UNSW Course Outline

# CODE2250 Robotic Computing - 2024

Published on the 31 Jan 2024

## General Course Information

**Course Code :** CODE2250
**Year :** 2024
**Term :** Term 1
**Teaching Period :** T1
**Is a multi-term course? :** No
**Faculty :** Faculty of Arts, Design and Architecture
**Academic Unit :** School of Built Environment
**Delivery Mode :** Multimodal
**Delivery Format :** Standard
**Delivery Location :** Kensington
**Campus :** Sydney
**Study Level :** Undergraduate
**Units of Credit :** 6

**Useful Links**

Handbook Class Timetable

## Course Details & Outcomes

### Course Description

The course introduces and critiques innovative research studies on robotic fabrication techniques and technologies. In this course, you will be provided with the conceptual understanding, technical skills and working methods required to fabricate architectural elements

and apply principles of robotics and digital fabrication to your design work. You will use programming languages to optimise both the design and fabrication process to improve the performance and function of the elements.

## Relationship to Other Courses

This course has a prerequisite: CODE1161

## Course Learning Outcomes

| Course Learning Outcomes |
| --- |
| CLO1 : Critique case studies and developments in robotic fabrication. |
| CLO2 : Apply computational thinking and methods to robotic fabrication. |
| CLO3 : Create design projects that apply principles of robotic and digital fabrication. |
| CLO4 : Apply relevant verbal and multimedia communication skills in a professional context. |
| CLO5 : Create and construct digitally fabricated working prototypes. |

| Course Learning Outcomes | Assessment Item |
| --- | --- |
| CLO1 : Critique case studies and developments in robotic fabrication. | • Design Report<br>• Prototyping Design Project |
| CLO2 : Apply computational thinking and methods to robotic fabrication. | • Final Exam<br>• Design Report<br>• Prototyping Design Project |
| CLO3 : Create design projects that apply principles of robotic and digital fabrication. | • Final Exam<br>• Design Report<br>• Prototyping Design Project |
| CLO4 : Apply relevant verbal and multimedia communication skills in a professional context. | • Design Report<br>• Prototyping Design Project |
| CLO5 : Create and construct digitally fabricated working prototypes. | • Design Report<br>• Prototyping Design Project |

## Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

## Additional Course Information

Students must have completed a workshop safety badge induction to complete this course : https://www.making.unsw.edu.au/access/entry-badges/

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|---|---|
| Design Report<br>Assessment Format: Individual | 40% | Start Date: Not Applicable<br>Due Date: Not Applicable |
| Prototyping Design Project<br>Assessment Format: Group | 40% | Start Date: Not Applicable<br>Due Date: Not Applicable |
| Final Exam<br>Assessment Format: Individual | 20% | Start Date: Not Applicable<br>Due Date: Not Applicable |

## Assessment Details

### Design Report

#### Assessment Overview

You will develop a report that reflects on covers your learning across weeks 1 - 5 and explains your initial prototype artefacts. Feedback will be given through the learning management system and the level of achievement will be indicated against the assignment criteria rubric as well as a section for additional comments. Feedback will also be given verbally in class where applicable.

#### Course Learning Outcomes

- CLO1 : Critique case studies and developments in robotic fabrication.
- CLO2 : Apply computational thinking and methods to robotic fabrication.
- CLO3 : Create design projects that apply principles of robotic and digital fabrication.
- CLO4 : Apply relevant verbal and multimedia communication skills in a professional context.
- CLO5 : Create and construct digitally fabricated working prototypes.

#### Detailed Assessment Description

The detailed assessment brief can be found on the Moodle homepage.

#### Assignment submission Turnitin type

Not Applicable

### Prototyping Design Project

#### Assessment Overview

In groups you will present a 20 minute oral presentation that covers your design projects. Each group will investigate the design, optimisation and programming methods to create robotically fabricated prototypes in relation to a specified area of research. Feedback will be given through the learning management system and the level of achievement will be indicated against the

assignment criteria rubric as well as a section for additional comments. Feedback will also be given verbally in class where applicable.

**Course Learning Outcomes**

- CLO1 : Critique case studies and developments in robotic fabrication.
- CLO2 : Apply computational thinking and methods to robotic fabrication.
- CLO3 : Create design projects that apply principles of robotic and digital fabrication.
- CLO4 : Apply relevant verbal and multimedia communication skills in a professional context.
- CLO5 : Create and construct digitally fabricated working prototypes.

