



Established: 1999

Annasaheb Dange College of Engineering and Technology

Ashta - 416301, Dist.: Sangli, Maharashtra

(An Empowered Autonomous Institute)



S.Y. B. Tech. – Robotics and Artificial Intelligence

[Level 5, UG Diploma] Semester -III

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	BS	T1	0RABS201	Applied Mathematics for Robotics and AI	3	1	-	4	4	40	20	40	-	-
02	PC	T1	0RAPC202	Fundamentals of Robotics & AI	3	1	-	4	4	40	20	40	-	-
03	PC	LIT1	0RAPC203	Digital Systems & Microprocessor	2	-	2	2	3	40	20	40	50	50
04	PC	LIT2	0RAPC204	Sensors & Actuators for Robotics	2	-	2	2	3	40	20	40	50	-
05	PC	T1	0RAPC205	Theory of Machines	2	-	-	2	2	40	20	40	-	-
06	VS	L1	0RAVS206	Python Programming	1	-	2	1	2	-	-	-	50	50
07	HS	T2	0RAHS2XX	Foreign Language	2	-	-	2	2	-	50	-	-	-
08	HS	T2	0RAHS209	Psychology	1	-	-	1	1	-	50	-	-	-
09	HS	T2	0RAHS210	Environment Studies	2	-	-	2	2	-	50	-	-	-
10	MA	T2	0RAMA211	Aptitude and Reasoning-I	2	-	-	-	-	-	50	-	-	-
Total					20	2	6	20	23					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : $\geq 8/20$	MSE + ESE (Theory) : $\geq 32/80$	TA (Theory) / CIA (Lab) : $\geq 20/50$	ESE (Lab) : $\geq 20/50$
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Foreign Language Bouquet:

0RAHS207	Foreign Language- German	0RAHS208	Foreign Language- Japanese
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celi
Member Secretary-BOS

Adh
Chairman -BoS



Basmath
Member Secretary-AC

P. P.
Chairman-AC



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S.Y. B. Tech. – Robotics and Artificial Intelligence [Level 5, UG Diploma] Semester -IV

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	PC	LIT1	0RAPC213	Hydraulic & Pneumatic Drives for Robots	2	-	2	2	3	40	20	40	50	50
02	PC	LIT2	0RAPC214	Data Structures and Algorithms	2	-	2	2	3	40	20	40	50	-
03	PC	L1	0RAPC215	Microcontroller based system design	2	-	2	2	3	-	-	-	50	50
04	PE	T1	0RAPE2XX	Professional Elective - I	3	-	-	3	3	40	20	40	-	
05	MM	LIT2	0RARB220	Multidisciplinary Minor - I	3	-	2	3	4	40	20	40	50	-
06	OE	T1	3ILOEXXX	Open Elective - I	2	-	-	2	2	-	-	100	-	-
07	HS	T2	0RAHS221	Indian Constitution	1	-	-	1	1	-	50	-	-	-
08	HS	T2	0RAHS222	Universal Human Values	2	-	-	2	2	-	50	-	-	-
09	RM	L2	0RARM223	Research Methodology	-	-	2	-	1	-	-	-	50	-
10	EL	L2	0RAEL224	Innovation and Product Development	-	-	2	-	1	-	-	-	50	-
11	MA	T2	0RAMA225	Aptitude and Reasoning- II	2	-	-	-	-	-	50	-	-	-
Total					19	-	12	17	23					
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Summer Internship (in Industry, R&D organization, or Academic Institute) shall be undertaken after the IV Semester during the summer vacation. The evaluation of the internship will be conducted during the V Semester														
Minimum Passing Criteria			TA (Theory) : ≥8/20		MSE + ESE(Theory): ≥32/80		TA (Theory) / CIA (Lab) : ≥20/50		ESE (Lab) : ≥20/50		ESE(Theory) : ≥40/100			

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(An Empowered Autonomous Institute)**Exit Criteria after S. Y. B.Tech. – Robotics and Artificial Intelligence**
(As per AICTE Guidelines)**Eligibility Criteria**

- All conditions applicable to the Exit Option After First Year shall also apply. In addition, the following criteria must be met:
- Students will have the option to exit the Mechanical Engineering Program after successfully completing the second year.
- To qualify this exit option students must complete Internship of minimum 8 weeks in Mechanical Engineering related field, aimed at enhancing practical knowledge and industry exposure. Students must submit **internship** report in accordance with the schedule and guidelines provided.

