

4.3.1.2.Computer Science Courses (CCS)

CAI3401 Fundamentals of Robotics

COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
EBA2204	4	7/8	2	2	0	3

COURSE AIM

- To understand the fundamental concepts and architectures of robotic systems.
- To gain knowledge in robot design, movement principles, and basic algorithms.
- To explore the integration of artificial intelligence in robotics.
- To appreciate the synergy between software and hardware in robotics.
- To gain hands-on experience through a simple robotic project.

COURSE WEEKLY CONTENTS

1	Introduction to Robotics: Overview of Robotic Systems and Historical Context
2	Robot Design Principles: Basic Components and Structures
3	Robot Movement and Kinematics: Basics of Movement
4	Basic Algorithms in Robotics: Control and Coordination
5	Software-Hardware Integration in Robotics: Synergies and Challenges
6	Robot Sensing and Perception: Basics of Sensory Information
7	Mid-term Exam
8	Robot Navigation and Path Planning: Algorithms and Strategies
9	Artificial Intelligence in Robotics: AI Techniques in Robotics
10	Practical Robotics: Implementing Theory in Real-World Scenarios
11	Advanced Topics in Robotics: Current Trends and Future Directions
12	Robotics Project Presentations
13	Ethics and Real-world Implications of Robotics
14	Industry or Academic Guest Lecture/Workshop
15	Revision and Recap of Course Content

STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	←		30	MARKS		→	30
8 to 12	←		20	MARKS		→	20
1 to 15	←		10	MARKS		→	10
16 or 17	40	Final					40

REFERENCES

Textbook	"Robotics: Modelling, Planning and Control" by Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, and Giuseppe Oriolo. This textbook provides a comprehensive foundation in robotics, covering design, kinematics, dynamics, control, and practical applications, making it well-suited for the course.
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