Symbiosis Institute of Technology, Pune
Bachelor of Technology (Robotics and Automation)
Programme Structure 2023-2027

<table>
<tr><td>1.</td><td>OBJECTIVE</td><td colspan="4">To generate competent manpower in the emerging areas of Robotics and Automation To inculcate among the students an aptitude for engineering and research in Industry 4.0 for generation of better and smarter solutions to real world problems.</td></tr>
<tr><td>2.</td><td>DURATION (IN MONTHS)</td><td colspan="4">48 (Full Time)</td></tr>
<tr><td>3.</td><td>INTAKE</td><td colspan="4">60</td></tr>
<tr><td rowspan="4">4.</td><td rowspan="4">RESERVATION</td><td rowspan="2">I.Within the sanctioned intake</td><td>a) SC
(In Percentage)</td><td>b) ST
(In Percentage)</td><td>c) Differently abled
(In Percentage)</td></tr>
<tr><td>15</td><td>7.5</td><td>3</td></tr>
<tr><td rowspan="2">II.Over and above the sanctioned intake</td><td colspan="2">a) Kashmiri Migrants
(In Seats)</td><td colspan="2">b) International Students
(In Percentage)</td></tr>
<tr><td colspan="2">2</td><td colspan="2">20</td></tr>
<tr><td>5.</td><td>ELIGIBILITY</td><td colspan="4">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. 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.</td></tr>
</table>

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		However the admissions shall be based strictly on the eligibility criteria as mentioned in a, b, c, and d above.			
6.	**SELECTION PROCEDURE**	Selection would be based on joint merit of entrance exam score and PCM/PMV aggregate percentage			
7.	**MEDIUM OF INSTRUCTION**	English			
8.	**PROGRAMME PATTERN**	Semester			
9.	**COURSE & SPECIALISATION**	Annexure A: Bachelor of Technology (Robotics and Automation) 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 specialisation area. Annexure B: Optional 'Honours' specialisation area 1. Aerial Robotics and Drone Technology Annexure C: Optional 'Minor' specialization area 1. Artificial Intelligence and Machine Learning (CSE) 2. Data Science (CSE) 3. Smart Cities and Urban Analytics (CE) 4. Computing(CSE) 5. Automobile Engineering with Hybrid and Autonomous Technology(ME) 6. Embedded Systems			
10.	**FEE**		**Academic Fee p.a**	**Institute Deposit**	**Total**

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	Indian Students (Amount in INR)		300000	20000	320000
	International Students	**NRI/ PIO/ OCI Category (Amount in US$)**	5875	275	6150
		Foreign National Category (Amount in US$)	1300	275	1575

Note: For additional optional Specialisation '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**	Bachelor of Technology (Robotics and Automation) OR Bachelor of Technology (Robotics and Automation) with Honors in Aerial Robotics and Drone Technology OR Bachelor of Technology (Robotics and Automation) with Minor in Artificial Intelligence and Machine Learning /Data Science / Smart Cities and Urban Analytics/ Computing/ Automobile Engineering with Hybrid and Autonomous Technology/Embedded Systems will be awarded at the end of semester VIII examination by taking into consideration the performance of all semester examinations after obtaining a minimum 4.00 CGPA out of 10 CGPA.

14. CLASSIFICATION OF CREDITS

Semester	Generic Core	Generic Elective	Specialisation Core	Specialisation Elective	Open Elective	Non-Letter Grade Mandatory Course/s	Non-Letter Grade Audit Course/s	Total
Common								
1	20	0	0	0	0	1 *	As per the student's choice	20
2	19	0	0	0	0	1 *		19
3	21	2	0	0	0	1 *		23
4	23	1	0	0	0	0		24
5	19	3	0	0	3	0		25
6	16	4	0	0	3	0		23
7	14	8	0	0	0	0		22
8	14	0	0	0	0	1 *		14
Total	**146**	**18**	**0**	**0**	**6**	**0**		**170**
Optional Additional Courses (Honours)								
Total	**0**	**0**	**20**	**0**	**0**	**0**		**20**
Optional Additional Courses (Minor)								
Total	**0**	**0**	**20/17**	**0/3**	**0**	**0**		**20**
							Grand Total	**190**

* Satisfactory completion of the non letter grade course 'Integrated Disaster Management', 'Environmental Science', '*Vasudhaiva Kutumbakam*' and 'Fitness for Life' is mandatory for the award of degree.

