Faculty

Don Van (2001). Professor and Department Chair. B.S. and M.S., University of Illinois in Chicago; M.S. and Ph.D., New Jersey Institute of Technology; P.E., CEM.

Jay Bernheisel (2006). Assistant Professor of Engineering. B.S.M.E. and M.S.M.E., Rose-Hulman Institute of Technology; Ph.D., Northwestern University; P.E.

Jeannette Herring Russ (2002). Associate Professor of Engineering. B.S., Mississippi State University; M.B.A., Colorado State University; Ph.D., Vanderbilt University; P.E.

Engineering Major Requirements—58 hours

I. Major core requirements—47 hours + a Concentration

A. EGR 101, 105, 109, 210, 240, 250, 261, 262
B. EGR 330, 342, 360, 375
C. EGR 475, 491, 492, 498

II. Mechanical Engineering Concentration—14 hours

A. EGR 320, 352, 385
B. EGR 450, 456

III. Electrical Engineering Concentration—14 hours

A. EGR 340, 376, 395 (2)
B. EGR 405, 416

Assessment of Majors

Assessment of majors culminates with the Fundamentals in Engineering (FE) exam taken during the senior year. The test, prepared by the National Council of Examiners for Engineering and Surveying, is administered by the State of Tennessee as the first step toward becoming a licensed professional engineer. Throughout the program, however, the student is monitored by a portfolio tracking system to ensure he/she will have attained all expected educational outcomes.

Course Offerings in Engineering (EGR)

( ) Hours Credit; F–Fall, W–Winter; S–Spring; Su–Summer

101. Introduction to Engineering Design and Analysis (2) F

Provides an overview of the engineering profession, including technical and legal responsibilities, the design and analysis method, and application of the engineering process to problem solving.

105. Engineering Graphics (3) S

Graphical communication methods through one of the widely used software packages–ProE; covers 2-D projections and views, 3-D surface and solid modeling, and general concepts such as object dimensions and tolerances.

109. Introduction to Matlab and Computer Programming (2) S
Introduces computer programming using Matlab as a high-level programming language and Matlab as an engineering computational tool. Includes general computer programming principles and structures and the unique feature of Matlab, such as vector and matrix operations, with application to engineering.

210. Materials Engineering (3) S
Prerequisite: CHE 111, PHY 231.
Examines the structure of material at the atomic level, including how physical, thermal, and mechanical properties affect the behavior of materials.

240. Mechanical Engineering Fundamentals I: Mechanics (3) F
Prerequisites: MAT 212 and PHY 231
Introduces vector analysis of forces and torques. Examines rigid bodies and determinate structures at equilibrium. Covers kinematics of a particle and of a rigid body. Presents kinetic analysis using force-acceleration, work-energy, and impulse-momentum techniques.

250. Thermo-fluid Dynamics I (4) S
Prerequisite: CHE 111, PHY 232; Corequisite: MAT 314.
Introduces macroscopic concepts of thermodynamics, including first and second laws, properties of a pure substance, and energy analysis; also introduces hydrostatics and fluid dynamics, including pressure distribution, relations for fluid particles, and development of conservation theorems. Includes weekly lab.

261. Electrical Engineering Fundamentals I: Digital Logic (3) F
Basic Principles of logic design, including Boolean algebra, number systems, combinational and sequential logic, and programmable logic devices. Introduces computer simulation techniques for logic circuits.

262. Electrical Engineering Fundamentals II: Electric and Electronic Circuits (4) F
Prerequisites: PHY 232 and MAT 212
Fundamental concepts of circuits and electronics, including basic concepts, theorems, and laws of ds and ac circuits. Introduces power sources, passive circuit devices, op amps, and selected semiconductor devices. Includes a weekly lab.

320. Mechanics of Materials (3) F
Prerequisite: CHE 111, PHY 231, MAT 314.
The relationship between internal stresses and changes of form produced by external forces acting on solid bodies; also covers normal and shear stresses, strain, elasticity and plasticity, deformations, and loading.

330. Engineering Economy (3) S
Presents basic136(b)-11(a)sdnb.v1, PHY 231,al

405. Electronic Circuit Analysis and Design (4) S
Prerequisite: EGR 262.
Introduces fundamental principles of electronics, including analysis and design techniques for circuits containing diodes, field effect transistors, and bipolar junction transistors. Includes weekly lab.

416. Physical Principles of Solid State Devices (3) S
Prerequisite: EGR 210. Reciprocal credit: PHY 416.
Introduces concepts in material science and quantum physics, including modern theory of solids, magnetic and optical properties of materials, semi-conductors and semi-conductor devices, dielectric materials, and superconductivity.

450. Thermo-fluid Dynamics II (4) F
Prerequisite: EGR 250.
Properties of the ideal gas, models of incompressible and corresponding states, gas-vapor mixtures, availability and irreversibility, power and refrigeration cycles, viscous and boundary-layer flow, inviscid incompressible flow, compressible flow, and turbo-machinery. Includes weekly lab.

456. Machine & Mechanism Theory & Design (3) F
Prerequisite: EGR 290.
Covers design, selection, and evaluation of mechanisms for various applications, including planar and spatial linkages, cams, gears, planetary and non-planetary gear systems, linkage synthesis, and linkage dynamics.

470. Heat Transfer (3) S
Prerequisite: EGR 450.
The analysis of various heat transfer modes, including conduction, natural and forced convection, and radiation; introduces industrial applications of heat transfer such as heat exchangers, waste heat recovery, and steam generators in a nuclear plant or in a gas turbine electrical generator.

475. Control Theory and Design (4)
Prerequisite: EGR 262.
Introduces analysis and design of linear control systems using root locus and frequency response techniques; includes system representation and control system characteristics. Includes weekly lab.

491. Major Project Design I (3) F
Allows a student to work individually on a real-world engineering problem assigned by either the instructor or a sponsoring industry; requires the student to solve the problem by applying the engineering design and analysis method; involves oral and written presentations, where the written presentation is in the form of a design portfolio that documents a full engineering study of the project.

492. Major Project Design II (3) S
Allows a team of students to work on a real-world engineering problem assigned by either the instructor or a sponsoring industry; requires the student to solve the problem by team effort via project management; involves oral written presentations, where the written presentation is in the form required for EGR 491. The oral presentation will be a publicly announced event.

498. Engineering Seminar (2) F
Prerequisite: Senior Standing.
Provides a comprehensive review of all engineering fundamentals, including mathematics, physics, chemistry, and economics, to prepare engineering seniors for the national Fundamentals of Engineering (FE) examination; also provides a review of engineering ethics and Christian conduct in the workplace.

499. Seminar (1-3) As Needed
To be used at the discretion of the department.

179-279-379-479. External Domestic Study Programs (1-3) As Needed
All courses and their applications must be defined and An(a)-7(t)-7(h)-7(e)-7slw4ci Du-7(t)-7b Dyo-4i-7(t)-7o