



Source Outline
Term 2 2019

MECH3610

ADVANCED THERMOFLUIDS

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I. Staff contact d

Contact details and consultation times for course convenor

Course Convenor

Name: Dr Charitha de Silva

Office location: J17 Ainsworth Building Room 311/H

Email: c.desilva@unsw.edu.au

Course Lecturer

Name: Naomi Tsafnat

Email: n.tsafnat@unsw.edu.au

Head Demonstrator

Name: Joshua Pham

Email: z5059367@zmail.unsw.edu.au

All non-personal matters should be addressed through forums in the first instance. Personal administrative matters should be directed to the Head Demonstrator, then to the Course Convener only if matters remain unresolved.

Other Demonstrators

3. Course details

Credit points

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

The normal workload expectations of a student are approximately 25 hours per term for each UOC, including class contact hours, other learning activities, preparation and time spent on all assessable work.

You should aim to spend about 15 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 | 4pm - 6pm | Rex Vowels Theatre (F17-LG3) |
| | Friday | 11am - 1pm | Law Theatre(F8-G04) |
| | Wednesday | 9am - 11am | |

Problem Solving Sessions

areas will be applied to heat exchanger and cooling fin design, which will include experiments on heat transfer mechanisms to validate theoretical calculations.

Problem solving sessions provide the opportunity for students to test their conceptual framework on problems.

The Laboratories focus on the Heat Transfer component of the course and provide students the opportunity to compare specific parts of the theory to practical results in a controlled environment. This is to encourage students to consider the practical implications of their theoretical learning.

The Assignment will cover theory from the second half of the course and give students the opportunity to research a specific area of engineering knowledge in depth.

Moodle forum discussions provide an opportunity to further explore and discuss content. Students are encouraged to seek other learning resources and share them on the forums for the benefit of all.

5. ~~Course schedule~~

| Week | Date | Name | Topics | Reading** |
|------|-------------|--|---|-------------|
| 1 | 3 -7 June | Introduction to Heat Transfer / Conduction | Heat Transfer Overview; Units and Dimensions; Heat Diffusion Equation; Conduction | ÇG: 1 & 2 |
| 2 | 10 -14 June | Conduction and Transience | 1D Steady State Conduction; Extended Fins; Transient Conduction; Lumped Capacitance Method. | ÇG 3, 4 & 5 |
| 3 | 17 -21 June | Convection | Convection; Forced / Free (Natural) Convection | ÇG: 6 & 7 |
| 4 | 23-28 June | Heat Exchangers / Radiation | | |

| Week | Date | Name | Topics | Reading** |
|------|---------|------------|---|-------------|
| 10 | 5-9 Aug | Combustion | Relations; Chemical Equation Balancing; Heat of Combustion; Adiabatic Flame Temperature Chemical Equilibrium; Le Chatelier's principle | ÇB: 15 & 16 |
| 11 | 12 Aug | Revision | | |

**** Notes on recommended readings:**

ÇG: *Heat and Mass Transfer, Fundamentals and Applications*, 5th Edition in SI Units by Yunus Çengel and Afshin Gg.t jcg.t jcg.oar00008871 0 595.32 841.92 reW* nBT/F1 11.04 Tf1 0 0 1 144.26

6. Assessment

Assessment overview

| Assessment | Length | Weight | Learning outcomes assessed | Assessment criteria | Due date and submission requirements | Deadline for absolute fail | Marks returned |
|------------------------------|---------|--------|----------------------------|---------------------|--------------------------------------|----------------------------|----------------|
| Heat Transfer Formative Quiz | 2 hours | 0% | 1 | | | | |

Formative Quiz

There will be a Moodle quiz held in Week 4 to give students the opportunity to verify that they have understood the material so far. This quiz has a zero percent (0%) weighting and does not contribute to your overall course mark; however students are encouraged to participate.

The quiz will be open at the start of Week 4.

It is intended that the style and difficulty of the Moodle quiz will be representative of that in the final Mid Term exam although marking and feedback comments will be automatically applied by computer marking.

Assignments

Presentation

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

The submission of online material should follow the instructions given on the appropriate Moodle page.

Online submissions are required to be submitted via Moodle. No cover sheet is required as all assignments will be identified through your Moodle account. *All digital assignments are due by 5pm on the due date.* An additional allowance will be granted automatically to submit assignments until 11:55pm without penalty, but you accept any risk of technical difficulties with submission. *If you try to submit between 5pm and 11:55pm and Moodle does not accept the submission for any reason, the assignment will be considered late.*

Work submitted late without an approved 4ps45(t)-4(on)3(si)5oen by the course ccordinor or lps45(t)-4(ed)3



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
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

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

[Attendance](#)

[UNSW Email Address](#)

[Computing Facilities](#)

[Special Consideration](#)

[Exams](#)

[Approved Calculators](#)

[Academic Honesty and Plagiarism](#)

[Student Equity and Disabilities Unit](#)

[Health and Safety](#)

[Lab Access](#)

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 |