation Systems		3	30	45	0	0	75
T7509	070125653	Open Source Technologies		3	30	45	0	0	75
T7474	070125654	Basics of Database		3	30	45	0	0	75
TE7264	070125655	Introduction to BIGDATA		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Semester : 7									
Generic Core Courses									

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T7804	070125701	B.Tech Project		4	0	0	40	60	100
TE7081	070125702	Refrigeration and Airconditioning		3	30	45	0	0	75
T7674	070125703	Cyber Security		2	50	0	0	0	50
F0002	070125704	Flexi-Credit Course		2	50	0	0	0	50
T7649	070125705	Refrigeration & Airconditioning Lab		1	0	0	10	15	25
Total				12	130	45	50	75	300
Specialization Core Courses for Optional Additional Specialization : Automobile Engineering (Major)									
T7805	070125706	Project	Automobile Engineering	5	0	0	50	75	125
T7802	070125707	Seminar	Automobile Engineering	2	0	0	20	30	50
TE7437	070125708	Automotive Safety	Automobile Engineering	1	10	15	0	0	25
Total				8	10	15	70	105	200
Specialization Core Courses for Optional Additional Specialization : CAD/CAM (Major)									
T7805	070125706	Project	CAD/CAM	5	0	0	50	75	125
TE7392	070125709	Structural Non Linear and 3D Analysis Lab	CAD/CAM	3	0	0	30	45	75
Total				8	0	0	80	120	200
Specialization Core Courses for Optional Additional Specialization : Design of Heat Exchanger (Major)									
T7805	070125706	Project	Design of Heat Exchanger	5	0	0	50	75	125
T7802	070125707	Seminar	Design of Heat Exchanger	2	0	0	20	30	50
Total				7	0	0	70	105	175
Specialization Core Courses for Optional Additional Specialization : Mechatronics and Manufacturing Automation (Industry 4.0) (Major)									
T7805	070125706	Project	Mechatronics and Manufacturing Automation (Industry 4.0)	5	0	0	50	75	125
T7802	070125707	Seminar	Mechatronics and Manufacturing Automation (Industry 4.0)	2	0	0	20	30	50
Total				7	0	0	70	105	175
Generic Elective Courses Group									
T7602	070125710	Automobile Engineering		3	30	45	0	0	75
T7639	070125711	Mechanical Vibration		3	30	45	0	0	75
TE7393	070125712	Tool Engineering		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75
Generic Elective Courses Group									
T7676	070125713	Total Quality Management		3	30	45	0	0	75
TE7383	070125714	Nature Inspired Optimization Techniques		3	30	45	0	0	75
T7642	070125715	Non Conventional Energy Sources		3	30	45	0	0	75
Total Required Credits				3	30	45	0	0	75

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Generic Elective Courses Group									
T2573	070125716	Organizational Behaviour		2	50	0	0	0	50
TE7438	070125717	History of Science and Technology		2	50	0	0	0	50
Total Required Credits				2	50	0	0	0	50
Semester : 8									
Generic Core Courses									
T7912	070125801	Internship		12	0	0	120	180	300
T7802	070125802	Seminar		2	0	0	20	30	50
Total				14	0	0	140	210	350

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Semester	Internal Credits	External Credits	Total Credits	Total Marks
Semester 1	1	19	20	500
Semester 2	4	16	20	500
Semester 3	2	21	23	575
Semester 4	6	16	22	550
Semester 5	4	22	26	650
Semester 6	6	19	25	625
Semester 7	6	14	20	500
Semester 8	0	14	14	350
Total	29	141	170	4250