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**AERO9610**

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# 1. Contact details

## Contact details and consultation times for course convenor

The course convenor is Dr Jason Held, an adjunct lecturer normally working off campus. Best time for questions is face-to-face during the lecture. Also feel free to send a note directly connect via the moodle site.

Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>

## Contact details and consultation times for additional lecturers/demonstrators/lab staff

Name: Taofiq Huq

Email: [n.huq@unsw.edu.au](mailto:n.huq@unsw.edu.au)

## Contact hours

	<b>Day</b>	<b>Time</b>	<b>Location</b>
<b>Lectures</b>	Monday	1500hrs – 1800hrs	Ainsworth 202 (K-J17-202)

## Summary and Aims of the course

This course will give you a basis in the design issues involved in the engineering of the space segment to fulfil a space mission. This course is intended to deliver a broad overview of the engineering principles involved with the design, development, testing and implementation of the space segment of a space mission.

Design is an open-ended problem for which there is normally no single correct answer, only

program, although it is intended (though not required) to be taken early in the Satellite Systems Engineering Master's program.

The course is also available as a 4th year disciplinary elective within the Bachelor of Engineering. There are no prerequisite courses leading into this course; however it is expected that enrolling students will have completed

## 5. s f h

Week	Topic	Location	Suggested Readings
1	Introduction, design process, space customers, payloads	Ainsworth 202 (K-J17-202)	Class readings
2	Mission Design	Ainsworth 202 (K-J17-202)	C. Brown Ch2 Space Vehicle Design, ch. 3
3	Mass budgets, Structures and Mechanisms	Ainsworth 202 (K-J17-202)	C. Brown, ch 2.2
4	Thermal Subsystems	Ainsworth 202 (K-J17-202)	C. Brown, ch 7
5	Power Subsystems and EPS budgets	Ainsworth 202 (K-J17-202)	C. Brown, ch 6
6	Attitude Determination and Control	Ainsworth 202 (K-J17-202)	C. Brown, ch 5
7	Propulsion	Ainsworth 202 (K-J17-202)	C. Brown, ch 4
8	C&DH	Ainsworth 202 (K-J17-202)	C. Brown, ch 8
9	Communications	Ainsworth 202 (K-J17-202)	C. Brown, ch 8 and Class Readings
10	<National Holiday>		
11	<National Holiday>		
12	Mission Planning Workshop	Ainsworth 202 (K-J17-202)	Class Readings

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There are three assessments in this course: Subsystem designs, a mission plan, and a final report.

Each lecture covers a single subsystem or related aspect of the spacecraft design. The students will then develop that subsystem on their own as an assignment due the next week. Each subsystem accounts for equal fraction of the total assignment assessment. Each submission will consist of a short description of the solution along with calculations (in excel or similar spreadsheet) demonstrating the design's feasibility. Students are expected to work with their own code or spreadsheets as part of their submission.

The mission design consists of a short report consisting of a description of the selected orbits, outputs from satellite simulations output (overpass information), and related calculations for customer volume, converted from the outputs. Software will be provided that can produce the orbit overpasses into a .csv format.

The final report due at the end of semester will consist of the completed solution to include a refined mission plan, updated spacecraft design (corrected from assignment feedback), and final analysis of how your spacecraft supports their customer experience.

#### Presentation

All non-electric submissions should have a standard School cover sheet which is available from this course's Moodle page.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

#### Submission

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Special consideration for assessment tasks must be processed through [student.unsw.edu.au/special-consideration](http://student.unsw.edu.au/special-consideration).

It is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

Where there is no special consideration granted, the 'deadline for absolute fail' in the table above indicates the time after which a submitted assignment will not be marked, and will achieve a score of zero for the purpose of determining overall grade in the course.

#### Assessment Criteria

The following criteria will be used to grade assignments:

- Identification of key facts and the integration of those facts in a logical development.
- Clarity of communication—this includes development of a clear and orderly structure and the highlighting of core arguments.
- Sentences in clear and plain English—this includes correct grammar, spelling and punctuation.
- Correct referencing in accordance with the prescribed citation and style guide.

For numerical calculations:

- Accuracy of numerical answers.
- All work shown.
- Use of diagrams, where appropriate, to support or illustrate the calculations.
- Use of graphs, where appropriate, to support or illustrate the calculations.
- Use of tables, where appropriate, to support or shorten the calculations.
- Neatness.

## Examinations

This course has no examinations.

## Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the [School intranet](#), and the information on UNSW's [Special Consideration page](#).

## 7A tt c

You are required to attend a minimum of 80% of all classes, including lectures, labs and seminars. It is possible to fail the course if your total absences equal to more than 20% of the required attendance. Please see the [School intranet](#) and the [UNSW attendance page](#) for more information.

## 8. ct s c sf st ts

## Textbooks

1. Elements of Spacecraft Design, C. D. Brown.  
- This is \*the\* quintessential resource, a great reference for this class  
[https://books.google.com.au/books/about/Elements\\_of\\_Spacecraft\\_Design.html?id=mTSMHcmVbkC&redir\\_esc=y](https://books.google.com.au/books/about/Elements_of_Spacecraft_Design.html?id=mTSMHcmVbkC&redir_esc=y)
2. Spacecraft Systems Engineering (4<sup>th</sup> -







# A A S t ( A ) t c s

## Stage 1 Competencies for Professional Engineers

	<b>Program Intended Learning Outcomes</b>
<b>PE1: Knowledge and Skill Base</b>	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
<b>PE2: Engineering Application Ability</b>	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
<b>PE3: Professional and Personal Attributes</b>	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership