UNSW Course Outline

ZEIT8413 Simulation Applications - 2024

Published on the 09 Feb 2024

General Course Information

Course Code : ZEIT8413
Year : 2024
Term : Semester 1
Teaching Period : Z1
Is a multi-term course? : No
Faculty : UNSW Canberra
Academic Unit : School of Systems and Computing
Delivery Mode : Online
Delivery Format : Standard
Delivery Location : UNSW Canberra at ADFA
Campus : UNSW Canberra
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

In today's complex environment, Modelling and Simulation (M&S) applications are widely used in various disciplines and domains (e.g. defence, business, public policy) to support many decision making and education areas, including: problem solving, research, training, and acquisition.

Large scale M&S applications are typically developed through large complex projects. These projects involve multiple teams with different organizational and technical knowledge and skills, who contribute to different aspects and phases of the development process, such as project management, technical development, and training.

Building knowledge and skills related to M&S application is an essential for those who are interested to get involved in various aspects of M&S application projects.

This course (6 UoC) provides ‘know-how’ knowledge and skills for developing and using M&S applications. This is achieved by offering the following: fundamental and generic (technique and domain non-specific) understanding of M&S applications, an integrated view of M&S application development (i.e. theory, methodology, case studies), a practice-oriented focus (i.e. problem solving exercises, showcases), and a learning by doing experience (i.e. project-based assignment).

Course Learning Outcomes

Course Learning Outcomes
CLO1 : On successful completion of this program, the student will be able to recognize the potential of using various Modeling and Simulation application types in solving complex problematic issues
CLO2 : On successful completion of this program, the student will be able to understand and make use of the fundamental concepts and terminologies used in Modeling and Simulation applications, and how these concepts relate to real life issues.
CLO3 : On successful completion of this program, the student will be able to design and apply a process for developing and using Modeling and Simulation applications to address a complex problematic situation.
CLO4 : On successful completion of this program, the student will be able to reflect critically on the process for developing Modeling and Simulation applications, including encountered challenges and learnt lessons

Course Learning Outcomes	Assessment Item
CLO1 : On successful completion of this program, the student will be able to recognize the potential of using various Modeling and Simulation application types in solving complex problematic issues	• Project Assessment 1 • Project Assessment 3
CLO2 : On successful completion of this program, the student will be able to understand and make use of the fundamental concepts and terminologies used in Modeling and Simulation applications, and how these concepts relate to real life issues.	• Project Assessment 2 • Project Assessment 3
CLO3 : On successful completion of this program, the student will be able to design and apply a process for developing and using Modeling and Simulation applications to address a complex problematic situation.	• Project Assessment 2 • Project Assessment 3
CLO4 : On successful completion of this program, the student will be able to reflect critically on the process for developing Modeling and Simulation applications, including encountered challenges and learnt lessons	• Project Assessment 2 • Project Assessment 3

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

The teaching approach to be employed will involve:

- individual study of the essential texts and web-based resources identified in this booklet, with the aim of developing knowledge of, and skills in, simulation modeling
- independent study of additional textual materials and other coursework resources, as necessary to strengthen your understanding;
- presenting specific coursework materials to: set the context, provide examples, and guide your individual study.

Assessable work has been designed to bring out specific lessons from the topics covered in the course up to selected points in time. As your lecturers, Dr. Turan and Prof. Sarker will provide written formative (qualitative) feedback to you at the time of returning materials that have been submitted for assessment. This feedback will indicate the extent to which you have assimilated the coursework covered.

Email will be used to provide responses to student questions. Where these responses are of general interest, responses will be posted for the benefit of all students.

;

- independent study of additional textual materials and other coursework resources, as necessary to strengthen your understanding;

Other Professional Outcomes

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Project Assessment 1	10%	Start Date: Not Applicable Due Date: 08/03/2024 11:55 PM
Project Assessment 2	45%	Start Date: Not Applicable Due Date: 26/04/2024 11:55 PM
Project Assessment 3	45%	Due Date: 07/06/2024 11:55 PM

Assessment Details

Project Assessment 1

Assessment Overview

The purpose of assignment 1 is to outline the scope of your M&S application project. It will be used as a reference point for your subsequent assignments.

Course Learning Outcomes

- CLO1 : On successful completion of this program, the student will be able to recognize the potential of using various Modeling and Simulation application types in solving complex problematic issues

Detailed Assessment Description

Task

The purpose of assignment 1 is to outline the scope of your M&S application project. It will be used as a reference point for your subsequent assignments.

