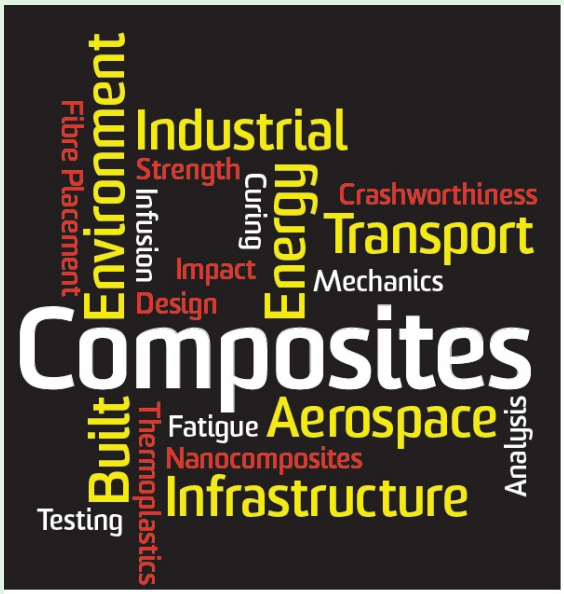
MECH9420

Composite Materials and Mechanics

Term 1, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Gangadhara Prusty	G.Prusty@unsw.edu.au	Friday 12-1 p.m. in-person and Via Moodle	208F	0293855939

Administrators

Name	Email	Availability	Location	Phone
Doha Shamsuddoha	m.shamsuddoha@unsw.edu.au	Friday 12-1 p.m. in-person and Via Moodle	208A, MECHENG	

School Contact Information

Location

UNSW Mechanical and Manufacturing Engineering

Ainsworth building J17, Level 1

Above Coffee on Campus

Hours

9:00–5:00pm, Monday–Friday*

*Closed on public holidays, School scheduled events and University Shutdown

Web

School of Mechanical and Manufacturing Engineering

Engineering Student Support Services

Engineering Industrial Training

UNSW Study Abroad and Exchange (for inbound students)

UNSW Future Students

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

(+61 2) 9385 4097 – School Office**

**Please note that the School Office will not know when/if your course convenor is on campus or available

Email

Engineering Student Support Services – current student enquiries

- e.g. enrolment, progression, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries

- e.g. admissions, fees, programs, credit transfer

School Office – School general office administration enquiries

- NB: the relevant teams listed above must be contacted for all student enquiries. The School will only be able to refer students on to the relevant team if contacted

Important Links

- Student Wellbeing
- Urgent Mental Health & Support
- Equitable Learning Services
- Faculty Transitional Arrangements for COVID-19
- Moodle
- Lab Access
- Computing Facilities
- Student Resources
- Course Outlines
- Makerspace
- UNSW Timetable
- UNSW Handbook

Course Details

Units of Credit 6

Summary of the Course

Using a unified and integrated approach, this course will give you a solid grounding in:

- The properties of composite materials;
- Processing and manufacturing methods;
- Micromechanics and lamination theory;
- The analysis and manufacture of light weight composite structures;
- The design of a composite structures;
- Test methods to confirm mechanical properties.

The course will cater to the specific challenge of materials engineers across all engineering disciplines:

- Aerospace
- Manufacturing
- Civil & Mechanical Engineering
- Mechatronics
- Naval Architecture
- Architecture
- Industrial Design

Course Aims

To provide an understanding of the advanced composite materials, micro-mechanical analysis of composite strength and stiffness, and be able to manufacture of macro level specimens for structural applications.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Upon completion of this course the student is expected to be familiar with the use of advanced composite materials such as glass and carbon fibre epoxy for design and manufacture of composite structures.	PE1.1, PE1.3, PE1.6, PE1.5
2. Develop the basic understanding to use the composite materials, micromechanics of layered composites, Analysis and design of composite structures and Failure analysis of laminated panels.	PE2.1, PE2.2, PE2.3, PE2.4

Teaching Strategies

This course includes two face-to-face teaching methods:

1. Lectures to introduce properties of composite materials, micro and macro-mechanical studies
2. Hands-on laboratory and team-work to apply fundamental concepts in in understanding the material properties and their use in engineering applications.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Assignment 1	15%	04/03/2022 05:00 PM	1, 2
2. Assignment 2	25%	01/04/2022 05:00 PM	1, 2
3. Assignment 3	20%	15/04/2022 05:00 PM	1, 2
4. Class Test 1	20%	10/03/2022 08:00 PM	
5. Class Test 2	20%	21/04/2022 08:00 PM	1, 2

Assessment 1: Assignment 1

Assessment length: 10 pages
Submission notes: Submission via Moodle only
Due date: 04/03/2022 05:00 PM
Marks returned: Wk 5

In-depth knowledge of a topic is a pre-requisite to conduct credible research in the field. A literature review is an evaluative and coherent compilation of what has been studied and documented on a particular topic in the literature. The primary objective of a literature review is to provide your target reader with an overview of what the scholars and experts have delivered in the topic that you wish to study.

