INTRODUCTION TO ROBOTICS

Course Code	20EC6701D	**Year**	IV	**Semester**	I
Course Category	HONORS	**Branch**	ECE	**Course Type**	THEORY
Credits	4	**L-T-P**	3-1-0	**Prerequisites**	
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	Summarize the history of robotics, technological advances and types of End Effectors (L2)
CO2	Utilize the knowledge gained on different robotic drive systems, actuators and their control (L3)
CO3	Make use of the Sensors based on different applications (L3)
CO4	Predict the future applications of robotics (L3)

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	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**
CO1	2												1	
CO2	2					2							1	
CO3	2					2			2				2	
CO4	3								3				2	1
Average * (Rounded to nearest integer)	**2**								**3**				**2**	1

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Fundamentals of Robotics:** Introduction, History of robotics, Robot anatomy, work volume, robot drive systems, control systems and dynamic performance, precision of movement, end effectors, robotic sensors, applications	CO1, CO2
II	**Control systems & Components:** control systems concepts, models,control system analysis, activation and feedback components, position sensors, velocity sensors power transmission systems, joint control design	CO2, CO3
III	**End effectors:** Types of end effectors, mechanical grippers, tools as end effectors, end effector interface, considerations in gripper selection and design,	CO2, CO4

IV	**Sensors:** Transducers & sensors, tactile sensors, proximity and range sensors, use of sensors in robotics	CO1, CO3
V	**Robot Programming:** Robot language structure, methods of robot programming, motion interpolation, WAIT, SIGNAL and Delay Commands, limitations of lead through methods	CO3, CO4

Learning Resources
Text Books
1. Mikell P. Groover, Mitchell Weiss, Roger N. Nagel & Nicholas G. Odrey, Industrial Robotics Technology, Programming & Applications, Tata McGraw Hill, 2008. 2. Mittal R K & Nagrath I J, Robotics and Control, TMH
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. https://nptel.ac.in/courses/107/106/107106090/