UNSW Course Outline

ZEIT3506 Managing the Development of Engineered Systems - 2024

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General Course Information

Course Code : ZEIT3506
Year : 2024
Term : Semester 2
Teaching Period : Z2
Is a multi-term course? : No
Faculty : UNSW Canberra
Academic Unit : School of Engineering and Technology
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : UNSW Canberra at ADFA
Campus : UNSW Canberra
Study Level : Undergraduate
Units of Credit : 6

Useful Links

[Handbook](#) [Class Timetable](#)

Course Details & Outcomes

Course Description

The course explains how three critical disciplines (project management, systems engineering

and capability sustainment) coexist and interrelate during the stages of a typical medium-complexity development project.

Project management (PM) is presented using the Project Management Body of Knowledge. Key project management tools such as the work breakdown structure, cost estimating and schedule development, are taught and practiced using a popular project management software application.

The key systems engineering (SE) principles and processes are presented and several systems-engineering tools such as use cases, functional-flow block diagrams and specification practice and are practiced.

The course also introduces the discipline of capability sustainment, including modern concepts such as product lifecycle management. The course introduces students to the analysis of system lifecycle concepts to derive system requirements for incorporation in the system specification.

Course Aims

The course aim to provide engineering students with an overview of the processes required to develop a successful engineered system. The course introduces the disciplines of project management, systems engineering and capability sustainment.

Relationship to Other Courses

The course in Year 3 is core to the standard BE (Hons) Aeronautical, Elecrical, Mechanical and Naval Architecture programs, and their CDF variant.

Course Learning Outcomes

Course Learning Outcomes	Engineers Australia - Professional Engineer (Stage 1)
CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.	• PEE1.6 : Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline • PEE2.2 : Fluent application of engineering techniques, tools and resources • PEE2.4 : Application of systematic approaches to the conduct and management of projects within the technology domain
CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.	• PEE1.5 : Knowledge of engineering design practice and contextual factors impacting the engineering discipline • PEE2.2 : Fluent application of engineering techniques, tools and resources • PEE2.3 : Application of systematic engineering synthesis and design processes • PEE2.4 : Application of systematic approaches to the conduct and management of projects within the technology domain
CLO3 : Explain how the capability sustainment discipline applies to a medium-complexity engineering development project.	• PEE1.6 : Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline • PEE2.4 : Application of systematic approaches to the conduct and management of projects within the technology domain
CLO4 : Develop a project management plan integrating the disciplines of project management, systems engineering and capability sustainment.	• PEE2.4 : Application of systematic approaches to the conduct and management of projects within the technology domain • PEE3.1 : Ethical conduct and professional accountability • PEE3.2 : Effective oral and written communication in professional and lay domains • PEE3.3 : Creative, innovative and pro-active demeanour • PEE3.4 : Professional use and management of information • PEE3.5 : Orderly management of self, and professional conduct • PEE3.6 : Effective team membership and team leadership
CLO5 : Apply system engineering tools and techniques to specify system requirements by analysing capability needs	• PEE2.2 : Fluent application of engineering techniques, tools and resources • PEE2.3 : Application of systematic engineering synthesis and design processes • PEE2.4 : Application of systematic

approaches to the conduct and management of projects within the technology domain
• PEE3.1 : Ethical conduct and professional accountability
• PEE3.2 : Effective oral and written communication in professional and lay domains
• PEE3.3 : Creative, innovative and pro-active demeanour
• PEE3.4 : Professional use and management of information
• PEE3.5 : Orderly management of self, and professional conduct
• PEE3.6 : Effective team membership and team leadership