In the process of writing a research review, you should be able to learn to:

1. identify various important issues and research questions raised in the literature,
2. justify the theoretical and conceptual method and framework,
3. provide audiences with the state of existing knowledge in your field of study and
4. assess pertinent studies to demonstrate your scholarly ability in a topic of your research and to identify a gap in existing knowledge which can provide a rationale for further research.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment criteria

Essential checklist for a good literature review

Overall presentation
Is the literature review sensibly sectioned? Is each section organised using subheadings, providing a logical flow to aid transitional phrases throughout the review?
Was the literature review formatted in accordance with instructions given in the assignment? (i.e. font type and size, a page limit and the number of articles)
What is the overall quality of English Expression (clear and concise)? - The overall quality of English expression also includes use of relevant verbs in places when incorporating references and quotations.

Are there any spelling and/or punctuation errors? Is technical jargon correctly used throughout the literature review?	
Do the references cited properly conform to APA style? Is the reference list properly formatted using APA style for each type of references?	
Contents	
Introduction	How well have the context and aims of a literature review been introduced?
	Is the overview statement of the literature clearly and succinctly presented?
	Does the author clearly describe the significance of a topic and
	Is the appropriate inquiry question established as a scholarly article?
	Are the findings and results of reviewed articles judiciously compared, contrasted and connected to each other?
Main text	Are the chosen articles closely pertinent to the initial inquiry question described in the introduction?
	Has the author successfully managed to deliver the main argument and meaningful findings of articles reviewed?
	Are arguments and analyses from multiple sources in the literature coherently integrated to link author's main topic and argument together?
	Are all arguments and contents evidenced using correct references for the academic integrity?
	Are all similarities and differences of ideas and research outcomes related to the topic of a literature review correctly identified and demonstrated from a reference to a reference?
	Has the author successfully verified through evidence and facts? You must remain objective through scientific facts or evidence and statistics.
Conclusions	Does the conclusion of the review summarise knowledge acquired from the review well in context of the specific focus described in the introduction?
	Are the obvious gaps and methodological flaws in research of the area identified explicitly? - The conclusions must briefly evaluate 'state-of-the-art' for the literature reviewed, indicating major gaps in research, inconsistencies in theory and findings and current issues pertinent to the topic of interest.
	Has a proper closing remark been provided at the conclusion of a literature review? – The conclusions sometimes need to finish by providing author's overall perspective and insight into the topic and outline of what the obvious next stage of research would be.

Assessment 2: Assignment 2

Assessment length: 15 1.5-spaced pages, not including the references page, with Times New Roman at 12 pts and the standard margins (3 cm for the top and 2.54 cm for the rest).
Due date: 01/04/2022 05:00 PM

The aim of this assignment is to expand your knowledge and understanding of composite materials under mechanical loads using standardized test methods of ASTM International (American Society for Testing and Materials). In this assignment, you will be able to conduct laboratory scale experiments on coupons made from Carbon/Epoxy, E-glass/Epoxy and Kevlar/Epoxy unidirectional composite panels. You will also be able to compare estimated and experimental values predicted as per the ASTM Standards.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment criteria

Report writing instruction (Using all groups data)

1. **Introduction:** **(Marks 10)**

- Give a short description about the composite laminates
- Why the mechanical characterization is essential?
- How this will assist you in analysing the physical problem you may be dealing in real life
- The reason why you want to conduct experimental determination of properties

1. **Description of the experiment:** **(Marks 30)**

- Describe materials e.g., Carbon/epoxy composite, glass/epoxy composite and Kevlar/epoxy composite
- Describe the panel manufacturing e.g., vacuum infusion technique, number of ply etc.
- Mechanical test e.g., Tensile test, compression test and shear test

    - Sample dimension
    - Test setup
    - Loading rate etc.

1. **Result analysis and mechanical characterisation with discussions:** **(Marks 40)**

3.1. Carbon/Epoxy (using all groups data)

3.1.1. Tensile test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.1.2. Compressive test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.1.3. Shear test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.2. E-glass/Epoxy (using all groups data)

3.2.1. Tensile test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.2.2. Compressive test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.2.3. Shear test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.3. Kevlar/Epoxy (using all groups data)

3.3.1. Tensile test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

3.3.2. Compressive test results: Draw Stress vs Strain and calculate Strength (σ) and Modulus (E)

Compare the tensile, compression & shear test results of Carbon/Epoxy, E□glass/Epoxy and Kevlar/Epoxy composite.