**Detailed Assessment Description**

The detailed assessment brief can be found on the Moodle homepage.

**Assignment submission Turnitin type**

Not Applicable

### Final Exam

**Assessment Overview**

You will complete a final online exam that will assess your knowledge of programming concepts and knowledge utilised in assessments 1 and 2. The exam will cover all related course content from week 1 - 10. You will have two hours to complete the exam. Feedback will be given through the learning management system used.

**Course Learning Outcomes**

- CLO2 : Apply computational thinking and methods to robotic fabrication.
- CLO3 : Create design projects that apply principles of robotic and digital fabrication.

**Detailed Assessment Description**

The detailed assessment brief can be found on the Moodle homepage.

**Assignment submission Turnitin type**

Not Applicable

## General Assessment Information

**Grading Basis**

Standard

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 1 : 12 February - 18 February | Lecture | Course Introduction |
| | Tutorial | Course Introduction & Beginner Python for Grasshopper |
| Week 2 : 19 February - 25 February | Lecture | 3D Printing in the Context of the Built Environment |
| | Tutorial | Introduction to Custom Slicing |
| Week 3 : 26 February - 3 March | Lecture | In-depth Slicing Geometry |
| | Tutorial | Extended Slicing Techniques |
| Week 4 : 4 March - 10 March | Lecture | 3D Printing & Facade Desgin |
| | Tutorial | Python designing techniques - Geometry and Form |
| Week 5 : 11 March - 17 March | Lecture | Guest Lecture |
| | Tutorial | Studio Session & Consultations<br>Robotic Arm Inductions |
| | Assessment | Assessment 01 is due |
| Week 6 : 18 March - 24 March | Other | Flexibility week |
| Week 7 : 25 March - 31 March | Lecture | Sustainability, Additive Manufacturing & Built Environment |
| | Tutorial | Group Work on assessment 02 |
| Week 8 : 1 April - 7 April | Lecture | Optimisation Techniques for design of facades |
| | Tutorial | Group work on assessment 02<br>Studio Session |
| Week 9 : 8 April - 14 April | Lecture | Future of robotics in construction |
| | Tutorial | Group work on assessment 02<br>Studio Session |
| Week 10 : 15 April - 21 April | Assessment | Group work presentations in class - submission on assessment 02 |
| Week 11 : 22 April - 28 April | Homework | Students are to revise course content in prepartion of the python exam in W12. |
| Week 12 : 29 April - 5 May | Assessment | Assessment 03 is Due - Students are to complete the python exam online. |

## Attendance Requirements

You are expected to be regular and punctual in attendance at all classes for the School of Built Environment courses in which you are enrolled. If and where individual courses have specific attendance requirements, these will be stated in the course outline.

If you do not attend, engage, or participate in scheduled class activities, including lectures, tutorials, studios, labs, etc, you run the risk of failing a course.

If illness or unexpected and beyond your control circumstances prevent you from completing a task on time, or substantially disturb your assessment performance, you should apply for Special Consideration, as soon as practicable, accompanied by appropriate documentation.

No special consideration will be provided if you miss out on essential course information and materials, or if you miss assessment tasks and deadlines due to unexplained absences or an unapproved lack of attendance.

You may be advised by the Course Convenor to withdraw from the course if significant learning activities are missed.

# Course Resources

## Prescribed Resources

All resources relating to the course can be found on the Moodle homepage.

## Recommended Resources

García Cuevas, D., & Pugliese, G. (2020). Advanced 3D printing with grasshopper: clay and FDM. *(No Title)*.

## Additional Costs

As this course focuses on prototyping objects, there could be some costs associated with this. The course aims to provide materials where possible, but additional material may need to be purchased through the Design Futures Lab.

## Course Evaluation and Development

Feedback to students will be given through the learning management system, and the level of achievement will be indicated against the assignment criteria rubric as well as a section for additional comments. Feedback will also be given verbally in class where applicable.

Feedback from students: We encourage and support students to maintain regular contact with the course convenor to provide informal feedback throughout the course. For specific issues or detailed feedback, please arrange a meeting with the course convenor via email.

In this course there is an option for students to provide anonymous feedback via the course's Moodle page, which is directly sent to the convenor. As a final step, students are invited to share their insights and experiences by completing the MyExperience survey. The feedback gathered each year is integral to the continuous enhancement and development of the course.

# Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|---|---|---|---|---|---|---|---|
| Convenor | Charlotte Firth | | | | | No | Yes |

# Other Useful Information

## Academic Information

Due to evolving advice by NSW Health, students must check for updated information regarding online learning for all Arts, Design and Architecture courses this term (via Moodle or course information provided).

