West Virginia University
MAE/CpE 412 Mobile Robotics
Fall 2020
Lecture: Online Time: TR 12:30 – 1:45 pm (3 Credit Hours)

OBJECTIVE: The objective of this course is to teach students key engineering topics related to the field of mobile robotics, which includes robot locomotion, sensing, navigation, planning, decision making, control, and robot systems design.

INSTRUCTOR: Dr. Yu Gu
935 Engineering Science Building Phone: 304-293-3992
E-mail: Yu.Gu@mail.wvu.edu

PREREQUISITE: Consent.

COURSE FORMAT: Lecture. Please see the tentative course outline provided at the end of the document for additional details.

OFFICE HOURS: The instructor will keep regular (online) office hours on Wednesday and Thursday from 11:00 am - 12:00 pm. You can also make an appointment by email or by talking to the instructor after the class.

TEXT: “Robotics, Vision and Control: Fundamental Algorithms in MATLAB,” Peter Corke, Springer, 2011 (The book can be downloaded from Springer website for free). You may also find the following references useful:


CATLOG DESCRIPTION: Introduction to fundamental topics in mobile robotics; methods of locomotion; common mobile robot sensors, state estimation and navigation algorithms; path planning and obstacle avoidance methods; robot decision making and control processes; and mobile robot systems design.

LEARNING OUTCOMES: By the end of this course you should have demonstrated your ability to:

- analyze the advantages and disadvantages of different mobile robot design choices.
- select and interface sensors, actuators, and microprocessors for controlling a mobile robot.
- program and debug a robot in MATLAB for navigation, control, path planning, and obstacle avoidance tasks.
• write structured technical proposals and reports.
• work effectively within an inter-disciplinary project team.

**Grading Policy:**

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Midterm Exams</td>
<td>25%</td>
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<td>Final Project</td>
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Letter grades are assigned with respect to total percentages earned based upon the standard university policy described in the catalog.

(100% – 90%: A, 80% - 89%: B, 70% - 79%: C, 60% - 69%: D, <60%: F)

**Quizzes and Exams:** Quizzes will be given in class. The quizzes will cover lecture material as well as required reading material. Quizzes may be unannounced and there will be no makeup quizzes. There will be two midterm exams. If you must miss an exam, you must inform the instructor before the scheduled start of the exam. Failure to do so will result in denial of the opportunity to make up the exam.

**Homework:** Homework will mostly be MATLAB programming assignments. Late homework will be accepted at a deduction of 15% per day.

**Project:** You will be divided into teams and will undertake a final project, as specified in a request for proposal (RFP) document, which will be distributed by the instructor. The project will require you to apply the material learned in the class, and will consist of two phases: 1. write proposal and 2. the actual development of the project. Note that each member of the group will be asked to compile a contribution form to evaluate the contribution of the other group members.

**Academic Policies:** Academic policies and statements, including a COVID-19 statement, can be found at [https://tlcommons.wvu.edu/syllabus-policies-and-statements](https://tlcommons.wvu.edu/syllabus-policies-and-statements). For the detailed WVU's academic standards policy, please visit: [https://provost.wvu.edu/governance/academic-standards-resources](https://provost.wvu.edu/governance/academic-standards-resources).