UNSW Course Outline

# CODE2132 Computational Design 3 (Urban) - 2024

Published on the 22 May 2024

## General Course Information

**Course Code :** CODE2132
**Year :** 2024
**Term :** Term 2
**Teaching Period :** T2
**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

Computational Design 3 (Urban) develops intermediate skills in a visual programming language interface and a text-based programming language to create algorithmic processes for data driven urban design. You will iteratively and collaboratively generate, analyse, and evaluate

spatial massing and urban design layouts. You will use a dynamic game engine environment to explore and communicate design proposals.

## Relationship to Other Courses

CODE2132 (Urban) is the third core computational design course, the preceeding coursese being CODE2121 Computational Design 2 (Structure) and CODE1240 Computational Design 1 (Building)

## Course Learning Outcomes

| Course Learning Outcomes |
| --- |
| CLO1 : Apply intermediate visual and text-based programming skills to the design of buildings and spaces that respond to their urban context. |
| CLO2 : Analyse and evaluate algorithms for data driven urban design. |
| CLO3 : Communicate design proposals using a dynamic game engine environment. |
| CLO4 : Apply collaborative skills in teamwork to ensure productivity and shared responsibility. |

| Course Learning Outcomes | Assessment Item |
| --- | --- |
| CLO1 : Apply intermediate visual and text-based programming skills to the design of buildings and spaces that respond to their urban context. | • Building Structure and Standards Modelling<br>• Urban Scale Building Envelope Modelling |
| CLO2 : Analyse and evaluate algorithms for data driven urban design. | • Building Structure and Standards Modelling<br>• Urban Scale Building Envelope Modelling |
| CLO3 : Communicate design proposals using a dynamic game engine environment. | • Building Facade and Layout Modelling<br>• Building Structure and Standards Modelling |
| CLO4 : Apply collaborative skills in teamwork to ensure productivity and shared responsibility. | • Building Facade and Layout Modelling |

## Learning and Teaching Technologies

Moodle - Learning Management System

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|---|---|
| Building Facade and Layout Modelling<br>Assessment Format: Individual<br>Short Extension: Yes (5 days) | 40% | Start Date: 27/05/2024 12:00 AM<br>Due Date: 10/06/2024 12:00 AM |
| Building Structure and Standards Modelling<br>Assessment Format: Individual<br>Short Extension: Yes (5 days) | 30% | Start Date: 10/06/2024 12:00 AM<br>Due Date: 08/07/2024 12:00 AM |
| Urban Scale Building Envelope Modelling<br>Assessment Format: Individual<br>Short Extension: Yes (5 days) | 30% | Start Date: 08/07/2024 12:00 AM<br>Due Date: 12/08/2024 12:00 AM |

## Assessment Details

### Building Facade and Layout Modelling

**Assessment Overview**

You will design and create a building facade in a programming environment and analyse its performance to enable its optimisation. Grading will be done against assessment criteria accompanied by written feedback.

**Course Learning Outcomes**

- CLO3 : Communicate design proposals using a dynamic game engine environment.
- CLO4 : Apply collaborative skills in teamwork to ensure productivity and shared responsibility.

**Assignment submission Turnitin type**

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

### Building Structure and Standards Modelling

**Assessment Overview**

You will investigate and use industry building regulations in a programming environment to design and create the structural elements of buildings to satisfy performance requirements. Grading will be done against assessment criteria accompanied by written feedback.

**Course Learning Outcomes**

- CLO1 : Apply intermediate visual and text-based programming skills to the design of buildings and spaces that respond to their urban context.

- CLO2 : Analyse and evaluate algorithms for data driven urban design.
- CLO3 : Communicate design proposals using a dynamic game engine environment.

**Submission notes**

Moodle Turnitin

**Assignment submission Turnitin type**

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

### Urban Scale Building Envelope Modelling

**Assessment Overview**

You will use data and programming to design and create building envelopes that respond to their urban context. Grading will be done against assessment criteria accompanied by written feedback.

**Course Learning Outcomes**

- CLO1 : Apply intermediate visual and text-based programming skills to the design of buildings and spaces that respond to their urban context.
- CLO2 : Analyse and evaluate algorithms for data driven urban design.

**Assignment submission Turnitin type**

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

## General Assessment Information

See detailed assessment brief for more information regarding assessments.

**Grading Basis**

Standard

**Requirements to pass course**

To pass this course you will need to achieve a composite mark of at least 50 out of 100.

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 0 : 20 May - 26 May | Homework | Prepare software for class:<br>- Rhino / GH - Python 3.10+ - Code Editor - VSCode, Webstorm/Pycharm, etc. |
| Week 1 : 27 May - 2 June | Lecture | Introduction to Computational Facade Modeling |
| | Tutorial | Introduction to merging Grasshopper and basic Python scripting for building scale modeling |
| Week 2 : 3 June - 9 June | Lecture | Parametric Facade Design with Python |
| | Tutorial | Grasshopper intergration and Python scripting for facade modeling. |
| Week 3 : 10 June - 16 June | Lecture | Advanced Facade Modeling Techniques Using Data |
| | Tutorial | Using plugins in Grasshopper and Python to intergrate collected data for complex facade modeling. |
| Week 4 : 17 June - 23 June | Lecture | Environmental Analysis and Optimisation Using Facades |
| | Tutorial | Simulating solar radiation and heat gain on building facades with Grasshopper and Python processes in the urban context. |
| Week 5 : 24 June - 30 June | Lecture | Integration of Building Performance Data |
| | Tutorial | Linking facade design with performance data in Grasshopper using Python. |
| Week 6 : 1 July - 7 July | Lecture | No lecture - Flexibility Week |
| | Tutorial | No tutorial - Flexibility Week |
| Week 7 : 8 July - 14 July | Lecture | Scaling Up: From Building to Urban Scale |
| | Tutorial | Introduction to urban modeling tools for contextual design and analysis. |
| Week 8 : 15 July - 21 July | Lecture | Urban Heat Island Effect |
| | Tutorial | Simulation of urban heat effects in Grasshopper. |
| Week 9 : 22 July - 28 July | Lecture | Data Management and Analysis for Urban Scale Design |
| | Tutorial | Data visualisation processes for web-based design outputs. |
| Week 10 : 29 July - 4 August | Lecture | Web Dashboard Development for Design Visualisation |
| | Tutorial | Creating interactive web dashboards using Python libraries from Grasshopper. |

## 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.

## General Schedule Information

This course is delivered through an one-hour lecture and a three hour tutorial each week. The lectures/workshops will be recorded for your reference at any time.

# Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|---|---|---|---|---|---|---|---|
| Convenor | Daniel Yu | | Anita Lawrence West, R2015 Level 2 | | Organise via email | Yes | 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