Failure criteria mode: Describe your own group data. If possible, you can also compare your result with ASTM standard.

1. **Conclusion and comments based on the results obtained: (Marks 15)**

1. **Reflection: (Marks 5)**

Assessment 3: Assignment 3

Assessment length: Question 1 – 20 marks (1-2 pages as a guide), Question 2 – 20 marks (1-2 pages as a guide),Question 3 – 20 marks (1-2 pages as a guide), Question 4 – 20 marks Write a report (3-4 pages as a guide) , Question 5 – 20 marks (1 page as a guide)
Due date: 15/04/2022 05:00 PM

Large Panel Manufacturing and Testing

Introduction *• During Weeks 4-10 you are allocated to a group within which you have the opportunity to help prepare a FRP composite panel which is processed by the vacuum resin infusion (VRI) closed-moulding process. After curing, mechanical test specimens are cut from the panel and tested for tensile and flexural performance. In this assignment you are asked to answer some questions and perform some calculations regarding the sample panel, reflect on the application of the VRI process and write a report on the mechanical tests that you performed.*

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment criteria

Question 1 – 20 marks

(1□2 pages as a guide)

Assume the following fibre, laminate ply and core data:

g/m2		Wf%	ρF (10EE3kg/m3)
200	Woven carbon	60	1.81
612	DB E-glass	65	2.55

1. Calculate the areal mass in kg/m2 of the **cured** laminate for the single skin portion of the panel on page 1and 2.
2. Calculate the areal mass in kg/m2 of the sandwich portion of the panel.

3. Show *full workings for each entry*, then complete the following table for the 200g/m2 woven carbon ply (refer to the *MECH9420_Fibre Fraction Interpolator*.xlsx spreadsheet on the Course Moodle):

1. Using the spreadsheet *MECH9420_Fibre Fraction Interpolator*.xlsx, perform the same calculations as in (c) above for the 612g/m2 DB E-glass ply. Do *not* show full workings. Just provide a copy of the completed spreadsheet for these two cases.
2. Complete the grey-shaded cells in the following table to **2 decimal** places:

Question 2 – 20 marks

(1□2 pages as a guide)

Given the following data:

Transform the section according 446.5=6.77

Carbon ply thickness 0.22mm and Glass ply thickness 0.51mm

And observing the XX- and YY- axes convention shown on the drawing on page 1;

1. Calculate the moment of inertia, Ixx of the sandwich laminate in mm4/(mm width).
2. Calculate the section modulus, Zxx of the sandwich laminate in mm3/(mm width).
3. Calculate the moment of inertia, Ixx of the single skin in mm4/(mm width).

4. Calculate the section modulus, Zxx of the single skin in mm3/(mm width).

HINT: To complete (a) to (d) successfully, you must firstly perform a **transformed "equivalent section"** of the laminate cross-section as the plies of the laminate do not have the same Young's elastic modulus in the x-x direction (Eb xx [GPa]). Refer to *Design_multilayer laminates in flexure*.pdf in Assignment 3 section of Course Moodle for help with the method.

1. Calculate the bending stiffness (laminate flexural rigidity Elam•Ixx) of the laminate. What can be said about the bending stiffness of the single skin region compared to the bending stiffness of the sandwich laminate region in the x-x direction? What is the main reason for the difference?

Question 3 – 20 marks

(1□2 pages as a guide)

Vacuum resin infusion is a widely-adopted composites processing method.

1. List **four advantages and disadvantages** of the method.
2. Write approximately **150 words describing the method, as found in one existing application** that you have researched and found interesting. Include a photograph and/or diagram including reference in APA style.
3. Suggest a *novel* application of the vacuum resin infusion processing method for a composite component that you can think of, as opposed to an established method. Briefly explain what advantages the use of the method would bring to the application in approx.150 words.

Question 4 – 20 marks

Write a report ***(3□4 pages as a guide)*** on the mechanical testing that **you participated** (**Own group results)** in during the period Week 4-10. Your report *must* include the following elements identified in **bold**:

1. Write the experimental **Aims** in bullet-point form.
2. Two test methods are used—ASTM D3039 for tensile properties and ASTM D790 Procedure A for flexural properties. Provide full citations for the two **Test Methods** using APA style (*see Instruction 5 below). Copies of the two test methods are on the Course Moodle site in the Assignment 3 section.
3. Provide **photos** of the specimen you tested; before, during and after failure. Clearly label each photo with a **caption** identifying the laminate type, test method (abbreviated) and before/during/after failure.
4. A **Results section** according to both of the test methods. Each **must include**:

- Date and location of test. Test machine name and model.
- Your name and Group Number.
- One specimen per group is to be tested. Label each specimen with Group Number.
- The specimen length, width and thickness in mm. For ASTM D790 specimen, state the support span length.
- A Chart or Graph (Curve) for both sets of test results as produced by the Instron machine

software output (**Own group results)**.

