

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



1.	OBJECTIVE	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. Being a professional programme it ensures a healthy balance between theoretical foundation and practical exposure to the present day world. 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.			
2.	DURATION (IN MONTHS)	48 (Full Time)			
3.	INTAKE	60			
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	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. B. Tech (Lateral entry to second year) : 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.			

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



		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. 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. 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. 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 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 Any State Government Engineering Entrance Examination
7.	MEDIUM OF INSTRUCTION	English
8.	PROGRAMME PATTERN	Semester
9.	COURSE & SPECIALIZATION	Annexure A: Bachelor of Technology (Mechanical 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. Annexure B: Optional 'Honours' specialization area 1. CAD/CAM 2. Design of Heat Exchanger 3. Smart Manufacturing (Industry 4.0) 4. Automobile engineering with hybrid and autonomous technology Annexure C : Optional 'Minor' specialization area 1. Artificial Intelligence and Machine learning (CSE) 2. Data Science (CSE)

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



		3. Internet of things (CSE) 4. Smart Cities and Urban Analytics (CE) 5. Embedded Systems (E&TC)			
10.	FEE		Academic Fee p.a	Institute Deposit	Total
		Indian Students	260000	20000	280000
		International Students (USD equivalent to INR)	390000	20000	410000
Note: For additional optional specialization 'Honours' or 'Minor', an additional fees of Rs. 25000/- will be charged in the third year.					
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) OR Bachelor of Technology (Mechanical Engineering) with Honours in CAD/CAM / Design of Heat Exchanger/Smart Manufacturing (Industry 4.0)/Automobile engineering with hybrid and autonomous technology. OR Bachelor of Technology (Mechanical Engineering) with Minor in Artificial Intelligence and Machine learning /Data Science / Internet of things / Smart Cities and Urban Analytics /Embedded Systems 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. CLASSIFICATION OF CREDITS							
Semester	Generic Core	Generic Elective	Specialization Core	Specialization Elective	Open Elective	Audit	Total
1	20	0	0	0	0	1*	20
2	20	0	0	0	0	1*	20
3	22	2	0	0	0	1*	24
4	23	1	0	0	0	0	24
5	17	4	0	0	3	0	24
6	11	10	0	0	3	0	24
7	12	8	0	0	0	0	20
8	14	0	0	0	0	0	14
Total	139	25	0	0	6	0	170
Optional Additional Courses (Honours)							
Total	0	0	20	0	0	0	20
Optional Additional Courses (Minor)							
Total	0	0	17	3	0	0	20
Grand Total							190
* Satisfactory completion of the non letter grade courses 'Integrated Disaster Management', 'Fitness for Life', 'Environmental Science' is mandatory for the award of degree.							

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.

Head - Academics

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Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Semester : 1													
Generic Core Courses													
TE7168	0701250101	Engineering Mathematics -I	BS		3	1	0	0	0	40	60	4	100
TE7686	0701250102	Physics for Mechanical Engineers	BS		3	0	0	0	0	30	45	3	75
TE7687	0701250103	Physics Lab	BS		0	0	2	10	15	0	0	1	25
T7383	0701250104	Communication Skills	HS		2	0	0	0	0	20	30	2	50
T7384	0701250105	Communication skills lab	HS		0	0	2	10	15	0	0	1	25
TE7624	0701250106	Engineering Graphics	ES		1	0	0	0	0	25	0	1	25
T7925	0701250107	Engineering Graphics Lab	ES		0	0	4	20	30	0	0	2	50
TE7286	0701250108	Programming and Problem Solving	ES		2	0	0	0	0	20	30	2	50
TE7287	0701250109	Programming and Problem Solving Lab	ES		0	0	2	10	15	0	0	1	25
T6873	0701250110	Creative Thinking	HS		1	0	0	0	0	25	0	1	25
T7658	0701250111	Workshop Practice	ES		0	0	4	50	0	0	0	2	50
TE7188	0701250112	Environmental Science *			0	0	0	0	0	0	0	Non Letter Grade	0
Total					12	1	14	100	75	160	165	20	500
Semester : 2													
Generic Core Courses													



