

<b>Semester:</b>	4				
<b>Course Code:</b>	ME2030				
<b>Course Name:</b>	Machine Elements Design				
<b>Credits Value:</b>	3 (Notional hours: 150)				
<b>Pre-requisites:</b>	ME2020 and CE2080				
<b>Core/ Optional:</b>	Core				
<b>Hourly Breakdown</b>	Lectures (hours)	Tutorials (hours)	Practical classes (hours)	Assignments (hours)	Independent Learning & Assessment (hours)
	13			64	73

**Course Aim:** To provide the students with an opportunity to identify the design processes of simple machine elements so that all the students will be able to integrate such elements into machine design.

**Intended Learning Outcomes:**

On successful completion of the course, the students should be able to;

- **analyze** simple mechanisms and select a suitable mechanism to satisfy the functional requirements of a machine,
- **design** machine elements against failure and select standard components and devices for engineering designs by referring to design manuals, manufacturer’s catalogues and data sheets,
- **integrate** machine elements in developing mechanical systems,
- **communicate** the design solutions effectively by means of drawings, solid models, simulations, and written reports.

**Course Content:**

- **Planar Mechanisms:** Linkages, planar mechanism synthesis and kinematic analysis of spatial mechanisms. CAM-follower systems. Selection of mechanisms
- **Failure Modes and Evaluation:** Design for static and dynamic loading, factor of safety, stress analysis, material selection, failure modes and evaluation, fatigue and fracture mechanics.
- **Design of Machines:** Load-carrying joints. Shafts, Keys and Couplings, limits & fits and Bearings. Power screws & threaded fasteners. Simple gear trains and belt drives. Selection of standard components: springs, bearing; screws. Representation of design solutions by means of solid models, drawings and design reports. Design of machine frames.

**Teaching/ Learning Methods:**

Classroom lectures, design classes, and in-class exercises and assignments

**Assessment Strategy:**

<b>Continuous Assessment</b> 70%		<b>Final Assessment</b> 30%	
Details:		Theory (%)	Practical (%)
Assignments/Quizzes/Reports & Drawings 70 %		30%	Other (%)
<b>Recommended Reading:</b>			
<ul style="list-style-type: none"> <li>➤ Giesecke, F. E., Hill, I. L., Spencer, H. C., and Mitchell, A. E. (2016). <i>Technical Drawing with Engineering Graphics</i> (15<sup>th</sup> Edition). Prentice Hall, Boston, USA.</li> <li>➤ Lieu, D.K., and Sorby, S.A. (2008). <i>Visualization, Modeling, and Graphics for Engineering Design</i>. Cengage Publishers, Massachusetts, USA.</li> <li>➤ Myszka, D. (2012). <i>Machines and Mechanisms, Applied Kinematic Analysis</i> (4<sup>th</sup> Edition). Prentice Hall, New York, USA.</li> <li>➤ Budynas–Nisbett (2008). <i>Shigley’s Mechanical Engineering Design</i> (8th Edition). McGraw Hill, New York, USA.</li> </ul>			