- Can you attempt a calculation of the tensile stress, tensile strain and tensile chord modulus (see ASTM D3039 at 13.1, 13.2 and 13.3.1/13.3.1.1 respectively) **of your own group results**? If so, please include your attempt.
- Can you attempt a calculation of modulus in bending (see ASTM D790 at 13.1.12 (tangent modulus only) and flexural stress at break in 13.1.15)? If so, please include your attempt.

1. Summarise the key **Observations** you made.
2. Write up a **Discussion of Results**.
3. State your **Conclusions**.
4. Write a **Statement** explaining what you have learned about the nature of typical **failure modes** in composites compared with, for example, metals. [Hint: Consider the use of such terms as *brittle* and *ductile*].

Question 5 – 20 marks

(1 page as a guide)

Write a brief reflection on what you see as the learning outcomes of this assignment (in bullet-point form; **max. 500 words**).

Instructions:

1. Your assignment **must be typed** in Arial 11-point x 1.5-spacing or 1 mark will be deducted.

Page limits 12 excluding References and Appendix

Note: Please put all figures in Appendix

1. Each page must be marked in the footer with your name, student number and page X of Y page numbering format.
2. File format is to be either MS Word or Adobe Acrobat pdf.
3. Run Spelling-and-Grammar check (F7) before finishing.
4. *Citations must use APA style https://student.unsw.edu.au/american-psychological-association-apa-referencing-system , http://www.apastyle.org/ .

Assessment 4: Class Test 1

Start date: 10/03/2022 07:00 PM
Assessment length: Space will be allocated in the Test paper
Due date: 10/03/2022 08:00 PM
Marks returned: Wk 5

1 Hour on-line test via Moodle

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment criteria

Total number of questions: 2

Answer all the questions

Total value: **20 marks**

Assessment 5: Class Test 2

Start date: 21/04/2022 07:00 PM
Submission notes: The on-line test will be via Moodle
Due date: 21/04/2022 08:00 PM
Marks returned: Wk 11

Details of the test:

Time allowed: **ONE** hour

Total number of questions: 2

Answer all questions

Total value: **20 marks**.

Candidates may use electronic calculators

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Additional details

Details of the test:

Time allowed: **ONE** hour

Total number of questions: 2

Answer all questions

Total value: **20 marks**.

Candidates may use electronic calculators

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Resources

Prescribed Resources

1. Expected resources for students

Reference Texts

1. Isaac M. Daniel and Ori Ishai, Engineering Mechanics of Composite Materials, Oxford University Press, 1994.
2. Mel M. Schwartz, Composite Materials, Vol 2, Prentice Hall, New Jersey, 1997.
3. R. A. Shenoi and J. F. Wellicome, Composite Materials in Maritime Structures, Vol 1&2, Cambridge University Press, U.K., 1993.

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

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

Recommended Resources

Reference Texts

1. Isaac M. Daniel and Ori Ishai, Engineering Mechanics of Composite Materials, Oxford University Press, 1994.
2. R. A. Shenoi and J. F. Wellicome, Composite Materials in Maritime Structures, Vol 1&2, Cambridge University Press, U.K., 1993.

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

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

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.

Feedback from a previous instance of the course suggested that a large number of small assessment tasks were conducive to continued online learning and this has been maintained. Prior to that, improvements included moving to a single platform for online content delivery and assessment.

Laboratory Workshop Information

The laboratory component of this course will be held in Automated Composite Laboratory (L102 & 103 of Willis Annexe) of the MECHENG School.

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
- UNSW Email Address
- Computing Facilities
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Lab Access
- Makerspace
- UNSW Timetable
- UNSW Handbook
- UNSW Mechanical and Manufacturing Engineering

Submission of Assessment Tasks

Assessment submission and marking criteria

Should the course have any non-electronic assessment submission, these should have a standard School cover sheet.

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.

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.

Late policy

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day, for a minimum of zero marks.

The late penalty is applied per calendar day (or part thereof), including weekends and public holidays, that the assessment is overdue.

