CSE495A – Introduction to Robotics
Spring 2024

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Office: SAC1019
Office hours: ST after 2.30pm. You can also email me for a suitable time.
Class room: NAC992, **Time:** ST, 10.50am – 12.05pm

Course Description

Robotics is a rapidly growing field with applications in widely diverse fields such as medicine, agriculture, manufacturing, automobile and aviation to name a few. Examples of robotic applications include autonomous cars, robotic arms and manipulators, autonomous aerial vehicles etc. In this course we will study the theory, algorithms and methods that make autonomous mobile robots possible. Topics include: robot dynamics and kinematics, trajectory optimization and tracking, motion planning and feedback control, robot perception and vision, state estimation, localization and mapping, state machines and system architectures.

Prerequisite
Programming (CSE115), Linear Algebra, Differential Equations, Probability

Grading (Subject to modification as the semester progresses)

Attendance	10%
Homework	20%
Project or research paper	20%
Midterm	25%
Final	25%

Course content
1. Robot dynamics and kinematics
2. Trajectory optimization and tracking, motion planning and feedback control
3. Robot perception and vision
4. State estimation, localization, mapping and SLAM
5. System architectures, state machines (if time permits)

Textbook
There are no fixed textbooks for the course. The textbooks below can be used as reference.

- R. Siegwart, I. R. Nourbakhsh, D. Scaramuzza. *Introduction to Autonomous Mobile Robots*. MIT Press, 2nd Edition, 2011, ISBN-10: 0262015358
- S. Thrun, W. Burgard, D. Fox. *Probabilistic Robotics*. MIT Press, 2005, ISBN-10: 0262201623
- P. Corke. *Robotics, Vision and Control*. Springer, 2011, ISBN: 978-3-642-20143-1