Celebrating 50 Years of Excellence

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
TE7169	0701250201	Engineering Mathematics -II	BS		3	1	0	0	0	40	60	4	100
TE7694	0701250202	Chemistry	BS		3	0	0	0	0	30	45	3	75
TE7695	0701250203	Chemistry Lab	BS		0	0	2	10	15	0	0	1	25
T7540	0701250204	Basic Electrical and Electronics Engineering	ES		3	0	0	0	0	30	45	3	75
T7593	0701250205	Basic Electrical and Electronics Engineering Lab	ES		0	0	2	10	15	0	0	1	25
T7414	0701250206	Engineering Mechanics	ES		3	0	0	0	0	30	45	3	75
T7415	0701250207	Engineering Mechanics Lab	ES		0	0	2	10	15	0	0	1	25
TE7814	0701250208	Software Tools For Mechanical Engineering	ES		0	0	2	25	0	0	0	1	25
TE7300	0701250209	Tinker Lab	ES		0	0	4	50	0	0	0	2	50
T6732	0701250210	Critical Thinking	HS		1	0	0	0	0	25	0	1	25
TH4095	0701250211	Fitness for Life *			0	0	0	0	0	0	0	Non Letter Grade	0
Total					13	1	12	105	45	155	195	20	500
Semester : 3													
Generic Core Courses													
TE7170	0701250301	Engineering Mathematics-III	BS		2	1	0	0	0	30	45	3	75
TE7390	0701250302	Strength of Materials	PC		3	0	0	0	0	30	45	3	75
T7652	0701250303	Strength of Materials Lab	PC		0	0	2	10	15	0	0	1	25





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Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Celebrating 50 Years of Excellence

Annexure A

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
TE7367	0701250304	Engineering Materials and Metallurgy	PC		3	0	0	0	0	30	45	3	75
T7632	0701250305	Manufacturing Technology	PC		3	0	0	0	0	30	45	3	75
T7633	0701250306	Manufacturing Technology Lab	PC		0	0	2	25	0	0	0	1	25
TE7368	0701250307	Engineering Thermodynamics	PC		2	0	0	0	0	20	30	2	50
T7940	0701250308	Engineering Thermodynamics Lab	PC		0	0	2	10	15	0	0	1	25
TE7639	0701250309	Mechatronics and IoT	PC		3	0	0	0	0	30	45	3	75
TE7578	0701250310	Mechatronics and IoT Lab	PC		0	0	4	20	30	0	0	2	50
T4005	0701250311	Integrated Disaster Management *			0	0	0	0	0	0	0	Non Letter Grade	0
Total					16	1	10	65	60	170	255	22	550
Generic Elective Courses Group													
T6184	0701250312	Basic German I	GE		2	0	0	0	0	50	0	2	50
T6186	0701250313	Basic French I	GE		2	0	0	0	0	50	0	2	50
T6188	0701250314	Basic Spanish I	GE		2	0	0	0	0	50	0	2	50
Total Required Credits								0	0	50	0	2	50
Semester : 4													
Generic Core Courses													



Celebrating 50 Years of Excellence

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

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					L	T	La b	Practical		Theory			
								CA	ESE	CA	ESE		
T8000	0701250401	Service Learning	HS		0	0	8	100	0	0	0	4	100
TE7691	0701250402	Statistics, Probability and Numerical Methods	BS		3	0	0	0	0	30	45	3	75
TE7692	0701250403	Statistics, Probability and Numerical Methods Lab	BS		0	0	2	10	15	0	0	1	25
TE7370	0701250404	Fluid Mechanics	PC		3	0	0	0	0	30	45	3	75
T7615	0701250405	Fluid Mechanics Lab	PC		0	0	2	10	15	0	0	1	25
T7635	0701250406	Measurement and Metrology	PC		3	0	0	0	0	30	45	3	75
T7636	0701250407	Measurement and Metrology Lab	PC		0	0	2	10	15	0	0	1	25
T7700	0701250408	Theory of Machines - I	PC		3	0	0	0	0	30	45	3	75
T7656	0701250409	Theory of Machines-I Lab	PC		0	0	2	10	15	0	0	1	25
T2646	0701250410	Entrepreneurship Venture	HS		1	0	0	0	0	25	0	1	25
T6749	0701250411	Design Thinking	HS		2	0	0	0	0	50	0	2	50
Total					15	0	16	140	60	195	180	23	575
Generic Elective Courses Group													
T6872	0701250412	Foundation of Ethics	GE		1	0	0	0	0	25	0	1	25
T6760	0701250413	Introduction to Indian Philosophy	GE		1	0	0	0	0	25	0	1	25
Total Required Credits								0	0	25	0	1	25
Semester : 5													





Celebrating 50 Years of Excellence

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Generic Core Courses													
TE7357	0701250501	CAD & CAM	PC		3	0	0	0	0	30	45	3	75
T7607	0701250502	CAD& CAM Lab	PC		0	0	2	10	15	0	0	1	25
TE7372	0701250503	Heat Transfer	PC		3	0	0	0	0	30	45	3	75
T7619	0701250504	Heat Transfer Lab	PC		0	0	2	10	15	0	0	1	25
T7625	0701250505	Machine Design - I	PC		3	0	0	0	0	30	45	3	75
TE7851	0701250506	Introduction to Artificial Intelligence	ES		2	0	0	0	0	50	0	2	50
TE7353	0701250507	Advanced Manufacturing Technology	PC		3	0	0	0	0	30	45	3	75
TE7583	0701250508	Advanced Manufacturing Technology Lab	PC		0	0	2	10	15	0	0	1	25
Total					14	0	6	30	45	170	180	17	425
Generic Elective Courses Group - I													
T7653	0701250509	Theory of Machines - II	PE		3	0	0	0	0	30	45	3	75
TE7808	0701250510	Industrial Automation and Robotics	PE		3	0	0	0	0	30	45	3	75
TE7360	0701250511	Computational Fluid Dynamics	PE		3	0	0	0	0	30	45	3	75
TE7653	0701250512	PLC & SCADA	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Generic Elective Courses Group - II													
T7654	0701250513	Theory of Machines - II Lab	PE		0	0	2	10	15	0	0	1	25
T7623	0701250514	Industrial Automation & Robotics Lab	PE		0	0	2	10	15	0	0	1	25





Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Celebrating 50 Years of Excellence

Annexure A

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
T7686	0701250515	Computational Fluid Dynamic Lab	PE		0	0	2	10	15	0	0	1	25
TE7596	0701250516	PLC Programming Lab	PE		0	0	2	10	15	0	0	1	25
Total Required Credits								10	15	0	0	1	25
Open Electives Courses Group													
TE7698	0701250517	Nanotechnology	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7676	0701250518	Executive Corporate Communication For Impact	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7195	0701250519	GIS Applications	OE	Civil Engineering	3	0	0	0	0	30	45	3	75
TE7203	0701250520	Intelligent Transportation Management	OE	Civil Engineering	0	0	0	0	0	30	45	3	75
TE7297	0701250521	Software Testing Tools	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
TE7756	0701250522	Open Source Technologies	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
T7584	0701250523	Printed Circuit Board (PCB) Design	OE	Electronics & Tele-communication Engineering	3	0	0	0	0	30	45	3	75
TE7334	0701250524	Introduction to Mechatronics	OE	Electronics & Tele-communication Engineering	3	0	0	0	0	30	45	3	75
TE7804	0701250525	Design Optimization Techniques	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
TE7351	0701250526	3D Printing and Prototyping	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75





Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Celebrating 50 Years of Excellence

