UNSW Course Outline

ZEIT8305 Systems Thinking and Modelling - 2024

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General Course Information

Course Code : ZEIT8305
Year : 2024
Term : Semester 2
Teaching Period : Z2
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

Future systems engineers and project managers have to deal with increasingly complex problems that extend beyond technical engineering knowledge. Crucial part of this is acquiring the skills and knowledge required for understanding the complexities arising from the

interactions between social, technological, and decision-making factors. Systems thinking, a complex problem-solving approach, is recognized as a critical and essential competency for systems engineers and project managers by many Australian and international professional bodies (e.g. INCOSE Systems Engineers Competency Framework).

This course (6 UoC) aims to build your fundamental understanding of the systems thinking/ system dynamics approach, as well as your capacity to use this approach to critically analyse problematic issues. The course is relevant and critical to all areas and applications related to systems engineering and project management. This is achieved by offering students a fundamental understanding of systems thinking/system dynamics concepts and principles, a practice-oriented focus (i.e. problem-solving exercises, showcases), and a practical systems inquiry into complex problems (i.e. case study-based assignments)

Course Learning Outcomes

Course Learning Outcomes
CLO1 : On successful completion of this program, the student will be able to recognize the limitations of traditional reductionist approaches on dealing with the complex nature of systems.
CLO2 : On successful completion of this program, the student will be able to identify the value of using systems thinking/system dynamics approach in analysing problematic issues and inform decision making
CLO3 : On successful completion of this program, the student will be able to use the systems thinking language to define and characterise complex problems, and their dominant features.
CLO4 : On successful completion of this program, the student will be able to apply various systems thinking and systems dynamics techniques and tools to visualise, analyse, and communicate about various aspects of complex problems

Course Learning Outcomes	Assessment Item
CLO1 : On successful completion of this program, the student will be able to recognize the limitations of traditional reductionist approaches on dealing with the complex nature of systems.	• Mini-assessment • Case Study Assignment (Part 1)
CLO2 : On successful completion of this program, the student will be able to identify the value of using systems thinking/system dynamics approach in analysing problematic issues and inform decision making	• Case Study Assignment (Part 1)
CLO3 : On successful completion of this program, the student will be able to use the systems thinking language to define and characterise complex problems, and their dominant features.	• Case Study Assignment (Part 2) • Mini-assessment • Case Study Assignment (Part 1)
CLO4 : On successful completion of this program, the student will be able to apply various systems thinking and systems dynamics techniques and tools to visualise, analyse, and communicate about various aspects of complex problems	• Case Study Assignment (Part 2) • Case Study Assignment (Part 1)

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

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, to develop knowledge of, and skills in, systems thinking and system dynamics modelling;
- 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 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 lecturer, Dr Elsawah 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

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Mini-assessment Assessment Format: Individual	10%	Start Date: 30/09/2024 12:00 AM Due Date: 05/10/2024 11:59 PM
Case Study Assignment (Part 1) Assessment Format: Individual Short Extension: Yes (5 days)	45%	Start Date: Not Applicable Due Date: 03/11/2024 11:59 PM
Case Study Assignment (Part 2) Assessment Format: Individual Short Extension: Yes (5 days)	45%	Due Date: 15/12/2024 11:59 PM

Assessment Details
Mini-assessment

Assessment Overview

This mini assessment aims to test students basic understanding of concepts employed in the course. The assessment is designed as a quiz for the distance students, and as a reflective practice journaling activity for IDM students.

Course Learning Outcomes

- CLO1 : On successful completion of this program, the student will be able to recognize the limitations of traditional reductionist approaches on dealing with the complex nature of systems.
- CLO3 : On successful completion of this program, the student will be able to use the systems thinking language to define and characterise complex problems, and their dominant features.

Assignment submission Turnitin type

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

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.

