

The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] **Structural Steel Design**

[Course Code] **CIVL 4320**

[No. of Credits] **3**

[Any pre-/co-requisites] **Prerequisite: CIVL 3310 Structural Analysis**

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Course Description

Introduction to the behaviour and design of steel structures. The course covers stability analysis and limit-states design of tension members, columns, beams, plate girders, beam-columns, and structural connections. Teaching is delivered through lectures, worked examples, and problem-solving assignments using the Hong Kong Steel Code.

Course Intended Learning Outcomes (CILOs)

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

CILO 1. Explain the fundamental principles and limit-states basis of modern structural steel design codes.

CILO 2. Analyse the principal failure and instability modes of skeletal steel members and explain how they affect structural performance.

CILO 3. Design steel members and connections competently using the Code of Practice for the Structural Use of Steel in Hong Kong.

CILO 4. Evaluate alternatives and develop a justified solution to an open-ended structural steel design problem with practical building constraints.

Assessment and Grading

This course uses criterion-referenced assessment (CRA). Each student's work is judged against the stated CILOs and grading rubrics; grades are not assigned by ranking students or fitting marks to a curve.

Assessment timeline: The milestones below are the planned 2026–27 Fall schedule. Exact calendar dates and any approved changes will be published on Canvas at the start of the course. The University-scheduled final examination date will apply.

Assessment task	Weight	Planned timeline
Assignments	15%	Due by the end of Week 5, 9, 13
Pop quizzes	5%	Selected class meetings in Weeks 2–13
Mid-term examination	30%	Week 8 (exact date on Canvas)
Final examination	50%	University final-examination period
Total	100%	

Marks for individual in-course assessment tasks will normally be released through Canvas within two weeks after the due date or assessment date.

Mapping of CILOs to Assessment Tasks

Assessed task	Mapped CILOs	How the task provides evidence
Assignments (15%)	CILOs 1–4	Students interpret code provisions, analyse member behaviour, complete designs, and justify solutions through documented calculations.
Pop quizzes (5%)	CILOs 1–3	Short questions check timely understanding of concepts, failure modes, and routine code application.
Mid-term examination (30%)	CILOs 1–3	Timed problems assess understanding and application of design principles covered in the first part of the course.
Final examination (50%)	CILOs 1–4	Integrated problems assess analysis, design, code application, and evaluation across the course.

Grading Rubrics

The following analytic rubrics are used with the published marking scheme for each task. Performance may fall between descriptors; the awarded mark reflects the level most consistently demonstrated. A serious conceptual or safety-critical error may limit the score for the affected criterion.

Assignments (15% of course grade; rubric applied to each assignment)

Criterion	Excellent	Good	Satisfactory	Insufficient
Concepts and code application (30%)	Selects and interprets all relevant principles and clauses correctly; assumptions are justified.	Uses appropriate principles and clauses with only minor omissions.	Uses the main principles but shows partial understanding or needs correction in some applications.	Uses inappropriate principles or clauses, or shows major conceptual misunderstanding.
Analysis and calculation accuracy (35%)	Analysis, calculations, units, and checks are accurate and complete.	Method is sound; minor errors do not materially affect the design conclusion.	A workable method is shown, but repeated errors or missing checks affect parts of the result.	Analysis is incomplete or materially incorrect; results are unsupported.
Problem-solving and design judgement (25%)	Presents a logical, efficient process and evaluates assumptions or alternatives convincingly.	Presents a logical process and reasonable design decisions with limited evaluation.	Shows a basic process, but reasoning or design justification is incomplete.	Shows little coherent process or defensible design judgement.
Diagrams and communication (10%)	Work is clear, concise, legible, and professionally labelled; another	Work is organized and mostly easy to verify, with minor presentation issues.	Meaning can be recovered, but organization, notation, or	Work is unclear, poorly labelled, or not sufficiently documented for verification.

	engineer can readily verify it.		diagrams require effort to follow.	
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Pop quizzes (5% of course grade)

Criterion	Excellent	Good	Satisfactory	Insufficient
Conceptual and technical correctness (80%)	Answers are correct and demonstrate secure understanding and application.	Answers are substantially correct with minor gaps.	Answers demonstrate partial understanding but contain notable errors.	Answers demonstrate limited understanding or are largely incorrect.
Reasoning and clarity (20%)	Essential reasoning, notation, and units are clear and sufficient.	Reasoning is generally clear with minor omissions.	Some relevant work is shown, but the reasoning is difficult to follow.	Little relevant reasoning or interpretable work is shown.

