

1.	Title of the course	Design of Machine Elements
2.	Course number	ME313L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	Modified with ME302L/DESIGN OF MACHINE ELEMENTS
5.	To be offered by	Mechanical Engineering
6.	Proposed by	SUBBAREDDY DAGGUMATI
7.	Prerequisite	None
8.	Course Objective(s): To discuss the industrial practices followed in designing commonly used machine elements and machines along with the basic understanding of the theory behind it. To understand a comprehensive design procedure for machine elements and systems based on stiffness, strength, stability and fatigue failure using the data books and empirical relationships. To discuss a commercial finite element (FE) software for the design of complex machines and machine elements.	
9.	Course Content: Introduction to various stages in the design and manufacturing of machines and machine components; Technology readiness level (TRL) and manufacturing readiness level (MRL); Optimal selection of materials and geometrical shapes for various structural applications; Introduction to various design philosophies; The safety factor and various influencing parameters; Stiffness-based design of machine components; Failure theories for ductile and brittle materials; Failure by instability; Stress concentration and its influence on the design process; Fatigue failure behaviour of metals: S-N curves, random variable amplitude fatigue loading, rain-flow counting, estimating the fatigue life with mean stress effects under random variable amplitude loads; Design of beams, shafts, bolted joints, welded joints; Gear design: American Gear Manufacture Association (AGMA) method for gear design; Design of rolling and journal bearings; Introduction to finite element methods (FEM) to solve complex design problems.	
10.	Textbook(s): 1. Budynas R and Nisbett K, Shigley's Mechanical Engineering Design, 10th Edition, McGraw-Hill Education (2014).	
11.	Reference(s): 1. Norton R L, Machine Design, An Integrated Approach, 2nd Edition, Pearson Education (1997). 2. PSG College Design Data: Data Book of Engineers, Kalaikathir Achchagam (2012).	