



UNSW Course Outline

BENV2001 Emerging Digital Technologies - 2024

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General Course Information

Course Code : BENV2001

Year : 2024

Term : Term 3

Teaching Period : T3

Is a multi-term course? : No

Faculty : Faculty of Arts, Design and Architecture

Academic Unit : School of Built Environment

Delivery Mode : In Person

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

This course will introduce you to the fields of robotic fabrication and collaborative robotics, which are emerging technologies for the built environment. This course will provide you with technical skills to operate collaborative robotic systems whilst identifying novel applications for

arts, design, and architecture. You will build a theoretical understanding of robotic applications for the built environment and the impact they could have on the built form in the future. You will be introduced to foundational programming knowledge and designing for robotic fabrication to carry out their applications. Through laboratory-based design exercises, you will investigate 2D and 3D works using the robot arm. You will design, generate, and reflect on your own robotic applications based on your own discipline.

Relationship to Other Courses

This elective is the first course in both the robotic fabrication and social robotics minors available to Bachelor of Design students. Students do not need to be enrolled in the minor to take this elective, but they must take it if they plan on completing either of the mentioned minors.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe technical and operational principles of robots.
CLO2 : Demonstrate robot operating skills for design.
CLO3 : Identify robotics application opportunities in and for design.
CLO4 : Apply robotics in design projects and professional work.

Course Learning Outcomes	Assessment Item
CLO1 : Describe technical and operational principles of robots.	<ul style="list-style-type: none">• Robotics Foundational Knowledge• Digital Process Journal• Design Project
CLO2 : Demonstrate robot operating skills for design.	<ul style="list-style-type: none">• Digital Process Journal• Design Project
CLO3 : Identify robotics application opportunities in and for design.	<ul style="list-style-type: none">• Design Project
CLO4 : Apply robotics in design projects and professional work.	<ul style="list-style-type: none">• Digital Process Journal• Design Project

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Learning and Teaching in this course

All lecture recordings, course content, and resources are available through Moodle. Course

communication, questions, and inquiries are to be made through the Teams platform.

Additional Course Information

To take this course, students must complete a maker space induction. The induction is called the Workshop Safety Badge, <https://www.making.unsw.edu.au/access/badges/b/workshop-safety-badge/>. It can be booked at the Design Futures Lab, Engineering Makerspace, and the Art and Design Makerspace.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Robotics Foundational Knowledge Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Not Applicable
Digital Process Journal Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Not Applicable
Design Project Assessment Format: Group	40%	Start Date: Not Applicable Due Date: Not Applicable

Assessment Details

Robotics Foundational Knowledge

Assessment Overview

You will take an online quiz that will test your operational and technical knowledge of robotics. Feedback will be provided upon completion.

Course Learning Outcomes

- CLO1 : Describe technical and operational principles of robots.

Detailed Assessment Description

Please refer to the detailed assessment brief on moodle, the quiz tests knowledge on the first 3 weeks of lectures and tutorials.

Assessment Length

25 Questions

Submission notes

Moodle Quiz

Assignment submission Turnitin type

This is not a Turnitin assignment

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

Digital Process Journal

Assessment Overview

You will develop small design projects that demonstrate skills and knowledge in collaborative robotics. Marking will be done using a rubric with students receiving individual verbal feedback. Class-wide feedback will also be provided.

Course Learning Outcomes

- CLO1 : Describe technical and operational principles of robots.
- CLO2 : Demonstrate robot operating skills for design.
- CLO4 : Apply robotics in design projects and professional work.

Detailed Assessment Description

Please refer to the detailed assessment brief on moodle. The journal documents in-class learning and design prototypes made within the first 5 tutorials.

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.

If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct &

Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see [here](#).

Design Project

Assessment Overview

In groups, you will design projects demonstrating skills and knowledge for robotic applications in the built environment. As a group, you will give a 20 minute oral presentation on your project. Individual contributions will be assessed. Marking will be done using a rubric with students receiving individual written feedback. Class-wide feedback will also be provided.

Course Learning Outcomes

- CLO1 : Describe technical and operational principles of robots.
- CLO2 : Demonstrate robot operating skills for design.
- CLO3 : Identify robotics application opportunities in and for design.
- CLO4 : Apply robotics in design projects and professional work.

Detailed Assessment Description

Please refer to the detailed assessment brief on Moodle. Working in groups students will design, fabricate and assemble a small prototype of an architectural element using hot-wire cutting tools with our collaborative robot arms.

