ME410 Robotics

Introduction Class

Pranav Bhounsule

pranav@uic.edu

Department of Mechanical and Industrial Engineering

University of Illinois at Chicago

24 August 2020

Career in Robotics

- Manufacturing
- Automobile/Aerospace
- Research (Universities/Lab/Companies)
- Startups
- Google/Amazon/Apple/SpaceX
- Education

Staff

Instructor:

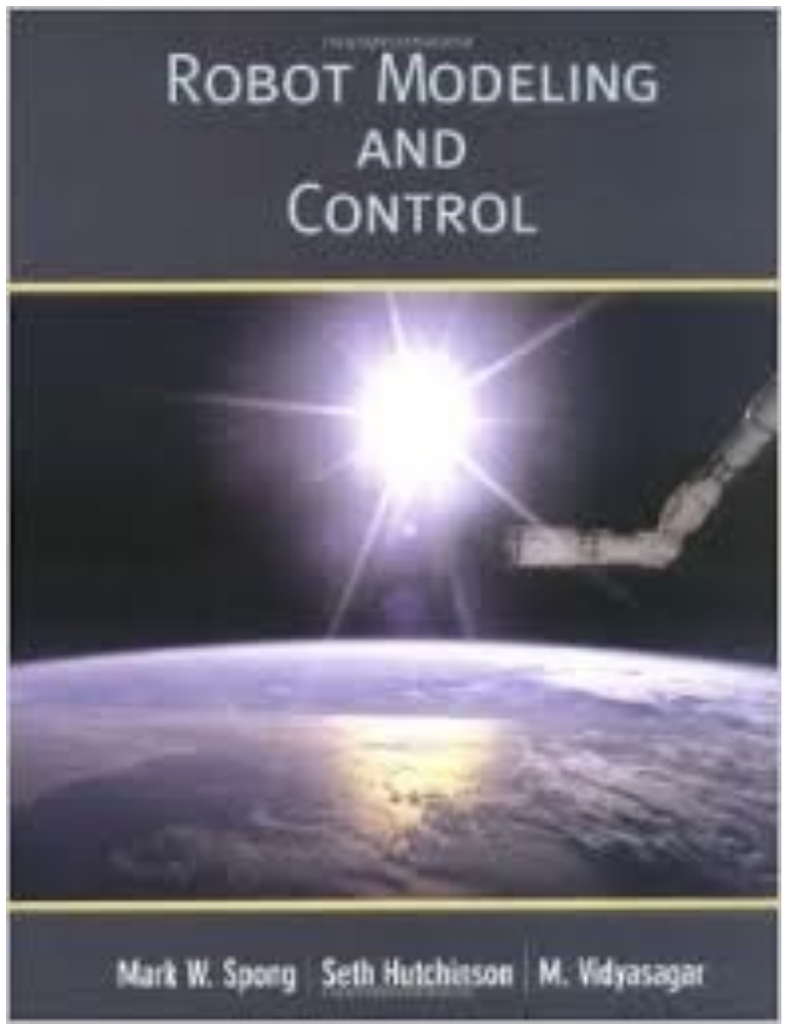
Pranav Bhounsule

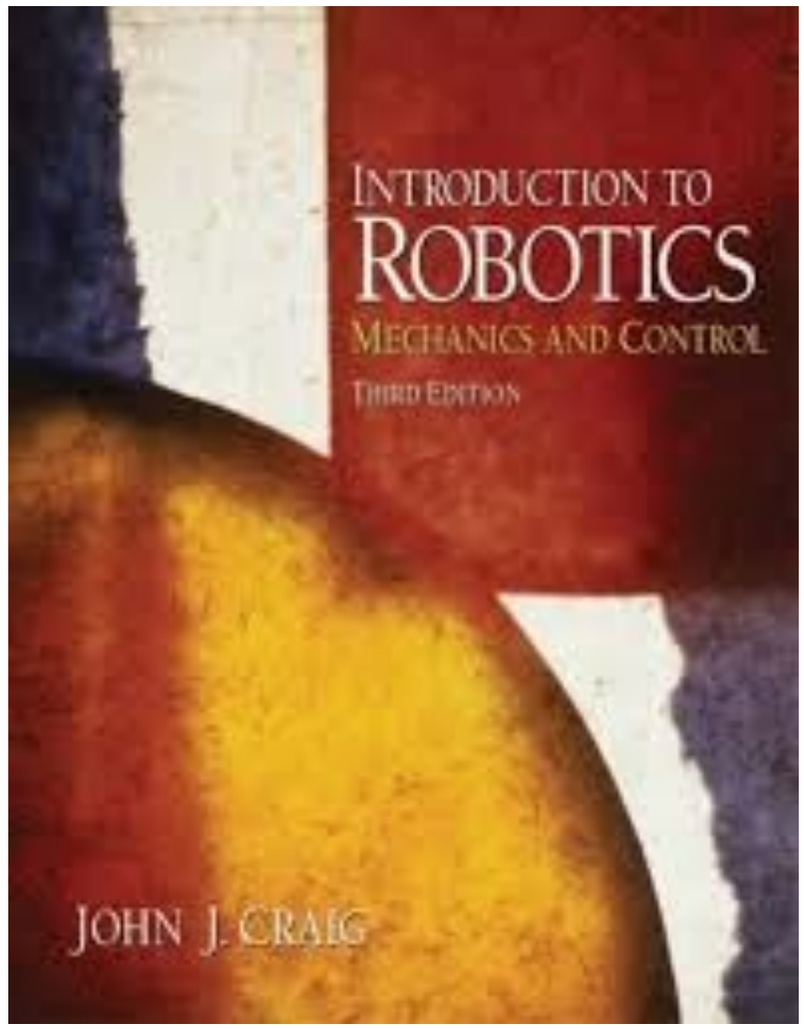
TA:

