UNSW Course Outline

ZEIT8012 Space Systems Engineering Management - 2024

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General Course Information

Course Code : ZEIT8012
Year : 2024
Term : Semester 1
Teaching Period : Z1
Is a multi-term course? : No
Faculty : UNSW Canberra
Academic Unit : School of Engineering and Technology
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

Space Systems Engineering provides those studying the engineering of space systems with a grounding in the discipline of systems engineering, applying that body of knowledge to space systems by way of example throughout the course. The course begins by providing a framework

within which to develop an understanding of the processes and management practises associated with the systems engineering discipline. The underlying systems engineering process is presented and is shown to be applied repeatedly throughout the entire system lifecycle. Attention then focuses on the broad topic of systems engineering management and some of the activities normally associated with engineering management are detailed. The course also introduces tools commonly used in systems engineering and details how systems engineering coexists with other disciplines (particularly Project Management, Quality Management and Integrated Logistics Support Management). The systems engineering body of knowledge is reinforced by the use of example and tutorials throughout the course. Students are further practised though a series of individual exercises that reinforce the application of the discipline of systems engineering to the specific nature of space systems.

Course Aims

This course aims to:

1. provide those studying the engineering of space systems with a grounding in the discipline of systems engineering, applying that body of knowledge to space systems by way of example throughout the course;
2. provide a framework within which to develop an understanding of the processes and management practises associated with the systems engineering discipline;
3. present the underlying systems engineering process which is shown to be applied repeatedly throughout the entire system lifecycle;
4. focus on the broad topic of systems engineering management and some of the activities normally associated with engineering management are detailed;
5. introduce the tools commonly used in systems engineering; and
6. detail how systems engineering coexists with other disciplines (particularly Project Management, Quality Management and Integrated Logistics Support Management).

Course Learning Outcomes

Course Learning Outcomes
CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
CLO2 : On successful completion of this course, students will have synthesized an advanced and integrated understanding of the space and systems engineering disciplines to develop a tailored systems engineering management plan for a given space system.
CLO3 : On successful completion of this course, students will have researched and applied contemporary systems engineering theories to break down a space programme into a sequence of appropriate reviews and phases
CLO4 : On successful completion of this course, students will have developed a physical description of a space system from a set of functional requirements using systems thinking and life-cycle theories and techniques
CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Course Learning Outcomes	Assessment Item
CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum	• Quizzes throughout session • Two forum posting activities • Assignment peer assessment • Assignment • Class test
CLO2 : On successful completion of this course, students will have synthesized an advanced and integrated understanding of the space and systems engineering disciplines to develop a tailored systems engineering management plan for a given space system.	• Two forum posting activities • Assignment peer assessment • Assignment
CLO3 : On successful completion of this course, students will have researched and applied contemporary systems engineering theories to break down a space programme into a sequence of appropriate reviews and phases	• Assignment peer assessment • Assignment
CLO4 : On successful completion of this course, students will have developed a physical description of a space system from a set of functional requirements using systems thinking and life-cycle theories and techniques	• Assignment peer assessment • Assignment
CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.	• Quizzes throughout session • Class test • Two forum posting activities • Assignment peer assessment • Assignment

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate | Microsoft Teams

Learning and Teaching in this course

Throughout this course, you are expected to apply yourself to the tasks set within these instructions and other guidance on the course online site. The University expects that you would devote to this course approximately 150 hours of effort throughout the session. The effort will be reflected in the knowledge you demonstrate in your responses to the quizzes, forum postings, and in the depth and rigour of your assignment.

We expect all students to use their UNSW email for any correspondence with the Course Convenor. All messages generated from the course Moodle page will be sent to your UNSW email. If you use a private or work email, you must have your emails automatically forwarded to

the alternate address. This can be set up by auto-forwarding your incoming emails. This avoids confusion and missed information.

Please always use Moodle Q/A discussion forums as the first point of access for course related matters, but for your personal matters, please email your Course Convenor directly. *Your email subject line must always include the course code ZEIT8012*

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

Additional Course Information

Referencing

In this course, students are required to reference following the APA referencing style. 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
Quizzes throughout session Assessment Format: Individual	0%	Due Date: Week 4: 18 March - 22 March
Two forum posting activities Assessment Format: Individual	30%	Due Date: 12/04/2024 11:00 PM
Assignment peer assessment Assessment Format: Individual	10%	Start Date: Not Applicable Due Date: 03/05/2024 11:00 PM
Assignment Assessment Format: Individual	50%	Due Date: 03/06/2024 09:00 AM
Class test Assessment Format: Individual	10%	Due Date: 07/06/2024 11:00 PM

Assessment Details

Quizzes throughout session

Assessment Overview

Online revision (practice) quizzes are provided throughout the course to provide on-going feedback to the student and course convenor. These will provide you with a chance to confirm your understanding of the content of the text chapters and prepare you for the timed online test. If you fail to reach 75% after 3 attempts, you are strongly encouraged to contact the course convenor by email to discuss any problems.