Course Learning Outcomes	Assessment Item
CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.	• Assignment 1 - Project Management • Assignment 2 - Project Management • Final Assignment - Complete Revised Project Documentation • Case Study Report Brief • Tutorial Participation (Quiz)
CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.	• Assignment 3 - Systems Engineering • Assignment 4 - Systems Engineering • Final Assignment - Complete Revised Project Documentation • Case Study Report Brief • Tutorial Participation (Quiz)
CLO3 : Explain how the capability sustainment discipline applies to a medium-complexity engineering development project.	• Final Assignment - Complete Revised Project Documentation • Case Study Report Brief • Tutorial Participation (Quiz)
CLO4 : Develop a project management plan integrating the disciplines of project management, systems engineering and capability sustainment.	• Assignment 1 - Project Management • Assignment 2 - Project Management • Final Assignment - Complete Revised Project Documentation
CLO5 : Apply system engineering tools and techniques to specify system requirements by analysing capability needs	• Assignment 3 - Systems Engineering • Assignment 4 - Systems Engineering • Final Assignment - Complete Revised Project Documentation

Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

Learning and Teaching in this course

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 7, 10, Mac OSX Sierra, iPad IOS10

For further details about system requirements click here.

Log in to Moodle here.

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

Other Professional Outcomes

Developing Graduate Capabilities

Successful completion of this course contributes to the acquisition of UNSW graduate capabilities. UNSW aspires to develop globally focused graduates who are rigorous scholars, capable of leadership and professional practice in an international community.

Engineers are required to take responsibility for system development. This includes the integration of various technologies and subsystems to form a complete, sustainable, and self-consistent system that fulfils a business need and is reliable, safe and socially responsible to operate.

Additional Course Information

As a 6 unit-of-credit (UoC) course 6 hours per week (h/w) of face-to- face contact have been timetabled. The UNSW website states "The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week." This means that you should aim to spend a minimum of 9 h/w on this course. Additional time should be spent in making sure that you understand the lecture material, completing the set assignments and on further reading.

Academic Integrity and Plagiarism

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

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

Referencing

Information about referencing styles is available at: https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720

Study at UNSW Canberra

https://www.unsw.adfa.edu.au/study

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.

Additional Information as required

CRICOS Provider no. 00098G

The University of New South Wales Canberra.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 1 - Project Management Assessment Format: Individual Short Extension: Yes (3 days)	15%	Start Date: 17/07/2024 12:00 AM Due Date: 02/08/2024 11:55 PM
Assignment 2 - Project Management Assessment Format: Individual	15%	Start Date: 31/07/2024 12:00 AM Due Date: 23/08/2024 11:55 PM
Assignment 3 - Systems Engineering Assessment Format: Individual	15%	Start Date: 21/08/2024 12:00 AM Due Date: 27/09/2024 11:55 PM
Assignment 4 - Systems Engineering Assessment Format: Individual	15%	Start Date: 25/09/2024 12:00 AM Due Date: 18/10/2024 11:55 PM
Final Assignment - Complete Revised Project Documentation Assessment Format: Individual	25%	Start Date: 17/07/2024 12:00 AM Due Date: 06/11/2024 11:55 PM
Case Study Report Brief Assessment Format: Individual	9%	Start Date: Not Applicable Due Date: Week 2: 22 July - 26 July, Week 4: 05 August - 09 August, Week 6: 19 August - 23 August, Week 8: 16 September - 20 September, Week 10: 30 September - 04 October, Week 12: 14 October - 18 October
Tutorial Participation (Quiz) Assessment Format: Individual	6%	Start Date: Not Applicable Due Date: Week 1: 15 July - 19 July, Week 3: 29 July - 02 August, Week 5: 12 August - 16 August, Week 7: 09 September - 13 September, Week 9: 23 September - 27 September, Week 13: 21 October - 25 October

Assessment Details

Assignment 1 - Project Management

Assessment Overview

Students will form small groups and divide the work to complete Project Management documentation. Although group based, the submissions are individually assessed.

Course Learning Outcomes

- CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.
- CLO4 : Develop a project management plan integrating the disciplines of project management, systems engineering and capability sustainment.

Detailed Assessment Description

This first assignment has the team deliver the components of a Business Case.

Assessment Length

A template provided with this assignment task, which limits the length of submission

Submission notes

Via Moodle

Assignment submission Turnitin type

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

Assignment 2 - Project Management

Assessment Overview

Students will form small groups and divide the work to complete Project Management documentation. Although group based, the submissions are individually assessed.

