



SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF MECHANICAL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods/Week	Academic Year	Date of commencement of Semester
23ME6E06	Industrial Robotics	VI	ME	5	2025-2026	10-12-2025

Unit	Course outcome / Blooms Level	Topic No	Topic/Activity	Text Book/Reference	Contact Hour	Delivery Method
Unit-1: INTRODUCTION						Chalk & Talk, PPT, Quiz
I	CO1: Describe the fundamentals of automation and robotics. [K2] CO2: Illustrate robot components such as anatomy, degrees of freedom. [K2]	1.1	Automation and robotics, CAD/CAM and robotics	T1, T2, R5	1	
		1.2	An overview of robotics –present and future applications	T1, T2, R5	1	
		1.3	Components of the industrial robotics: robot anatomy, work volume	T1, T2, R5	1	
		1.4	Components, number of degrees of freedom	T1, T2, R5	2	
		1.5	Robot drive systems	T1, T2, R5	2	
		1.6	Function line diagram representation of robot arms	T1, T2, R5	2	
		1.7	Requirements and challenges of end effectors	T1, T2, R5	2	
		1.8	Determination of the end effectors.	T1, T2, R5	1	
		TOTAL				
Unit-2: ROBOT ACTUATORS AND FEED BACK COMPONENTS						Chalk & Talk, PPT, Quiz
II	CO3: Compare and contrast different types of actuators and feedback sensors. [K4]	2.1	Actuators: pneumatic,	T1, T2, R5	2	
		2.2	Hydraulic actuators,	T1, T2, R5	2	
		2.3	Electric& stepper motors.	T1, T2, R5	2	
		2.4	Comparison of electric, hydraulic and pneumatic types of actuation devices.	T1, T2, R5	1	
		2.5	Feedback components: position sensors–	T1, T2, R5	2	
		2.6	Potentiometers,	T1, T2, R5	2	
		2.7	Resolvers, encoders–velocity sensors.	T1, T2, R5	2	
TOTAL				13		

Unit-3: MOTION ANALYSIS						Chalk & Talk, PPT, Quiz, PBL
III	CO4: Apply homogeneous transformations to analyze robot motion and solve problems. [K3]	3.1	Homogeneous transformations as applicable to rotation and translation – problems.	T1, T2, R5	2	
		3.2	MANIPULATOR KINEMATICS: Specifications of matrices,	T1, T2, R5	2	
		3.3	D-H notation	T1, T2, R5	2	
		3.4	Joint coordinates and world coordinates	T1, T2, R5	2	
		3.5	Forward and inverse kinematics– problems.	T1, T2, R5	3	
		CBS	Roboanalyzer Software for FK & IK of ROBOTS			
		TOTAL				
Unit-4: GENERAL CONSIDERATIONS IN PATH DESCRIPTION AND GENERATION						Chalk & Talk, PPT, Quiz, Videos
IV	CO5: Describe path and trajectory planning strategies, incorporating joint and linear motion planning using robot programming tools. [K3]	4.1	Trajectory planning and avoidance of obstacles,	T1, T2, R5	2	
		4.2	Path planning, skew motion,	T1, T2, R5	1	
		4.3	Joint integrated motion	T1, T2, R5	2	
		4.4	Straight line motion	T1, T2, R5	2	
		4.5	Robot programming	T1, T2, R5	2	
		4.6	Languages and software packages	T1, T2, R5	1	
		4.7	Description of paths with a robot programming language.	T1, T2, R5	1	
TOTAL				11		
Unit-5: IMAGE PROCESSING AND MACHINE VISION						Chalk & Talk, PPT, Quiz
V	CO6: Discuss the principles of machine vision, including sensing, digitizing, training, and application in robotic	5.1	Introduction to Machine Vision,	T1, T2, R5	2	
		5.2	Sensing and Digitizing function in Machine Vision,	T1, T2, R5	2	
		5.3	Training and Vision System,	T1, T2, R5	2	
		5.4	Robotic Applications.	T1, T2, R5	2	
		TOTAL				
TOTAL					55	

TEXTBOOKS:

1

Mikell P. Groover, Industrial Robotics: Technology, Programming, and Applications., McGraw-Hill, 1st Edition (1986).

2	R.K. Mittal, I.J. Nagrath, Robotics and Control, Tata McGraw-Hill, 1st Edition.
3	Saeed B. Niku, Introduction to Robotics: Analysis, Control, Applications, John Wiley & Sons, 2nd Edition (2010)
REFERENCES:	
1	S.R. Deb & S. Deb, Robotics Technology and Flexible Automation
2	John J. Craig, Introduction to Robotics: Mechanics and Control, Pearson Education, 3rd Edition (2004).
3	Robert J. Schilling, Fundamentals of Robotics: Analysis and Control, Prentice Hall, 1st Edition.
4	K.S. Fu, R.C. Gonzalez, C.S.G. Lee
5	Milan Sonka, Vaclav Hlavac, Roger Boyle, Image Processing, Analysis, and Machine Vision, Cengage Learning, 4th Edition.

Web Links:	
1	https://youtu.be/BeRMXR-vZNg
2	https://sccemechanical.wordpress.com/wp-content/uploads/2014/10/robot-actuators-and-feedback-components.pdf
3	https://youtu.be/4Y1_y9DI_Hw?list=PLZaGkBteQK3HQFSWDM7-yRQWTd86DeDIY
4	https://www.scribd.com/document/616788625/UNIT-4-Trajectory-Path-planning-and-programming
5	https://www.cl72.org/090imagePLib/books/sonka,hlavac,boyle-imageProc.pdf

		Name	Signature With Date
1	Faculty	Ch Harish Kumar	
2	Course Coordinator	Ch Harish Kumar	
3	Module Coordinator	B Mahesh Krishna	
4	Program Coordinator	Dr Francis Luther King M	