Gautam Buddha University
Electrical Engineering Department, SOE

4-Year B.Tech. (Robotics and Artificial Intelligence) Programme
(Effective from Session 2024-2025)

		SEMESTER-I		
Sl. No.	Course Code	Name of Course	L-T-P	Credits
		Theory Courses		
1.	CY101/PH102	Engineering Chemistry/ Engineering Physics	3-1-0	4
2.	MA 101	Engineering Mathematics –I	3-1-0	4
3.	EC101/EE102	Basic Electronics Engineering/ Basic Electrical Engineering	3-1-0	4
4.	CS101/ME101	Fundamentals of Computer Programming/ Engineering Mechanics	3-1-0	4
5.	BS101	Human Values & Buddhist Ethics	2-0-0	2
6.	EN101	English Proficiency	2-0-0	2
		Practical Courses		
7.	CE103/ME102	Engineering Graphics/Workshop Practice	1-0-2	2
8.	CY103/PH104	Engineering Chemistry Lab/ Engineering Physics Lab	0-0-2	1
9.	CS181/ EN151	Computer Programming Lab/ Language Lab	0-0-2	1
10.	EC181/EE 104	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	0-0-2	1
11.	GP	General Proficiency	-	NC
		Total Contact Hours/Credits	**29**	**25**

		SEMESTER II		
S. No.	Course Code	Name of Course	L-T-P	Credits
		Theory Courses		
1	CY101/ PH102	Engineering Chemistry/ Engineering Physics	3-1-0	4
2	MA102	Engineering Mathematics –II	3-1-0	4
3	EC101/EE102	Basic Electronics Engineering/ Basic Electrical Engineering	3-1-0	4
4	CS101/ME101	Fundamentals of Computer Programming/ Engineering Mechanics	3-1-0	4
5	ES 101	Environmental Studies	4-0-0	4
		Practical Courses		
6	CE103/ME102	Engineering Graphics/Workshop Practice	1-0-2	2
7	CY103/PH104	Engineering Chemistry Lab/ Engineering Physics Lab	0-0-2	1
8	CS181/EN151	Computer Programming Lab/ Language Lab	0-0-2	1
9	EC181/EE104	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	0-0-2	1
10	GP	General Proficiency	-	NC
		Total Contact Hours/Credits	**29**	**25**

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SEMESTER III				
Sl. No.	Course Code	Course	L-T-P	Credit
		Theory Courses		
1.	MA201	Engineering Mathematics-III	3-1-0	4
2.	CS205	Data Structures and Algorithms	2-0-2	3
3.	RAI 205/CS 208	Fundamentals of Artificial Intelligence	3-0-0	3
4.	RAI201/EC201	Analog & Digital Electronics	3-1-0	4
5.	EE 203	Fundamentals of Materials Science, Nano Materials & Smart Materials	3-0-0	3
6.	RAI 203	Fundamentals of Robotics	3-0-0	3
		Practical Courses		
7.	PH331	Materials Science Laboratory	0-0-2	1
8.	RAI221	Analog & Digital Electronics Laboratory	0-0-2	1
9.	RAI223/CS 286	Fundamental of AI & Robotics Lab	0-0-2	1
10.	GP	General Proficiency	-	NC
		Total Contact Hours/Credits	**29**	**23**

SEMESTER IV				
S.No.	Course Code	Course	L-T-P	Credit
		Theory Courses		
1.	RAI 202	Electrical Machines & Drives	3-1-0	4
2.	AI202/EE428	Machine Learning	3-0-0	3
3.	RAI204	Sensors and Actuators for Robotics	3-0-0	3
4.	EE310/EC321	Microprocessor & Microcontroller	3-1-0	4
5.	EE 206	Signals and Systems	3-1-0	4
6.	RAI206	Robot Safety and Maintenance	3-0-0	3
		Practical Courses		
7.	RAI212	Sensors and Actuators Laboratory	0-0-2	1
8.	EE316	Microprocessor & Microcontroller Lab	0-0-2	1
9.	RAI214	Signals and Systems Laboratory	0-0-2	1
10.	RAI218	Mini Project-I	0-0-2	1
11.	GP	General Proficiency	-	NC
		Total Contact Hours/Credit	**28**	**25**

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		SEMESTER V		
Sl. No.	Course Code	Courses	L-T-P	Credit
		Theory Courses		
1.	RAI301/EC421	Wireless Networks / Wireless Communication	3-0-0	3
2.	ME300	Theory of Machines & Machine Design	3-0-0	3
3.	RAI303	Industrial Electronics and Power Convertors	3-0-0	3
4.	RAI305	Advances in Robotics and Artificial Intelligence	3-0-0	3
5.	EE305	Control Systems	3-1-0	4
6.	CS417/AI419	Data Science	3-0-0	3
		Practical Courses		
7.	EE313	Control Systems Laboratory	0-0-2	1
8.	RAI315	Industrial Electronics Laboratory	0-0-2	1
9.	RAI317	AI & Robot Design Lab	0-0-2	1
10.	ME317/RAI319	Theory of Machines & Mechanism Laboratory	0-0-2	1
11.	EE319	Industrial Training-I	-	2
12.	GP	General Proficiency	-	NC
		Total Contact Hours/Credits	**29**	**25**

Students will do industrial training of 4-6 weeks after 4th semester and evaluation will be done in 5th semester.