Course Learning Outcomes

- CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.
- CLO4 : Develop a project management plan integrating the disciplines of project management, systems engineering and capability sustainment.

Detailed Assessment Description

This assignment requires the submission of a Preliminary Project Management Plan.

Assessment Length

A template provided with this assignment task, which limits the length of submission

Submission notes

submitted via Moodle

Assignment submission Turnitin type

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

Assignment 3 - Systems Engineering

Assessment Overview

Students will form small groups and divide the work to complete Systems Engineering documentation. Although group based, the submissions are individually assessed.

Course Learning Outcomes

- CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.
- CLO5 : Apply system engineering tools and techniques to specify system requirements by analysing capability needs

Detailed Assessment Description

This assignment requires the submission of a Systems Engineeing Management Plan

Assessment Length

A template provided with this assignment task, which limits the length of submission

Submission notes

submitted via Moodle

Assignment submission Turnitin type

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

Assignment 4 - Systems Engineering

Assessment Overview

Students will form small groups and divide the work to complete Systems Engineering documentation. Although group based, the submissions are individually assessed.

Course Learning Outcomes

- CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.
- CLO5 : Apply system engineering tools and techniques to specify system requirements by analysing capability needs

Detailed Assessment Description

This assignment requires the submission of the Concept Report and Test and

Evaluation documents

Assessment Length

A template provided with this assignment task, which limits the length of submission

Submission notes

submitted via Moodle

Assignment submission Turnitin type

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

Final Assignment - Complete Revised Project Documentation

<u>Assessment Overview</u>

From their groups, the students will divide the work to submit the complete project documentation that extends upon Assignments 1, 2, 3 and 4, as well as additional capability lifecycle documentation. Although group based, the submissions are individually assessed.

<u>Course Learning Outcomes</u>

- CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.
- CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.
- CLO3 : Explain how the capability sustainment discipline applies to a medium-complexity engineering development project.
- CLO4 : Develop a project management plan integrating the disciplines of project management, systems engineering and capability sustainment.
- CLO5 : Apply system engineering tools and techniques to specify system requirements by analysing capability needs

<u>Assessment Length</u>

A template provided with this assignment task, which limits the length of submission

<u>Submission notes</u>

Submission via Moodle

<u>Assignment submission Turnitin type</u>

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

Case Study Report Brief

<u>Assessment Overview</u>

Students will attend the six case study presentations and produce a brief report in Moodle summarising the important and relevant parts of each case study. Each report is worth 1.5%.

<u>Course Learning Outcomes</u>

- CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.
- CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.
- CLO3 : Explain how the capability sustainment discipline applies to a medium-complexity engineering development project.

Detailed Assessment Description

This report will be completed in the class immediately following the fortnightly even-week Case Study presentations.

Assessment Length

less than 15 minute summary report

Submission notes

completed online via Moodle

Assignment submission Turnitin type

Not Applicable

Tutorial Participation (Quiz)

Assessment Overview

Topic based in-tutorial quizzes.

In all six tutorial classes, students are required to complete a quiz (online mode via the Moodle platform). each quiz is worth 1%.

Course Learning Outcomes

- CLO1 : Explain how the PM discipline applies to a medium-complexity engineering development project.
- CLO2 : Explain how the SE discipline applies to a medium-complexity engineering development project.
- CLO3 : Explain how the capability sustainment discipline applies to a medium-complexity engineering development project.

Assessment Length

These are 10 minutes online quizzes

Submission notes

Completed online in Moodle

Assignment submission Turnitin type

Not Applicable

General Assessment Information

Feedback and results on the first assignments will be provided within 1 weeks of submission to meet the end of week 4 census date. Feedback and results of assignments 2,3 and 4 will be

within 2 weeks of submission.

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.

Use of Generative AI in Assessments

FULL ASSISTANCE WITH ATTRIBUTION

You can use generative AI software in this assessment to the extent specified in the assessment instructions. Any output of generative software within your assessment must be attributed with full referencing.