Ali Zamani

Reference books (only 2 shown)

No need to buy





NOTE: I will provide handwritten notes.

Blackboard

- Syllabus, Announcements, Notes, Videos, grades, HW, Project, etc.

Pre-requisites

- ME 210 Dynamics
- Linear Algebra, Matrices, Ordinary Differential Equations, Calculus
- MATLAB: Nice to have knowledge, but not assumed.
- Lua (reqd for Coppelia Sim): No knowledge assumed.

Class schedule

- Current: MWF 10 to 10:50 AM
- Location: Virtual through zoom.

Bookmark this shortened link

http://tiny.cc/roboticsZoom

Lecture policy

- Mute the mike when not asking questions.
- If you turn video on, be presentable.
- All lectures recorded and shared via YouTube and linked to Blackboard.
- Voice will be recorded and will be part of the recording. If you don't want this then ask questions via chat.
- Attendance not mandatory.

Grading

- Homework (10 %)
- Homework programming Q's (10 %)
- Mid-Term/Final (30 %)
- Computing projects (50 %)
- Piazza, bonus homework (extra credit)

Computing

- Fast, stable internet (videos/notes will be made available offline)
- 4 GB RAM (8 GB preferred), 8-9 GB free space to install MATLAB/Coppelia Sim
- ACCC can provide laptop on loan (see syllabus)

Software

- MATLAB - general computing
  - (1) online via Citrix (Free)
  - (2) student desktop version $99 (recommended)
- Coppelia Sim - physics simulation
  - Edu version is free, https://www.coppeliarobotics.com/

Homework (20%)

- Individual or groups of two (max)
- Due on Sunday 11:59 PM. No late submissions.
- Online through https://gradescope.com/
- Code, Plots (legends, labels for axis)
- Some sections of homework might have to be emailed to the instructor/TA.

Project (50%)

- Individual or groups of two (max)
- Due dates announced
- Should be emailed to the instructor/TA
- If done in groups of two, both members should contribute.
- Instructor/TA might do a routine peer review or oral assessment through Q&A to assess contribution.

Exams (30%)

- Mid-Term 15%, Finals 15%
- No make-up except medical emergencies.
- 24 hour open book/notes
- No discussing/copying/sharing solutions among students or asking help from others
- All exam solutions has to be your individual work

Piazza (extra credit)

- Extra credit for being active on piazza
- Forum to ask Q&A to the instructor and all your classmates
- You will get a faster response and you can also read through old responses.
- Sign up: piazza.com/uic/fall2020/me410

Office Hours etc

- Via zoom, same link as lecture: http://tiny.cc/roboticsZoom
- Thu/Fri 11 AM to 12:00 PM
- Email me: pranav@uic.edu (May not respond immediately. Give me max 24 hours)

Course Description

- Basic pneumatic and hydraulic systems.
- Design of sequential control circuits and ladder diagrams.
- Robot kinematics and dynamics.
- Robot design.
- Trajectory planning.
- Applications and demonstrations.

Course Description

- ~~Basic pneumatic and hydraulic systems.~~
- ~~Design of sequential control circuits and ladder diagrams.~~
- Robot kinematics and dynamics.
- ~~Robot design.~~
- Trajectory planning.
- Applications and demonstrations.

Course Topics

- 2D and 3D Manipulators
- Differential Drive cars
- Legged robots
- Quadcopter
- MATLAB/Coppelia Sim
- Optimization/Control/Planning

Coppelia Sim

- https://www.coppeliarobotics.com/

Are there any questions?