

<b>Subject Code</b>	CSE28362
<b>Subject Title</b>	Structural Steel Design
<b>Credit Value</b>	3
<b>Level</b>	2
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Exclusion: CSE29362 Design of Steel Structures
<b>Objectives</b>	(1) To enable students to acquire basic knowledge of structural steel design; (2) To equip students with basic design methodology of structural steelwork.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>a. apply structural mechanics and engineering mathematics to rational design of steel structures;</li> <li>b. develop an appreciation of design philosophy of steel structures as well as their structural behaviour;</li> <li>c. appreciate effective and efficient use of steel as a constructional material and to understand its engineering properties for practical applications in construction.</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li>1. <u>Introduction</u> Objectives and design considerations. Basic structural forms and load paths. Assessment of loading on members.</li> <li>2. <u>Theory of strength</u> Maximum normal stress theory, maximum shear stress theory, maximum strain energy of distortion.</li> <li>3. <u>Stability of columns</u> Short columns under eccentric loads. Long columns and buckling. Euler's column formula, and the secant formula.</li> <li>4. <u>Allowable stress and limit state design</u> Design philosophy. Factors of safety. Partial safety factors. Mechanical properties. Characteristic values. Design strengths.</li> <li>5. <u>Structural steel design</u> Section properties. Ties, struts, and beams. Axial buckling of columns. Lateral buckling of beams. Effective lengths. Buckling of beam-columns. Connections with bolts and welds.</li> <li>6. <u>Laboratory work</u> Bending in a beam. Combined bending and shear in a beam. Axial buckling of a column.</li> </ol>

<b>Teaching/Learning Methodology</b>	Fundamental knowledge will be covered in lectures. Tutorials will provide opportunities for discussion of lecture materials, and will also be conducted in the form of example classes and problem-solving sessions to supplement understanding from lectures. A project as well as laboratory works are required and they will help students appreciate basic principles and familiarize themselves with basic instruments under an environment of group effort.																											
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1"> <thead> <tr> <th data-bbox="523 465 834 577" rowspan="2">Specific assessment methods / tasks</th> <th data-bbox="850 465 1002 577" rowspan="2">% weighting</th> <th colspan="3" data-bbox="1010 465 1369 544">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th data-bbox="1010 544 1121 577">a</th> <th data-bbox="1129 544 1249 577">b</th> <th data-bbox="1257 544 1369 577">c</th> </tr> </thead> <tbody> <tr> <td data-bbox="523 577 834 723">1. Assignments, laboratory reports, project and Mid-term test</td> <td data-bbox="850 577 1002 723">30</td> <td data-bbox="1010 577 1121 723">✓</td> <td data-bbox="1129 577 1249 723">✓</td> <td data-bbox="1257 577 1369 723">✓</td> </tr> <tr> <td data-bbox="523 723 834 768">2. Final examination</td> <td data-bbox="850 723 1002 768">70</td> <td data-bbox="1010 723 1121 768">✓</td> <td data-bbox="1129 723 1249 768">✓</td> <td data-bbox="1257 723 1369 768">✓</td> </tr> <tr> <td data-bbox="523 768 834 801">Total</td> <td data-bbox="850 768 1002 801">100</td> <td data-bbox="1010 768 1121 801"></td> <td data-bbox="1129 768 1249 801"></td> <td data-bbox="1257 768 1369 801"></td> </tr> </tbody> </table>	Specific assessment methods / tasks	% weighting	Intended subject learning outcomes to be assessed			a	b	c	1. Assignments, laboratory reports, project and Mid-term test	30	✓	✓	✓	2. Final examination	70	✓	✓	✓	Total	100				<p><b>Students must attain at least grade D in both coursework and final examination assessments (whenever applicable) in order to attain a passing grade in the overall result.</b></p> <p>The students will be assessed with three components, i.e. 1. assignments, laboratory reports, and a project, 2. a mid-term test, and 3. a final examination at the end of the semester. The students will be required to attend laboratory sessions and submit group laboratory reports. These laboratory sessions will enable students to acquire basic laboratory techniques and technical report writing. The laboratory experiments, the assignments, and the project are closely related to structural behaviour, analysis and design of steel members, and the students will have to exercise engineering judgments in completing all these coursework. Hence, they are considered to be highly effective in achieving the intended learning outcomes a, b, and c.</p> <p>Moreover, the mid-term test and the final examination are designed to assess the basic concepts as well as the practice on structural steel design of the students, and they are effective to achieve all the intended learning outcomes.</p>			
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1. Assignments, laboratory reports, project and Mid-term test	30	✓	✓	✓																								
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<b>Student Study Effort Expected</b>				<b>Average hours per week</b>																								
	Class contact:																											
	<ul style="list-style-type: none"> <li>▪ Lectures/ Tutorials/ Group Laboratory Sessions</li> </ul>			3 Hrs.																								
	Other student study effort:																											
	<ul style="list-style-type: none"> <li>▪ Reading</li> </ul>			3 Hrs.																								
	<ul style="list-style-type: none"> <li>▪ Completion of assignments, laboratory reports, and a project</li> </ul>			3 Hrs.																								
	Total student study effort			9 Hrs.																								

**Reading List and  
References**

**Books**

Ray, S.S.: *Structural Steelwork Analysis and Design*, Blackwell Science, 1998.

Davison, B. & Owens, G.W.: *The Steel Designers' Manual*, The Steel Construction Institute, 7<sup>th</sup> Ed., 2012.

**Design standards**

*Code of Practice for the Structural Use of Steel, 2011*, Buildings Department, The Government of Hong Kong HKSAR.

*Various parts of BS5950 Structural Use of Steelwork in Buildings*, British Standards Institution.

**Journals**

*The Structural Engineer*, Institution of Structural Engineers.  
Transactions, The Hong Kong Institution of Engineers.