

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Strength of Materials
2.	Course Number	CE2101
3.	Status of the Course	Core
4.	Structure of Credits	3-1-0-4
5.	Offered To	UG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Civil & Environmental Engineering
8.	To take effect from	July 2018
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To understand the concept of force equilibrium, stress, strain and the relation between the quantities. To learn the analysis of members subjected to flexure (beams), torsion (shear) and compression (columns). Also learn the methods to compute deflection which are necessary for analysis of indeterminate systems.	
12.	Course Content: Equilibrium of forces; Deformable bodies; State of stress and strain, transformation - Mohr circle, principal stresses and strains, plane stress and strain, stress- strain relation, thermal strains; Thick and thin walled cylinders - Pressure vessel; Bending of beams- bending moment and shear force diagrams, normal and shear stresses, bending equation, deflection due to bending - double integration method, McCaulay's method, method of superposition, energy method - Castigliano's theorem; Shear center, Shear flow; Torsion - circular shafts; Combined stresses; Strain energy due to axial deformations, bending and torsion; Failure theories; Stability - buckling of columns, Euler buckling load, short and long columns.	
13.	Text book(s): 1. Crandall S H, Dahl N C, Larndner T J and Sivakumar M S, <i>An Introduction to Mechanics of Solids</i> , Tata McGraw-Hill (2012). 2. Popov E P, <i>Engineering Mechanics of Solids</i> , Pearson (2015).	
14.	Reference(s): 1. Beer F, Johnston Jr. E R, Dewolf J and Mazurek D, <i>Mechanics of Materials</i> , McGraw-Hill (2015). 2. Hibbeler R C, <i>Mechanics of Materials</i> , Pearson (2013). 3. Gere J M and Timoshenko S P, <i>Mechanics of Materials</i> , CBS Publisher and Distributor (2002).	