The revised programme structure supersedes the previously approved programme structure dated 20/09/2025 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	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 1													
Generic Core Courses													
TE7168	0701270101	Engineering Mathematics -I	BS		3	1	0	0	0	40	60	4	100
T7391	0701270102	Physics	BS		3	0	0	0	0	30	45	3	75
TE7687	0701270103	Physics Lab	BS		0	0	2	10	15	0	0	1	25
T7383	0701270104	Communication Skills	HS		2	0	0	0	0	20	30	2	50
T7384	0701270105	Communication skills lab	HS		0	0	2	10	15	0	0	1	25
T7658	0701270106	Workshop Practice	ES		0	0	4	50	0	0	0	2	50
TE7286	0701270107	Programming and Problem Solving	ES		2	0	0	0	0	20	30	2	50
TE7287	0701270108	Programming and Problem Solving Lab	ES		0	0	2	10	15	0	0	1	25
T6873	0701270109	Creative Thinking	HS		1	0	0	0	0	25	0	1	25
T7414	0701270110	Engineering Mechanics	ES		3	0	0	0	0	30	45	3	75
TE7188	0701270111	Environmental Science *			0	0	0	0	0	0	0	Non - Letter Grade Mandatory	0
				Total	**14**	**1**	**10**	**80**	**45**	**165**	**210**	**20**	**500**
Semester : 2													
Generic Core Courses													

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7169	0701270201	Engineering Mathematics -II	BS		3	1	0	0	0	40	60	4	100
TE7694	0701270202	Chemistry	BS		3	0	0	0	0	30	45	3	75
TE7695	0701270203	Chemistry Lab	BS		0	0	2	10	15	0	0	1	25
T7540	0701270204	Basic Electrical and Electronics Engineering	ES		3	0	0	0	0	30	45	3	75
T7593	0701270205	Basic Electrical and Electronics Engineering Lab	ES		0	0	2	10	15	0	0	1	25
TE7624	0701270206	Engineering Graphics	ES		1	0	0	0	0	25	0	1	25
T7925	0701270207	Engineering Graphics Lab	ES		0	0	4	20	30	0	0	2	50
TE7300	0701270208	Tinker Lab	ES		0	0	4	50	0	0	0	2	50
TE7890	0701270209	Software Tools for Robotics	ES		0	0	2	25	0	0	0	1	25
T6732	0701270210	Critical Thinking	HS		1	0	0	0	0	25	0	1	25
TH4095	0701270211	Fitness for Life *	0		0	0	0	0	0	0	0	Non - Letter Grade Mandatory	0
				Total	**11**	**1**	**14**	**115**	**60**	**150**	**150**	**19**	**475**
Semester : 3													
Generic Core Courses													
TE7845	0701270301	Fundamentals of Robotics and Automation	PC		2	0	0	0	0	20	30	2	50

