- **Course Number and Title:** M E 486. Introduction to Robotics
- **Catalog Description:** This course provides the students with an introduction to the theories and methods for analysis, modeling, motion planning, and control of robotic manipulators. We discuss the spatial descriptions and transformations, kinematics, and dynamics of these mechanisms and how to practically implement these concepts into actual robotic manipulators. Crosslisted with M E 586.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): ENGR 234 and M E 328
  Corequisite(s): None
- **Required:** Elective for BSME or BSAE Degree
- **Course Availability:** Fall and Spring Semesters
- **Instructor (Usual):** Dr. Mahdi Haghshenas-Jaryani (See https://mae.nmsu.edu/people/faculty.html)
- **Textbook:**
  1) "Introduction to Robotics: Mechanics and Control", John J. Craig, 4th Edition, Pearson, 2018, ISBN-13: 9780133489798.
  2) "Modern Robotics", Kevin M. Lynch and Frank C. Park, Cambridge University Press, 5th reprint 2021, ISBN-13: 9781107156302 (Hardback), 9781316609842 (Paperback).
- **Course Learning Objectives:** After completing this course, a student should be able to:
  1) Develop spatial description and transformations of rigid body motion and coordinate frames;
  2) Derive the kinematics and dynamics of robotic manipulators in forward and inverse forms;
  3) Plan motion and trajectories, program, and control these robotic platforms;
  4) Apply the theoretical methods into industrial robots;
  5) Implement these knowledge and experiences to real-world engineering projects.
- **Topics Covered:** An Overview of Robotic Systems; Spatial Descriptions and Transformations; Manipulator Kinematics; Jacobians: Velocities, Static forces, and Singularities; Trajectory Planning and Generation; Manipulator Dynamics; Control of Robotic Manipulators