



# WPI

RBE-550 Motion Planning  
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## Assignment 1 Project Proposal

DUE: 2022-01-31 @ 12:00 UTC

### Abstract

Get started with the semester project by first submitting a detailed proposal. Use this opportunity to present to the class, and receive feedback.

## 1 Introduction

In lieu of a final exam, this course has a semester-length project to build a system that demonstrates a major aspect of motion planning. The project may be implemented in any language, with Python and C++ being popular options. Be sure to plan accordingly if more obscure languages, tools, or environments are needed. That is, if a team wants to show off, go ahead. But keep in mind constraints on time and resources within the scope of this course project.

### 1.1 Project Teams

This project is a collaborative effort. Students shall form teams of two or three members, and submit all related assignments as a group. Students have discretion in choosing their teams, but each student is allowed to belong to only a single team. Teams may collaborate on specific components, provided that such collaborations are thoroughly documented. For example, one team could implement a visualization system for a mobile robot, or set up the requisite systems in ROS. This team may subsequently share this component with another team, or with the class as a whole. The allowance for inter-team collaboration precludes working on a larger shared project, unless specifically approved by the professor.

## 2 Project Topics

Each team must choose a project topic related to motion planning, utilizing the concepts taught in the course, or closely related or tangential. The project shall be extensive and complete, and scoped appropriately in regards to the time constraints and size of the team. The project need not be a novel contribution to the field of motion planning, and it is fully appropriate to implement a system discussed in the literature. However, creativity is encouraged, and the beginnings of a novel contribution may be created, as long as a working system is presented. Keep in mind the time and resource constraints presented by this course before proposing novel work.

Choose a project involving motion planning with an interesting application. The projects could involve areas such as,

- autonomous driving
- parking trailers
- cleaning robots
- delivery robots, logistics

- aerial robots
- legged robot locomotion
- grasping and manipulation

or any other student proposed topic. This application should involve a challenging motion planning problem, and require in-depth and creative solutions.

### 3 Proposal Document

The main submission for this assignment is a detailed project proposal document, formatted as an academic article. (IEEE transactions format encouraged, but not mandatory.) Include appropriate citations, specifically relating to the core work proposed. Citations must be conference or journal articles published in peer reviewed forums, with a preference for in-depth journal articles. Textbooks and properly sourced news articles are acceptable as secondary sources. The proposal shall include an introduction, short background, proposed methods, goals, planned schedule, details on the division of labor, and overview of expected results. Include all relevant figures and links to software packages.

Consider continually developing this document as the project progresses. The proposal may be used as a base to produce the status update and final project documents. Teams are strongly discouraged from waiting until the final week (or days) before starting the final report.

Use any tools to create the written proposal.  $\text{\LaTeX}$  is suggested (e.g., using Overleaf for collaboration). Regardless of the tools used, the submitted document must be in PDF format.

### 4 Proposal Presentation




In addition to a written proposal, each team must submit a presentation. Create slides that highlight the topic, background, and proposed scope of the project. Three to five slides of content is appropriate. Present these slides, creating a video where the contents are discussed, in a format similar to an in class presentation. Duration of the presentation must be shorter than six minutes.

### 5 Student Feedback

Each group shall create a post in the discussion forum, where all students can review each project proposal. This post shall give a brief overview of the proposed project (i.e., the video presentation, and short abstract). Approximate size guidelines here are a one or two page abstract and five minute presentation. All students are encouraged to review the course project proposals and offer suggestions and constructive criticism. Additionally, teams should attach their full proposal document as additional material.

## 6 Grading and Submission

This assignment is due 2022-01-31 @ 12:00 UTC. *Late submissions are not accepted.* Upload completed assignment components (as individual files, not a single ZIP or TAR file) to the course site on Canvas.

Weight	Type	Component
 70%	PDF	Proposal Document
 20%	PDF,video	Proposal Presentation
 10%	discussion	Student Feedback

Only a single submission per group is required; include the project title and names of all group members in all project submissions. For the proposal presentation, submit a PDF of the slides in addition to the video.

## 7 List of URLs

<https://canvas.wpi.edu> ..... p. 3  
<https://journals.ieeeauthorcenter.ieee.org/create-your-ieee-journal-article/authoring-tools-and-templates/tools-for-ieee-authors/ieee-article-templates/> ..... p. 2  
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