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7688	0701270302	Statistics and Numerical Methods in Robotics	BS		3	0	0	0	0	30	45	3	75
TE7857	0701270303	Mechanics of Materials	ES		3	0	0	0	0	30	45	3	75
TE7858	0701270304	Mechanics of Materials Lab	ES		0	0	2	10	15	0	0	1	25
TE7887	0701270305	Sensor and Electronics Drives	PC		3	0	0	0	0	30	45	3	75
TE7888	0701270306	Sensor and Electronics Drives Lab	PC		0	0	2	10	15	0	0	1	25
TE7851	0701270307	Introduction to Artificial Intelligence	PC		2	0	0	0	0	20	30	2	50
TE7820	0701270308	Advanced Python Lab	ES		0	0	4	20	30	0	0	2	50
TE7828	0701270309	Basics of Operating Systems	PC		3	0	0	0	0	75	0	3	75
TE7829	0701270310	Basics of Operating Systems Lab	PC		0	0	2	10	15	0	0	1	25
T4005	0701270311	Integrated Disaster Management *			0	0	0	0	0	0	0	Non - Letter Grade Mandatory	0
				Total	**16**	**0**	**10**	**50**	**75**	**205**	**195**	**21**	**525**
Generic Elective Courses Group (Choose any one Course)													
T6184	0701270312	Basic German I	GE		2	0	0	0	0	50	0	2	50
T6186	0701270313	Basic French I	GE		2	0	0	0	0	50	0	2	50
T6188	0701270314	Basic Spanish I	GE		2	0	0	0	0	50	0	2	50

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Total Required Credits								**0**	**0**	**50**	**0**	**2**	**50**
Semester : 4													
Generic Core Courses													
T8000	0701270401	Service Learning	HS		0	0	8	100	0	0	0	4	100
TE7879	0701270402	Robotic Control Systems	PC		2	0	0	0	0	20	30	2	50
TE7880	0701270403	Robotic Control Systems Lab	PC		0	0	4	20	30	0	0	2	50
TE7852	0701270404	Kinematics and Dynamics of Robotics	PC		3	0	0	0	0	75	0	3	75
TE7853	0701270405	Kinematics and Dynamics of Robotics Lab	PC		0	0	2	10	15	0	0	1	25
TE7824	0701270406	Application of AI in Robotics and Automation	PC		2	0	0	0	0	20	30	2	50
TE7825	0701270407	Application of AI in Robotics and Automation Lab	PC		0	0	2	10	15	0	0	1	25
TE7674	0701270408	Applied Mathematics for Robotics	BS		3	0	0	0	0	75	0	3	75
T2646	0701270409	Entrepreneurship Venture	HS		1	0	0	0	0	25	0	1	25
TE7846	0701270410	Hydraulics and Pneumatics for Robots	PC		3	0	0	0	0	30	45	3	75
TE7847	0701270411	Hydraulics and Pneumatics for Robots Lab	PC		0	0	2	10	15	0	0	1	25
Total					**14**	**0**	**18**	**150**	**75**	**245**	**105**	**23**	**575**
Generic Elective Courses Group (Choose any one Course)													
T6872	0701270412	Foundation of Ethics	GE		1	0	0	0	0	25	0	1	25

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
T6760	0701270413	Introduction to Indian Philosophy	GE		1	0	0	0	0	25	0	1	25
Total Required Credits								**0**	**0**	**25**	**0**	**1**	**25**
GIP													
G7006	0701270414	Global Immersion Programme			0	0	0	0	0	0	150	6	150
Note: For students under Global Immersion Programme (0701270414), courses "Service Learning" (0701270401),"Entrepreneurship Venture" (0701270409),"Foundation of Ethics" (0701270412) will be waived off.													
Semester : 5													
Generic Core Courses													
T6749	0701270501	Design Thinking	HS		2	0	0	0	0	50	0	2	50
TE7855	0701270502	Materials and Measurement	ES		3	0	0	0	0	30	45	3	75
TE7856	0701270503	Materials and Measurement Lab	ES		0	0	2	10	15	0	0	1	25
TE7889	0701270504	Simulator for Robotics Lab	PC		0	0	2	10	15	0	0	1	25
TE7818	0701270505	Advanced Manufacturing	PC		3	0	0	0	0	30	45	3	75
TE7819	0701270506	Advanced Manufacturing Lab	PC		0	0	2	10	15	0	0	1	25
TE7859	0701270507	Microcontroller and Embedded Systems	PC		2	0	0	0	0	20	30	2	50
TE7860	0701270508	Microcontroller and Embedded Systems Lab	PC		0	0	2	10	15	0	0	1	25
TE7836	0701270509	Computer Vision for Robotics	PC		3	0	0	0	0	30	45	3	75
TE7837	0701270510	Computer Vision for Robotics Lab	PC		0	0	4	20	30	0	0	2	50

