

Course Title	Course Code	Credit Hours
Robotics and Automation	AE-487	3-0

Textbooks:

- H. Asada, J.-J. E. Slotine., “Robot Analysis and Control”, Wiley.
- Peter Corke, “Robotics Vision and Control: Fundamental Algorithms In MATLAB”, Springer .

Reference Books/Materials:

- Jeffrey S. Saltz, Jeffrey M. Stanton, “An Introduction to Data Science”, SAGE Publications
- Dr. Charles Russell Severance, Sue Blumenberg, Elliott Hauser, Aimee Andrion, “Python for Everybody: Exploring Data Using Python 3”, CreateSpace Independent Pub.
- Cathy O’Neil, Rachel Schutt, “Doing Data Science, Straight Talk from the Frontline”, O’Reilly.

Course Objectives:

In this course students will,

- Understand the concept of robotics.
- Learn about design principles to integrate multidisciplinary components as a system to meet requirements of products.

Course Outline:

- Introduction to Robotics.
- Actuators and Drives.
- Control Components for Robots.
- Control Software: ROS.
- Sensors and linkages.
- Robot Kinematics: Forward.
- Robot Kinematics: Inverse.
- Robot Kinematics: Jacobian.
- Robot Kinematics: Velocities.
- Differential Motion.
- Statics and Energy Motion.

- Position Control.
- Force Control.
- End Effector Design.
- Introduction to Mobile Robotics
- Wheeled and Legged robots
- Aerial and Tele operated Robots