



UNSW Course Outline

ZEIT8008 Space Systems Design - 2024

Published on the 30 Jun 2024

General Course Information

Course Code : ZEIT8008

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 : 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 examines the design of space systems, including both ground and space segments. It covers issues such as astrodynamics, satellite subsystems, satellite propulsion, satellite attitude determination and control, aerospace structures and satellite integration. It concludes

by examining systems aspects of space applications, such as communications, navigation and remote sensing.

Course Aims

This course aims to:

- 1) Examine the design of space systems, including both ground and space segments.
- 2) Introduce issues such as astrodynamics, satellite subsystems, satellite propulsion, satellite attitude determination and control, aerospace structures and satellite integration.
- 3) Examine systems aspects of space applications, such as communications, navigation and remote sensing.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Acquire the critical aspects of spacecraft and then analyse the mission purpose and requirements
CLO2 : Recognise the different type of payload available and size of payload.
CLO3 : Understand the principles and design aspects of the spacecraft subsystems such that you can oversee their procurement. Then, apply the design consideration concepts into a preliminary design of each subsystem with a sensible selection of subsystem elements for a given mission.
CLO4 : Address the manufacturing, integrating and test issues for spacecraft missions.

Course Learning Outcomes	Assessment Item
CLO1 : Acquire the critical aspects of spacecraft and then analyse the mission purpose and requirements	<ul style="list-style-type: none">• Online Test• Research Presentation• Assignment
CLO2 : Recognise the different type of payload available and size of payload.	<ul style="list-style-type: none">• Online Test• Research Presentation• Assignment
CLO3 : Understand the principles and design aspects of the spacecraft subsystems such that you can oversee their procurement. Then, apply the design consideration concepts into a preliminary design of each subsystem with a sensible selection of subsystem elements for a given mission.	<ul style="list-style-type: none">• Research Presentation• Assignment
CLO4 : Address the manufacturing, integrating and test issues for spacecraft missions.	<ul style="list-style-type: none">• Research Presentation• Assignment

Learning and Teaching Technologies

Moodle - Learning Management System

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

Additional Course Information

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

In this course, students are required to reference following the APA 7 / Chicago NB referencing style. Information about referencing styles is available at: <https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720>

<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
Online Test Assessment Format: Individual	10%	Start Date: 05/08/2024 12:05 AM Due Date: 11/08/2024 11:55 PM
Research Presentation Assessment Format: Individual Short Extension: Yes (2 days)	35%	Due Date: Slides submission will be due on 22/09/2024 11:55 PM
Assignment Assessment Format: Individual Short Extension: Yes (2 days)	55%	Due Date: 13/10/2024 11:55 PM

Assessment Details

Online Test

Assessment Overview

Test questions are derived from the textbook. The test covers material from Chapters 14 to 17. Note that tests are open for one week, and you must have completed them by nominated close dates. You can attempt the test only once, and your mark will be based on that attempt. Please note that the test is timed, and you must complete as many questions as possible within the set time. Non-completion of an online test by the required date will result in a mark of zero being awarded for that test. No extensions will be granted until the test is completed.

Course Learning Outcomes

- CL01 : Acquire the critical aspects of spacecraft and then analyse the mission purpose and requirements
- CL02 : Recognise the different type of payload available and size of payload.

Assignment submission Turnitin type

Not Applicable

Research Presentation

Assessment Overview

Create a 10-minute PowerPoint presentation about establishing the problem and assembly, integration and verification considerations. Include a full bibliographic citation for each source. Present the PowerPoint presentation live online to a small group of fellow students and the lecturer and discuss.

Course Learning Outcomes

- CL01 : Acquire the critical aspects of spacecraft and then analyse the mission purpose and requirements
- CL02 : Recognise the different type of payload available and size of payload.
- CL03 : Understand the principles and design aspects of the spacecraft subsystems such that you can oversee their procurement. Then, apply the design consideration concepts into a preliminary design of each subsystem with a sensible selection of subsystem elements for a given mission.
- CL04 : Address the manufacturing, integrating and test issues for spacecraft missions.

Detailed Assessment Description

Each student will deliver a 10-minute presentation. Presentations will be scheduled during Weeks 9 of the semester. Students must submit their presentation slides by the end of Week 8.