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Total					**13**	**0**	**12**	**60**	**90**	**160**	**165**	**19**	**475**
Generic Elective Courses Group (Choose any one Course)													
TE7892	0701270511	Theory of Universal Robots and Cobots	PE		3	0	0	0	0	30	45	3	75
TE7844	0701270512	Fundamentals of IOT and Cloud Computing	PE		3	0	0	0	0	30	45	3	75
TE7867	0701270513	Optimization for Robotics	PE		3	0	0	0	0	30	45	3	75
TE7832	0701270514	Building Automation	PE		3	0	0	0	0	30	45	3	75
TE7841	0701270515	Digital Signals	PE		3	0	0	0	0	30	45	3	75
TE7835	0701270516	Computational Fluid Dynamics with Artificial Intelligence	PE		3	0	0	0	0	30	45	3	75
TE7874	0701270517	Probabilistic Robotics	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								**0**	**0**	**30**	**45**	**3**	**75**
Open Elective Courses Group (Choose any one Course)													
TE7698	0701270518	Nanotechnology	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7676	0701270519	Executive Corporate Communication For Impact	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7195	0701270520	GIS Applications	OE	Civil Engineering	3	0	0	0	0	30	45	3	75
TE7203	0701270521	Intelligent Transportation Management	OE	Civil Engineering	3	0	0	0	0	30	45	3	75

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7297	0701270522	Software Testing Tools	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
TE7756	0701270523	Open Source Technologies	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
T7584	0701270524	Printed Circuit Board (PCB) Design	OE	Electronics and Telecommunication Engineering	3	0	0	0	0	30	45	3	75
TE7334	0701270525	Introduction to Mechatronics	OE	Electronics and Telecommunication Engineering	3	0	0	0	0	30	45	3	75
TEE7044	0701270526	Data Modelling and Analytics for Battery Energy Storage Systems	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
TE7351	0701270527	3D Printing and Prototyping	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
Total Required Credits								**0**	**0**	**30**	**45**	**3**	**75**
Semester : 6													
Generic Core Courses													
TE7870	0701270601	PLC and SCADA	PC		2	0	0	0	0	20	30	2	50
TE7871	0701270602	PLC and SCADA Lab	PC		0	0	4	20	30	0	0	2	50
TE7290	0701270603	Project Based Learning -I	PIS		0	0	4	50	0	0	0	2	50
T7802	0701270604	Capstone Course	PC		2	0	0	0	0	50	0	2	50
T6774	0701270605	Principles of Economics	HS		2	0	0	0	0	50	0	2	50

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Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
F7075	0701270606	Database Management and Warehousing	PC		2	0	0	0	0	50	0	2	50
TE7885	0701270607	Robotics Operating System	PC		2	0	0	0	0	20	30	2	50
TE7886	0701270608	Robotics Operating System Lab	PC		0	0	4	20	30	0	0	2	50
		Total			**10**	**0**	**12**	**90**	**60**	**190**	**60**	**16**	**400**
Generic Elective Courses Group - I (Choose any one Course)													
TE7862	0701270609	Mobile Application Development	PE		3	0	0	0	0	30	45	3	75
TE7848	0701270610	Industrial Internet of Things	PE		3	0	0	0	0	30	45	3	75
TE7868	0701270611	Path Planning and Reinforcement Learning	PE		3	0	0	0	0	30	45	3	75
TE7816	0701270612	Additive Manufacturing	PE		3	0	0	0	0	30	45	3	75
TE7842	0701270613	Embedded System and Wireless Sensor Network	PE		3	0	0	0	0	30	45	3	75
		Total Required Credits						**0**	**0**	**30**	**45**	**3**	**75**
Generic Elective Courses Group - II (Choose any one Course)													
TE7863	0701270614	Mobile Application Development Lab	PE		0	0	2	10	15	0	0	1	25
TE7849	0701270615	Industrial Internet of Things Lab	PE		0	0	2	10	15	0	0	1	25
TE7869	0701270616	Path Planning and Reinforcement Learning Lab	PE		0	0	2	10	15	0	0	1	25
TE7817	0701270617	Additive Manufacturing Lab	PE		0	0	2	10	15	0	0	1	25