Objective

The objective is to demonstrate your ability to:

- Recognize the potential of using a M&S application to solve a problematic situation,
- Select and define the project context where you will develop and use the M&S application.

Preparation

1. Use the following selection criteria for setting up your project:

- Importance of using M&S application to address a real-life problem situation
- Relevance of the simulation application to your work or study area.
- Availability and ease of access to all data and information essential for completing the project within the expected timeline and quality.

2. Use the following resources to help you prepare your assignment:

- Part 1 (M&S application fundamentals), mainly sections: Introduction, M&S applications taxonomy, and M&S types.
- Part 3 (M&S case studies) gives you examples of real-life examples of M&S applications.
- The course resource reading document is available on Moodle.

Guidelines

See course Moodle page for Guidelines

Assessment Length

3 pages (single space)

Assignment submission Turnitin type

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

Project Assessment 2

Assessment Overview

The purpose of this assignment is to describe the project activities (process and outcome) applied for formulating the problem, specifying requirements, and developing the conceptual model. This assignment presents a critical milestone in your project as it collates your understanding of the problem situation and simulation application requirements. It also serves as a reference point for building and testing the computer model. Tasks included practical activities for problem formulation, requirement engineering, and conceptual modelling, along with related verification and validation activities.

Course Learning Outcomes

- CLO2 : On successful completion of this program, the student will be able to understand and make use of the fundamental concepts and terminologies used in Modeling and Simulation applications, and how these concepts relate to real life issues.
- CLO3 : On successful completion of this program, the student will be able to design and apply a process for developing and using Modeling and Simulation applications to address a complex problematic situation.
- CLO4 : On successful completion of this program, the student will be able to reflect critically on the process for developing Modeling and Simulation applications, including encountered challenges and learnt lessons

Detailed Assessment Description

Task

The purpose of this assignment is to describe the project activities (process and outcome) applied to formulating the problem, specifying requirements, and developing the conceptual model. This assignment presents a critical milestone in your project as it collates your understanding of the problem situation and simulation application requirements. It also serves as a reference point for building and testing the computer model.

Objective

The objective is to demonstrate your knowledge and skills required for building a conceptual model for M&S application. This includes the activities of problem formulation, requirement engineering, and conceptual modelling, along with related verification and validation activities.

Preparation

1. Use the M&S development lifecycle to structure the way you tackle the task and organize your document.
2. Use the following resources to help you prepare your assignment:

- Part 2 (M&S lifecycle), mainly sections: Validation & Verification, Problem formulation, Requirement engineering, M&S conceptualization, and Documentation.
- The course resource reading document is available on Moodle.

Guidelines

See course Moodle page for Guidelines

Assessment Length

15 pages (Single Space)

Assignment submission Turnitin type

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

Project Assessment 3

Assessment Overview

The purpose of this assignment is to describe the project activities (process and outcome) applied for the design and technical implementation of the M&S application. It also presents and interprets results obtained from the simulation experimentation. Tasks included practical activities for M&S application design, technical implementation, experimentation, presentation of results, along with related verification and validation activities.

Course Learning Outcomes

- CLO1 : On successful completion of this program, the student will be able to recognize the potential of using various Modeling and Simulation application types in solving complex problematic issues
- CLO2 : On successful completion of this program, the student will be able to understand and make use of the fundamental concepts and terminologies used in Modeling and Simulation applications, and how these concepts relate to real life issues.
- CLO3 : On successful completion of this program, the student will be able to design and apply a process for developing and using Modeling and Simulation applications to address a complex problematic situation.
- CLO4 : On successful completion of this program, the student will be able to reflect critically on the process for developing Modeling and Simulation applications, including encountered challenges and learnt lessons

Detailed Assessment Description

Task

The purpose of assignment 1 is to outline the scope of your M&S application project. It will be used as a reference point for your subsequent assignments.

Objective

The objective is to demonstrate your ability to:

- Recognize the potential of using a M&S application to solve a problematic situation,
- Select and define the project context where you will develop and use the M&S application.

Preparation

1. Use the following selection criteria for setting up your project:

- Importance of using M&S application to address a real-life problem situation
- Relevance of the simulation application to your work or study area.
- Availability and ease of access to all data and information essential for completing the project within the expected timeline and quality.

