

ROBOTICS

Course Code	19EE4801C	Year	IV	Semester	II
Course Category	Program Elective-VI	Branch	EEE	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	
CO1	Understand the concepts of Robotics
CO2	Obtain basic idea on working principle of various actuators and sensors, End Effectors
CO3	Analyze and Design the Robot , Safety in Robotics
CO4	Analyze the Control Hardware and Implement Robot Programming skills
CO5	Understand the Social Issues & future applications of a robot

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2		2							1	2	1
CO2	3		2		2							1	2	1
CO3	3	2	3	2	2							1	2	1
CO4	3	3	3	2	2							1	2	1
CO5	3		2		1							1	2	1

Syllabus

Unit No.	Contents	Mapped CO
I	Fundamentals Concepts :Introduction to Robot, Classification of Robots, What Is Robotics, History of Robotics ,Advantages and Disadvantages of Robots ,Robot Components ,Robot Degrees of Freedom ,Robot Joints , Robot Coordinates ,Robot Reference Frames , Programming Modes , Robot Characteristics , Robot Workspace ,Robot Languages ,Robot Applications ,Other Robots and Applications	CO1
II	Robot End Effectors, Actuators: Introduction, end effectors, types of end effectors, grippers and tools, Requirements and challenges of end effectors. Actuators: Electric Pneumatic, Hydraulic actuators, Sensors, Vision and Signal Conditioning: Sensors Classification, Internal Sources, External Sources, Vision ,Signal Conditioning, Sensor Selection	CO2
III	Robot Cell Design and control- Safety in Robotics, Robot cell layouts, Multiple Robots and machine interference, Interlocks, Workcell Controllers, and Robot cycle time analysis.	CO3
IV	Control Hardware and Robot Programming: Control Consideration, Hardware Architecture, Hardware for Joint Controllers, Computational Speed.	CO4

	Robot Programming: Methods of Robot Programming, Lead through Programming Methods, wait, signal and delay Commands, Branching, Capabilities and Limitations of Lead through methods.	
V	Social Issues and Future Applications: Social Labor Issues: Productivity and Capital Formations, Robotics and Labor, Education and Training, International Impacts . Future Applications: Robot Intelligence, Characteristics of future Robot Tasks, Future Manufacturing Applications of robots, Service Industry and Similar Applications	CO5

Learning Resources	
Text Books	
1. Introduction to Robotics: Analysis, systems and applications” by Niku. Saeed B.” 2 nd edition Wiley,2004. 2. Industrial Robotics Technology Programming and Applications by Mikell P.Groover, McGraw-Hill Int. Edition,2012 3. S.K.Saha “Introduction to Robotics “McGraw-Hill, New Delhi,2014	
Reference Books	
1. Introduction to Robotics – John J. Craig, Addison Wesley 2. Robotics – K. S. Fu, Gonzalez & Hee 3. Introduction to Robotics – Saeed B.Niku, Prentice Hall	
e- Resources & other digital material	
1. http://nptel.ac.in/downloads/112101098/ 2. http://engineering.nyu.edu/mechatronics/smart/Archive/intro_to_rob/Intro2Robotics.pdf	