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7843	0701270618	Embedded System and Wireless Sensor Network Lab	PE		0	0	2	10	15	0	0	1	25
Total Required Credits								**10**	**15**	**0**	**0**	**1**	**25**
Open Elective Courses Group (Choose any one Course)													
TE7677	0701270619	Financial Mathematics	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7700	0701270620	Smart Materials	OE	Applied Science	3	0	0	0	0	30	45	3	75
TE7223	0701270621	Smart Urban Planning	OE	Civil Engineering	3	0	0	0	0	30	45	3	75
TE7240	0701270622	Water Resource Planning and Management	OE	Civil Engineering	3	0	0	0	0	30	45	3	75
TE7948	0701270623	Introduction to Cloud Computing	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
TE7952	0701270624	User Interface and Experience Design	OE	Computer Science and Engineering	3	0	0	0	0	30	45	3	75
TEE7018	0701270625	Engineering Simulation and Modeling Tools	OE	Electronics and Telecommunication Engineering	3	0	0	0	0	30	45	3	75
TE7428	0701270626	Introduction to Image Processing	OE	Electronics and Telecommunication Engineering	3	0	0	0	0	30	45	3	75
TE7810	0701270627	Industrial Revolution and Introduction of Industry 5.0	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75

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								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
T7650	0701270628	Six Sigma	OE	Mechanical Engineering	3	0	0	0	0	30	45	3	75
				Total Required Credits	**0**	**0**		**0**	**0**	**30**	**45**	**3**	**75**
Semester : 7													
Generic Core Courses													
T7804	0701270701	B.Tech Project	PIS		0	0	8	40	60	0	0	4	100
TE7877	0701270702	Robot System Design and Simulation	PC		3	0	0	0	0	30	45	3	75
TE7878	0701270703	Robot System Design and Simulation Lab	PC		0	0	4	20	30	0	0	2	50
F0003	0701270704	Flexi-Credit Course	PC		3	0	0	0	0	75	0	3	75
TE7876	0701270705	Responsible AI for Robotics	PC		1	0	0	0	0	25	0	1	25
F0001	0701270706	Flexi-Credit Course	PC		1	0	0	0	0	25	0	1	25
				Total	**8**	**0**	**12**	**60**	**90**	**155**	**45**	**14**	**350**
Generic Elective Courses Group - I (Choose any one Course)													
TE7831	0701270707	Block Chain Technology For Robotics	PE		3	0	0	0	0	30	45	3	75
TE7875	0701270708	Reliability Engineering	PE		3	0	0	0	0	30	45	3	75
TE7854	0701270709	Lean Manufacturing	PE		3	0	0	0	0	30	45	3	75
TE7822	0701270710	Agile Development for Robotics Application	PE		3	0	0	0	0	30	45	3	75
TE7873	0701270711	Predictive Maintenance	PE		3	0	0	0	0	30	45	3	75
				Total Required Credits				**0**	**0**	**30**	**45**	**3**	**75**

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Annexure A

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Generic Elective Courses Group - II (Choose any one Course)													
TE7618	0701270712	Cyber Physical System	PE		3	0	0	0	0	30	45	3	75
TE7891	0701270713	Sustainable Development	PE		3	0	0	0	0	30	45	3	75
TE7827	0701270714	Augmented Reality and Virtual Reality Technology	PE		3	0	0	0	0	30	45	3	75
TE7861	0701270715	Mobile and Micro Robotics	PE		3	0	0	0	0	30	45	3	75
TE7623	0701270716	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 - III (Choose any one Course)													
T2585	0701270717	Organizational Behaviour	GE		2	0	0	0	0	50	0	2	50
TE7438	0701270718	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													
T7912	0701270801	Internship	PIS		0	0	24	120	180	0	0	12	300
T7802	0701270802	Seminar	PIS		0	0	4	20	30	0	0	2	50

