

Department Of Computer Science and Engineering
Kathmandu University
Dhulikhel, Kavre



Subject: Elements of Engineering I

Course: ENGT 111

Level: B.E./B.Sc 1st Year/1st Semester

Credit Hours: 3

OBJECTIVES

This course will accommodate the civil engineering foundations in the existing Basic Mechanical Engineering taking advantage of commonalities in the topics shared by those courses Including Mechanics, Strength of Materials and Fluid Mechanics. The topics covered by Basic Mechanical Engineering will be restructured and made into three major topics instead of the existing five topics. The additional topics will include the topics in basic civil engineering that will include building materials, components and structure; and surveying.

DESCRIPTION:

Engineering Mechanics and Strength of Materials [9hr.]

Equivalent force systems: equilibrium, friction, cables, the 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, Hooke's law.

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.

Surveying

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

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.

Fluid Mechanics and Hydraulic Machinery

Introductory concepts, fluid properties, fluid in motion, types of flows, continuity equation,

mass conservation equation, Bernoulli's equation, boundary layer. Turbomachines, types of hydro turbines, axial flow and centrifugal flow machines. Pumps.