Work submitted after the 'deadline for absolute fail' is not accepted and a mark of zero will be awarded for that assessment item. For example:

- Your course has an assessment task worth a total of **30 marks (Max Possible Mark)**
- You submit the assessment **2 days after the due date**
- The assessment is marked as usual and achieves a score of **20 marks (Awarded Mark)**
- The late policy is applied using **Late Mark = Awarded Mark - (Days*Penalty per Day)*Max Possible Mark**. Your adjusted final score is **8 marks** (20 - ((2*0.2)*30)).

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

1. Weekly online tests or laboratory work worth a small proportion of the subject mark, or
2. Online quizzes where answers are released to students on completion, or
3. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
4. Pass/Fail assessment tasks.

Examinations

You must be available for all quizzes, tests and examinations. For courses that have final examinations, these are held during the University examination periods: February for Summer Term, May for T1, August for T2, and November/December for T3.

Please visit myUNSW for Provisional Examination timetable publish dates. For further information on

exams, please see the Exams webpage.

Special Consideration

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

UNSW now has a Fit to Sit / Submit rule, which means that if you attempt an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

Please note that students will **not** be required to provide **any** documentary evidence to support absences from any classes missed **because of COVID-19 public health measures such as isolation**. UNSW will **not** be insisting on medical certificates from anyone deemed to be a positive case, or when they have recovered. Such certificates are difficult to obtain and put an unnecessary strain on students and medical staff.

Applications for special consideration **will** be required for assessment and participation absences – but no documentary evidence **for COVID-19 illness or isolation** will be required.

Special Consideration Outcomes

Assessments have default Special Consideration outcomes. The default outcome for the assessment will be advised when you apply for Special Consideration. Below is the list of possible outcomes:

Outcome	Explanation	Example
Time extension	Student provided more time to submit the assessment	e.g. 1 more week of time granted to submit a report
Supplementary assessment	Student provided an alternate assessment at a later date/time	e.g. a supplementary exam is scheduled during the supplementary exam period of the term
Substitute item	The mark for the missed assessment is substituted with the mark of another assessment	e.g. mark for Quiz 1 applied also applied as mark for Quiz 2, meaning if a student achieved a mark of 20/30 for Quiz 1 and was granted Special Consideration for Quiz 2, a mark of 20/30 would be applied for Quiz 2, etc
Exemption	All course marks are recalculated excluding this assessment and its weighting	e.g. The course has an assessment structure of: - Assignments 30%, - Lab report 30%, - Final Exam 40%. If the Lab report is missed and student is granted Special Consideration, then the assessment structure may be reweighted as follows: - Assignments 50% - Final Exam 50% as though the Lab report did not exist
Non-standard	Course Coordinator is contacted for the outcome when special consideration is granted as the outcome differs on a case-by-case basis	e.g. typical for group assessments where time extension supplementary assessment could be granted to the group member, time extension could be granted to the whole group, etc. Clarify with your Course Convenor for

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, 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

Academic Information

Credit points

Course credit is calculated in Units-Of-Credit (UOC). The normal workload expectation for one UOC is approximately 25 hours per term. This includes class contact hours, private study, other learning activities, preparation and time spent on all assessable work.

Most coursework courses at UNSW are 6 UOC and involve an estimated 150 hours to complete, for both regular and intensive terms. Each course includes a prescribed number of hours per week (h/w) of scheduled face-to-face and/or online contact. Any additional time beyond the prescribed contact hours should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

On-campus class attendance

****T1-2022 UPDATE****
- -

Public distancing conditions must be followed for all face-to-face classes. To ensure this, only students enrolled in those classes will be allowed in the room. No over-enrolment is allowed in face-to-face classes. Students enrolled in online classes can swap their enrolment from online to on-campus classes by Sunday, Week 1. Please refer to your course's Microsoft Teams and Moodle sites for more information about class attendance for in-person and online class sections/activities.

Your health and the health of those in your class is critically important. You must stay at home if you are sick or have been advised to self-isolate by NSW health or government authorities. Current alerts and a list of hotspots can be found here. **You will not be penalised for missing a face-to-face activity due to illness or a requirement to self-isolate.** We will work with you to ensure continuity of learning during your isolation and have plans in place for you to catch up on any content or learning activities you may miss. Where this might not be possible, an application for fee remission may be discussed. Further information is available on any course Moodle or Teams site.

In certain classroom and laboratory situations where physical distancing cannot be maintained or there is a high risk that it cannot be maintained, face masks will be considered **mandatory PPE** for students and staff.

For more information, please refer to the
FAQs: https://www.covid-19.unsw.edu.au/safe-return-campus-faqs

Guidelines

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

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	✓
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	✓
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering 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	✓
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in 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	