Course Learning Outcomes

- CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
- CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Detailed Assessment Description

Online quiz 1 must be attempted by the census date in week 4

Assignment submission Turnitin type

This is not a Turnitin assignment

Two forum posting activities

Assessment Overview

The two forum postings are intended to provide a platform for discussion within the group around the broader issues affecting space systems engineering.

Postings are expected to be around 800-1000 words excluding references. Posts must be a minimum of 500 words and not exceed 1500 words (excluding references). Posts outside these limits will receive a grade of 0%. 75% of the forum-posting grade will be awarded for the quality of your forum post, and 25% for the quality of your engagement and discussion on others' posts.

Course Learning Outcomes

- CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
- CLO2 : On successful completion of this course, students will have synthesized an advanced and integrated understanding of the space and systems engineering disciplines to develop a tailored systems engineering management plan for a given space system.
- CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Detailed Assessment Description

For 2024, only 1 forum post will be required for the course

Assessment Length

800-1200 words recommended. 500 words minimum, 1500 words maximum

Assignment submission Turnitin type

This is not a Turnitin assignment

Assignment peer assessment

Assessment Overview

You are required to formally peer assess 2 assignment submissions from 4 of your peers' assignments randomly allocated to you. No feedback on the assignment is available from the course convenor until the peer assessment activity is complete. You must complete the peer assessment activity independently. Clear protocols and guidelines will be provided explaining how the peer assessment will be made. The grade for this assessment item will be governed by the quality of the critical summary and analysis within each peer assessment. The peer assessment activity is designed to demonstrate that you have attained the following UNSW

graduate attributes: *“the skills involved in scholarly enquiry”, “an in-depth engagement with the relevant disciplinary knowledge in its interdisciplinary context”,* and *“the ability to engage in independent and reflective learning”*.

Course Learning Outcomes

- CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
- CLO2 : On successful completion of this course, students will have synthesized an advanced and integrated understanding of the space and systems engineering disciplines to develop a tailored systems engineering management plan for a given space system.
- CLO3 : On successful completion of this course, students will have researched and applied contemporary systems engineering theories to break down a space programme into a sequence of appropriate reviews and phases
- CLO4 : On successful completion of this course, students will have developed a physical description of a space system from a set of functional requirements using systems thinking and life-cycle theories and techniques
- CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Detailed Assessment Description

For 2024, only 1 formal peer assessment is required. Students shall select 1 forum post from their peers' submissions to critically analyse.

Assessment Length

400-600 words recommended. Minimum 100 words, maximum 800 words

Assignment submission Turnitin type

This is not a Turnitin assignment

Assignment

Assessment Overview

The assignment requires higher order independent thinking beyond the ability to remember the information provided in the textbook. Along with the forum postings, it will help you draw together all of the discrete areas studied in each section and demonstrate your mastery of the discipline.

Formal feedback is provided via a rubric and comments. Feedback from earlier forum posting assignments informs the development of this assessment item.

Course Learning Outcomes

- CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
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- CLO3 : On successful completion of this course, students will have researched and applied contemporary systems engineering theories to break down a space programme into a sequence of appropriate reviews and phases
- CLO4 : On successful completion of this course, students will have developed a physical description of a space system from a set of functional requirements using systems thinking and life-cycle theories and techniques
- CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Detailed Assessment Description

A detailed description will be provided on Moodle.

Assignment submission Turnitin type

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

Class test

Assessment Overview

The test questions will be presented in a similar manner to the quiz questions. The lecture material and associated online quizzes comprise the primary revision material for the tests. The test will be made available at the conclusion of the last week of lecture material. You are able to attempt the test only once—your mark will be based on that attempt. Please note, unlike the quizzes, the tests are timed and you must complete as many questions as you can within the set time.

Non-completion of an online test by the required date will result in a mark of ‘zero’ being awarded for the test. There will be no extensions granted to the completion date for the test.

Course Learning Outcomes

- CLO1 : On successful completion of this course, students will have critically evaluated the utility of the systems-engineering body of knowledge for the design, development, implementation and sustainment of a space mission concept within an online forum
- CLO5 : On successful completion of this course, students will be capable of applying the core systems engineering body of knowledge to space systems problems.

Assignment submission Turnitin type

This is not a Turnitin assignment

General Assessment Information

There are four formal assessment items in this course: a forum post (30%), one on-line test (10%), an assignment (50%), and a peer-review activity (10%).