If the outputs of generative AI such as ChatGPT form part of your submission and is not appropriately attributed, 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, nor properly referenced. You should ensure that you have moderated and critically evaluated the outputs from generative AI tools such as ChatGPT before submission.

Grading Basis

Standard

Requirements to pass course

Overall passing mark is set at 50%.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Lecture	L1. Introduction and the Business Case
	Tutorial	Develop the business case
Week 2 : 22 July - 26 July	Lecture	L2. PM1 - Planning documentation and sturcture
	Presentation	Case Study on the Birth of Engineering Projects
Week 3 : 29 July - 2 August	Lecture	L3. PM2 WBS, Schedule and Budget
	Tutorial	Scheduling and budgeting
	Assessment	Assignment 1 due
Week 4 : 5 August - 9 August	Lecture	L4. PM3 Risk Management
	Presentation	Case Study - Project Management in Defence
Week 5 : 12 August - 16 August	Lecture	L5. PM4 Quality Management and Control
	Tutorial	Risk Management
Week 6 : 19 August - 23 August	Lecture	L6. SE1 System Engineering Project Lifecycle and acquisition
	Presentation	Case Study - Australian Mint
	Assessment	Assignment 2 due
Week 7 : 9 September - 13 September	Lecture	L7. SE2 Concept and Preliminary Design
	Tutorial	CONOPS, context diagrams and scenarios
Week 8 : 16 September - 20 September	Presentation	Case Study - RESMED No Lecture this week
Week 9 : 23 September - 27 September	Lecture	L8. SE4 Acceptance, Test and Evaluation
	Tutorial	Requirements and Test and Evaluation
	Assessment	Assignment 3 due
Week 10 : 30 September - 4 October	Lecture	L9. SE3 - Detailed Design
	Presentation	Case Study - Test and Evaluation in Defence
Week 11 : 7 October - 11 October	Lecture	L10. Sustainment 1
Week 12 : 14 October - 18 October	Lecture	L11. Sustainment 2
	Presentation	Case Study - Ship Sustainment
	Assessment	Assignment 4 due
Week 13 : 21 October - 25 October	Lecture	L12. Course review
	Tutorial	Sustainment and final assessment support

Attendance Requirements

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

General Schedule Information

Every week has a Lecture on an element of Project Management, System Engineering or Sustainment: Wednesday 10:00 to 12:00

Every odd number week includes a tutorial:Tut group 1 on Thursday10:00 to 12:00, Tut group 2 Friday10:00 to12:00

Every even number week includes a case study presented by a guest: Thursday 10:00 to 12:00

Missed or changed classes - as Noted in the course Schedule below.

Week 5: Friday Timetable on Tuesday - Tut group 2

Week 8: No Lecture (Wednesday MTD)

Week 11: No Tut groups (Friday and Thursday MTD)

Course Resources

Prescribed Resources

Links and resources to required reading will be provided during the course.

Recommended Resources

Course content will relate to the project Management Book of Knowledge (PMBOK). Access to recent editions of this resource is recommended.

Additional Costs

Students are also required to install a copy of the following application software on their personal computers:

- Microsoft Project Version 2016 or later

Microsoft Project is available to all UNSW Students through the Microsoft Azure Development Tools website via this link:

- https://azureforeducation.microsoft.com/devtools

This subscription service portal provides access to Azure. Enter your UNSW zPass credential to log in. Details are given on the Moodle page.

Note that Microsoft Project is not available for Mac users; Mac users will need to either invest in a Windows device or install a Windows virtual machine. Notably, if any students using Mac or Linux want to install a virtual machine for using Project, they can get a Windows 10 license key from the Azure development tool also.

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	Sean McCracken		Building 20 Room 105	+61 2 5114 5294	Meetings can be arranged after class or by email	Yes	Yes
Lecturer	Anthony Sexton		R130, Building 20	+61 2 5114 5381	Meetings can be arranged after class or by email	No	No