School of Civil and Environmental Engineering

Term 3, 2021

CVEN4309 SUSTINABLE TIMBER ENGINEERING

COURSE DETAILS

Units of Credit	**6**		
Contact hours	0 hours per week		
Lecture	Pre-recorded online		Available through Moodle
Workshop	Thursday Week 3,	6pm–8pm	CLB7 (Optional)
	Thursday Week 7,	6pm–8pm	CLB7 (Optional)

Course Coordinator and Lecturer	Dr. Daniel J. O'Shea
	email: d.oshea@unsw.edu.au
	office: Room 108, H20, Kensington Campus

INFORMATION ABOUT THE COURSE

The aim of this course is to introduce you to the fundamental concepts and principles applied by engineers in the design of timber structures of all sorts of sizes and purpose. The course is an online timber design course with three workshops throughout the course to look at current case studies in sustainable design using timber such as International House at Barangaroo, Australia's first engineered timber office block. The workshops will be given by industry partners.

HANDBOOK DESCRIPTION

Structural and Construction Engineers may be responsible for the design and construction of timber structures; from timber frame housing to high rise engineered timber structures. This course provides an introduction to the design of timber structures using a range of timber products and the relevant Australian and European Standards. It further outlines the considerations to design for Durability, Fire, Manufacture and Assembly that play an important role in timber engineering.

https://www.handbook.unsw.edu.au/undergraduate/courses/2021/CVEN4309/

OBJECTIVES

The aims of this course are to:

- Build the understanding of sustainable timber design.
- Learn the nature of timber products and engineering properties.
- Be able to apply acquired theory to the design of multi-level office and residential timber buildings.
- Understand the methods involved in the manufacture and assembly of timber structural members.
- Be familiar with current innovative design methods being used in Australia with regards to Timber design.

The assessments in this course are designed to measure your competency in addressing these aims and demonstrating the following programme attributes:

- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Capacity for analytical and critical thinking and for creative problem solving
- Ability to engage independent and reflective learning
- Information literacy
- Skills for collaborative and multi-disciplinary work
- A respect for ethical practice and social responsibility
- Skills for effective communication

TEACHING STRATEGIES

This course will be delivered fully-online with pre-recorded lectures delivered through Microsoft SharePoint sites, and interactive workshop problems delivered through Moodle. Discussion on course content will be facilitated through Microsoft Teams. There will also be intense campus workshops which could be teleconferenced to those that are not on campus. The workshop will be given by Guest Lectures from industry. The teaching strategies that will be used include:

Blended Learning Course Pages (SharePoint)	• Intuitive step-by-step guide through each week's content, including access to pre-recorded lectures • Direct access to lecture recordings, weekly problem sets, and discussion forum • Dashboard providing progression through the course content
Private Study	• Review Handbook chapters, and relevant codes and standards • Do online weekly assignments each week to gauge understanding of each topic • Reflect on class problems and assignments with your peers and teachers through discussions on MS Teams • Keep up with Announcements and find out marks via Moodle and Teams
Pre-Recorded Lectures	• Short videos focusing on the development and application of timber design • Emphasis on the relationship between the course content and engineering practice • Observe methods and approaches not found in the textbook • Follow worked examples in timber design and analysis of timber structures
Industry Workshops	• Provide real applications for the content you are learning • Provide a context as to why we are learning this content • Provide potential industry contacts for career progression after graduation • Ask questions
Assessments	• Demonstrate your knowledge and skills in timber design • Demonstrate higher understanding and problem-solving ability for timber engineering problems

EXPECTED 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.	*Apply understanding of timber material properties and timber structural behaviour to the design of timber structural members and connections.*	*PE1.1, PE1.2*
2.	*Interpret and apply relevant Australian and European Standards to competently design and evaluate the capacity of timber members and connections.*	*PE1.1, PE1.2*
3.	*Appreciate the range of potential timber structures from houses to multistorey timber buildings and larger iconic structures.*	*PE1.1, PE1.2*
4.	*Incorporate practical durability, fire, manufacture and assembly considerations in design.*	*PE1.1, PE1.2*

In addition to the viewing of the recorded videos and online tasks, you are expected to commit an additional **6 – 8 hours per week** to independent learning and general problem solving.

COURSE PROGRAM

A table of lectures and workshops or practical class topics for each week, indicating the name of lecturer involved (where multiple lecturers teaching in course), online activities, such as discussion forums, and relevant readings from textbook and other reference material identified for the course.