Online Practice Quizzes

Online revision (practice) quizzes are provided throughout the course to provide on-going feedback to the student and course convenor. These will provide you with a chance to confirm your understanding of the content of the text chapters and prepare you for the timed online test. No marks are awarded for their completion and no time limit is applied. Please contact the course convenor to discuss any problems following 3 unsuccessful attempts. **It is a requirement to complete the first quiz (week 1 material) prior to the census date.** Student will get feedback of the first quiz by the census date (24th of March)

Referencing

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

Forum Post (30%)

The forum post is intended to provide a platform for discussion within the group around the broader issues affecting space systems engineering.

Postings are expected to be around 800-1200 words excluding references. Posts must be a minimum of 500 words and not exceed 1500 words (excluding references). Posts outside these limits will receive a grade of 0%.

Assignment (50%)

The assignment requires higher order independent thinking beyond the ability to remember the information provided in the textbook. Along with the forum postings, it will help you draw together all of the discrete areas studied in each section and demonstrate your mastery of the discipline. Details of the assignment will be posted on the class Moodle page.

Peer Assessment (10%)

You are required to critically engage with a forum post from your peers. The grade for this assessment item will be governed by the quality of the critical summary and analysis within each peer assessment. The peer assessment activity is designed to demonstrate that you have attained the following UNSW graduate attributes: *"the skills involved in scholarly enquiry", "an in-depth engagement with the relevant disciplinary knowledge in its interdisciplinary context",* and *"the ability to engage in independent and reflective learning"*.

Students are encouraged to enter into free-flowing discussion on the forum, however you must clearly identify the 2 replies you wish to be formally evaluated by writing "FOR ASSESSMENT" at the top of the posts. Formal forum post replies must be a minimum of 100 words and not exceed 800 words (excluding references). Assessed posts outside these limits will receive a grade of 0%. Replies selected for assessment must be on separate threads.

Online Test (10%)

The test questions will be presented in a similar manner as the quiz questions. The lecture material and online quizzes comprise the primary revision material for the tests.

The test is available on the same site as the quizzes.

You are able to attempt the test only once—your mark will be based on that attempt. Please note, unlike the quizzes, the test is timed and you must complete as many questions as you can within the set time.

Non-completion of an online test by the required date will result in a mark of 'zero' being awarded for the test. There will be no extensions granted to the completion date for the test.

Use of Generative AI

As the assessment tasks involve some planning or creative processes, you are permitted to use software to generate initial drafts [or ideas, structures, etc]. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the software should not be a part of your final submission. It is a good idea to keep copies of your initial drafts to show your lecturer if there is any uncertainty about the originality of your work. Please note that your submission will be passed through an AI-text detection tool. If your marker has concerns that your answer contains passages of AI-generated text that have

not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

Grading Basis

Standard

Requirements to pass course

You are not required to pass any one particular piece of assessment; you simply need to achieve at least 50 marks out of a total 100 marks to pass this course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 26 February - 1 March	Module	What is Space Systems Engineering? Project Life Cycle
Week 2 : 4 March - 8 March	Module	Scope and ConOps System Architecture
Week 3 : 11 March - 15 March	Module	System Hierarchy and WBS Requirements
Week 4 : 18 March - 22 March	Module	Functional analysis Systems synthesis Design, interfaces
	Assessment	Online quiz 1 attempted by census date
Week 5 : 25 March - 29 March	Module	Margins Technical performance measures Cost Risk
Week 6 : 1 April - 5 April	Module	Technology readiness level
	Assessment	Forum post 1 due 12th April 2300h
Week 7 : 22 April - 26 April	Module	Trade studies Reliability Verification
Week 8 : 29 April - 3 May	Module	Technical reviews
	Assessment	Peer assessment due 3rd May 2300h
Week 9 : 6 May - 10 May	Module	Schedule Management Logistics
Week 10 : 13 May - 17 May	Module	Assignment
Week 11 : 20 May - 24 May	Module	Assignment
Week 12 : 27 May - 31 May	Module	Asssignment
Week 13 : 3 June - 7 June	Assessment	Assignment due 3rd June 0900h
	Assessment	Online test due 7th June 2300h

Attendance Requirements

Not Applicable - as no class attendance is required

General Schedule Information

Please use the Moodle Q/A discussion forums or the online tutorial sessions as the first point of access for course related matters. To arrange a private consultation, or discuss a private matter, please email Dr Melrose Brown to arrange a suitable time to call. ***Your email subject line must always include the course code ZEIT8012***

Course Resources

Prescribed Resources

All of the resources for students are digital and shall be made available through the course Moodle site. The course will use concepts from the NASA Systems Engineering Handbook to provide a space-centric flavour to the systems engineering body of knowledge

https://www.nasa.gov/connect/ebooks/nasa-systems-engineering-handbook

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	Melrose Brown		B16, Level 2	0251145129	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.