



Mechanical and Manufacturing Engineering

Course Outline

Semester 2 2017

AERO4110

AEROSPACE DESIGN PROJECT

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1. Staff contact details

Contact details and consultation times for course convenor

Name: Dr John Olsen
Office Location: Ainsworth Building, Rm 311C
Tel: (02) 9385 5217
Email: j.olsen@unsw.edu.au

Only use email as a last resort. I would prefer you see me after the lecture if you have a problem.

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

David Simons will be chairing the design meetings

Name: David Simons
Tel: (02) 9791 0164
Email: david@autoavia.com.au
Auto Avia Design
Aircraft Certification & Design
www.autoavia.com.au

Please see the course [Moodle](#).

2. Important links

- [Moodle](#)
- [UNSW Mechanical and Manufacturing Engineering](#)
- [Course Outlines](#)
- [Student intranet](#)
- [UNSW Mechanical and Manufacturing Engineering Facebook](#)
- [UNSW Handbook](#)

3. Course details

Credit Points

This is a 6 unit-of-credit (UoC) course, and involves 4 hours per week (h/w) of face-to-face contact.

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 about 9 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

Contact hours

	Day	Time	Location
Lectures	Tuesday	12 noon - 1pm	Ainsworth 102
Design	Tuesday	1pm - 2pm	Ainsworth 405
Meetings	Thursday	1pm - 3pm	Ainsworth 405

Summary and Aims of the course

This course focuses on the conceptual design of a vehicle. It is group-based design work, with a design task provided to each group based on a specification.

The aim of this course is to learn how to utilise your discipline knowledge and synthesise the design of a whole aerospace vehicle.

Student learning outcomes

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Conceptually design or partial design of an aerospace vehicle	1.5, 1.6, 2.1, 2.3, 2.4
2. Work in a team environment	3.1, 3.4, 3.5, 3.6
3. Professionally communicate design information and ideas	3.2, 3.3
4. Use modern engineering design tools to analyse aerospace systems	1.3, 2.2

4. Teaching strategies

The course will use a combination of lectures and workshop sessions. The onus is on the group to work as a team and meet the design targets outside of timetabled contact hours. The philosophy is to treat the academic and professional staff as sources of guidance to assist you to meet your design goals.

5. Course schedule

Week	Topic	Major Assessment Due Dates
1	Introduction and Request for Proposal	
2	Configuration Layout	
3	Aircraft Performance	
4	Aerodynamics	
5	Propulsion	Design Review 1
6	Propulsion	
7	Systems	
8	Flight testing and certification	
9	Systems	
10	Structures	
11	Structures	
12	Costing	
13		Final Design Presentation
14		Final Report, Peer Assessment

6. Assessment

Assessment overview

Tasks	Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned	Deadline for absolute fail
T1	Design Report 1	5-10 pages	25%	1, 2 and 3	As per rubric provided on Moodle	Thursday Week 5	2 weeks after submission	1 week after submission
	Final Design Report	Max. 50 pages	50%	All	As per rubric provided on Moodle	Thursday Week 14	Released with final marks	2 days after submission
T2	Final Design Group Presentation	45mins	15%	2 and 3	As per rubric provided on Moodle	Week 13 Day TBA	Released with final marks	Has to be done on the day.
T3	Logbooks	N/A	5%	All	TBA	Sprung on you without warning	Released with final marks	Has to be handed in on the spot. No extension at all.
T4	Peer Assessment	N/A	5%	All	TBA	Thursday Week 14	Released with final marks	2 days after submission

Assignments

Presentation

All 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. Presenting them 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. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor **before the due date**. Special consideration for assessment tasks of 20% or greater must be processed through 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.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Examinations

There is no examination for this course.

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](#).

7. Attendance

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. Expected resources for students

Recommended reading:

E. Torenbeek, Advanced Aircraft Design, Conceptual design, analysis and optimisation of subsonic civil airplanes, Aerospace Series, Wiley, 2013.

Suggestions:

E. Torenbeek & H. Wittenberg, Flight Physics, Essentials of aeronautical disciplines and technology, with historical notes, Springer, 2002.

J. Roskam, Airplane Design, Roskam Aviation and Engineering Corporation, Kansas, 1989.

A. Filippone, Advanced Aircraft Flight Performance, Cambridge University Press, 2012.

D.P. Raymer, Aircraft Design: a conceptual approach, 4th edition, AIAA Education Series, 2006.

N. Cumpsty & A. Hayes, Jet Propulsion, a simple guide to the aerodynamics and thermodynamic design and performance of jet engines, 3rd edition, Cambridge University Press, 2015.

J.G. Leishman, Principles of Helicopter Aerodynamics, 2nd edition, Cambridge Aerospace Series, Cambridge University Press, 2006.

I. Moir & A. Seabridge, Aircraft Systems, mechanical, electrical, and avionics subsystems integration, Aerospace Series, Wiley, 2008.

UNSW Library website: <https://www.library.unsw.edu.au/>

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

9. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience process, informal discussion in the final class for the course, and the School's Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

This course has been reduced to a single session course for 2017.

10. Academic honesty and plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism: student.unsw.edu.au/plagiarism The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the [intranet](#).

11. Administrative matters and links

All students are expected to read and be familiar with School guidelines and policies, available on the intranet. In particular, students should be familiar with the following:

- [Attendance, Participation and Class Etiquette](#)
- [UNSW Email Address](#)
- [Computing Facilities](#)

- [Assessment Matters](#) (including guidelines for assignments, exams and special consideration)
- [Academic Honesty and Plagiarism](#)
- [Student Equity and Disabilities Unit](#)
- [Health and Safety](#)
- [Student Support Services](#)

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	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
PE2: Engineering Application Ability	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
PE3: Professional and Personal Attributes	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