Annexure A

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					L	T	La b	Practical		Theory			
								CA	ESE	CA	ESE		
Total Required Credits								0	0	30	45	3	75
Semester : 6													
Generic Core Courses													
TE7806	0701250601	IC Engine and E-Mobility	PC		3	0	0	0	0	30	45	3	75
TE7807	0701250602	I.C. Engines and E-Mobility Lab	PC		0	0	2	10	15	0	0	1	25
TE7798	0701250603	Project Based Learning	PIS		0	0	4	50	0	0	0	2	50
T6774	0701250604	Principles of Economics	HS		2	0	0	0	0	50	0	2	50
T7802	0701250605	Capstone Course	PC		2	0	0	0	0	50	0	2	50
F0001	0701250606	Flexi-Credit Course	PC		1	0	0	0	0	25	0	1	25
Total					8	0	6	60	15	155	45	11	275
Generic Elective Courses Group - I													
TE7369	0701250607	Finite Element Methods	PE		3	0	0	0	0	30	45	3	75
T7612	0701250608	Fluid Machinery	PE		3	0	0	0	0	30	45	3	75
TE7378	0701250609	Jigs and Fixtures	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Generic Elective Courses Group - II													
T7611	0701250610	Finite Element Methods Lab	PE		0	0	2	10	15	0	0	1	25
T7613	0701250611	Fluid Machinery Lab	PE		0	0	2	10	15	0	0	1	25
TE7063	0701250612	Jigs and Fixtures Lab	PE		0	0	2	10	15	0	0	1	25





Celebrating 50 Years of Excellence

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

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					L	T	La b	Practical		Theory			
								CA	ESE	CA	ESE		
Total Required Credits								10	15	0	0	1	25
Generic Elective Courses Group - III													
T7647	0701250613	Production Management	PE		3	0	0	0	0	30	45	3	75
TE7379	0701250614	Machine Design II	PE		3	0	0	0	0	30	45	3	75
TE7385	0701250615	Power Plant Engineering	PE		3	0	0	0	0	30	45	3	75
TE7623	0701250616	Theory of Innovative Design	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Generic Elective Courses Group - IV													
TE7359	0701250617	Composite Materials	PE		3	0	0	0	0	30	45	3	75
TE7366	0701250618	Engineering Design Optimization	PE		3	0	0	0	0	30	45	3	75
TE7373	0701250619	Industrial Fluid Power	PE		3	0	0	0	0	30	45	3	75
TE7809	0701250620	Industrial IoT with Applications (Industry 4.0)	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Open Electives Courses Group													
TE7677	0701250621	Financial Mathematics	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7700	0701250622	Smart Materials	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7223	0701250623	Smart Urban Planning	OE	Civil Engineering	3	0	0	0	0	30	45	3	75
TE7240	0701250624	Water Resource Planning and Management	OE	Civil Engineering	3	0	0	0	0	30	45	3	75





Celebrating 50 Years of Excellence

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure A

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
T7499	0701250625	Java	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
TE7750	0701250626	Web Application Development	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
T7574	0701250627	MATLAB	OE	Electronics & Tele-communication Engineering	3	0	0	0	0	30	45	3	75
TE7428	0701250628	Introduction to Image Processing	OE	Electronics & Tele-communication Engineering	3	0	0	0	0	30	45	3	75
TE7810	0701250629	Industrial Revolution and Introduction of Industry 5.0	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
T7650	0701250630	Six sigma	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Semester : 7													
Generic Core Courses													
T7804	0701250701	B.Tech Project	PIS		0	0	8	40	60	0	0	4	100
T7674	0701250702	Cyber Security	ES		2	0	0	0	0	50	0	2	50
TE7081	0701250703	Refrigeration and Airconditioning	PC		3	0	0	0	0	30	45	3	75
T7649	0701250704	Refrigeration & Airconditioning Lab	PC		0	0	2	10	15	0	0	1	25
F0002	0701250705	Flexi-Credit Course	PC		2	0	0	0	0	50	0	2	50





