BREE 415. DESIGN OF MACHINES AND STRUCTURAL ELEMENTS

Credits: 3

Offered by: Bioresource Engineering (Faculty of Agric Environ Sci)

Terms offered: Fall 2025

View offerings for Fall 2025 in Visual Schedule Builder.

Description

Design of shafts, bearings, gears, fasteners, and frames. Material selection and introduction to advanced materials for machine and structural design applications. Stress, strain, and deflection analysis for standard machine and structural elements. Predicting mechanical failure caused by static and variable (fatigue) loads using proper design criteria. Applying fundamental concepts for the analysis and design of machine elements (shafts, gears, and bearings). Integrating the design of individual machine elements into larger systems and applying numerical modeling (finite element method), engineering drawing, and 3D printing for validation and rapid prototyping of designed machine and structural elements.

- Prerequisite: BREE 210, BREE 216, and BREE 341
- Restriction: Not open to students who have taken BREE 315.
- 3 hours of lecture and 2 hours of problems per week
- A course fee of $20.60 is to pay for supplies used in fused-deposition modeling (FDM) and Stereoithography (SLA) for 3D printing of structural and machine elements. The fee is associated with the printing materials and accessories used in lab sessions.