

**Course Number: 28022**  
**Course Name: Kinematics and Dynamics**

Course Type:
Prerequisite:
Level: Graduate
Group: Applied Design

Type & Max Unit: 3
Corequisite:
First Presentation:
Last Edition:

**TEXT BOOK:** Introduction to Robotics, By: John J. Craig, Pearson Prentice Hall, 3<sup>rd</sup> Ed., 2005, and John Wiley & Sons, Translated to Farsi, By: A. Meghdari & F. Mirfakhraei, E. Shojaei, S. M. Akrami, SUT Press, 1388.

**REFERENCES:** Intelligent Robotics Systems, By: M. Shahinpoor, ERI Press, 1994. Fundamentals of Robotics; By: R. J. Schilling, Prentice Hall, 1996. Robot Manipulators, By: R.P. Paul, MIT Press, 1982.

**TOPICS:**

1. Introduction to Robotics Technology & Applications
2. Review of Current & Emerging Robotics Research
3. Robots Geometrical Configurations & Designs
4. Design of Robotic Grippers/End-Effectors
5. Spatial Descriptions & Transformations
6. Robot Manipulator Kinematics
7. Robot Manipulator Inverse-Kinematics
8. Jacobians: Velocities & Static Forces
9. Robot Manipulator Dynamics: Newton-Euler's & Lagrangian Methods
10. Robot Trajectory Generation
11. Manipulator Mechanism Design
12. Robotics Sensors & Actuators
13. Linear Control of Manipulators
14. Robot Programming (Laboratory)