DEPARTMENT OF ENGINEERING

COLLEGE OF ARTS AND SCIENCES

Faculty

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

Don Van (2001). Professor of Engineering and Director of Accreditation. 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). Professor of Engineering. B.S.M.E. and M.S.M.E., Rose-Hulman Institute of Technology; Ph.D., Northwestern University; P. E.

Georg Pingen (2010). Associate Professor of Engineering. B.A., Samford University; B.S. and M.S., Washington University; Ph.D., University of Colorado at Boulder; P.E.

Randal S. Schwind (2004). Professor of Engineering. B.S., Hardin-Simmons University; M.S., Texas A&M University; Ph.D., University of Illinois at Urbana-Champaign; P.E.

Staff

Christine Rowland (2006). Academic Secretary—Engineering, Physics, Math, and Computer Science.

Ethan Wilding (2015). Lab Systems Engineer. B.S., University of Memphis; B.S.E., Union University; M.S., University of Tennessee.

Objectives

1. Graduates will make contributions through engineering practice, graduate school, or other professional pursuits.
2. Graduates will solve problems through inventive thinking.
3. Graduates will participate in continuing education.
4. Graduates will exemplify Christian principles and ethical standards.

Curriculum

Union offers the Bachelor of Science in Engineering, BSE, with concentrations in electrical and mechanical engineering. The curriculum is designed to expose students to a broad base of engineering knowledge and the basic science and math upon which that knowledge rests. In addition, the curriculum at Union includes a strong general education component that provides a greater understanding of the world in which engineering products will ultimately be used.

Because engineering courses build upon one another, the prerequisite sequences that exist in the curriculum must be closely followed. Incoming freshmen will ideally be ready to begin the calculus sequence in their first semester in order to satisfy the various prerequisites and complete the degree in four years.

The engineering major must complete all General Core

for students who intend to pursue graduate work in related disciplines not offered at Union.

The minor in computational engineering science will benefit science, engineering, and mathematics students who are interested in the intersection of these three fields. It combines Union's existing strengths in these disciplines to offer an innovative program of study that introduces students to the field of computational modeling and simulations.

The Union BSE pro4 (t)6a5g6osd.jgcct 4cctrÁ×E»ËjW, t[¼

many states and for admission to some engineering graduate schools. ABET does not accredit minors.

I. Major in Engineering—61 hours
   A. Major core requirements—47 hours + a Concentration
      1. EGR 101, 105, 109, 210, 240, 250, 261, 262
      2. EGR 330, 342, 360, 375, 391
      3. EGR 475, 491, 492, 498
   B. Mechanical Engineering Concentration—14 hour40, 250, 261,

Major in Engineering with
Discipline-Specific Honors

The Discipline-Specific Honors program in Engineering offers students an opportunity to go beyond the basic curriculum through taking engineering contract courses with expanded requirements, completing an original honors project, and attending colloquia sponsored by the Honors Community. Specific program requirements are outlined below, and additional details can be found on the engineering website.

Application Requirements

- At least three full semesters, preferably four, must remain before graduation.
- The applicant must first meet with the Chair of the Engineering Department. If approval to proceed is granted at the departmental level, the student must submit an application to the Office of the Director of the Honors Community.

Admission Requirements

- Students must have a cumulative GPA of at least 3.5, as well as a GPA of at least 3.5 in engineering courses.
- Students must have completed at least ten credit hours of sophomore-level engineering courses. Transfer students must have completed at least two engineering courses at Union.

Progression Requirements

- Students must maintain a GPA of 3.5 overall and in engineering courses.
- Students must complete each honors contract course with a grade of B or better and achieve satisfactory completion of the honors contract for each course.

Curriculum Requirements

- Students must take at least 12 credits of honors contract courses.
  - For electrical engineering concentration students, typical honors contract courses include EGR 361 (4 credits), EGR 405 (4 credits), EGR 475 (4 credits), and EGR 498 (1 credit).
  - For mechanical engineering concentration students, typical honors contract courses include EGR 320 (3 credits), EGR 355 (4 credits), EGR 475 (4 credits), and EGR 498 (1 credit).
- Students must complete an honors project that is distinctly different from the senior design project. The honors project will be either a research project or a humanitarian engineering design project, with specific requirements to be determined in conjunction with the student's departmental

250. Mechanical Engineering Fundamentals II: Thermo-fluid Dynamics I (4) S
Prerequisite: PHY 232; pre- or corequisites: EGR 109; MAT 314.

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
Prerequisites: EGR 262; MAT 314.
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.

455. Energy Conversion (3) S
Pre- or corequisite: EGR 355.
Provides a comprehensive analysis of current energy systems, including [illegible]