Please see: https://www.unsw.edu.au/arts-design-architecture/student-life/resources-support/protocols-guidelines for essential student information relating to:

- UNSW and Faculty policies and procedures;
- Student Support Services;
- Dean's List;
- review of results;
- credit transfer;
- cross-institutional study and exchange;
- examination information;
- enrolment information;
- Special Consideration in the event of illness or misadventure;
- student equity and disability;

And other essential academic information.

## Academic Honesty and Plagarism

Plagiarism is using the words or ideas of others and presenting them as your own. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement.

UNSW groups plagiarism into the following categories:

- Copying: Using the same or very similar words to the original text or idea without acknowledging the source or using quotation marks. This includes copying materials, ideas or concepts from a book, article, report or other written document, presentation, composition, artwork, design, drawing, circuitry, computer program or software, website, internet, other electronic resource, or another person's assignment without appropriate acknowledgement.
- Inappropriate paraphrasing: Changing a few words and phrases while mostly retaining the original information, structure and/or progression of ideas of the original without acknowledgement. This also applies in presentations where someone paraphrases another's ideas or words without credit and to piecing together quotes and paraphrases into a new whole, without appropriate referencing.

- Collusion: Working with others but passing off the work as a person's individual work. Collusion also includes providing your work to another student for the purpose of them plagiarising, paying another person to perform an academic task, stealing or acquiring another person's academic work and copying it, offering to complete another person's work or seeking payment for completing academic work.
- Inappropriate citation: Citing sources which have not been read, without acknowledging the "secondary" source from which knowledge of them has been obtained.
- Duplication ("self-plagiarism"): Submitting your own work, in whole or in part, where it has previously been prepared or submitted for another assessment or course at UNSW or another university.

The UNSW Academic Skills support offers resources and individual consultations. Students are also reminded that careful time management is an important part of study. One of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and proper referencing of sources in preparing all assessment items. UNSW Library has the ELISE tool available to assist you with your study at UNSW. ELISE is designed to introduce new students to studying at UNSW, but it can also be a great refresher during your study.

Completing the ELISE tutorial and quiz will enable you to:

- analyse topics, plan responses and organise research for academic writing and other assessment tasks
- effectively and efficiently find appropriate information sources and evaluate relevance to your needs
- use and manage information effectively to accomplish a specific purpose
- better manage your time
- understand your rights and responsibilities as a student at UNSW
- be aware of plagiarism, copyright, UNSW Student Code of Conduct and Acceptable Use of UNSW ICT Resources Policy
- be aware of the standards of behaviour expected of everyone in the UNSW community
- locate services and information about UNSW and UNSW Library

### Use of AI for assessments

As AI applications continue to develop, and technology rapidly progresses around us, we remain committed to our values around academic integrity at UNSW. Where the use of AI tools, such as ChatGPT, has been permitted by your course convener, they must be properly credited and your submissions must be substantially your own work.

In cases where the use of AI has been prohibited, please respect this and be aware that where unauthorised use is detected, penalties will apply.

Use of AI for assessments | UNSW Current Students

## Submission of Assessment Tasks

### Turnitin Submission

If you encounter a problem when attempting to submit your assignment through Turnitin, please telephone External Support on 9385 3331 or email them on externalteltsupport@unsw.edu.au

Support hours are 8:00am – 10:00pm on weekdays and 9:00am – 5:00pm on weekends (365 days a year). If you are unable to submit your assignment due to a fault with Turnitin, you may apply for an extension, but you must retain your ticket number from External Support (along with any other relevant documents) to include as evidence to support your extension application. If you email External Support, you will automatically receive a ticket number, but if you telephone, you will need to specifically ask for one. Turnitin also provides updates on their system status on Twitter.

Generally, assessment tasks must be submitted electronically via either Turnitin or a Moodle assignment. In instances where this is not possible, alternative submission details will be stated on your course's Moodle site. For information on how to submit assignments online via Moodle: https://student.unsw.edu.au/how-submit-assignment-moodle

### Late Submission Penalty

UNSW has a standard late submission penalty of:

- 5% per calendar day,
- for all assessments where a penalty applies,
- capped at five calendar days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Students are expected to manage their time to meet deadlines and to request Special Consideration as early as possible before the deadline. Support with Time Management is available here.

## School Contact Information

beadmin@unsw.edu.au