Case Study Assignment (Part 1)

Assessment Overview

This asessment is case study assignment (Part 1). Students are given a full description of a case study which comprises complex decision making situation. Students are required to employ the concepts and methods from the course to diagnose the nature of the problems in the case study area. On doing this, students will be able: to recognize the key features of complex problems that warrants employing the systems thinking approach, recognize the four levels operating simultaneously in the problem, understand the system boundary, identify multiple perspectives and possible hidden priorities, create and use Causal Loop Diagrams, and create and use Systems Archetypes.

Course Learning Outcomes

- CLO1 : On successful completion of this program, the student will be able to recognize the limitations of traditional reductionist approaches on dealing with the complex nature of systems.
- CLO2 : On successful completion of this program, the student will be able to identify the value of using systems thinking/system dynamics approach in analysing problematic issues and inform decision making
- CLO3 : On successful completion of this program, the student will be able to use the systems thinking language to define and characterise complex problems, and their dominant features.
- CLO4 : On successful completion of this program, the student will be able to apply various systems thinking and systems dynamics techniques and tools to visualise, analyse, and communicate about various aspects of complex problems

Assignment submission Turnitin type

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

Generative AI Permission Level

No Assistance

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Case Study Assignment (Part 2)

<u>Assessment Overview</u>

This asessment is case study assignment (Part 2). Students are given a full description of a case study which comprises complex decision making situation. Students are required to employ the concepts and methods from the course to formulate a systemic strategy to allow the decision makers in the case study to achieve their goals. Part of this, students will be able to understand the role of system boundaries in formulatiing solutions, create and use Causal Loop Diagrams for strategy definition and mapping, identify multiple perspectives and possible hidden priorities, and create and use stock and flow diagram to test the strategy logic and connect strategies to resources.

<u>Course Learning Outcomes</u>

- CLO3 : On successful completion of this program, the student will be able to use the systems thinking language to define and characterise complex problems, and their dominant features.
- CLO4 : On successful completion of this program, the student will be able to apply various systems thinking and systems dynamics techniques and tools to visualise, analyse, and communicate about various aspects of complex problems

<u>Assignment submission Turnitin type</u>

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

<u>Generative AI Permission Level</u>

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.

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General Assessment Information

Late Submission of Assessment

• The penalty for late submission will be 5% per calendar day, or part thereof, unless prior special

consideration has been granted.

• All requests for special consideration must be formally submitted via MyUNSW prior to the assessment due date.

• Late assignments will only be accepted if prior arrangement is made with the lecturer, or a formal application for special consideration is submitted.

• Unless prior arrangement is made with the lecturer or a formal application for special consideration is submitted, a penalty will apply for each day that an assessment item is late.

• Late assignments will be accepted provided they are received prior to the start of the examination period. Students requiring an extension must let me know by email prior to the published due date. Note: Penalties for late submission should apply from the original submission date, unless that date is formally varied by agreement. If a late submission is allowed, the extra time granted should be viewed solely as a period of grace. If this delayed date is not met, the penalty should apply from the original date of submission, not from the end of the period of grace.

Referencing

In this course, students are required to reference following the APA 6 / Chicago NB referencing style. Information about referencing is available at: Support for Referencing Assignments | UNSW Current Students

Grading Basis

Standard

Requirements to pass course

To pass the course, students must undertake the three assessments.

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.

Course Schedule

Attendance Requirements

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

General Schedule Information

Detailed course schedule is available on the Moodle site.

Course Resources

Prescribed Resources

1. Course slides (available on Moodle) which are essential components of the course material in addition to the textbook.

2. Course recorded lectures (available on Moodle)

3. Textbook: You will need to obtain the following essential text.

Stroh, D. P. (2015). *Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results*. Chelsea Green Publishing.

A valuable guide for the writing and presentation of assignments, and for the correct method to be used when citing source materials, is: Anderson, J. and Poole, M., 2001 (4th Ed), *Assignment and Thesis Writing*, Wiley.

4. The learning resources for each module are available on the Moodle page as "Learning packs".

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Sondoss El Sawah					Yes	Yes
Lecturer	Ebrahim Mohamed					No	No

Other Useful Information

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 4pm, Mon to Fri)