		SEMESTER VI		
S. No.	Course Code	Course	L-T-P	Credit
		Theory Courses		
1.	RAI302	Kinematics of Robotics	3-0-0	3
2.	RAI304	Embedded Systems Design	3-0-0	3
3.	RAI306	Dynamics and Trajectory Planning	3-0-0	3
4.	RAI308	Robot Operating Systems	3-0-0	3
5.	RAI310	Knowledge Engineering and Expert System	3-0-0	3
6.	RAI312	Hydraulic & Pneumatic Drives for Robots	3-0-0	3
7.	-	Elective-I	3-0-0	3
		Practical Courses		
8.	AI481/RAI316	Robotic Simulation Laboratory	0-0-2	1
9.	EC375	Embedded Systems Laboratory	0-0-2	1
10.	RAI318/ME216	Hydraulic & Pneumatic Drives Laboratory	0-0-2	1
11.	EE318	Mini Project-II	0-0-4	2
12.	GP	General Proficiency	-	NC
		Total Contact Hours/Credits	**31**	**26**

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		SEMESTER VII		
Sl. No.	Course Code	Courses	L-T-P	Credit
		Theory Courses		
1.	ME310	Smart Manufacturing	3-0-0	3
2.	RAI401/AI302	Internet of Robotic Things (R IoT)	3-0-0	3
3.	RAI403/MA402	Data Modeling and Visualization	3-0-0	3
4.	EE429	Image Processing & Computer Vision	3-0-0	3
5.	RAI405	Robotics and AI case studies with RIoT	3-0-0	3
6.	-	Elective-II	3-0-0	3
		Practical Courses		
7.	RAI411	Data Modeling and Visualization Laboratory	0-0-2	1
8.	ME318	Smart Manufacturing Laboratory	0-0-2	1
9.	EE497	Project-I	0-0-6	3
10.	EE487	Seminar	0-0-2	1
11.	EE485	Industrial Training -II	-	2
12.	GP	General Proficiency	-	NC
		Total Contact Hours/Credit	27	**26**

Students will do industrial training of 4-6 weeks after 6th semester and evaluation will be done in 7th semester.

		SEMESTER VIII		
S. No.	Course Code	Course	L-T-P	Credit
		THEORY COURSES		
1.	RAI404	Robot System Design and SLAM (Simultaneous Localization and Area Mapping)	3-0-0	3
2.	-	Elective-III/MOOC Course	3-0-0	3
		PRACTICAL COURSES		
3.	EE498	Project-II	0-0-16	8
4.	RAI412	Robot System Design and SLAM (Simultaneous Localization and Area Mapping) Laboratory	0-0-2	1
5.	GP	General Proficiency	-	NC
		Total Contact Hours /Credit	**29**	**15**

- *Any Dept. Elective will be run only when there will be 1/3 students of the total class strength.*

Grand Total Credits of 4 Year B. Tech. Degree = 190

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List of Electives

Elective-I

Sr. No.	Course Code	Course Specialization / Track	Elective Course -I
1	RAI314	Robotics	Mobile and Micro Robotics
2	RAI318	AI	Data Analytics
3	RAI320	Mechatronics	Intelligent Manufacturing
4	RAI322	Control Systems	Microcontrollers Architecture and Programming
5.	RAI324	Electrical Engineering	Fundamental of Biomedical and Bio-informatics

Elective-II

Sr. No.	Course Code	Course Specialization/ Track	Elective Course -II
1	RAI406	Robotics	Autonomous Robotics and Telecherics
2	RAI408	AI	Deep Learning
3	RAI410	Mechatronics	Mechatronics System Design
4	RAI414	Control Systems	Control of Robotic Systems
5.	RAI416	Electrical Engineering	Biomedical Robotics

Elective-III

Sr. No.	Course Code	Course Specialization/ Track	Elective Course -III
1	RAI418	Robotics	Advanced Robotics Programming
2	RAI420	AI	Advanced Artificial Intelligence
3	RAI422	Mechatronics	Micro Electro Mechanical Systems
4	RAI424	Control Systems	Advanced Control System
5	RAI426	Robotics	Probability and Statistics

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List of Other Related Electives

Dept. Elective-I

1. EE 409, Digital Control
2. PED 502, Industrial Instrumentation & Automation
3. EE 415, Industrial Process Control
4. EE 417, Introduction to AI & Neural Networks
5. EE 419, Computer Aided Machine Design
6. JAVA Programming
7. Cryptography
8. Computer Graphics
9. Object Oriented System Design
10. Human Computer Interface
11. EE 210, Electrical Machine II

Dept. Elective-II

1. EE 421, Soft Computing Techniques
2. EE 423, Renewable Energy Sources
3. EE 425, Advance Control System
4. EE 427, Advance Instrumentation
5. EE 429, Digital Image Processing
6. Electric Vehicles
7. Computer Graphics

Dept. Elective-III

1. EE 404, Non-Linear System
2. EE 410, Smart Transducers & Sensors
3. EE 424, Intelligent Control
4. EE 426, Optimal Control
5. Big Data Analysis
6. Design & Analysis of Algorithms
7. Deep Learning and Cognitive Computing
8. Software Testing
9. Distributed Systems
10. Quantum Computing
11. Blockchain Architecture Design
12. Mobile Computing

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