UNSW AUSTRALIA

Course outline

Semester 2 2016

Never Stand Still | Engineering | Mechanical and Manufacturing Engineering

AERO3110

AEROSPACE DESIGN

Contents

1. Staff contact details

Contact details and consultation times for course convenor

Name: John Page
Office location: J17/311
Tel: (02) 9385 9385
Email: j.page@unsw.edu.au

To make an appointment, please send an email

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

John Olsen
Room: J17/311C
Telephone: 9385 5217
Email: j.olsen@unsw.edu.au

Zoran Vulovic
Room: J17/311D
Telephone: 9385 6261
Email: z.vulovic@unsw.edu.au

Consultation times with Dr Vulovic will be announced later.

2. Course details

Credit Points

This is a 6 unit-of-credit (UoC) course, and involves five (5) 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	Monday	1500 – 1700	Ainsworth 102
Studio	Tuesday	1000 – 1200	Ainsworth 102
Catia	Tuesday	1200 – 1300	Ainsworth 204

Summary of the course

The course will provide the student with an understanding of the aerospace design process.

Aims of the course

The course builds on the principles taught in the science based classes and provides insight into the application of aeronautical engineering knowledge in a practical industrial environment. Students are shown methods used by practicing engineers in the design process and assisted in developing engineering judgement that will be useful to them throughout their careers. They are also introduced to the tools and data sources used by a modern practicing aerospace designer.

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.	Carry out a simple aerospace detail design	PE 1.5 PE 2.3 PE 3.2 PE 3.3
2.	Understand how aerospace structures, flight dynamics, propulsion and systems interact with the design process	PE 1.3 PE 3.2 PE3.3
3.	Have a very basic ability to use CATIA, the design computer program that dominates the industry	PE 1.5 PE 2.2
4.	An ability to seek out sources if design data and evaluate their reliability and relationship to the safety regulators	PE 1.6 PE 3.1

3. Teaching strategies

A number of teaching strategies are adopted in the teaching of this course. Each week there are three hours of lectures shared by academics with expertise in flight dynamics\propulsion, aerostructures, regulations and aerosystems. The aim of these lectures is to assist in the understanding of how the theoretical work undertaken on the course relates to the design of aerospace vehicles.

Two hours a week are spent in a studio environment. The aim of this time is to cultivate creative skills by undertaking a number of simple structural design tasks under supervision. This approach is adapted from the teaching methods developed for architectural students. A further hour is allocated in the computer lab for learning CATIA. This is taught by direct hands on practice where exercises are provided which when complete allow the required standard to be achieved. The undertaking of these tasks is entirely voluntary but there is a strong correlation that those who ignore this opportunity do poorly at the CATIA assignment. During this period the students will also be able to attend a demonstration of modern simulation in small groups if they wish.

4. Course schedule

Topic	**Date**	**Location**	**Lecture Content**	**Demonstration/Lab Content**	**Suggested Readings**
Flt.Dyn. and Prop.	Wk. 1-12	Mech.Eng. 102	Design implications	N/A	As required
Systems	Wk 1-7	Mech.Eng. 102	Design implications	N/A	As required
Aviation Regulations	Wk 8-12	Mech.Eng. 102	Design implications	N/A	As required
Catia	WK 1-12	Mech Eng. 204	Laboratory	Hands on learning	N/A
Detail Design	Wk 1-12	RedCMO32	Studio	Design Practice	Texts and ESDU

5. Assessment

Assignments

Assessment	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
Aircraft assessment	10%	2, 4	Research and assessment of material in public domain	Mon Wk 5, 1500	By Wk.7
Flight systems	20%	1, 2, 4	A detailed design project	Mon Wk 9	By Wk 12
CATIA	20%	3, 4	Electronically submitted exercise showing understanding of capabilities	Tues Wk 13, 1700	On Request

Class test

Assessment	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
Flight mechanics/propulsion	10%	2, 4	General knowledge of subject	Mon Wk 12, 1500, in class	After Term
Aviation regulations	10%	3, 4	General knowledge of subject	Mon Wk12, 1600, in class	After Term

Studio

Assessment	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
Design studio	30%	1, 2, 3, 4	Ability to carry out detailed design in class environment	Wk 1-12, in class	N/A

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

The studio exercises are marked in class, 3 marks per week, so absence from studio class will mean the forfeit of the mark. If very exceptional circumstances result in nonattendance an allowance may be made.

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.

Examinations

There are no mid-session or final exams in this course but there is a class test where exam rules will apply.

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.

6. Expected resources for students

You will be expected to access and reference a number of texts throughout the course of this subject.

In particular you will be expected to use the ESDU data sheets as the only source of regulator approved data available within the university. It is also expected you will use the net extensively and develop discernment.

Catia is available in the schools computer laboratories but they get heavily used so you should take advantage of the hour set aside for them.

The UNSW Library website, from where a lot of material along with ESDU data sheets are available is www.library.unsw.edu.au/servicesfor/index.html

7. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the Course and Teaching Evaluation and Improvement (CATEI) 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.

In this course, recent improvements resulting from student feedback include the introduction to simulation and virtual engineering. This will take the form of a demonstration to a small group of students, five, at a time in the SAVE laboratory, in place of the CATIA class and an extra hour. Studio time has been allocated to CATIA to avoid restricting its content. This inclusion was particularly requested by the fourth year students who felt they needed this exposure to assist in their project designs. We will also this year be adding regulations to the studied areas. This will involve an overview of the regulations appertaining to design, manufacture operations and crash/incident investigation.

8. 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.

9. Administrative matters

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

John Page
30th June 2016

Appendix A: Engineers Australia (EA) 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