ENGINEERING, MECHANICAL (ENME)

ENME 4020 Adv Finite Element Analysis (4 Credits)

ENME 4310 Computational Methods for Mechanics and Materials (4 Credits)
An introductory course for the general-purpose computational methods in advanced multiscale materials and mechanics. Students learn the fundamentals on the numerical methods used in mechanical and materials engineering. Cross listed with ENME 3310.

ENME 4360 Elasticity (4 Credits)
Students will be able to apply the fundamental principles of elasticity to solve two- and three-dimensional mechanical engineering problems involved in modern applications of elastic structures, composite materials, tribology and contact mechanics. Dependence on previous knowledge of solid mechanics, continuum mechanics or mathematics is minimized. The emphasis is placed on the engineering applicaitons of elasticity. Suggeted prerequisite: ENME 2541.

ENME 4400 Fatigue (4 Credits)
A detailed overview of fatigue. Topics include: stress life and strain life approaches, fracture mechanics, constant amplitude and spectrum loading, life prediction, fatigue at notches, microstructural effects, environmentally assisted fatigue, retardation and acceleration, multi-axial fatigue, design against fatigue and reliability. Cross listed with ENME 3400.

ENME 4520 Intermediate Dynamics (4 Credits)
Development and analysis of dynamic systems through classical and modern approaches. Topics include: reference frames, particle kinematics, Newtonian particle mechanics, Phase Portraits, rigid-body kinematics, Euler's laws, Lagrange's Equations, Lagrange Multipliers, and Kane's Equations. Recommended prerequisites: MATH 2070 and MATH 2080.

ENME 4541 Advanced Mechanics of Materials (4 Credits)
This is a second-level course in mechanics of materials with an emphasis on techniques that are useful for mechanical design. Topics may include energy methods, non-symmetrical and nonlinear bending, shear and torsion of closed and open sections, beams in elastic foundations, membrane stress in axisymmetic shells, asisymmetric bending of cylindrical shells, thick-walled cylinders and disks, curved beams, and elastic stability. Recommended prerequisite: ENME 2541.

ENME 4630 Viscous Flow (4 Credits)
Course covers the fundamentals of fluid mechanics from an advanced point of view with emphasis on the mathematical treatment of viscous-flow phenomena. Topics cover the Navier-Stokes equations and its exact and similarity solutions, laminar boundary layer theory, free-shear flows, and the phenomena of instability and transition to turbulence. Recommended prerequisite: ENME 2661.

ENME 4650 Adv. Fluid Dynamics (4 Credits)
Physical properties of liquids and gases; turbulence and closure models; surface waves and instabilities; non-Newtonian fluid behavior; conformal mapping and airfoil theory.

ENME 4660 Micro Heat Exchangers (4 Credits)
Explores the advance principles and applications of fluid dynamics and heat transfer through the application to micro fluidic heat exchanger design and optimization. Students utilize Mathcad extensively to seek optimized exchanger performance within a clearly defined design space. Students also build small scale heat exchangers from their optimized designs. Prerequisite: ENME 2671.

ENME 4670 Advanced Computational Fluid Dynamics (4 Credits)
Building on the principles and applications of computational methods in fluid flow and topics chosen from heat transfer, mass transfer and two phase flow. Specifically, Monte Carlo and volume of fluid techniques are discussed at length. Additionally, students learn how to set up automated design optimization using the latest software packages. Time permitting, students also are introduced to fluid-solid interaction modeling. Prerequisite: ENME 3651.

ENME 4671 Convective Heat Transfer (4 Credits)
The objective of this course is to examine the physical phenomena associated with heat transfer in the presence of fluid flow. We will develop a mathematical description of the processes (fluid flow and heat transfer) for laminar and turbulent flows for both internal and external situations. Exposure to the fundamentals of fluid mechanics and heat transfer is expected before taking this course.

ENME 4800 Advanced Topics (ME) (0-5 Credits)
Determined by interest and demand. May be taken more than once for credit.

ENME 4900 Grad Professional Development (1 Credit)
This course is required for all MME MS graduate students and all MME PhD graduate students who enter with a BS or enter with an MS but fail their first qualifying exam. One of our objectives is for all graduating students to have good written and verbal communication skills. This course is set up to meet those objectives. During this course, students write a mini-proposal and/or literature review. Students follow guidelines for a funding agency (e.g. NSF or NIH) for the mini-proposal. If students have a research advisor, students can coordinate with their advisor. If students do not have a research advisor, students may pick a topic that most interests them. Both a written proposal and an oral presentation are required of all students. Graduate standing is required.

ENME 4950 Graduate Assessment (0 Credits)
This graduate assessment course is required for all MME graduate students to be taken in their last quarter. All required assessment materials are uploaded to DU Assessment to meet the course requirements. Students will receive emails through the DU Assessment system notifying you of what is required to be uploaded.

ENME 4991 Independent Study (1-10 Credits)

ENME 4992 Directed Study (1-10 Credits)

ENME 4995 Independent Research (1-16 Credits)

ENME 5991 Independent Study (1-10 Credits)

ENME 5995 Independent Research (1-16 Credits)