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Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
SMC001	0701270803	*Vasudhaiva Kutumbakam **			0	0	0	0	0	0	0	Non - Letter Grade Mandatory	0
				Total	**0**	**0**	**28**	**140**	**210**	**0**	**0**	**14**	**350**

Abbreviations (Nature)	Description
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
GE	Generic Elective

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Semester	Continuous Assessment	Term End Examination	Total Credits	Total Marks
Semester 1	3	17	20	500
Semester 2	5	14	19	475
Semester 3	5	18	23	575
Semester 4	12	12	24	600
Semester 5	2	23	25	625
Semester 6	8	15	23	575
Semester 7	7	15	22	550
Semester 8	0	14	14	350
Total	**42**	**128**	**170**	**4250**

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Annexure B
Optional 'Honours' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 5													
Aerial Robotics and Drone Technology Specialisation Core Courses													
TE7850	0701270528	Introduction to Aerial Robotics and Drones	PC	Aerial Robotics and Drone Technology	3	0	0	0	0	30	45	3	75
TE7864	0701270529	Motion Planning and Control	PC	Aerial Robotics and Drone Technology	2	0	0	0	0	20	30	2	50
TE7865	0701270530	Motion Planning and Control lab	PC	Aerial Robotics and Drone Technology	0	0	2	10	15	0	0	1	25
				Total	**5**	**0**	**2**	**10**	**15**	**50**	**75**	**6**	**150**
Semester : 6													
Aerial Robotics and Drone Technology Specialisation Core Courses													
TE7884	0701270629	Robotics Mobility and Perception	PC	Aerial Robotics and Drone Technology	3	0	0	0	0	30	45	3	75
TE7883	0701270630	Robotics Estimation and Learning	PC	Aerial Robotics and Drone Technology	2	0	0	0	0	20	30	2	50
TE7866	0701270631	Navigation and Communication Lab	PC	Aerial Robotics and Drone Technology	0	0	4	20	30	0	0	2	50
				Total	**5**	**0**	**4**	**20**	**30**	**50**	**75**	**7**	**175**

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Annexure B
Optional 'Honours' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 7													
Aerial Robotics and Drone Technology Specialisation Core Courses													
T7805	0701270719	Specialization Project	PIS	Aerial Robotics and Drone Technology	0	0	10	50	75	0	0	5	125
T7802	0701270720	Specialization Seminar	PIS	Aerial Robotics and Drone Technology	0	0	4	20	30	0	0	2	50
				Total	**0**	**0**	**14**	**70**	**105**	**0**	**0**	**7**	**175**

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Annexure B
Optional 'Honours' Specialisation

Semester	Continuous Assessment	Term End Examination	Total Credits	Total Marks
Aerial Robotics and Drone Technology				
Semester 5	0	6	6	150
Semester 6	0	7	7	175
Semester 7	0	7	7	175
Total	**0**	**20**	**20**	**500**

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Annexure C
Optional 'Minor' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 5													
Artificial Intelligence and Machine Learning Specialisation Core Courses													
TE7273	0701270531	Machine Learning: Classification	PC		3	0	0	0	0	30	45	3	75
TE7274	0701270532	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 Specialisation Core Courses													
TE7281	0701270533	Open Source Tools for Data Science	PC		4	0	0	0	0	40	60	4	100
TE7292	0701270534	R Programming	PC		3	0	0	0	0	30	45	3	75
		Total			**7**	**0**	**0**	**0**	**0**	**70**	**105**	**7**	**175**
Semester : 5													
Smart Cities and Urban Analytics Specialisation Core Courses													
TE7220	0701270535	Smart Cities : Context Policy and Governance	PC		3	0	0	0	0	30	45	3	75
TE7206	0701270536	IOT for Smart Cities	PC		3	0	0	0	0	30	45	3	75
TE7207	0701270537	IOT for Smart Cities Lab	PC		0	0	2	0	0	10	15	1	25