Mid-term and final examinations (80% of course grade)

Criterion	Excellent	Good	Satisfactory	Insufficient
Concepts and code application (30%)	Identifies all relevant limit states and applies code provisions correctly.	Identifies the main limit states and applies provisions with minor omissions.	Identifies some relevant limit states but makes notable interpretation or application errors.	Misses critical limit states or applies provisions incorrectly.
Analysis and calculation accuracy (45%)	Calculations, units, diagrams, and results are accurate and internally checked.	Approach and results are substantially correct; minor errors have limited effect.	A partly correct approach is evident, but errors materially affect some results.	No viable approach is established or results are predominantly incorrect.
Problem-solving process (20%)	Solution is complete, logically sequenced, and demonstrates sound engineering judgement.	Solution is logical and mostly complete with reasonable judgement.	Some relevant steps are shown, but important links or justification are missing.	Work is fragmentary, unsupported, or demonstrates unsafe judgement.
Presentation (5%)	Notation, units, sketches, and conclusions are consistently clear.	Presentation is clear with minor lapses.	Presentation is partly clear but requires interpretation.	Presentation prevents reliable interpretation of the answer.

Final Grade Descriptors

Grade	Descriptor	Course-level performance
A	Excellent	Comprehensive command of steel behaviour and design; accurate, well-justified solutions to routine and open-ended problems; clear engineering communication.

B	Good	Strong knowledge and generally accurate application; competent problem-solving and analysis with only limited gaps.
C	Satisfactory	Adequate knowledge of core content and competence on familiar problems, with some errors or limited analysis in more demanding applications.
D	Marginal pass	Threshold achievement of essential CLOs; basic judgements are possible, but knowledge and problem-solving remain fragile or incomplete.
F	Fail	Insufficient achievement of essential CLOs; major gaps in understanding, code application, calculation, or engineering judgement.

Course AI Policy

Generative artificial intelligence (GenAI) tools may be used for learning support—for example, to clarify terminology, generate extra practice questions, or review the clarity of a student’s own explanation—provided that their use follows the conditions below. GenAI use is not permitted during quizzes, the mid-term examination, or the final examination.

Students must complete and understand all submitted technical reasoning, calculations, code checks, and design decisions themselves.

Students must not submit AI-generated solutions, calculations, figures, or prose as their own work, or use GenAI to bypass an assessment’s intended learning outcomes.

Any permitted GenAI assistance used in an assignment must be disclosed in a short note naming the tool, date of use, purpose, and the parts of the submission affected. Relevant prompts and outputs must be retained and provided if requested.

Students are responsible for checking all AI-assisted content against course materials and the Hong Kong Steel Code. Fabricated references, incorrect clauses, and unsafe or unverifiable design output remain the student’s responsibility.

Communication, Feedback, and Syllabus Availability

This syllabus, assessment instructions, exact due dates, and any approved updates will be available to students on Canvas from the start of the course. In-course marks will normally be communicated through Canvas within two weeks. Feedback will identify technical strengths, errors, and areas for improvement. Questions about feedback or marks should be raised with the instructor within five working days after feedback is released.

Resubmission Policy

Resubmission or reassessment is not normally offered, except where required by an approved University arrangement or expressly authorized by the instructor under University regulations.

Required Texts and Materials

Buildings Department, Hong Kong SAR Government. Code of Practice for the Structural Use of Steel 2011 (2023 Edition), March 2023. Required.

Lam, D., Ang, T. C., and Chiew, S. P. Structural Steelwork: Design to Limit State Theory, 3rd ed., Elsevier, 2004.

Nethercot, D. A. Limit States Design of Structural Steelwork, 3rd ed., Chapman & Hall, 2001.

Trahair, N. S., Bradford, M. A., and Nethercot, D. A. The Behaviour and Design of Steel Structures to BS 5950, 3rd ed., Chapman & Hall, 2001.

Owen, G. W., Knowles, P. K., and Dowling, P. J. Steel Designers' Manual, Blackwell Scientific Publications, 1992.

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.