



## UNSW Course Outline

# ZEIT8039 Reliability Engineering Assurance - 2024

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## General Course Information

Course Code : ZEIT8039

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

This course teaches students how to assure reliability performance from systems. This includes how to specify reliability performance characteristics using both consumer and producer risk profiles. It also covers how reliability can be demonstrated (and assured) through both traditional

acceptance testing methodologies and more proactive reliability growth strategies. This course will also cover how reliability performance can be assured through performance based logistics (PBL) or performance based contracting (PBC) frameworks. Other areas include specific activities that can have positive, if not always quantifiable, effects on reliability performance. This includes design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis (FMECA) and failure reporting and corrective action systems (FRACAS).

## Course Aims

This course aims to:

- 1) Introduce students to the major aspects of how to assure reliability performance from systems.
- 2) Provide an understanding of reliability performance characteristics and how it can be demonstrated.
- 3) Provide an understanding of performance based logistics (PBL) or performance based contracting (PBC) frameworks.
- 4) Provide an understanding of design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis (FMECA) and failure reporting and corrective action systems (FRACAS).

## Course Learning Outcomes

Course Learning Outcomes
CLO1 : Understand the fundamentals of how to assure reliability performance from systems.
CLO2 : Understand how to specify reliability performance characteristics using both consumer and producer risk profiles.
CLO3 : Understand how reliability can be demonstrated (and assured) through both traditional acceptance testing methodologies and more proactive reliability growth strategies.
CLO4 : Understand how reliability performance can be assured through performance based logistics (PBL) or performance based contracting (PBC) frameworks.
CLO5 : Understand fundamentals of design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis (FMECA) and failure reporting and corrective action systems (FRACAS).

Course Learning Outcomes	Assessment Item
CLO1 : Understand the fundamentals of how to assure reliability performance from systems.	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Class Test</li> <li>• Class Test</li> </ul>
CLO2 : Understand how to specify reliability performance characteristics using both consumer and producer risk profiles.	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Class Test</li> <li>• Class Test</li> </ul>
CLO3 : Understand how reliability can be demonstrated (and assured) through both traditional acceptance testing methodologies and more proactive reliability growth strategies.	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Class Test</li> </ul>
CLO4 : Understand how reliability performance can be assured through performance based logistics (PBL) or performance based contracting (PBC) frameworks.	<ul style="list-style-type: none"> <li>• Assignment</li> </ul>
CLO5 : Understand fundamentals of design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis (FMECA) and failure reporting and corrective action systems (FRACAS).	<ul style="list-style-type: none"> <li>• Assignment</li> </ul>

## Learning and Teaching Technologies

Moodle - Learning Management System

### Learning and Teaching in this course

The Reliability Engineering Assurance course will be delivered via online lecture supported by the textbook. As this course focuses on management and organizational activities, there is limited scope for laboratories or tutorials. Students are required to independently complete the study schedule. Each week, view the online lectures and read the corresponding textbook chapters.

Moodle (Modular Object-Oriented Dynamic Learning Environment) is the LMS used at UNSW Canberra. All courses have a Moodle site which will become available at least one week before the start of the semester. Please find all help and documentation (including Blackboard Collaborate) on the Moodle Support page. UNSW Moodle supports the following web browsers: • Google Chrome 50+ • Internet Explorer 9.0+ • Mozilla Firefox 15+ • Safari 10+ Internet Explorer is not recommended. Addons and Toolbars can affect any browser's performance. Operating systems recommended are Windows 7, 10, Mac OSX Sierra, iPad IOS10. For further details about system requirements click [here](#). Log in to Moodle [here](#) (a UNSW zPass will be required). If you need further assistance with Moodle, enrolment and login issues please contact: IT Service Centre Email: [itservicecentre@unsw.edu.au](mailto:itservicecentre@unsw.edu.au) External: (02) 9385-1333 International: +61 2 9385 1333 For ALL other Moodle issues, please contact: External TELT Support Email:

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment	60%	Start Date: Not Applicable Due Date: 18/10/2024 11:59 PM
Class Test	30%	Start Date: Not Applicable Due Date: 04/08/2024 11:59 PM
	10%	Start Date: Not Applicable Due Date: 01/11/2024 11:59 PM

## Assessment Details

### Assignment

#### Assessment Overview

Assignments are available on Moodle at the start of the course and are to be submitted by the end of the course.

