

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Advanced Design of Metal Structures
2.	Course Number	CE5204
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Civil Engineering
8.	To take effect from	July 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: 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.	
12.	Course Content: 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.	
13.	Text book(s): 1. Narayanan R, Kalyanaraman V, Santhakumar A R, Seetharaman S, Kumar S, Jayachandran A S and Senthil R , <i>Teaching Resource Materials for Structural Steel Design (1, 2 & 3 Volumes)</i> , INSDAG Publications (2005). 2. Yu W W and LaBoube R A, <i>Cold-Formed Steel Design</i> , Wiley Publications, John Wiley & Sons (2018).	
14.	Reference(s): 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).	