Mechatronics and Mechanical Engineering

Course Outline

Term 2 2020

MTRN4110

ROBOT DESIGN

After successfully completing this course, you should be able to:

Learning Outcome		EA Stage 1 Competencies
1.	Apply relevant theoretical knowledge pertaining to mobile robots including locomotion, perception and localisation using onboard sensors, navigation and path planning, for practical problem-solving	PE1.1
2.	Apply computer vision techniques for feature/object detection and tracking in complicated environments	PE1.1
3.	Demonstrate practical skills in mechatronics design, fabrication, and implementation	PE2.1
4.	Demonstrate teamwork skills relevant to team-based projects	PE3.6

4. Teaching strategies

Lectures in the course are designed to cover theory and practical matters. Students are able to appreciate that the knowledge acquired in many of the previous subjects has an effective application for properly solving real problems.

Laboratory work and projects are designed to provide students with the opportunity to create a real complex robotic system.

5.

Week	Topic	Delivery Mode	Suggested Readings
1	Introduction, Locomotion, Perception	Online	Moodle lecture notes
2	Localisation I	Online	Moodle lecture notes
3	Planning I	Online	Moodle lecture notes
4	Vision I	Online	Moodle lecture notes
5	Vision II	Online	Moodle lecture notes
6	Flexibility Week		
7	Kinematics	Online	Moodle lecture notes
8	Localisation II	Online	Moodle lecture notes
9	Planning II	Online	Moodle lecture notes
10	Summary	Online	Moodle lecture notes

Assignments

Presentation

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

Work submitted after the 'deadline for absolute fail' is not accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

a. Weekly online tests or laboratory work worth a small proportion of the subject mark, or
b. Online quizzes where answers are released to students on completion, or
c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
d. Pass/Fail assessment tasks.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

Please note that UNSW now has a Fit to Sit / Submit rule, which means that if you attempt an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

7. Expected resources for students

Lecture notes, tutorials, and assignment specifications will be available on Moodle in advance before the class.

There will be no textbook required for this course. The students are suggested to read the following if they want to expand their learning:

> R. Siegwart, I. R. Nourbakhsh, D. Scaramuzza. Introduction to autonomous mobile robots. The MIT Press. Second edition. 2011.

UNSW Library website: https://www.library.unsw.edu.au/
Moodle: https://moodle.telt.unsw.edu.au/login/index.php