

RAI 811: Robot Mechanics and Control

Textbook:

1. Robotics, Vision and Control: Fundamental Algorithms in MATLAB, by Peter Corke, Springer, 2nd Edition, 2017. ISBN: 978-3-319-54412-0.
- 1 Introduction to Robotics: Mechanics and Control, by John J. Craig, Prentice-Hall, 3rd Edition, 2005. ISBN: 0-13-123629-6.

Objective

2. The objective of this course is to equip the students with the fundamentals of robotics theory. This course is designed to give the students a firm grip on the kinematics, dynamics, design and control fundamentals that form the backbone of robotics research.

Course Outcome

3. After studying this course the students are expected to have developed a firm grasp of the fundamentals of robotics theory. This will prepare the students to take on more sophisticated robotics courses that will follow in the coming semesters.

Course Outline

4. The course will mainly cover geometry and mathematical representation of rigid body motion; forward and inverse kinematics of articulated mechanical arms; trajectory generation, splines, interpolation; manipulator dynamics; position sensing, actuation and fundamentals of manipulator control.

Topics	Allocated Periods
☐ Representing position and Orientation ☐ Time variation of pose ☐ Forward and Inverse kinematics of serial robots. ☐ Manipulator Velocity in 2D and 3D ☐ Path Planning and Trajectory Generation ☐ Joint Control ☐ Implementation in Robotics Toolbox	45