Assessment Length

20 Minute Group Presentation

Assignment submission Turnitin type

This is not a Turnitin assignment

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

If your Convenor has concerns that your answer contains passages of AI-generated text or media that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text and media as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your

submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

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General Assessment Information

Grading Basis

Standard

Requirements to pass course

Students must receive a composite grade of at least 50 out of 100 to pass this course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Activity	Students are encouraged to download Rhino 8 on their laptops for Week 01. https://www.rhino3d.com/download/ Students are encouraged to familiarise themselves with Moodle and the course outline.
Week 1 : 9 September - 15 September	Lecture	Lecture 01: Course Introduction & Structure
	Tutorial	Tutorial 01: Tutorial 01 will cover basic knowledge of robotic fabrication. Students will be inducted on our collaborative robots in the Design Futures Lab and carry out their first program with guidance from technicians. Tutors will help students set up their laptops for the rest of the term.
	Module	Optional Online Module: Students are encouraged to complete the online learning module on Moodle that covers the basics of Rhino Modelling of 2D / 3D shapes.
Week 2 : 16 September - 22 September	Lecture	Lecture 02: Lecture 2 investigates robotic fabrication in design and architecture in the past few decades.
	Tutorial	Tutorial 02: Design Workshop 01. This workshop teaches students how to create their first robotic program which is an artwork of their choosing. Students will have time to create their artworks for assessment 02. If there is time at the end of class, students can run their programs on the robots.
	Module	Online Module: Learn Module 02 shows students how to export their program and run it on the collaborative robot. The module how to use the teach pendant and tools available to them in the workshop. Some of this content will be in the quiz, and students are highly advised to complete this short module.
Week 3 : 23 September - 29 September	Lecture	Lecture 03: Lecture 3 explores the history of robots & robot arms in pop culture and their influence on various industries.
	Tutorial	Tutorial 03: Design Workshop II - Tutors will show students multiple methods on how to create and design different artworks using Rhino and Illustrator. Students will have time to run their programs in class.
	Assessment	Assessment 01: Robotics Foundational Knowledge Quiz. Please refer to the detailed assessment brief on Moodle for further information.
Week 4 : 30 September - 6 October	Lecture	Lecture 04: Guest Lecture
	Tutorial	Tutorial 04: Design Workshop III—Students will learn about 3D foam cutting using collaborative robotics. Tutors will guide students step by step through creating a foam-cutting program. Foam pieces will be supplied for students to carry out their first experiment.
	Module	Online Module: This learn module covers additional knowledge on how to use the foam-cutting tool attached to the collaborative robotics in the workshop, students are highly encouraged to do this online module before their first booking on the robot.
Week 5 : 7 October - 13 October	Lecture	Lecture 05: This lecture covers assessment 03 in depth. It provides students with guidelines, previous examples, and information on how to complete this assessment.
	Tutorial	Tutorial 05: Tutors will demonstrate different methods of foam cutting techniques to students to increase the complexity of the designs. Students will have time to run their programs and tutors will help them model more complex shapes and forms. Students will pick their groups for assessment 03 and have a small team meeting at the end of class.
Week 6 : 14 October - 20 October	Assessment	Assessment 02 is due; please refer to the detailed assessment brief on Moodle.
Week 7 : 21 October - 27 October	Lecture	Lecture 07: Lecture 07 investigates sustainability and robotics for the built environment.
	Tutorial	Tutorial 07: This will be a studio class. Students will be working on assessment 3. They will have time to design, program and operate the robots in class. Groups will have consultations with their tutors to receive feedback on progress and troubleshoot any issues.
Week 8 : 28 October - 3 November	Lecture	Lecture 08: Lecture 08 showcases the robotics and computational design research our academic team is conducting at UNSW.
	Tutorial	Tutorial 08: This will be a studio class. Students will be working on assessment 3. They will have time to design, program and operate the robots in class. Groups will have consultations with their tutors to receive feedback on progress and troubleshoot any issues.
Week 9 : 4 November - 10 November	Lecture	Lecture 09: This lecture will wrap up the course content and discuss the future of robotics in design, architecture, and construction. Students will

		also be showcased the robotic fabrication minor.
	Tutorial	Tutorial 09: Students will be working on assessment 3. They will have time to design, program and operate the robots in class. Groups will have consultations with their tutors to receive feedback on progress and troubleshoot any issues.
Week 10 : 11 November - 17 November	Lecture	No lecture in week 10 - Final Presentations
	Assessment	Tutorial 10: Assessment 03 is due in class. Students will present with their team members within the tutorial timeslot. Please refer to the detailed assessment brief on Moodle.
Week 11 : 18 November - 24 November	Other	Please ensure you have uploaded all your assessments and individual reflections to Moodle by the end of Week 10.

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

Due to the practical nature of this course, tutorials will not be recorded; students are strongly advised to attend all lectures and tutorials.

Course Resources

Prescribed Resources

All resources are made available to students through Moodle.

Additional Costs

Materials will be supplied to students; if the materials are exhausted, students may have to buy additional foam from the Design Futures Lab.

Course Evaluation and Development

Feedback will be both formal and informal. Students will receive formal written feedback for each assessment through Moodle. Tutors will give informal feedback weekly as students progress through the course. Class-wide feedback will be offered in lectures after each assessment.

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
Lecturer	Charlotte Firth		Anita B. Level 02 Room 2015		Email for availability	No	Yes

Other Useful Information

Academic Information

For essential student information relating to:

- UNSW and Faculty policies and procedures;
- Student Support Services;
- Student equity and disability;
- Special Consideration in the event of illness or misadventure;
- Examination information;
- Review of results;

Please see: <https://www.unsw.edu.au/arts-design-architecture/student-life/resources-support/protocols-guidelines>

Academic Honesty and Plagiarism

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

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](#).

Important note: UNSW has a “fit to sit/submit” rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

School Contact Information

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