



Contents

1. Staff Contact Details	2
2. Course details	2
3. Teaching strategies.....	5
4. Course schedule	6
5. Assessment	7
6. Expected Resources for students.....	9
7. Course evaluation and development	10
8. Academic honesty and plagiarism.....	10
9. Administrative Matters.....	11
Appendix A: Engineers Australia (EA) Professional Engineer Competency Standards.....	12

1. Staff Contact Details

Contact details and consultation times for course convenors

Professor Gangadhara Prusty
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Tel: (02) 9385 5939
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Mr David Lyons CEng
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Contact details and consultation times for additional lecturers/demonstrators/lab staff

Consultation concerning this course is available by email, by phone or in person. For an in-person appointment, please contact a convenor by email to arrange.

2. Course details

Credit Points:

This is a hybrid (final year undergraduate/postgraduate) 6 unit-of-credit (UoC) course.

Contact Hours

Aims of the Course

On successful completion of this course, students should be able to; (a) Understand the use of fibre-reinforced composites in structural applications, and (b) Develop a basic understanding of the use of composite materials, micromechanics of layered composites, analysis and design of composite structures and failure analysis of laminated panels.

3. Teaching strategies

Component	Activities
Lectures	Find out what you must learn. See methods that are not in the textbook. Follow worked examples. Hear announcements on course changes.
Laboratory/Problem solving class	Be guided by course notes and demonstrators. Ask questions. Do problems, as set out in the course notes. Work with colleagues. Review lecture material and textbook. Do set problems and assignments.
Private study (including Moodle)	Discuss with fellow students

4. Course schedule

Composites 3M : Materials, Mechanics and Manufacturing		
Wk	Lecture (2 hr) Wed 13:00-15:00	Problem Solving Class/Laboratory (2 hr) Fri 09:00-11:00
1	Introduction to Composite Materials	
2	Processing of fibre reinforced composites (DL)	-Lab tour -WHS/RM forms organized
3	Processing of fibre reinforced composites (DL)	-Explanation of materials and demonstration of equipment. <i>Assignment 1 issued-a review document on composite materials-applications, relevant to your degree program. Submission due in Wk 5, to be peer reviewed. (15%)</i>
4	Composite Strength and Stiffness	- Sample problem solving class
5	Micro-mechanical Analysis, Elastic properties of uni-directional lamina	- Sample problem solving class
6	Laminated Composites	- Sample problem solving class
7	Analysis of laminated composites and composite beams	- Sample problem solving class <i>Assignment 2 issued- report on the materials, manufacturing method, experimental interpretation and validation using finite element software. Submission due in Wk 9 (20%)</i>
8	Failure Theories	- Large sample manufacture- Make, bake and break

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.

The preferred set-out of any numerical calculation is similar to the following:

$$\begin{aligned}
 A_{\text{bow}} &= 0.0035 A m f V && \text{(Equation in symbols)} \\
 &= 0.0035 \ 480 \ 0.95 \ 1.0 \ 18.00 && \text{(Numbers substituted)} \\
 &= 28.7 \text{ m}^2 && \text{(Answer with units)}
 \end{aligned}$$

Submission

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 <https://student.unsw.edu.au/special-consideration>.

Inability to attend the block tests on one of these times for reasons such as work commitments, holidays etc. cannot, unfortunately, be accommodated with a class of this size. Of course arrangements will be made for emergencies such as illness. Arrangements for each type of assessment are tabulated below.

Type of Assessment	
Assignments	Report submission via Turnitin <u>and</u> School assignment boxes.
Final Examination	Standard UNSW arrangements.

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.

Assessment Criteria

Assignment/ Laboratory Reports:

Interpretation of the experimental results for the required information described in the hand out for each experiment.

Understanding the relationship between the theory covered during the lectures to experimental results in the laboratory.

Presentation of the report in accordance with the MECHENG guidelines.

Attendance and participation during the laboratory experiments.

Final examination:

Use the basic concepts of micro- and macro-mechanics of structures.

Systematic approach to outline the steps for a problem and use the necessary fundamental concepts covered in the lectures and problem solving classes.

Correctness of the solution with the aid of necessary diagrams/sketches and the use of appropriate units.

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 [Administrative Matters](#).

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 <https://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

Centre prior to the examination. Calculators not bearing 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 [Administrative Matters](#), available on the School website and [Special Consideration page](#).

6. Exnected Resourrces for students

Reference texts

R. A. Shenoi and J. F. Wellicome, Composite Materials in Maritime Structures, Vol 1&2, Cambridge University Press, U.K., 1993.

Isaac M. Daniel and Ori Ishai, Engineering Mechanics of Composite Materials, Oxford University Press, 1994.

Mel M. Schwartz, Composite Materials, Vol 2, Prentice Hall, New Jersey, 1997.

Moodle site for MECH9420. Access via <https://moodle.telt.unsw.edu.au/login>

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:

<https://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

9. Administrative Matters

You are expected to have read and be familiar with *Administrative Matters*, available on the School website: www.engineering.unsw.edu.au/mechanical-engineering/sites/mech/files/u41/S2-2015-Administrative-Matters_20150721.pdf

This document contains important information on student responsibilities and support, including special consideration, assessment, health and safety, and student equity and diversity.

*Gangadhara Prusty
David Lyons
20 July 2015*

University of Queensland A: Engineers Australia (EA) Professional Engineering Competency Standards

	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