Term 3 2021

Date	Topic	Lecture Content	Workshop / Quiz
13/09/2021 (Week 1)	**Introduction; Engineering Properties of Timber**	See Moodle for access to Lecture Content	---
20/09/2021 (Week 2)	**Bending of Timber Members**		---
27/09/2021 (Week 3)	**Tension and Compression of Timber Members**		Guest Workshop Thursday 6pm-8pm (CLB7) Details TBC
04/10/2021 (Week 4)	**Capacity of Connections**		---
11/10/2021 (Week 5)	**Material Properties of Cross-Laminated Timber**		Quiz 1 (Online) 6pm-8pm Thursday
18/10/2021 (Week 6)	***Flexibility week for all courses (non-teaching)***		
25/10/2021 (Week 7)	**Bending, Compression and Tension of Cross-Laminated Timber**	See Moodle for access to Lecture Content	Guest Workshop Thursday 6pm-8pm (CLB7) Details TBC

01/11/2021 (Week 8)	**Capacity of Connections (for Cross-Laminated Timber)**		Quiz 2 (Online) 6pm-8pm Thursday
08/11/2021 (Week 9)	**Introduction to Fire Design and Engineering**		---
15/11/2021 (Week 10)	**Design for Manufacture and Assembly**		Quiz 3 (Online) 6pm-8pm Thursday

ASSESSMENT

Assessment will be based on completion of Weekly Online Assignments, Progress Quizzes, and a final exam. These components will address engineering problems consistent with those you are likely to face as a professional Civil/Environmental Engineer.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 45% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 55% of the Final Mark if included. *A mark of at least 40% in the final examination is required before the class work (Weekly Online Assignments and Progress Quizzes) is included in the final mark. The formal exam scripts will not be returned but you are permitted to view the marked script.*

Students who perform poorly in the progress quizzes and weekly assignments are recommended to discuss progress with the course coordinator during the term. There will be weekly assignment problems and progress quizzes with adaptive feedback, to gauge your understanding of concepts during term. Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Overall rationale for assessment components and their association with course objectives:

- The **Weekly Online Assignments** are learning modules to help you learn the solution strategies for the major topics. The assessment is based on completion of the modules. There are unlimited number of attempts allowed across a one-week period for each assignment.
- The **Final Exam** is given because the course learning outcomes include a significant level of technical learning that can be effectively assessed in an exam environment and because exams have high reliability. It is primarily designed to align with UNSW graduate attributes 2 and 3.
- Late submission needs prior approval as all assessment is online except for the final examination. Please apply for special consideration through the university. There is no penalty if approval has been granted.

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

Supplementary Examinations for Term 3 2021 will be held on **Monday 10 January – Friday 14 January 2022** (inclusive) should you be required to sit one. You are required to be available during these dates. Please do not to make any personal or travel arrangements during this period.

PENALTIES

The final examination, Weekly Online Assignments and Progress Quizzes show evidence of application of theoretical concepts to solving problems. There are no exemptions from any part of this assessment. If you are repeating this course, you must complete all components during this offering.

No assessment will be accepted after the published due date. If circumstances prevent you from attending a Progress Quiz, a special consideration application must be approved prior to the examination date.

ASSESSMENT OVERVIEW

Item	**Length**	**Weight**	**Learning outcomes assessed**	**Assessment Criteria** *(this needs to explicitly describe what students are expected to demonstrate in the task)*	**Due date and submission requirements**	**Deadline for absolute fail**	**Marks returned**
1. Online Quizzes **(45% total)**							
Progress Quiz One	90 minutes	15%	1, 2, 3, 4	Covers content from Weeks 1 – 4	Thursday Week 5, 6pm. Moodle		Within one week of completion
Progress Quiz Two	90 minutes	15%	1, 2, 3, 4	Covers content from Weeks 5 – 7	Thursday Week 8, 6pm. Moodle		Within one week of completion
Progress Quiz Three	90 minutes	15%	1, 2, 3, 4	Covers content from Week 8 – 9	Thursday Week 10, 6pm. Moodle		Within one week of completion
2. Online Weekly Assignments **(10% total)**							
Each Assignment (9 total)	2 week each	1.11% each	1, 2, 3	Competency in understanding material covered in previous week	Monday 11.55pm each week (see Moodle for details)		Immediately
3. Final Examination **(45% total)**							
Final Exam	2 hours	45%	1, 2, 3, 4	Demonstrate aptitude in solving a range of timber design problems which require knowledge of content taught during term.	See exam timetable		Official release of results.

RELEVANT RESOURCES

- Relevant codes and standards:
  - AS1720.1 – Timber Structures
  - SA HB 108 – Timber Design Handbook
  - EN 1995-1 – Eurocode 5 – Design of Timber Structures
- Recommended Internet sites:
  - www.woodsolutions.com.au
  - www.woodworks.org

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

https://student.unsw.edu.au/dates

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

https://student.unsw.edu.au/plagiarism

ACADEMIC ADVICE

For information about:

- Notes on assessments and plagiarism;
- Special Considerations: student.unsw.edu.au/special-consideration;
- General and Program-specific questions: The Nucleus: Student Hub
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC/SURVSOC/CEPCA

Refer to Academic Advice on the School website available at:

https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw

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