UNSW Course Outline

# ZEIT8404 Decision Making Analytics - 2024

Published on the 09 Feb 2024

## General Course Information

**Course Code :** ZEIT8404
**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

This course introduces students to the wide variety of analytical tools and qualitative approaches for operational analysis and decision making. Techniques for scoping unstructured and poorly defined decision problems and qualitative approaches for decision making in unknown and

uncertain environment will be introduced. The course will also cover the decision analytics, with spreadsheet applications, for operational problems such as planning and resource allocation, transportation and supply chain, rostering and scheduling, trend analysis and forecasting, project evaluation, and waiting line analysis.

## Relationship to Other Courses

This course is a 6-credit unit course for the postgraduate program. This is a compulsory course for the Master of Decision Analytics and an elective for other programs such as Master of Systems Engineering, Master of Capability Management, Master of Project Management, and Master of Cyber Security Operations /Management.

# Course Learning Outcomes

| Course Learning Outcomes |
|---|
| CLO1 : Identify the operational decision problems from real-life situations; |
| CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools; |
| CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches; |
| CLO4 : Select and implement the right solution approaches to solve the models; |
| CLO5 : Analyse and validate the solutions of the model; |
| CLO6 : Interpret the applicability of solutions and develop a plan for implementation; and |
| CLO7 : Understand the capability and limitations of Decision Making Analytics techniques. |

| Course Learning Outcomes | Assessment Item |
|---|---|
| CLO1 : Identify the operational decision problems from real-life situations; | • Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools; | • Assessment/Test/Quiz 1<br>• Assignment/Project 1<br>• Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches; | • Assessment/Test/Quiz 1<br>• Assignment/Project 1<br>• Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO4 : Select and implement the right solution approaches to solve the models; | • Assignment/Project 1<br>• Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO5 : Analyse and validate the solutions of the model; | • Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO6 : Interpret the applicability of solutions and develop a plan for implementation; and | • Assessment/Test/Quiz 2<br>• Assignment/Project 2 |
| CLO7 : Understand the capability and limitations of Decision Making Analytics techniques. | • Assessment/Test/Quiz 1<br>• Assignment/Project 1<br>• Assessment/Test/Quiz 2<br>• Assignment/Project 2 |

# Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate

# Learning and Teaching in this course

**Teaching Strategies**: The teaching approach for this course includes:

- use of examples/demonstrations and/or modelling – it involves practical and textbook-based activities where good practice can be exemplified and the process stages made explicit so that students can model their own practice on the exemplars
- project-based learning – activities are targeted at students completing several assignments (several linked small projects or a major project). Information and skills are developed sequentially as needed by the assignments /projects.

**Interactive Lecture:** Collaborative /interactive sessions via Moodle (known as Blackboard Collaborative Session) will be arranged once a week at 5 pm. The details will be provided on Moodle before the session starts.

**Students' Learning**: Students will also be able to . . .

- identify Decision Making Analytics problems in real life;
- define the problems for modelling;
- apply appropriate modelling tools to model the defined problems;
- use the right solution approaches to solve the model;
- analyse the solutions of the model; and
- interpret the applicability of solutions.

# Other Professional Outcomes

**Student Learning Outcomes:**

At the successful completion of this course, students will be able to:

CLO1: Identify the operational decision problems from real-life situations;

CLO2: Define the decision problems to solve them using one or more Decision Making Analytics tools;

CLO3: Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches;

CLO4: Select and implement the right solution approaches to solve the models;

CLO5: Analyse and validate the solutions of the model;

CLO6: Interpret the applicability of solutions and develop a plan for implementation; and

CLO7: Understand the capability and limitations of Decision-Making Analytics techniques.

## Additional Course Information

The objective of the course “Decision Making Analytics” is to introduce the student to the world of analytics and relevant quantitative decision tools for solving operational problems. Decision-Making Analytics is known to be an important component of Operations Research. The discipline of Operations Research emerged at the beginning of World War II when it was decided to second civilian scientists to military establishments to support the war effort through the application of their scientific skills. This course will introduce you to the basic analytical methods and their applications to common practical operational /tactical problems.

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|---|---|
| Assessment/Test/Quiz 1<br>Assessment Format: Individual | 10% | Start Date: 21/03/2024 12:00 AM<br>Due Date: 21/03/2024 11:59 PM |
| Assignment/Project 1<br>Assessment Format: Individual | 35% | Start Date: Not Applicable<br>Due Date: 22/04/2024 11:59 PM |
| Assessment/Test/Quiz 2<br>Assessment Format: Individual | 15% | Start Date: 16/05/2024 12:00 AM<br>Due Date: 16/05/2024 12:00 AM |
| Assignment/Project 2<br>Assessment Format: Individual | 40% | Start Date: Not Applicable<br>Due Date: 07/06/2024 11:59 PM |

## Assessment Details

### Assessment/Test/Quiz 1

**Assessment Overview**

Demonstrating learning on the first few topics of the course through solving different simple and complex decision problems.

**Course Learning Outcomes**

- CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools;
- CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches;
- CLO7 : Understand the capability and limitations of Decision Making Analytics techniques.

**Detailed Assessment Description**

Quiz marks will be automatically provided upon completing the quiz.

Submission notes

More information will be provided later on the Moodle page

Assignment submission Turnitin type

Not Applicable

## Assignment/Project 1

Assessment Overview

Demonstrating learning on all the topics covered in the course through solving different simple and complex decision problems

Course Learning Outcomes

- CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools;
- CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches;
- CLO4 : Select and implement the right solution approaches to solve the models;
- CLO7 : Understand the capability and limitations of Decision Making Analytics techniques.

