

### Subject Description Form

<b>Subject Code</b>	CSE30311
<b>Subject Title</b>	Design of Steel Structures
<b>Credit Value</b>	3
<b>Level</b>	3
<b>Pre-requisites/ Exclusion</b>	Pre-requisites: CSE204 Structural Mechanics II or CSE20204 Advanced Structural Mechanics Exclusion: CSE311 Design of Steel Structures
<b>Objectives</b>	To provide training to students to design in steel. Detailing for connections will be covered in order to allow students on-hand knowledge on design of steel structures used in practice.
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be:</p> <ol style="list-style-type: none"> <li>Able to understand structural behaviour for subsequent application of the theory of structural mechanics and engineering mathematics to design and construction of steel structures;</li> <li>Able to develop an appreciation of design philosophy behind steel structures against strength, ductility, stability and durability;</li> <li>Able to formulate a concept of constructing structures with reference to the design codes in various places. More focus on local design code is provided;</li> <li>Able to appreciate the effective and efficient use of steel as an engineering material and to understand its engineering properties;</li> <li>Able to realise the basic requirements for steel as a proper building material and the minimum requirements for using a batch of steel material in construction;</li> <li>Able to think critically and independently in design of structures in the aspects of safety, cost and serviceability.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li><u>Steelwork Design (9 weeks)</u> Section classification. Eccentric connections. Tension and compression members. Beams and columns using hot-rolled sections. Column bases. Trusses and frames. Euler's column buckling and beam lateral-torsional buckling. Beam-columns. Bolted joints. Welded joints. Elements of structural detailing.</li> <li><u>Ductility, Integrity, Fire Protection and Corrosion Resistance (2 weeks)</u> Mechanical and chemical tests. Structural design for fire. Bi-metallic action. Methods of corrosion protection. Ductility. Seismic design of steel structures.</li> <li><u>System Design of Steel Buildings (2 weeks)</u></li> </ol>

	<p>Framed structures. Structural integrity and robustness. Sway and non-sway frames. Braced and unbraced moment frames. Continuous frames. Simple construction. Typical structural systems. Second-order analysis for structural design.</p> <p>4. <u>Laboratory Work</u> Lateral-torsional buckling test of an I-beam. Tensile test of eccentrically connected angle sections.</p>																																																												
<b>Teaching/Learning Methodology</b>	The teaching method is mainly in the form of lectures with interaction during tutorial class.																																																												
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr> <tr> <th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th></tr> </thead> <tbody> <tr> <td>1. Assignment and laboratory report</td><td>5</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr> <tr> <td>2. Test</td><td>15</td><td>✓</td><td></td><td></td><td>✓</td><td></td><td></td></tr> <tr> <td>3. Project</td><td>10</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>4. Final Examination</td><td>70</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr> <tr> <td>Total</td><td>100 %</td><td colspan="6"></td></tr> </tbody> </table> <p><b>Students must pass the final examination and achieve a passing overall score/ grade to pass the subject.</b></p> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:  Assignment and laboratory report assists students to appreciate the design of a real structure.  Test is to assess the understanding of various items in the intended subject learning outcomes.  Project assists students in working as team members. Examination assesses understanding and appreciation of design of steel structures.</p>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	f	1. Assignment and laboratory report	5	✓	✓	✓	✓	✓		2. Test	15	✓			✓			3. Project	10	✓	✓	✓	✓	✓	✓	4. Final Examination	70	✓	✓	✓	✓	✓		Total	100 %						
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<b>Student Study Effort Expected</b>	Class contact:		Average hours per week																																																										
	▪ Lecture / Tutorial / Laboratory		3 Hrs.																																																										
	Other student study effort:																																																												
	▪ Reading		2.2 Hrs.																																																										
	▪ Project		3.8 Hrs.																																																										

	Total student study effort	9 Hrs.
<b>Reading List and References</b>	<p>Code of practice for structural uses of steel, Hong Kong, 2011.</p> <p>Handbook for design of steel structures, Structural Division, HKIE, 2011.</p> <p>Nethercot, D.A., Limit States Design of Structural Steelwork, Spon Press, 2001.</p> <p>Lam, D, Ang, T.C. &amp; Chiew, S.P., Structural Steelwork : Design to Limit State Theory, Oxford; Burlington, MA. : Elsevier Butterworth-Heinemann, 2004</p>	