Celebrating 50 Years of Excellence

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Programme Structure 2022-26

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								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Total					7	0	10	50	75	130	45	12	300
Generic Elective Courses Group - I													
T7639	0701250706	Mechanical Vibration	PE		3	0	0	0	0	30	45	3	75
T7602	0701250707	Automobile Engineering	PE		3	0	0	0	0	30	45	3	75
T7644	0701250708	Operations Research	PE		3	0	0	0	0	30	45	3	75
TE7813	0701250709	Smart Renewable Energy Harvesting and Storage	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Generic Elective Courses Group - II													
TE7873	0701250710	Predictive Maintenance	PE		3	0	0	0	0	30	45	3	75
TE7812	0701250711	Simulation Based Turbomachine Design	PE		3	0	0	0	0	30	45	3	75
T7676	0701250712	Total Quality Management	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Generic Elective Courses Group - III													
T2585	0701250713	Organizational Behaviour	GE		2	0	0	0	0	50	0	2	50
TE7438	0701250714	History of Science and Technology	GE		2	0	0	0	0	50	0	2	50
Total Required Credits								0	0	50	0	2	50
Semester : 8													
Generic Core Courses													



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure A

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
T7912	0701250801	Internship	PIS		0	0	24	120	180	0	0	12	300
T7802	0701250802	Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	28	140	210	0	0	14	350

Abbreviations (Nature)

BS	Basic Sciences
ES	Engineering Sciences
HS	Humanities and Social Sciences
OE	Open Electives
PC	Professional Core
PE	Professional Elective
PIS	Project, Internship, Seminar
PD	Professional Development Course
MC	Mandatory Course
L	Lecture
T	Tutorial
CA	Continuous Assessment
ESE	End Semester Examination



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26
Annexure A

Semester	Internal Credits	External Credits	Total Credits	Total Marks
Semester 1	4	16	20	500
Semester 2	4	16	20	500
Semester 3	3	21	24	600
Semester 4	8	16	24	600
Semester 5	2	22	24	600
Semester 6	7	17	24	600
Semester 7	6	14	20	500
Semester 8	0	14	14	350
Total	34	136	170	4250

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Semester : 5													
Automobile Engineering with Hybrid and Autonomous Technology													
Specialization Core Courses													
TE7355	0701250527	Basics of Automotive Engineering	PC		3	0	0	0	0	30	45	3	75
TE7665	0701250528	Automotive Electronics and Instrumentation	PC		2	0	0	0	0	50	0	2	50
TE7666	0701250529	Automotive Vehicle Dynamics and NVH Lab	PC		0	0	2	10	15	0	0	1	25
Total					5	0	2	10	15	80	45	6	150
Semester : 5													
CAD/CAM													
Specialization Core Courses													
TE7434	0701250530	Basic and Advanced CATIA Lab	PC		0	0	6	30	45	0	0	3	75
TE7380	0701250531	Manufacturing Engineering	PC		1	0	0	0	0	25	0	1	25
TE7664	0701250532	Structural Non Linear and 3D Analysis Lab	PC		0	0	4	20	30	0	0	2	50
Total					1	0	10	50	75	25	0	6	150
Semester : 5													
Design of Heat Exchanger													
Specialization Core Courses													
F0002	0701250533	Flexi-Credit Course	PC		2	0	0	0	0	50	0	2	50

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
TE7381	0701250534	Materials and Fabrication Processes for Heat Exchanger	PC		3	0	0	0	0	30	45	3	75
TE7667	0701250535	Heat Exchanger Simulation Lab 1	PC		0	0	2	10	15	0	0	1	25
Total					5	0	2	10	15	80	45	6	150
Semester : 5													
Smart Manufacturing (Industry 4.0) Specialization Core Courses													
F0002	0701250536	Flexi-Credit Course	PC		2	0	0	0	0	50	0	2	50
TE7668	0701250537	Modern Sensors and Actuators	PC		3	0	0	0	0	30	45	3	75
TE7673	0701250538	Sensors and Actuators Lab	PC		0	0	2	10	15	0	0	1	25
Total					5	0	2	10	15	80	45	6	150
Semester : 6													
Automobile Engineering with Hybrid and Autonomous Technology Specialization Core Courses													
TE7669	0701250631	Hybrid Technology	PC		2	0	0	0	0	20	30	2	50
F0002	0701250632	Flexi-Credit Course	PC		2	0	0	0	0	50	0	2	50
TE7435	0701250633	Automotive Engine and Transmission System	PC		3	0	0	0	0	30	45	3	75
Total					7	0	0	0	0	100	75	7	175