Assessment Length

10 pages report without cover page and references (if applicable) exclusing spreadsheets

Submission notes

More information will be provided later on the Moodle page

Assignment submission Turnitin type

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

## Assessment/Test/Quiz 2

Assessment Overview

Demonstrating in-depth learning through case study and project selected from real-world situations.

Course Learning Outcomes

- CLO1 : Identify the operational decision problems from real-life situations;
- CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools;
- CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches;
- CLO4 : Select and implement the right solution approaches to solve the models;

- CLO5 : Analyse and validate the solutions of the model;
- CLO6 : Interpret the applicability of solutions and develop a plan for implementation; and
- CLO7 : Understand the capability and limitations of Decision Making Analytics techniques.

**Assessment Length**

Not applicable

**Submission notes**

More information will be provided later on the Moodle page

**Assignment submission Turnitin type**

Not Applicable

### Assignment/Project 2

**Assessment Overview**

Demonstrating in-depth learning through case studies and projects selected from real-world situations.

**Course Learning Outcomes**

- CLO1 : Identify the operational decision problems from real-life situations;
- CLO2 : Define the decision problems in order to solve them using one or more Decision Making Analytics tools;
- CLO3 : Apply appropriate modelling tools to represent the problems as suitable inputs to solution approaches;
- CLO4 : Select and implement the right solution approaches to solve the models;
- CLO5 : Analyse and validate the solutions of the model;
- CLO6 : Interpret the applicability of solutions and develop a plan for implementation; and
- CLO7 : Understand the capability and limitations of Decision Making Analytics techniques.

**Assessment Length**

12 Pages of report excluding cover page, references, and spreadsheets.

**Submission notes**

More information will be provided later on the Moodle page

**Assignment submission Turnitin type**

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

## General Assessment Information

There are **4 assessment items** in this course: **2** assignments /projects /case studies and **2** Tests /quizzes.

Test /Quiz 1: 10%; Assignment 1: 35%; Test 2: 15%; and Assignment 2: 40%.

Details of the assignments will be posted on Moodle a few weeks before the assignment's due date. *Note that the test/quiz-*1 *is compulsory, and you must complete the quizzes within the given time windows* (usually 4 – 6 hours in the evening).

*It is expected that you submit all assessments with reasonable work. As per school/faculty policy, the final marks in this course may be moderated.*

**Grading Basis**

Standard

**Requirements to pass course**

*The overall passing mark is set at 50% by the university and this must not be varied.*

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 1 : 26 February - 1 March | Topic | Introduction to Decision Analytics; Modelling and Decision Making |
| Week 2 : 4 March - 8 March | Topic | Linear Programming and Graphical Method |
| Week 3 : 11 March - 15 March | Topic | LP Formulation and Spreadsheet modelling |
| Week 4 : 18 March - 22 March | Topic | LP: Spreadsheet applications and Sensitivity Analysis |
| Week 5 : 25 March - 29 March | Topic | Network Modelling |
| Week 6 : 1 April - 5 April | Topic | Integer Programming |
| Week 7 : 22 April - 26 April | Topic | Goal Programming |
| Week 8 : 29 April - 3 May | Topic | Project Network and Analysis |
| Week 9 : 6 May - 10 May | Topic | Queuing/ Waiting Lines Models |
| Week 10 : 13 May - 17 May | Topic | Regression Analysis |
| Week 11 : 20 May - 24 May | Topic | Time Series Analysis |
| Week 12 : 27 May - 31 May | Topic | Qualitative Approaches and Review |
| Week 13 : 3 June - 7 June | Project | Course project completion |

## Attendance Requirements

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

## General Schedule Information

*The Course Schedule divides the course content into 13 parts (equivalent to the 13 week teaching session), off-campus students may progress through the course at their own pace, subject only to the availability of assignment questions.*

# Course Resources

## Prescribed Resources

The compulsory textbook is used extensively to provide a comprehensive coverage of the basic concepts. Additional materials on selected topics and a list of topics referring to particular chapters and sections in the textbook may be provided later.

***Ragsdale, C, T., Spreadsheet Modelling and Decision Analysis: A Practical Introduction to Business Analytics, South-Western College Publishing, 9th edition 2021.***

You will need to use at least Excel Solver using PC to complete the requirements of this course.

## Recommended Resources

Any other Management Science /Operations Research books with Spreadsheet applications.

## Additional Costs

nil

## Course Evaluation and Development

**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

### Past Improvements

Based on student feedback and past experience, the following improvements have been made:

- Most basic materials (digitised notes, etc.) will be made available at the beginning of the semester.
- ETS shall try to ensure that all students registered for this course have proper access to Moodle with appropriate login and password. We have noticed that this delays the whole process and consequently affects the assignment deadlines.
- Some assignment /project components will be released early to encourage students to study the relevant materials each week and browse through literature.
- The number of assignments has been reduced to give more time to the students. However, the quality of the assignments along with the weight allocated has been increased.
- New initiatives will be taken to encourage group discussions.
- Additional materials may be posted for some who want to learn more.

# Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|---|---|---|---|---|---|---|---|
| Lecturer | Ruhul Sarker | | Building 15, Room 218 UNSW Canberra at ADFA | 0251145203 | by appointment | No | Yes |

# 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)