**DEPARTMENT OF MECHANICAL ENGINEERING**
**RICE UNIVERSITY**

## MECH/ELEC/COMP 498/598: INTRODUCTION TO ROBOTICS

# Project

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The goal of this four-week project is to apply concepts learned in Introduction to Robotics to a simulated or real-world system. The project should contain **at least two** of the following basic topics from this course:

- Kinematics (forward/inverse)
- Dynamics
- Manipulator Design
- Control

Examples of appropriate projects include analysis of the kinematics and dynamics of an existing robot, design (on paper) of a new manipulator with an analysis of its kinematics or dynamics, design of general dynamic simulation and control software, or application of two or more course concepts to solve an existing research problem.

The project is to be done *individually (498 or 598), in pairs (498 or 598),* or in *small groups of no more than 3 (only for those in 498),* and the expected time input is approximately that of two laboratory assignments/problem sets (about 30 hours *per person*). Graduate students working in pairs will be expected to cover a minimum of 3 topics. Projects with two or three group members are expected to have a higher level of sophistication than projects done by one person. Projects that can aid in research or other course projects are acceptable and encouraged.

**Deadlines:**

- Project Discussion – It is recommended that you discuss your project idea with the instructor before the proposal is due (in person or by email)
- Project Proposal – Friday, March 25, 2022
- Feedback provided by Monday, March 28, 2022
- Project Poster (electronic) – Friday, April 22, 2022
- Project Summary (electronic) – Last day of finals week, Tuesday May 3, 2022

**Project Proposal:** The project proposal is a short (approximately one page single-spaced) document providing a description of your project. It should include:

- Project title
- List of Group members
- Motivation
- Technical description (include an explicit statement of the course elements involved)
- Evaluation method (how will you know if your project is successful?)
- Project time line

**Project Poster:** The Project Poster Session will take scheduled during class the last week of classes. Each group will briefly describe their poster, and as appropriate, will present a demonstration of the project. Posters should be in Power Point (ppt) or Adobe Portable Document (pdf) formats, and uploaded to Canvas by MIDNIGHT on Thursday, April 21. Your poster should include motivation, a description of your technical approach and how it relates to the topics in the course, and results with figures. It should be approximately 17" x 22" (portrait layout) and should follow good poster guidelines (see http://www.owlnet.rice.edu/~cainproj/checkposter.pdf). Other poster examples can be found on Canvas. Include the following:

- Project Title
- Team members, plus Team or individual pictures (with names labeled)
- Motivation
- Description of your technical approach and how it relates to the topics in the course
- Results with figures

**Project Summary:** The project summary is a typed document that describes your project in sufficient detail for another Intro to Robotics student to exactly recreate your project. Attach drawings, images, and Matlab code (or other code, e.g. Java or C++) as necessary. Derivations of equations for kinematics, dynamics, etc. should be explicitly shown using equations.