

Semester:	5				
Course Code:	ME5010				
Course Name:	Mechanical Systems Design				
Credits Value:	3 (Notional hours: 150)				
Pre-requisites:	ME2030				
Core/ Optional:	Optional				
Hourly Breakdown	Lectures (hours)	Tutorials (hours)	Practical classes (hours)	Assignments (hours)	Independent Learning & Assessment (hours)
	11			68	71

Course Aim: To provide an opportunity for students to be familiar with modeling, analysis, synthesis, design methodologies, and the best practices of mechanical design from a system's perspective to enable carrying out a comprehensive mechanical engineering systems design.

Intended Learning Outcomes:

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

- **design** mechanical systems with reference to design handbooks, local and international standards, codes of practice;
- **select** materials for machine components through multi-disciplinary considerations;
- effectively **communicate**, orally and verbally, design solutions in a technical manner;
- **use** the methods of designing for the assessment of quality and reliability.

Course Content:

- **Design for Static Loading:** Design of steel structures according to international standards.
- **Design of Mechanical Systems:** Design against combined stresses, fatigue loading and wear, Analysis for static and dynamic loading of mechanical systems with gear drives, belt drives, pneumatic and hydraulic systems, actuator selection and control. Material selection, reliability and failure, risk assessment, preliminary hazard analysis, economic and environmental considerations, failure modes and effects analysis and quality control. Communication of design solutions.
- **Design of Pressure Vessels:** Industry standards and design for critical design parameters such as maximum safe operating pressure, temperature, safety factor, corrosion allowance, and failure modes, design of welded joints.

Teaching/ Learning Methods:

Classroom lectures, in-class design exercises and assignments

Assessment Strategy:

Continuous Assessment 100%		Final Assessment 0%		
Details:		Theory (%)	Practical (%)	Other (%) (Project)
In-class exercises /Assignments/Reports/Quizzes	100%			
Recommended Reading:				
<ul style="list-style-type: none"> ➤ Cleghorn, W. & Dechev, N. (2014). <i>Mechanics of Machines</i> (2nd Edition). Oxford University Press, Oxford , UK. ➤ Singhose, W. & Donnell, J. (2012). <i>Introductory Mechanical Design Tools</i> (1st Edition). Lulu Press, Inc, Morrisville, North Carolina. ➤ Budynas–Nisbett (2008). <i>Shigley’s Mechanical Engineering Design</i> (8th Edition). McGraw Hill, New York, USA. ➤ Kilian, C. T. (2001). <i>Modern Control Technology: Components and Systems</i> (2nd Edition). Delmar Thomson Learning, New York, USA. 				