Assignments are designed to allow students to show that they can analyse and provide informed comment on how to assure reliability performance from systems, specifying reliability performance characteristics using both consumer and producer risk profiles, assuring reliability performance, and design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis (FMECA) and failure reporting and corrective action systems (FRACAS).

Marks and feedback will be returned via Moodle within 2 weeks of the due date.

#### Course Learning Outcomes

- CL01 : Understand the fundamentals of how to assure reliability performance from systems.
- CL02 : Understand how to specify reliability performance characteristics using both consumer and producer risk profiles.
- CL03 : Understand how reliability can be demonstrated (and assured) through both traditional acceptance testing methodologies and more proactive reliability growth strategies.
- CL04 : Understand how reliability performance can be assured through performance based logistics (PBL) or performance based contracting (PBC) frameworks.
- CL05 : Understand fundamentals of design for reliability (DFR) activities such as reliability allocation, highly accelerated life testing (HALT), failure mode, effect and criticality analysis

(FMECA) and failure reporting and corrective action systems (FRACAS).

#### **Detailed Assessment Description**

The Term Project will provide you with an opportunity to demonstrate your ability to apply the knowledge and understanding you have gained throughout the course.

The Term Project will focus on a hypothetical reliability assurance problem that requires the techniques taught throughout the course to be applied. Marks for the Term Project will be allocated based on the effort you apply, and the depth of understanding demonstrated.

#### **Assessment Length**

5000 words

#### **Assessment information**

In this course, students are required to reference following the APA 6 / Chicago 16B referencing style. Information about referencing styles is available at: <https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720>

#### **Assignment submission Turnitin type**

Not Applicable

### **Class Test**

#### **Assessment Overview**

Closed book 120 minute class test assessing reliability performance characteristics, how reliability can be demonstrated and performance based logistics (PBL) or performance based contracting (PBC) frameworks.

Feedback will be provided to students on their returned scripts as well as in a group feedback session during class. Individual feedback is also available on request.

#### **Course Learning Outcomes**

- CL01 : Understand the fundamentals of how to assure reliability performance from systems.
- CL02 : Understand how to specify reliability performance characteristics using both consumer and producer risk profiles.
- CL03 : Understand how reliability can be demonstrated (and assured) through both traditional acceptance testing methodologies and more proactive reliability growth strategies.

#### **Detailed Assessment Description**

The online exams are to be completed in accordance with the Course Schedule via Moodle. The Mid-term Exam will cover material from weeks 1 to 4 of the course. You can attempt the exam

only once and it must be attempted no later than the date of completion outlined in the Course Schedule. The exams are timed, and you must complete as many questions as you can within the set time. Non-completion of an online exam by the required date will result in a mark of 'zero' being awarded for that exam. No extensions will be granted to the completion date for any of the exams unless a formal request for special consideration is submitted.

#### **Assignment submission Turnitin type**

Not Applicable

### **Class Test**

#### **Assessment Overview**

Closed book 30 minute class test assessing student understanding of the fundamentals of how to assure reliability performance from systems and how to specify reliability performance characteristics.

Feedback will be provided to students on their returned scripts as well as in a group feedback session during class. Individual feedback is also available on request.

#### **Course Learning Outcomes**

- CLO1 : Understand the fundamentals of how to assure reliability performance from systems.
- CLO2 : Understand how to specify reliability performance characteristics using both consumer and producer risk profiles.

#### **Detailed Assessment Description**

The online exams are to be completed in accordance with the Course Schedule via Moodle. The Final Exam will cover material from weeks 5 to 10. The Final Exam will cover material from lectures 9 onwards. You can attempt each exam only once and it must be attempted no later than the date of completion outlined in the Course Schedule. The exams are timed, and you must complete as many questions as you can within the set time. Non-completion of an online exam by the required date will result in a mark of 'zero' being awarded for that exam. No extensions will be granted to the completion date for any of the exams unless a formal request for special consideration is submitted.

#### **Assessment Length**

Two hours

#### **Assignment submission Turnitin type**

Not Applicable

# General Assessment Information

UNSW has standardised the penalties for late submissions. Unless a 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 working 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 zero (0) will be applied. Please note that the policy states that: "Work commitments are not normally considered a justification.". Where 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 will apply from the original due date of submission, not from the end of the period of grace. Please note that lecturers support will NOT be available after the original submission date. Assignments that have been received by the due date will be returned to students via Moodle on the dates nominated in the Course Schedule.

