

Course Title: Elements of Engineering I

Course Code: ENGG 111

Credit Hours: 3

Course Description:

This course introduces the fundamentals of Civil Engineering and the Mechanical Engineering. The contents include engineering mechanics, strength of materials, building materials, components and structure, surveying and fluid Mechanics.

Course Contents:

Unit 1: Engineering Mechanics and Strength of Materials

Equivalent force systems: equilibrium, friction, cables, centre of gravity, Velocity, acceleration, momentum, Newton's second law of motion, the moment law, work and energy, rotation about a fixed axis. Concepts of stress, strain, stress-strain diagram, Hook's law.

Unit 2: Building Materials, Components and Structure

Civil Engineering Materials: Bricks, stones, sand, cement, concrete, steel sections. Foundations: Types, bearing capacity. Requirements of good foundations, Superstructure: Brick masonry, stone masonry, beams, columns, lintels, roofing, flooring, plastering. Mechanics: Internal and external forces, Types of Bridges and Dams, Basics of Interior Design and Landscaping

Unit 3: Surveying

Fundamental Definitions and Concepts, Chain Surveying, The compass leveling, Plane table surveying, Theodolite, EDM & Total station, Contouring, GIS and remote sensing

Unit 4: Thermal Engineering and Thermal Power Plants

Laws of thermodynamics, heat engines, gas power cycles – Otto, Diesel, Brayton, Rankine cycles. Internal combustion engines, Vapour power cycles and thermal power plants. Refrigeration and air conditioning

Unit 5: Fluid Mechanics and Hydraulic Machineries

Introductory concepts, fluid properties, fluid in motion, types of flows, continuity equation, mass conservation equation, Bernoulli's equation, boundary layer. Turbo machines, types of hydro turbines, axial flow and centrifugal flow machines, Pumps

References:

As prescribed by the instructors in class