The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] **Design of Timber Structures**

[Course Code] **CIVL 4100M**

[No. of Credits] **3**

[Pre-requisites] **CIVL 2110 and CIVL 2120**

Name: [Instructor(s) Name] Prof. Yuxin PAN

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(Guest lectures and laboratory sessions may be delivered by invited experts in timber engineering.)

Course Description

[Briefly describe the course content, key topics or themes, objectives, methods of instruction, e.g., lectures, discussions, projects].

This course introduces the fundamental principles and modern practices for the analysis and design of timber structures. Emphasis is placed on understanding wood as a structural material and applying limit states design concepts to light-frame and mass timber systems. Topics include physical and mechanical properties of wood, engineered wood products, design of timber members under axial, bending, and combined loading, design of mechanical connections, and design of lateral load-resisting systems. Advanced topics such as cross-laminated timber (CLT), timber–concrete composite systems, and hybrid mass timber structures are also covered. The course aims to equip students with professional-level design skills for sustainable timber construction and to provide a solid foundation for graduate study and research in structural engineering.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Understand the fundamental material behavior of wood and engineered wood products, including the effects of moisture, load duration, and variability.
2. Apply limit states design principles and relevant design codes to timber structural members and systems.
3. Design timber members subjected to axial load, bending, and combined actions with appropriate consideration of serviceability and strength requirements.
4. Design timber connections using mechanical fasteners and interpret their load–deformation behavior.
5. Analyze and design lateral load-resisting systems for light-frame and mass timber buildings.
6. Develop engineering judgement and problem-solving skills through open-ended timber structural design tasks with consideration of sustainability and constructability.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Homework Assignments	15%	dd/mm/yyyy *
Lab Report	15%	dd/mm/yyyy *
Mid-term Examination	35%	dd/mm/yyyy *
Design Project	35%	dd/mm/yyyy

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

[add to/delete table as appropriate]

Assessed Task	Mapped ILOs	Explanation
Homework Assignments	ILO1 – ILO4	Assess understanding of timber material behavior, member design principles, and code-based calculations.
Lab Report	ILO1, ILO4	Evaluate students' ability to interpret experimental behavior of timber connections and relate test results to design assumptions.
Mid-term Examination	ILO1 – ILO5	Evaluate comprehensive understanding of theoretical principles and design methods.
Design Project	ILO2 – ILO5	Assess open-ended system-level design capability, problem-solving skills, and application of sustainable timber solutions.

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Criteria	**Assignment 1 – Timber Materials & Axial Members**	**Assignment 1 – Timber Materials & Axial Members**	**Assignment 1 – Timber Materials & Axial Members**
Correct Use of Concepts & Formulas (20%)	Demonstrates understanding of wood properties, design factors, and axial behavior	Correct interpretation of bending behavior and composite action	Correct application of connection theory and lateral system concepts
Calculation Accuracy (45%)	Accurate member capacity calculations with correct units	Accurate bending, serviceability, and interaction checks	Accurate connection and system-level calculations

Problem Solving Process (20%)	Logical and clearly presented solution steps	Organized design workflow and assumptions	Systematic design approach with justified decisions
Diagrams & Presentation (15%)	Clear sketches and member layouts	Properly labeled diagrams and sections	Clear connection details and load paths

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates comprehensive understanding of timber structural behavior, strong analytical ability, and outstanding design judgement beyond core requirements.
B	Good Performance	Shows solid understanding of design principles with competent problem-solving and good application of code provisions.
C	Satisfactory Performance	Demonstrates adequate understanding of fundamental concepts and ability to complete standard design tasks.
D	Marginal Pass	Shows threshold knowledge with limited analytical depth but meets minimum learning requirements.
F	Fail	Demonstrates insufficient understanding of timber structural behavior and inability to apply design principles effectively.

Course AI Policy

N/A

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include strengths and areas for improvement. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

N/A

Required Texts and Materials

[List required textbooks, readings, and any other materials]

CSA O86: Engineering Design in Wood (Latest Edition).

Wood Design Manual, Canadian Wood Council (Latest Edition).

Canadian CLT Handbook, FPInnovations.

National Building Code of Canada, Part 4 (Latest Edition).

Lecture notes and supplementary materials provided by the instructor.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.