Assignment

Assessment Overview

The assignments allow you to demonstrate your ability to apply the knowledge and understanding you have gained throughout the course. The assignment requires higher-order-independent thinking beyond the ability to read, comprehend, and remember the information provided in the textbook. It will help you draw together all of the discrete areas studied in each chapter. You are expected to make a significant effort to complete your assignment. Marks for the assignment will be allocated based on the effort and the depth of understanding demonstrated. The assignment is to be submitted via the Moodle Assignment submission area. You will find more detailed information on Moodle under the Assignment Information page. The assignment requires students to size the payload, address the design of all the subsystems and launch.

Course Learning Outcomes

- CL01 : Acquire the critical aspects of spacecraft and then analyse the mission purpose and requirements
- CL02 : Recognise the different type of payload available and size of payload.
- CL03 : Understand the principles and design aspects of the spacecraft subsystems such that you can oversee their procurement. Then, apply the design consideration concepts into a preliminary design of each subsystem with a sensible selection of subsystem elements for a given mission.
- CL04 : Address the manufacturing, integrating and test issues for spacecraft missions.

General Assessment Information

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.

Online Test 1 will be due in week 4, and feedback and grades will be given to students before the census date (August 11)).

Late submissions:

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. A grade of 0 will be applied.

Use of Generative AI in Assessment:

PLANNING ASSISTANCE! 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.

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Grading Basis

Standard

Requirements to pass course

The overall pass mark is 50% with the given weightings. This means students are not required to pass any one particular piece of assessment; you need to achieve at least 50 marks out of a total of 100 marks to pass this course. There is no minimum mark for any part of the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Lecture	Introduction and overview (Qiao)
Week 2 : 22 July - 26 July	Lecture	Chapters 14 & 15 Introduction to spacecraft (Lafleur)
	Reading	Chapters 14 & 15 Introduction to spacecraft (Lafleur)
Week 3 : 29 July - 2 August	Lecture	Chapters 16 & 17 Payloads (Qiao)
	Reading	Chapters 16 & 17 Payloads (Qiao)
Week 4 : 5 August - 9 August	Assessment	Test Due: Sunday 13 Aug 23 23:55 The feedback is provided immediately upon completion.
Week 5 : 12 August - 16 August	Lecture	Chapters 18 & 19 Propulsion & control (Lafleur)
	Reading	Chapters 18 & 19 Propulsion & control (Lafleur)
Week 6 : 19 August - 23 August	Lecture	Chapters 20 & 21 On-Board Processing, communication & Power (Lafleur)
	Reading	Chapters 20 & 21 On-Board Processing, communication & Power (Lafleur)
Week 7 : 9 September - 13 September	Lecture	Chapter 22 Structures, mechanisms & thermal (Lafleur)
	Reading	Chapter 22 Structures, mechanisms & thermal (Lafleur)
Week 8 : 16 September - 20 September	Lecture	Chapters 23.3, 25.3, 25.4 & 26 Manufacturing Integration and Test; Small satellites, Cube satellites, Launchers (Qiao)
	Reading	Chapters 23.3, 25.3, 25.4 & 26 Manufacturing Integration and Test; Small satellites, Cube satellites, Launchers (Qiao)
	Assessment	Slides uploaded for a 10 min PowerPoint research presentation.
Week 9 : 23 September - 27 September	Assessment	Assignment focused
Week 10 : 30 September - 4 October	Assessment	Assignment focused
Week 11 : 7 October - 11 October	Assessment	Assignment due

Attendance Requirements

Not Applicable - as no class attendance is required

Course Resources

Prescribed Resources

The required book is the New SMAD which will be our guide for this class as the principal textbook. You will be using the design process in this book to develop the space systems.

Space Mission Engineering: The new SMAD, edited by, James R. Wertz, David F. Everett, Jeffery J. Puschell, Microcosm Press, Hawthorne, CA, ISBN: 978-1-881883-15-9, 2011.

Recommended Resources

A variety of additional resource materials will also be made available through the Moodle page. These comprise:

- Slides covering the material presented to assist you with completing your assignment.
- Online videos, recommended papers, chapters from textbooks and other sources.
- Live virtual lecture sessions and guest seminars are provided. The online sessions are recorded and made available to students for later viewing. Please note that by joining any virtual live sessions, you are giving consent for recording the session.
- Guest seminar(s) will be arranged to understand better how space systems engineering concepts are applied in real space projects. Attendance at the guest seminar is not mandatory. However, I encourage you to attend as the invited speakers work on real space projects. The time and title of guest seminars will be posted on the Moodle site.

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

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Lily Qiao		Bldg 16, Room 204		Email to book an appointment	No	Yes
Lecturer	Trevor Lafleur		Bldg 16, Room 203		Email to book an appointment	No	No