

1.	Title of the course	Advanced Design of Metal Structures
2.	Course number	CE515L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CE5204/8
6.	To be offered by	Department of Civil and Environmental Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<b>Course Objective(s):</b> This course introduces stability-based design of steel structural elements, plastic analysis and design of steel frames, design of cold formed steel structural elements and steel-concrete composite structures. This course also introduces the ductile detailing under earthquake (EQ) loading, fatigue and fire resistant design of steel structural elements.	
10.	<b>Course Content:</b> Limit state design of tension members, compression members, laterally supported and unsupported beams; Bolted and welded connections subjected to in-plane and out of plane loading; Splice connections; Beam-columns; Steel beams subjected to torsion and bending; Column bases; Plate girders; Effective width method and direct strength method of cold-formed steel structural elements subjected to tension, compression and flexure; Plastic analysis and design of steel frames; Design of steel-concrete composite beams and slabs; Fatigue design of plate/crane girders; Ductile detailing for EQ loads; Fire resistance design of steel members; Human induced vibrations in the floor system	
11.	<b>Textbook(s):</b> 1. Narayanan R, Kalyanaraman V, Santhakumar A R, Seetharaman S, Kumar S, and Jayachandran A S and Senthil R, <i>Teaching Resource Materials for Structural Steel Design (1, 2 &amp; 3 Volumes)</i> , INSDAG Publication (2005). 2. Yu W W and LaBoube R A, <i>Cold-Formed Steel Design</i> , Wiley Publications, John Wiley & Sons (2018).	
12.	<b>Reference(s):</b> 1. Wong B M, <i>Plastic Analysis and Design of steel frames</i> , Butterworth-Heinemann, UK (2008). 2. Lam D, Ang T C and Chiew S P, <i>Structural Steel Work: Design to Limit State Theory</i> , CRC Press (2016). 3. Johnson R, <i>Composite Structures of Steel and Concrete: Beams, Slabs, Columns and Frames for Buildings</i> , Wiley Blackwell publications (2013). 4. Lawson R M and Newman G M, <i>Fire Resistant Design of Steel Structures, A Handbook on BS 5950 : Part 8</i> , SCI Publication (1990).	