Outcome:

- Upon exit, they will be awarded an **Undergraduate Diploma in Robotics and Artificial Intelligence**

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Chairman -BoS



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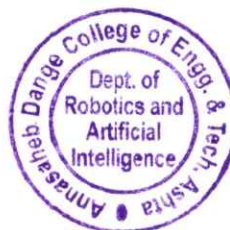


T.Y. B. Tech. – Robotics and Artificial Intelligence [Level 5.5, UG B. Voc.] Semester -V

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	PC	LIT1	0RAPC301	Machine Learning	3	-	2	3	4	40	20	40	50	50
02	PC	LIT2	0RAPC302	Design of Robotic Components	2	1	-	3	3	40	20	40	50	-
03	PC	LIT2	0RAPC303	Control System	2	1	-	3	3	40	20	40	50	-
04	PC	L1	0RAPC304	Industrial Robot Programming	1	-	2	1	2	-	-	-	50	50
05	PE	LIT2	0RAPE3XX	Professional Elective - II	3	-	2	3	4	40	20	40	50	-
06	MM	T1	0RARB309	Multidisciplinary Minor – II	3	-	-	3	3	40	20	40	-	-
07	OE	T1	3ILOEXXX	Open Elective - II	2	-	-	2	2	-	-	100	-	-
08	HS	L2	0RAHS310	Entrepreneurship	-	-	2	-	1	-	-	-	50	-
09	EL	L2	0RAEL311	Summer Internship	-	-	-	-	1	-	-	-	50	-
10	MA	T2	0RAMA312	Aptitude and Reasoning- III	2	-	-	-	-	-	50	-	-	-
Total					18	2	8	18	23					
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Minimum Passing Criteria			TA (Theory) : ≥8/20		MSE + ESE(Theory): ≥32/80			TA (Theory) / CIA (Lab) : ≥20/50			ESE (Lab) : ≥20/50		ESE(Theory) : ≥40/100	

Member-Secretary-BOS

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T.Y. B. Tech. – Robotics and Artificial Intelligence

[Level 5.5, UG B. Voc.] Semester -VI

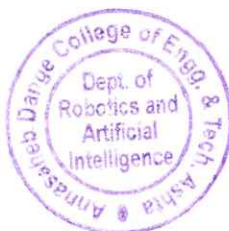
Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	PC	LIT2	0RAPC313	Robot Kinematics & Dynamics	2	-	2	2	3	40	20	40	50	-
02	PC	LIT1	0RAPC314	Data Science	2	-	2	2	3	40	20	40	50	50
03	PE	T1	0RAPE3XX	Professional Elective -III	3	-	-	3	3	40	20	40	-	-
04	MM	LIT2	0RARB319	Multidisciplinary Minor - III	3	-	2	3	4	40	20	40	50	-
05	OE	T1	3ILOEXXX	Open Elective - III	2	-	-	2	2	-	-	100	-	-
06	VS	L1	0RAVS320	Arial Robotics Lab	1	-	2	1	2	-	-	-	50	50
07	HS	T2	0RAHS321	Project Management and Finance	2	-	-	-	2	-	50	-	-	-
08	CEA	L2	0RACE322	Mini Project	-	-	4	-	2	-	-	-	50	-
09	SS	T2	0RASS323	Self-Study Course- I	-	-	-	-	2	-	-	100	-	-
10	MA	T2	0RAMA324	Aptitude and Reasoning- IV	2	-	-	-	-	-	50	-	-	-
Total					17	-	12	13	23					

Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

Minimum Passing Criteria	TA (Theory) : $\geq 8/20$	MSE + ESE(Theory): $\geq 32/80$	TA (Theory) / CIA (Lab) : $\geq 20/50$	ESE (Lab) : $\geq 20/50$	ESE(Theory) : $\geq 40/100$
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Exit Criteria after T. Y. B. Tech. – Robotics and Artificial Intelligence

(As per AICTE Guidelines)

Eligibility Criteria:

- Completion of all core courses in the first three years of the engineering curriculum.
- Demonstration of both theoretical understanding and practical application through:
 - Industry-Relevant Practical Training: Including internships or apprenticeships.
 - Advanced Skill-Based Course: Aligning with current industry needs.
 - Internship/Apprenticeship: At least 8 weeks in a relevant engineering field.
 - Community Engagement Project: Real-world problem-solving with societal benefit.
 - Capstone Project (Optional): Integration and application of learning outcomes across three years.

Outcome:

- Students will be awarded a **B. Voc. Degree in Robotics and Artificial Intelligence**, signifying a strong foundation in engineering concepts, technical proficiency, and vocational readiness.


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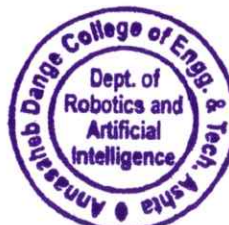
Final Year B. Tech. – Robotics and Artificial Intelligence

[Level 6, UG B. Tech] Semester -VII

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	PC	T2	0RAPC401	Smart Manufacturing	2	1	-	3	3	40	20	40	-	-
02	PC	LIT1	0RAPC402	Robot System Design & SLAM	2	-	2	2	3	40	20	40	50	50
03	PC	L2	0RAPC403	Data Modeling and Visualization	2	-	2	2	3	-	-	-	50	-
04	PE	LIT2	0RAPE4XX	Professional Elective - IV	3	-	2	3	4	40	20	40	50	-
05	PE	T1	0RAPE4XX	Professional Elective - V	3	-	-	3	3	40	20	40	-	-
06	MM	T1	0RARB409	Multidisciplinary Minor – IV	3	-	-	3	3	40	20	40	-	-
07	EL	L1	0RAEL410	Project	-	-	8	-	4	-	-	-	50	50
Total					15	1	14	16	23					
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Minimum Passing Criteria			TA (Theory) : ≥8/20		MSE + ESE(Theory): ≥32/80			TA (Theory) / CIA (Lab) : ≥20/50			ESE (Lab) : ≥20/50			

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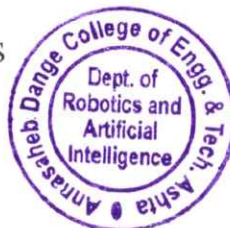
Final Year B. Tech. – Robotics and Artificial Intelligence

[Level 6, UG B.Tech Semester -VII]

Sr. No.	Course Category	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	PE	LIT2	0RAPE4**	Professional Elective – VI	3	-	-	3	3	-	-	100	-	-
02	SS	LIT1	0RAPE415	Self Study Course- II	-	-	-	-	2	-	-	100	-	-
03	EL	L2	0RAEL416	Internship	-	-	-	-	12	-	-	-	50	-
Total					3	-	-	3	17					
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination, CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Minimum Passing Criteria			TA (Theory) : ≥8/20		MSE + ESE(Theory): ≥32/80			TA (Theory) / CIA (Lab) : ≥20/50		ESE (Lab) : ≥20/50		ESE(Theory) : ≥40/100		

[Signature]
 Member Secretary-BOS

[Signature]
 Chairman -BoS



[Signature]
 Member Secretary-AC

[Signature]
 Chairman-AC



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Multidisciplinary Minor (14 Credits)