2. Use the following resources to help you prepare your assignment:

- Part 1 (M&S application fundamentals), mainly sections: Introduction, M&S applications taxonomy, and M&S types.
- Part 3 (M&S case studies) gives you examples of real-life examples of M&S applications.
- The course resource reading document is available on Moodle.

Guidelines

See course Moodle page for Guidelines

Assessment Length

20 pages (single space)

Assessment information

This assessment also inlcudes submission of a recorded presentation (maximum length is 10 minutes)

Assignment submission Turnitin type

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

General Assessment Information

All marks obtained for assessment items during the session are provisional. The final mark as

published by the university following the assessment review group meeting is **the only official mark.** Students are required to undertake **a project-based assessment that includes three independent assignments.**

The assessment to immerse you in a 'learning by doing' experience to develop and use M&S applications. The project experience allows you to demonstrate:

1. Your understanding of how to apply the principles, process, and techniques presented in the course into a real-world case study relevant to your work or study area, and

2. Your understanding of how to produce various simulation application artefacts, starting from early problem formulation to experimentation, including intermediate conceptual model and computer models.

Upon a successful completion of the project, you will have developed a **practical understanding** of the requirements for a successful development and use of a M&S application. A full documentation of the course assessment will be available on the course Moodle website.

Through the project, you are **encouraged to seek early and frequent guidance** from your lecturers regarding the development of your assignments. You can find information on the availability of the course lecturers at the course Moodle website.

Late Submission of Assessment: Unless prior arrangement is made with the lecturer or a formal application for special consideration is submitted, **a penalty of 5% of the total available mark for the assessment will apply for each day that an assessment item is late up to a maximum of 5 days (120 hours)** after which an assessment can no longer be submitted and a grade of 0 will be applied.

Grading Basis

Standard

Requirements to pass course

To pass the course, **students must submit Parts 1, 2, and 3.** The overall passing mark is set at 50%.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 26 February - 1 March	Blended	• Introduction to the course • Modelling and Simulation: Fundamental concepts and Taxonomy • Introduction to the Modelling and Simulation lifecycle
Week 2 : 4 March - 8 March	Assessment	Assignment 1 preparation
Week 3 : 11 March - 15 March	Other	• The Practice of Problem formulation • AnyLogic Practice (Get yourself familiar with the software)
Week 4 : 18 March - 22 March	Other	• Validation of the Problem formulation • AnyLogic Practice (Get yourself familiar with the software)
Week 5 : 25 March - 29 March	Other	• Requirement elicitation and validation • AnyLogic Practice (Develop a conceptual model using AnyLogic)
Week 6 : 1 April - 5 April	Other	• Conceptual modelling + Validating the conceptual model • AnyLogic Practice
Week 7 : 22 April - 26 April	Assessment	Assignment 2 wrap up
Week 8 : 29 April - 3 May	Other	• Model design: selecting a modelling technique • AnyLogic Practice
Week 9 : 6 May - 10 May	Other	• Technical model implementation • Model testing
Week 10 : 13 May - 17 May	Other	• Technical model implementation • Model testing
Week 11 : 20 May - 24 May	Other	• Technical model implementation • Model testing
Week 12 : 27 May - 31 May	Other	Model use for experimentation
Week 13 : 3 June - 7 June	Assessment	Assignment 3 wrap up

Attendance Requirements

Not Applicable - as no class attendance is required

Course Resources

Prescribed Resources

Compulsory Text: *Robinson, S. (2014). Simulation: the practice of model* development and use, *Bloomsbury Publishing*. You can access the electronic version of the book via the Academy Library.

In addition to the compulsory text, you will also need to go through the Course Slides and Reading Material available on the course Moodle website to be able to complete the course assignment.

Recommended Resources

The **recommended** simulation modelling software for this course is *AnyLogic*. However, the students are free to use any software.

The Personal Learning Edition (PLE) of Anylogic is free and it can be downloaded from https://www.anylogic.com/downloads/. The course Moodle website also contains tutorials on AnyLogic prepared by course instructors.

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups. Student opinions really do make a difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

Important note: *Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct Policy*

https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Hasan Turan					No	Yes
Lecturer	Ruhul Sarker					No	No

Other Useful Information

Academic Information

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of each course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups (where applicable). Student opinions really do make a difference. Refer to the Moodle site for your course to see how the feedback from previous students has contributed to the course development.