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Semester : 6													
CAD/CAM Specialization Core Courses													
TE7362	0701250634	Computer Aided Design II Lab	PC		0	0	6	30	45	0	0	3	75
TE7670	0701250635	Computer Aided Manufacturing Lab	PC		0	0	4	20	30	0	0	2	50
TE7582	0701250636	Structural Dynamics and Non Linear Analysis Lab	PC		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 6													
Design of Heat Exchanger Specialization Core Courses													
TE7384	0701250637	Numerical Methods for Heat Exchanger	PC		3	0	0	0	0	30	45	3	75
TE7649	0701250638	CFD Simulation for heat exchanger	PC		2	0	0	0	0	50	0	2	50
TE7671	0701250639	Heat Exchanger Simulation Lab-2	PC		0	0	4	20	30	0	0	2	50
Total					5	0	4	20	30	80	45	7	175
Semester : 6													
Smart Manufacturing (Industry 4.0) Specialization Core Courses													
TE7672	0701250640	AI and ML for Smart Manufacturing	PC		3	0	0	0	0	30	45	3	75

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
TE7374	0701250641	Industrial Internet of Things	PC		2	0	0	0	0	20	30	2	50
TE7573	0701250642	Machine Learning and Artificial Intelligence Lab	PC		0	0	4	20	30	0	0	2	50
Total					5	0	4	20	30	50	75	7	175
Semester : 7													
Automobile Engineering with Hybrid and Autonomous Technology													
Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
CAD/CAM													
Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
Design of Heat Exchanger													
Specialization Core Courses													

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure B
Optional 'Honours' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
Smart Manufacturing (Industry 4.0) Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure B
Optional 'Honours' Specialization

Semester	Internal Credits	External Credits	Total Credits	Total Marks
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
CAD/CAM				
Semester 5	1	5	6	150
Semester 6	0	7	7	175
Semester 7	0	7	7	175
Total	1	19	20	500
Design of Heat Exchanger				
Semester 5	2	4	6	150
Semester 6	2	5	7	175
Semester 7	0	7	7	175
Total	4	16	20	500
Smart Manufacturing (Industry 4.0)				
Semester 5	2	4	6	150
Semester 6	0	7	7	175
Semester 7	0	7	7	175
Total	2	18	20	500

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Semester : 5													
Artificial Intelligence and Machine Learning Specialization Core Courses													
TE7273	0701250539	Machine Learning: Classification	PC		3	0	0	0	0	30	45	3	75
TE7274	0701250540	Machine Learning: Regression	PC		3	0	0	0	0	30	45	3	75
Total					6	0	0	0	0	60	90	6	150
Semester : 5													
Data Science Specialization Core Courses													
TE7281	0701250541	Open Source Tools for Data Science	PC		4	0	0	0	0	40	60	4	100
TE7292	0701250542	R Programming	PC		3	0	0	0	0	30	45	3	75
Total					7	0	0	0	0	70	105	7	175
Semester : 5													
Internet of Things Specialization Core Courses													
TE7268	0701250543	Introduction to IOT	PC		4	0	0	0	0	40	60	4	100
TE7293	0701250544	Raspberry Pi and Python	PC		3	0	0	0	0	30	45	3	75
Total					7	0	0	0	0	70	105	7	175