Minor Stream: Robotics (RB)

Minor Stream: Robotics (RD)														
Sr. No.	Semester	Course category	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	IV	MM	0RARB218	Introduction to Robotics	3	-	2	3	4	40	20	40	50	-
02	V	MM	0RARB309	Embedded System & Control for Robots	3	-	-	3	3	40	20	40	-	-
03	VI	MM	0RARB319	AI for Robotics	3	-	2	3	4	40	20	40	50	-
04	VII	MM	0RARB409	Intelligent Autonomous Systems	3	-	-	3	3	40	20	40	-	-
Total					12	-	4	12	14					
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Minimum Passing Criteria				TA (Theory) : ≥8/20		MSE + ESE(Theory): ≥32/80			TA (Theory) / CIA (Lab) : ≥20/50			ESE (Lab) : ≥20/50		

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Professional Electives / Honor's Tracks (20 Credits)

Specialization / Track Name	Department Professional Elective Courses					
	PE -I (3-0-0)	PE - II (3-0-2)	PE -III (3-0-0)	PE -IV (3-0-2)	PE- V (3-0-0)	PE -VI (3-0-0)
Class	S. Y. B. Tech	T. Y. B. Tech	T. Y. B. Tech	Final Year B. Tech	Final Year B. Tech	Final Year B. Tech
Semester	IV	V	VI	VII	VII	VIII
Robotics	Mobile and Micro Robotics (0RAPE216)	Autonomous Robotics and Telecherics (0RAPE305)	Advanced Robotics Programming (0RAPE315)	Internet of Robotic Things (IoRT) (0RAPE404)	Swarm Robotics (0RAPE405)	MOOC Courses offered by NPTEL/SWAYAM (0RAPE411-14)
AI	Intelligent Decision Systems (0RAPE217)	Computer Vision (0RAPE 306)	Deep Learning (0RAPE316)	Natural Language Processing (0RAPE405)	Generative AI (0RAPE406)	
Mechatronics	Intelligent Manufacturing (0RAPE218)	Mechatronics System Design (0RAPE307)	Micro electromechanical Systems (0RAPE317)	Advanced Mechatronics (0RAPE406)	Cyber-Physical Systems (CPS) (0RAPE407)	
Control Systems	Signal and Systems (0RAPE219)	Dynamic Control Systems (0RAPE308)	Advanced Control System (0RAPE318)	Robot Dynamics and Control (0RAPE404)	Intelligent and Adaptive Control Systems (0RAPE408)	

- Students may choose Professional Elective courses from a single track or across multiple tracks, based on their academic interests and career aspirations.
- Only one Professional Elective course may be selected from a given column in a semester. Additional courses from the same column may be taken in subsequent semesters, but not concurrently.
- Students opting for the Honors Degree shall complete all Honors courses from a single track, which shall be different from the track chosen for their Professional Elective courses.

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S.Y. B. Tech. – Robotics and Artificial Intelligence

Bridge Course: (DSY - Lateral Entry Students)

Sr. No.	Semester	Course Category	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Marks)				
										Theory			Laboratory	
										MSE	TA	ESE	CIA	ESE
01	III	BS	0RABS212	Mathematics (Matrices, Differential Calculus and Probability)	3	-	-	3	3	-	-	100	-	-
02	IV	ES	0RAES226	Computer Programming	1	-	2	1	2	-	-	-	50	-
Legends: L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination, CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination														
Minimum Passing Criteria										CIA (Lab) : $\geq 20/50$			ESE (Theory) : $\geq 40/100$	

*Note: All Direct Second Year students admitted to the B.Tech. Robotics and Artificial Intelligence programme shall compulsorily undergo the prescribed bridge courses. Students admitted from diploma programmes other than the parent discipline shall additionally complete bridge courses as prescribed by the designated committee.

Member Secretary-BOS

Chairman -BoS



Member Secretary-AC

Chairman-AC