Important note: Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct.

https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf

Equitable Learning Services (ELS)

Students living with neurodivergent, physical and/or mental health conditions or caring for someone with these conditions may be eligible for support through the Equitible Learning Services team. Equitable Learning Services is a free and confidential service that provides practical support to ensure your mental or physical health conditions do not adversely affect your studies.

Our team of dedicated **Equitable Learning Facilitators** (ELFs) are here to assist you through this process. We offer a number of services to make your education at UNSW easier and more equitable.

Further information about ELS for currently enrolled students can be found at: https://www.student.unsw.edu.au/equitable-learning

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct. Find relevant information at: Student Code of Conduct (unsw.edu.au)

Plagiarism undermines academic integrity and is not tolerated at UNSW. It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from deliberate cheating to accidental copying from a source without acknowledgement.

For more information, please refer to the following:

https://student.unsw.edu.au/plagiarism

Submission of Assessment Tasks

Special Consideration

Special Consideration is the process for assessing and addressing the impact on students of short-term events, that are beyond the control of the student, and that affect performance in a specific assessment task or tasks.

Applications for Special Consideration will be accepted in the following circumstances only:

- Where academic work has been hampered to a substantial degree by illness or other cause;
- The circumstances are unexpected and beyond the student's control;
- The circumstances could not have reasonably been anticipated, avoided or guarded against by the student; and either:

(i) they occurred during a critical study period and was 3 consecutive days or more duration, or a total of 5 days within the critical study period; or

(ii) they prevented the ability to complete, attend or submit an assessment task for a specific date (e.g. final exam, in class test/quiz, in class presentation)

Applications for Special Consideration must be made as soon as practicable after the problem occurs and at the latest within three working days of the assessment or the period covered by the supporting documentation.

By sitting or submitting the assessment task the student is declaring that they are fit to do so and cannot later apply for Special Consideration (UNSW 'fit to sit or submit' requirement).

Sitting, accessing or submitting an assessment task on the scheduled assessment date, after applying for special consideration, renders the special consideration application void.

Find more information about special consideration at: https://www.student.unsw.edu.au/special/consideration/guide

Or apply for special consideration through your MyUNSW portal.

Late Submission of assessment tasks (other than examinations)

UNSW has a standard late submission penalty of:

- 5% per day,
- capped at five 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 extensions as early as possible before the deadline.

Electronic submission of assessment

Except where the nature of an assessment task precludes its electronic submission, all assessments must be submitted to an electronic repository, approved by UNSW or the Faculty, for archiving and subsequent marking and analysis.

Release of final mark

All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting is the only official mark.

School-specific Information

The Leaning Management System

Moodle is the Learning Management System used at UNSW Canberra. All courses have a Moodle site which will become available to students at least one week before the start of semester. Please find all help and documentation (including Blackboard Collaborate) at the Moodle Support page.

UNSW Moodle supports the following web browsers:
• Google Chrome 50+
• Safari 10+
Internet Explorer is not recommended. Addons and Toolbars can affect any browser's performance.

Operating systems recommended are:
• Windows 10,
• Mac OSX Sierra,
• iPad IOS10

Further details:

Moodle System Requirements

Moodle Log In

If you need further assistance with Moodle:

For enrolment and login issues please contact:

IT Service Centre

Email: itservicecentre@unsw.edu.au

Phone: (02) 9385-1333

International: +61 2 9385 1333

For all other Moodle issues please contact:

External TELT Support

Email: externalteltsupport@unsw.edu.au

Phone: (02) 9385-3331

International: +61 2 938 53331

Opening hours:

Monday – Friday 7:30am – 9:30 pm

Saturday & Sunday 8:30 am – 4:30pm

Study at UNSW Canberra

Study at UNSW Canberra has lots of useful information regarding:

• Where to get help

• Administrative matters

• Getting your passwords set up

• How to log on to Moodle

• Accessing the Library and other areas.

UNSW Canberra Student Hub

For News and Notices, Student Services and Support, Campus Comminity, Quick Links, Important Dates and Upcoming Events

School Contact Information

Deputy Head of School (Education): Dr Erandi Hene Kankanamge

E: e.henekankanamge@adfa.edu.au

T: 02 5114 5157

Syscom Admin Support: syscom@unsw.edu.au

T: 02 5114 5284

Syscom Admin Office: Building 15, Level 1, Room 101 (open 10am to 3pm, Mon to Fri)