## Use of Generative AI in Assessments

*As this assessment task involves some planning or creative processes, you are permitted to use software to generate initial ideas. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., only occasional AI-generated words or phrases may form part of your final submission. It is a good idea to keep copies of the initial prompts to show your lecturer if there is any uncertainty about the originality of your work.*

*If the outputs of generative AI, such as ChatGPT form a part of your submission, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension, and exclusion.*

\* To cite: OpenAI (Year Accessed). ChatGPT. OpenAI. <https://openai.com/models/chatgpt/>

\* Please note that the outputs from these tools are not always accurate, appropriate, or properly referenced. Before submission, you should ensure that you have moderated and critically evaluated the outputs from generative AI tools such as ChatGPT.

## Grading Basis

Standard

## Requirements to pass course

Your final grade will be based on the overall course grade, regardless of performance in individual items of assessment. You must have a final grade of 50 out of 100 possible marks or better to pass the course. Final marks in this course may be moderated. Assessment will be

released and due in accordance with the Course Schedule. All assessments will be submitted via Moodle.

## Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Online Activity	Introduction to Reliability and History of Reliability
Week 2 : 22 July - 26 July	Online Activity	Reliability Assurance and Case Study
Week 3 : 29 July - 2 August	Online Activity	Organisational Context of Reliability Assurance and Measures of Performance Mid-Term Exam completed by 4 August 2024 (feedback provided by census date)
Week 4 : 5 August - 9 August	Online Activity	Performance Base Management Framework and Probabilistic Concepts
Week 5 : 12 August - 16 August	Online Activity	Reliability Testing
Week 6 : 19 August - 23 August	Online Activity	Individual preparation for Term Project.
Week 7 : 9 September - 13 September	Online Activity	Reliability Specification and Reliability Growth Testing
Week 8 : 16 September - 20 September	Online Activity	Designing for Reliability and Reliability Planning
Week 9 : 23 September - 27 September	Online Activity	Reliability Assurance Management
Week 10 : 30 September - 4 October	Online Activity	Individual preparation for Term Project and Final Exam
Week 11 : 7 October - 11 October	Online Activity	Individual preparation for Term Project and Final Exam
Week 12 : 14 October - 18 October	Project	Term Project due 23:59 AEST Friday 18 October 2024
Week 13 : 21 October - 25 October	Online Activity	Individual preparation for Final Exam. Final Exam due 23:59 AEST Friday 1 November 2024.

## Attendance Requirements

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

## General Schedule Information

The schedule for the course is broadly aligned with the chapter structure of the recommended text.

## Course Resources

### Prescribed Resources

The textbook is “Reliability Engineering and Management” by Chris Jackson and is available electronically on Kindle at <https://www.amazon.com/Reliability-EngineeringManagement-Christopher-Jackson-ebook/dp/B071LGDYQG>.

All other course resources will be provided via Moodle.

### Recommended Resources

There are no specifically recommended additional resources for the course.



## Additional Costs

There are no additional costs for the course.

## 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 lecturers, the “On-going Student Feedback” link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups. Please feel free to forward any recommendations, observations or feeling directly to the lecturers. We want to make this course better as quickly as possible. 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	Jeffrey Malone		I don't maintain an office on campus.	0407581131	Contact via email is best, although you are welcome to phone or text (I sometimes work in a secure location so I might not answer straight away, so please leave voice messages). If you wish to meet in person (I largely work at either Fairbairn or Russell)	No	No
Lecturer	Ismail Ali		Building 21		Dr Ali is available for consultation during normal working hours. Please email first to make a time. He is usually available for consultation during the week from Monday to Thursday during 10am to midday via email contact initially.	No	Yes

## Other Useful Information

### School-specific Information

### The Learning 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](mailto: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](mailto: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 Community, 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](mailto:e.henekankanamge@adfa.edu.au)

T: 02 5114 5157

**Syscom Admin Support:** [syscom@unsw.edu.au](mailto:syscom@unsw.edu.au)

T: 02 5114 5284

Syscom Admin Office: Building 15, Level 1, Room 101 (open 10am to 4pm, Mon to Fri)