

School of Engineering and Computer Science

Te Kura Mātai Pūkaha, Pūrorohiko



Prescription

This course examines aspects of both physical and algorithmic aspects of modern mechatronic and robotic systems. Students are evaluated on their design, construction, testing and demonstration of a robotic device intended to address a specified problem. Students will then develop software for pose estimation and SLAM of a robot.

Course learning objectives

Students who pass this course should be able to:

1. Deconstruct a complex robotic engineering problem into its various interdependent subsystems.
2. Identify and develop suitable evaluation techniques for analysing and testing a music-themed robotic system.
3. Work both individually and collaboratively to design and implement a solution to a robotics-related engineering problem.
4. Use an appropriate simulation language to demonstrate the effectiveness of a proposed robotic system.

Withdrawal from Course

Withdrawal dates and process:

<https://www.wgtn.ac.nz/students/study/course-additions-withdrawals>

Lecturers

Christopher Hollitt (Coordinator)

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223 Alan MacDiarmid Building, Kelburn

Jim Murphy

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202 92 Fairlie Tce, Kelburn

Teaching Format

The first part of the course will use a Problem-Based Learning pedagogy where students will work on a series of problems and projects which will be supplemented by weekly lectures and labs. The problems

will collectively form a project where the expectation is for students to apply their learning in the design, construction, testing and demonstration of the final robotic artefact. Students will then examine how to manage a robot's internal knowledge of its position within the world and produce a map of its surroundings. This part of the course will consist of lectures and tutorials, along with two substantial simulation (Matlab-based) assignments.

Student feedback

ECEN426 has not been run in this form before, so feedback from previous students is not available.

Dates (trimester, teaching & break dates)

- Teaching: 05 July 2021 - 08 October 2021
- Break: 16 August 2021 - 29 August 2021
- Study period: 11 October 2021 - 14 October 2021
- Exam period: 15 October 2021 - 06 November 2021

Class Times and Room Numbers

Other Classes

ECEN426 does not have formal class times other than the lectures.

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Mandatory Course Requirements

There are no mandatory course requirements for this course.

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

Assessment

| Assessment Item | Due Date or Test Date | CLO(s) | Percentage |
|--|------------------------------|----------|------------|
| Project: Guided Literature Review (750 word report, 5 minute presentation) | Wk 3 | CLO: 1,2 | 10% |
| Project: Demonstration of formative (guided) engineering subsystem and individual report on the design, development and testing of the subsystem (2,000 word report, 10 minute presentation) | Wk 7 | CLO: 3 | 40% |
| Simulation-based Assignments (2) | Wk 10 , Assessment Period | CLO: 4 | 50% |

Penalties

Work submitted late will be penalised 10% per working day or part thereof.

Extensions

Extensions for assessment items will only be granted if discussed before the submission date.

Submission & Return

Work should be submitted by the ECS submission system unless otherwise noted. Feedback will be distributed via the submission system, or posted onto the ECS course page.

Workload

The student workload for this course is approximately 150 hours.

Teaching Plan

Week 0

| | |
|---------|---|
| Lecture | The first portion of classes will cover the design of a musical mechatronics system. |
| Lecture | The second portion of classes will address SLAM and introductory path planning for mobile robots. |

Communication of Additional Information

Additional information will be distributed via the course page on the ECS wiki.

Links to General Course Information

- Academic Integrity and Plagiarism: <https://www.wgtn.ac.nz/students/study/exams/integrity-plagiarism>

- Academic Progress: <https://www.wgtn.ac.nz/students/study/progress/academic-progress> (including restrictions and non-engagement)
- Dates and deadlines: <https://www.wgtn.ac.nz/students/study/dates>
- Grades: <https://www.wgtn.ac.nz/students/study/progress/grades>
- Special passes: Refer to the Assessment Handbook, at <https://www.wgtn.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>
- Statutes and policies, e.g. Student Conduct Statute: <https://www.wgtn.ac.nz/about/governance/strategy>
- Student support: <https://www.wgtn.ac.nz/students/support>
- Students with disabilities: https://www.wgtn.ac.nz/st_services/disability/
- Student Charter: <https://www.wgtn.ac.nz/learning-teaching/learning-partnerships/student-charter>
- Terms and Conditions: <https://www.wgtn.ac.nz/study/apply-enrol/terms-conditions/student-contract>
- Turnitin: <http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin>
- University structure: <https://www.wgtn.ac.nz/about/governance/structure>
- VUWSA: <http://www.vuwsa.org.nz>

Offering CRN: [18574](#)

Points: 15

Prerequisites: Permission of Head of School

Duration: 05 July 2021 - 07 November 2021

Starts: Trimester 2

Campus: Kelburn