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Optional 'Minor' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
				Total	**6**	**0**	**2**	**0**	**0**	**70**	**105**	**7**	**175**
Semester : 5													
Computing Specialisation Core Courses													
TE7248	0701270538	Cloud Computing	PC	Computing	3	0	0	0	0	30	45	3	75
TE7250	0701270539	Cloud Environment in Public Model	PC	Computing	3	0	0	0	0	30	45	3	75
				Total	**6**	**0**	**0**	**0**	**0**	**60**	**90**	**6**	**150**
Semester : 5													
Automobile Engineering with Hybrid and Autonomous Technology Specialisation Core Courses													
TE7355	0701270540	Basics of Automotive Engineering	PC	Automobile Engineering with Hybrid and Autonomous Technology	3	0	0	0	0	30	45	3	75
TE7665	0701270541	Automotive Electronics and Instrumentation	PC	Automobile Engineering with Hybrid and Autonomous Technology	2	0	0	0	0	50	0	2	50
TE7666	0701270542	Automotive Vehicle Dynamics and NVH Lab	PC	Automobile Engineering with Hybrid and Autonomous Technology	0	0	2	10	15	0	0	1	25
				Total	**5**	**0**	**2**	**10**	**15**	**80**	**45**	**6**	**150**

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Optional 'Minor' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 5													
Embedded Systems Specialisation Core Courses													
TEE7047	0701270543	Microcontrollers and Embedded C Programming	PC	Embedded Systems	3	0	0	0	0	30	45	3	75
TEE7046	0701270544	Microcontrollers and Embedded C Programming Lab	PC	Embedded Systems	0	0	2	10	15	0	0	1	25
TE7991	0701270545	Automotive Embedded System	PC	Embedded Systems	3	0	0	0	0	30	45	3	75
				Total	**6**	**0**	**2**	**10**	**15**	**60**	**90**	**7**	**175**
Semester : 6													
Artificial Intelligence and Machine Learning Specialisation Core Courses													
TE7266	0701270632	Introduction to Deep Learning	PC	Artificial Intelligence and Machine Learning	4	0	0	0	0	40	60	4	100
TE7271	0701270633	Machine Learning Clustering and Retrieval	PC	Artificial Intelligence and Machine Learning	3	0	0	0	0	30	45	3	75
				Total	**7**	**0**	**0**	**0**	**0**	**70**	**105**	**7**	**175**
Semester : 6													
Data Science Specialisation Core Courses													

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Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7247	0701270634	Business Analytics	PC	Data Science	3	0	0	0	0	30	45	3	75
TE7284	0701270635	Power BI	PC	Data Science	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 Specialisation Core Courses													
TE7177	0701270636	Application of Sensor Technology to Smart Cities	PC	Smart Cities and Urban Analytics	3	0	0	0	0	30	45	3	75
T7802	0701270637	Specialization Project	PIS	Smart Cities and Urban Analytics	0	0	4	50	0	0	0	2	50
T7802	0701270638	Specialization Seminar	PC	Smart Cities and Urban Analytics	0	0	4	50	0	0	0	2	50
				Total	**3**	**0**	**8**	**100**	**0**	**30**	**45**	**7**	**175**
Semester : 6													
Computing Specialisation Core Courses													
TE7246	0701270639	Block Chain	PC	Computing	4	0	0	0	0	40	60	4	100
TE7249	0701270640	Cloud Computing Platforms	PC	Computing	3	0	0	0	0	30	45	3	75
				Total	**7**	**0**	**0**	**0**	**0**	**70**	**105**	**7**	**175**

