



Mechanical and Manufacturing Engineering

Course Outline

Semester 1 2018

AVEN1920

INTRODUCTION TO AIRCRAFT ENGINEERING

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1. Staff contact details

Contact details and consultation times for course convenor

Name: Dr John Olsen
Office Location: J17 Ainsworth Building 311C
Tel: (02) 9385 5217
Fax: (02) 9663 1222
Email: j.olsen@unsw.edu.au
Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>

Consultation with me concerning this course will be available at a time to be decided.
Consultation by email should only be used as a very last resort as it is clumsy and inefficient.

Mechanics will be taught by:

Name: Dr Sangarapillai Kanapathipillai
Office Location: J17 Ainsworth Building 408J
Tel: +61 2 9385 4251
Fax: (02) 9663 1222
Email: s.kanapathipillai@unsw.edu.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	1pm – 3pm	Ainsworth 202
	Thursday	10am – 12noon	Ainsworth 202

Summary and Aims of the course

This course is aimed at first year students in aviation and other students who feel they could benefit from some limited understanding of aerospace engineering. It is not intended for students intending to have a career in aerospace engineering. It does, however, provide a general understanding aimed at pilots, aviation administrators and others for whom some knowledge of aircraft engineering would be beneficial.

The course aims to give the student an overview of the practice and theory behind aircraft engineering. It will encourage the student to carry out simple engineering analysis to explore the claims of the manufacturers. It will also introduce the student to some of the sources of data available on aircraft and the need to take care. It will also require the student to produce a report to a professional standard and encourage industry quality behaviour.

Student learning outcomes

After completion of the course the student should feel confident in exploring material related to aeronautical engineering. They should also have learnt how to carry out simple engineering calculations. The final reports should enhance their ability to produce a document to an acceptable professional standard.

EA's Stage 1 Competencies for Professional Engineers does not apply to this course as it is not an engineering course.

4. Teaching strategies

“Give a man a fish and you feed him for a day. Teach him how to fish and you feed him for a lifetime.” **Lao Tzu**

- Presentation of the material in lectures and discussions so that the students know how to approach complex engineering calculations required in industry.
- The problems I suggest you look at are intended to provide you with feedback and to allow you to investigate topics in greater depth. This is to ensure that you understand what you are being taught.

Consultation periods are designed to provide you with feedback and discussion on the problems that I would like you to do.

5. Course schedule

Week mon	Tuesday	Thursday
1 26/2/18	Introduction to flight physics, lift and drag, straight and level flight.	Mechanics (forces)
2 5/3/18	The atmosphere and airspeeds	Mechanics (forces)
3 12/3/18	Range and endurance equations	Mechanics (moments)
4 19/3/18	1 st class test. Weight and balance	Mechanics (equilibrium)
5 26/3/18	Wings	Mechanics (equilibrium)
6 9/4/18	Climbing flight	Mechanics (rigid body mechanics)
7 16/4/18	Turning flight	Mechanics class test
8 23/4/18	Take-off and landing distances	Reciprocating piston engines
9 30/4/18	Propellers	
10 7/5/18	Introduction to gas turbines, net thrust, propulsive & component efficiencies	
11 14/5/18	Introduction to helicopters	
12 21/5/18	The future of flight	
13 28/5/18	Final class test (excluding mechanics)	

The schedule shown may be subject to change at short notice to suit exigencies.

6. Assessment

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Mechanics class test	One hour	30%	All	All course content up to the date of the assignments.	19 th April	There is no supplementary	Two weeks after submission
Class test	One hour	20%	All	All course content up to the date of the test.	20 th March	There is no supplementary	One week after submission
Assignment 1	Roughly 10 pages	20%	All	All course content from weeks 1-12 inclusive.	30 th April	One week after the due date	Two weeks after submission
Final class test	One hour	30%	All	All course content from weeks 1-12 inclusive.	29 th May	There is no supplementary	Upon release of final results
TOTAL		100%					

The length of the assignment solutions will depend on you, but you need to show all working.

The assessments are based to allow you to obtain an understanding of the material being taught and will allow you to apply the concepts learnt in the course. In order to achieve a PASS (PS) in this course, you need to both achieve a total mark of at least 50%.

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 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.

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

You must be available for all tests and examinations. Final examinations for each course are held during the University examination periods, which are June for Semester 1 and November for Semester 2.

Provisional Examination timetables are generally published on myUNSW in May for Semester 1 and September for Semester 2

For further information on exams, please see the [Exams](#) section on the intranet.

Calculators

You will need to provide your own calculator, of a make and model approved by UNSW, for the examinations. The list of approved calculators is shown at student.unsw.edu.au/exam-approved-calculators-and-computers

It is your responsibility to ensure that your calculator is of an approved make and model, and to obtain an “Approved” sticker for it from the School Office or the Engineering Student Centre prior to the examination. Calculators not bearing an “Approved” sticker will not be allowed into the examination room.

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

Textbooks

E. Torenbeek & Wittenberg, 2002, *Flight Physics, Essentials of Aeronautical Disciplines and Technology, with Historical Notes*, Springer.

Suggested reading

J.L. Meriam & L.G. Kraige, 2003, *Engineering Mechanics, Statics*, 5th edition, SI version, John Wiley & Sons, Inc.

D. F. Anderson & S. Eberhardt, 2010, *Understanding flight*, 2nd edition, McGraw Hill.

R.H. Barnard & D.R. Philpott, 2004, *Aircraft Flight*, 3rd Edition, Pearson, Prentice Hall.

A.C. Kermode, 2012, *Mechanics of Flight*, 12th Edition, Pearson.

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

The library the website is: <https://www.library.unsw.edu.au/>

Other Resources

If you wish to explore any of the lecture topics in more depth, then other resources are available and assistance may be obtained from the UNSW Library.

One starting point for assistance is:

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.

I have taken over the course. Last year, a number of people convened the course but have now left or stepped back from teaching.

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](#).

II. Administrative matters and links

All students are expected to read and be familiar with School guidelines and polices, 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](#)

*Dr John Olsen
1st February, 2018*