Course Outline

Term 1 2020

AERO3410

AEROSPACE STRUCTURES

activities, preparation and time spent on all assessable work.

This course involves 5 hours per week (h/w) of face-to-face contact. You should aim to spend about 12 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

The aims of this course are to develop:

an understanding of and justifications for the configuration and materials used in airframes;
the ability to analyse aerospace structures using classical analysis techniques;
the ability to design aerospace structures against failure, degradation, instability and aeroelasticity.

Student learning outcomes

This course is designed to address the learning outcomes below and the correspondingmes

MATLAB examples will be used to demonstrate how to solve whole classes of problems, rather than specific instances.
Laboratory Demonstrations: Laboratory demonstrations of some core concepts will be provided. Laboratories allow you to physically experience the theoretical concepts taught in class.
Assignments (with group work): Assignments allow you to apply your new skills to challenging tasks that may involve synthesis of multiple concurrent conceptual approaches. Group work, peer feedback and self-reflection on submissions will develop critical professional skills.

5.

Week	***Mod***	***Topic***	***Concepts***	***Suggested Readings***
1	N/A	Airframe Basics	Flight Loads, Loads on the Airframe, Load Paths, Role of Components, Airframe types, Stressed Skin Design	*Megson B1-2*
2	1	Aerospace Materials	Drivers for Airframe Materials, Beneficial Properties, Choice of Materials, Fatigue, Corrosion, Wear, Creep	*Megson A1,B1*
Online		Solid Mechanics	Elasticity, Stress and Strain Tensor, Invariants and Failure Prediction, Material Characterisation	
3		Composites	Fibre Reinforced Materials, Properties, Characterisation, Laminates, Classical Laminate Theory, Failure Prediction	
4		Thin-walled Beams (Bending)	Beam View of Aircraft Structures, Shear Force and Bending Moments, Thin-walled Approx., Moments of Area, Unsymmetrical Bending	
5	2	Thin-walled Beams (Shear and Torsion)	Shear D/F1 9 Tf1 lMC 72.504 392.95 0.48 0.48001	*Megson B3-4*

2012. (4th Edition will suffice with minor inconvenience)

Recommended Background Knowledge

Cutler, J. Understanding Aircraft Structures, Fourth Edition. Blackwell, 2005.

Suggested Textbooks

Flabel, J.C. *Practical Stress Analysis for Design Engineers*. Lake City Publishing Company, 1997.

Recommended Reading

Daniel, I.M. and Ishai, O. *Engineering Mechanics of Composite Materials*. Oxford University Press, 1994.
Niu, M.C.Y. *Airframe Structural Design*. Conmilit Press, 1988.
Niu, M.C.Y. *Composite Airframe Structures*. Conmilit Press, 1992.
Baker A., Dutton S. and Kelly, D. *Composite Materials for Aircraft Structures*, 2nd Edition. AIAA Education Series, 2004.

UNSW Library website: https://www.library.unsw.edu.au/
Moodle: https://moodle.telt.unsw.edu.au/login/index.php

8. [illegible]

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.

In this course, recent improvements resulting from student feedback include

One extra hour of demonstration each week
Demonstrations

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, visit: 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

10. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

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