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Optional 'Minor' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 6													
Automobile Engineering with Hybrid and Autonomous Technology Specialisation Core Courses													
TE7669	0701270641	Hybrid Technology	PC	Automobile Engineering with Hybrid and Autonomous Technology	2	0	0	0	0	20	30	2	50
F0002	0701270642	Flexi-Credit Course	PC	Automobile Engineering with Hybrid and Autonomous Technology	2	0	0	0	0	50	0	2	50
TE7435	0701270643	Automotive Engine and Transmission System	PC	Automobile Engineering with Hybrid and Autonomous Technology	3	0	0	0	0	30	45	3	75
				Total	**7**	**0**	**0**	**0**	**0**	**100**	**75**	**7**	**175**
Semester : 6													
Embedded Systems Specialisation Core Courses													
TEE7042	0701270644	Model Based Design	PC	Embedded Systems	3	0	0	0	0	30	45	3	75
TEE7040	0701270645	Model Based Design Laboratory	PC	Embedded Systems	0	0	2	10	15	0	0	1	25
TEE7048	0701270646	Embedded Cyber Security	PC	Embedded Systems	3	0	0	0	0	30	45	3	75
				Total	**6**	**0**	**2**	**10**	**15**	**60**	**90**	**7**	**175**

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Optional 'Minor' Specialisation

Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
Semester : 7													
Artificial Intelligence and Machine Learning Specialisation Core Courses													
T7805	0701270719	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701270720	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 Specialisation Core Courses													
T7805	0701270719	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701270720	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 Specialisation Core Courses													
T7803	0701270721	Specialization Project	PIS		0	0	6	30	45	0	0	3	75
				Total	**0**	**0**	**6**	**30**	**45**	**0**	**0**	**3**	**75**
Specialisation Elective : Smart Cities and Urban Analytics (Choose any one course)													

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Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
TE7234	0701270722	Urban Hydrology and Hydraulics	PE		3	0	0	0	0	30	45	3	75
TE7205	0701270723	Intelligent Transportation Systems	PE		3	0	0	0	0	30	45	3	75
Total Required Credits								**0**	**0**	**30**	**45**	**3**	**75**
Semester : 7													
Computing Specialisation Core Courses													
T7805	0701270719	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701270720	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					**0**	**0**	**14**	**70**	**105**	**0**	**0**	**7**	**175**
Semester : 7													
Automobile Engineering with Hybrid and Autonomous Technology Specialisation Core Courses													
T7805	0701270719	Specialization Project	PIS		0	0	10	50	75	0	0	5	125
T7802	0701270720	Specialization Seminar	PIS		0	0	4	20	30	0	0	2	50
Total					**0**	**0**	**14**	**70**	**105**	**0**	**0**	**7**	**175**
Semester : 7													
Embedded Systems Specialisation Core Courses													

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Catalog Course Code	Course Code	Course Title	Nature	Specialisation/ Area/ Department	Teaching Scheme (Hours Per Week)			Examination Scheme (Marks)				Total Credits	Total
								Practical		Theory			
					L	T	Lab	CA	ESE	CA	ESE		
T7802	0701270724	Specialization Project	PIS	Embedded Systems	0	0	4	20	30	0	0	2	50
T7804	0701270725	Specialization Seminar	PIS	Embedded Systems	0	0	8	40	60	0	0	4	100
				Total	**0**	**0**	**12**	**60**	**90**	**0**	**0**	**6**	**150**

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Semester	Continuous Assessment	Term End Examination	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**
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**
Computing				
Semester 5	0	6	6	150
Semester 6	0	7	7	175
Semester 7	0	7	7	175
Total	**0**	**20**	**20**	**500**
Automobile Engineering with Hybrid and Autonomous Technology				
Semester 5	2	4	6	150
Semester 6	2	5	7	175

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Semester 7	0	7	7	175
Total	**4**	**16**	**20**	**500**
Embedded Systems				
Semester 5	0	7	7	175
Semester 6	0	7	7	175
Semester 7	0	6	6	150
Total	**0**	**20**	**20**	**500**