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Semester : 5													
Smart Cities and Urban Analytics Specialization Core Courses													
TE7220	0701250545	Smart Cities : Context Policy and Governance	PC		3	0	0	0	0	30	45	3	75
TE7206	0701250546	IOT for Smart Cities	PC		3	0	0	0	0	30	45	3	75
TE7207	0701250547	IOT for Smart Cities Lab	PC		0	0	2	10	15	0	0	1	25
Total					6	0	2	10	15	60	90	7	175
Semester : 5													
Embedded Systems Specialization Core Courses													
T7801	0701250548	Specialization Project	PIS		0	0	2	10	15	0	0	1	25
T7802	0701250549	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
TE7298	0701250550	System Programming	PC		4	0	0	0	0	40	60	4	100
Total					4	0	6	30	45	40	60	7	175
Semester : 6													
Artificial Intelligence and Machine Learning Specialization Core Courses													
TE7266	0701250643	Introduction to Deep Learning	PC		4	0	0	0	0	40	60	4	100
TE7271	0701250644	Machine Learning Clustering and Retrieval	PC		3	0	0	0	0	30	45	3	75

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Total					7	0	0	0	0	70	105	7	175
Semester : 6													
Data Science Specialization Core Courses													
TE7247	0701250645	Business Analytics	PC		3	0	0	0	0	30	45	3	75
TE7284	0701250646	Power BI	PC		3	0	0	0	0	30	45	3	75
Total					6	0	0	0	0	60	90	6	150
Semester : 6													
Internet of Things Specialization Core Courses													
TE7269	0701250647	IOT Security and Privacy	PC		3	0	0	0	0	30	45	3	75
TE7295	0701250648	Software Defined Networking	PC		3	0	0	0	0	30	45	3	75
Total					6	0	0	0	0	60	90	6	150
Semester : 6													
Smart Cities and Urban Analytics Specialization Core Courses													
TE7177	0701250649	Application of Sensor Technology to Smart Cities	PC		3	0	0	0	0	30	45	3	75
T7802	0701250650	Specialization Project	PIS		0	0	4	50	0	0	0	2	50

Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
					L	T	La b	Practical		Theory			
								CA	ESE	CA	ESE		
T7802	0701250651	Specialization Seminar	PC		0	0	4	50	0	0	0	2	50
Total					3	0	8	100	0	30	45	7	175
Semester : 6													
Embedded Systems Specialization Core Courses													
T7802	0701250650	Specialization Project	PIS		0	0	4	20	30	0	0	2	50
TE7325	0701250652	Embedded Linux	PC		4	0	0	0	0	40	60	4	100
Total					4	0	4	20	30	40	60	6	150
Semester : 7													
Artificial Intelligence and Machine Learning Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
Data Science Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26



Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
Internet of Things Specialization Core Courses													
T7805	0701250715	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701250716	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					0	0	14	70	105	0	0	7	175
Semester : 7													
Smart Cities and Urban Analytics Specialization Core Courses													
T7803	0701250717	Specialization Project	PIS		0	0	6	30	45	0	0	3	75
Total					0	0	6	30	45	0	0	3	75
Specialization Elective : Smart Cities and Urban Analytics													
TE7205	0701250718	Intelligent Transportation Systems	PE		3	0	0	0	0	30	45	3	75
TE7234	0701250719	Urban Hydrology and Hydraulics	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								0	0	30	45	3	75
Semester : 7													



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26

Annexure C
Optional 'Minor' Specialization

Catalog Course Code	Course Code	Course Title	Nature	Specialization/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	La b	CA	ESE	CA	ESE		
Embedded Systems Specialization Core Courses													
T7802	0701250720	Specialization Project	PIS		0	0	4	20	30	0	0	2	50
TE7304	0701250721	Advanced Microcontrollers and RTOS	PC		4	0	0	0	0	40	60	4	100
TE7305	0701250722	Advanced Microcontrollers and RTOS Lab	PC		0	0	2	10	15	0	0	1	25
Total					4	0	6	30	45	40	60	7	175



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26
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
Embedded Systems				
Semester 5	0	7	7	175
Semester 6	0	6	6	150



Symbiosis Institute of Technology, Pune
Bachelor of Technology (Mechanical Engineering)
Programme Structure 2022-26
Annexure C
Optional 'Minor' Specialization

Semester 7	0	7	7	175
Total	0	20	20	500