ECE ****: Robot Motion Planning

INSTRUCTOR:

Shalabh Gupta
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Office Hours: TBD

CLASSES: TBD

TEXT BOOK: The course will provide lecture notes. Suggested Reading:

• S. M. LaValle. Planning algorithms. 2006.
• H. Choset, K. M. Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. E. Kavraki, and S. Thrun. Principles of Robot Motion: Theory, Algorithms and Implementations. The MIT Press, 2005.

PREREQUISITES: TBD.

DESCRIPTION:

The course will cover various aspects of robotics. Topics include

• Review of Graphs and Trees
• Introduction to Motion Planning and Application Examples
• Robot Sensing and Localization
• The Bug Algorithms
• Potential Field-based Planning
• Workspace Decomposition and Configuration Space
• Shortest Path Search Algorithms on Graphs (Dijkstra's and A*)
• Sampling-based Motion Planning (Probabilistic Roadmaps, RRT, RRT* and variants, Informed Sets)
• Coverage Path Planning (Grid based Methods, Cellular Decomposition Methods)
• Planning in Dynamic Environments

PROJECT: All students have to do a class project which could be hardware design or simulation based. Project topics will be approved and assigned after discussion with the instructor.

GRADING:

Homeworks	20%
Midterm Exam	30%
Final Exam	20%
Project	30%
Total	100%

LOGISTICS AND GENERAL RULES:
• As needed, the necessary course materials will be available at http://huskyct.uconn.edu.
• Homework assignments will be due back on the due date mentioned on each homework.
• Each assignment may include computer problems. The computer problems shall be implemented in

MATLAB. MATLAB is available in the Engineering Learning Centers in ITEB.
- Make-up exams will be given only in case of illness or emergency condition, and a written note from the doctor or University Infirmary is required stating that the student is too sick to take the exam.