

ROBOTICS

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|---------------------------------------|-----------------|--------------------------------|-------|----------------------|--------|
| Course code | | Year | IV | Semester | I |
| Course category | Open Elective-4 | Offering Branch | ME | Course Type | Theory |
| Credits | 3 | L-T-P | 3-0-0 | Prerequisites | Nil |
| Continuous Internal Evaluation | 30 | Semester End Evaluation | 70 | Total Marks | 100 |

Course Outcomes: Upon successful completion of the course, the student will be able to

| | Statement | Skill | Level | Units |
|------------|--|--------------------------|--------------|--------------|
| CO1 | Understand the basic anatomy of robots, actuators, end effectors, robot sensors, programming and applications. | Understand | L2 | 1,2,3,4,5 |
| CO2 | Understand the working principles of robot actuators, end effectors | Understand | L2 | 2 |
| CO3 | Apply robot programming skills | Apply, Modern Tool Usage | L3 | 3 |
| CO4 | Apply knowledge of robot sensors and their applications in industries | Apply | L3 | 4,5 |

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | 3 | | | | | | | | | | | | 3 | 1 |
| CO2 | 3 | 3 | | | | | | | | | | | 3 | 1 |
| CO3 | 3 | 3 | 2 | | 2 | | | | | | | | 3 | 1 |
| CO4 | 3 | | 2 | | | | | | | | | | 3 | 1 |

Syllabus

| UNIT | Contents | Mapped COs |
|-------------|---|-------------------|
| I | Introduction: Automation and robotics – History of robots -Robot anatomy – classification of robots, major components-robot specifications, selection of robots. | CO1 |
| II | Robot actuators- Pneumatic, Hydraulic actuators, electric & stepper motors End Effectors- types of end effectors, grippers and tools, Requirements and challenges of end effectors. | CO1, CO2 |
| III | Robot Programming: - Robot programming languages - programming methods - off and on-line programming - Lead through method - Teach pendent method, simple programs. | CO1, CO3 |
| IV | Sensors used in robots: Sensor devices, Types of sensors - contact, position and displacement sensors, Force and torque sensors - Proximity and range sensors - acoustic sensors –slip sensors, Robot vision systems | CO1, CO4 |
| V | Applications of robots: Application of robots in industry - material handling, processing operations, assembly, and inspection operations. | CO1, CO4 |

| Learning Resource |
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| Text books: |
| 1. Mikell P. Groover. Industrial Robotics Technology Programming and Applications, McGraw Hill Co., Singapore, 1995. 2. Robotic Engineering by Richard D.Klafter, Prentice Hall |
| Reference books |
| 1. Introduction to Robotics – Saeed B.Niku, Prentice Hall 2. Introduction to Robotics – John J. Craig, Addison Wesley |
| E-Resources & other digital Material: |
| 1. http://nptel.ac.in/downloads/112101098/ |