Semester:	1			
Course Code:	CE1010			
Course Name:	Engineering Mechanics			
Credit Value:	3 (Notional hours:150)			
Prerequisites:	None			
Core/Optional	Core			
Hourly Breakdown	Lecture hrs.	Practical hrs.	Tutorial hrs.	Independent Learning & hrs.
	35	10	5	100

Course Aim : To provide an exposure to the fundamentals of physics, which govern the behaviour of macroscopic elements so that the students will be able to model and analyze complex mechanical systems and structures, and experience the art of scientific problem solving

Intended Learning Outcomes:
On successful completion of the course, the students should be able to;

- **illustrate** the construction of a free body diagram of an element in a mechanical or a structural system
- **compute** internal forces in statically determinate and indeterminate structures, using the concepts of equilibrium, compatibility and stress-strain relation
- **describe** the behavior of a particle in inertial and moving frames by identifying the Einstein, Centrifugal, Coriolis, and Euler accelerations
- **derive** the governing differential equations of a mechanical or a structural system using fundamental laws in mechanics.

Course Content:

- **Introduction**: Force systems: Forces and couples; equilibrium of rigid body
- **Analysis of simple structures**: Structures and components; loads and supports; internal and external forces; free-body diagrams; statically determinate structures; analysis of trusses; beams and shear force and bending moment diagrams; stress and strain; Hooke's law, and deformation of axially loaded members; statically indeterminate problems
- **Bending of beams**: Simple bending theory and its applications
- **Work and energy methods**: Work due to forces and couples; virtual displacements and virtual work; strain energy and potential energy; energy principles
- **Kinematics of Particle Motion:** Description of particle motion in 3D Inertial frames and in

moving frames. The use of the euclidean group of translations in describing the relative motion of frames

- **Kinetics of Particle Motion :** Concept of Space-Time, mass and conservation of linear momentum and its relationship to Newton's Laws; The concept of force, meaning of kinetic energy, the notion of spatial angular momentum; conservation of spatial angular momentum
- **Newton's laws in Moving Frames:** The meaning of centrifugal, Coriolis, Euler, and Einstein forces. Application to the description of complex motion of systems that can be approximated as particles

Teaching /Learning Methods:

Classroom lectures, tutorial discussions and practical classes

Assessment Strategy:

Continuous Assessment 50%	Final Assessment 50%		
Details: Tutorials 10% Laboratory practical classes 20% Mid semester examination 20%	Theory (%) 50%	Practical (%) -	Other (%) -

Recommended Reading:

- Cohenn, M. (2012). *Classical Mechanics: A Critical Introduction*. Hindawi Publications. Cairo, Egypt.
- Greenwood, D. T. (1997). *Classical Dynamics*. Dover Publications, United States of America.
- Tatum, B. *Classical Mechanics*, E-Book at: http://astrowww.phys.uvic.ca/~tatum/classmechs.html
- Hibller, R.C (2013) *Statics and Dynamics*, 13th Edition