ROSE-HULMAN / FOUNDATION-COALITION
SOPHOMORE ENGINEERING CURRICULUM

Curriculum Structure

The Rose-Hulman / Foundation Coalition Sophomore Engineering Curriculum consists of eight courses (30 credit hours) taken over the three quarters of the sophomore year. As shown below the courses are listed as either mathematics (MA) or engineering science (ES) courses:

FALL QUARTER 8 Credit Hours

MA 221  Differential Equations & Matrix Algebra I (4)
ES 201  Conservation & Accounting Principles (4)

WINTER QUARTER 13 Credit Hours

MA 222  Differential Equations & Matrix Algebra II (4)
ES 202  Fluid & Thermal Systems (3)
ES 203  Electrical Systems (3)
ES 204  Mechanical Systems (3)

SPRING QUARTER 9 Credit Hours

MA 223  Statistics for Engineers (4)
ES 205  Analysis & Design of Engineering Systems (5)

TOTAL 30 Credit Hours

Curriculum Goals

This set of courses has been designed so that students who participate in this program should

- develop a strong background in engineering science,
- develop an understanding of modeling,
- be able to apply a common problem-solving approach built around the application of conservation and accounting principles and constitutive relations,
- continue to develop effective communication skills,
- be proficient in applying standard statistical procedures and quality control concepts,
- develop a strong background in mathematics,
- be encouraged to be inquisitive and self-motivated learners,
- develop an appreciation for engineering as a profession and begin to develop an identity as an engineer,
- be able to work effectively in teams and recognize the importance of individual responsibility in team efforts,
- be able to apply computer tools appropriately,
- be comfortable working with ambiguity,
- be familiar with the overall design process,
- be able to locate and retrieve both technical and non-technical information,
- be introduced to safe and effective use of instruments,
☐ appreciate the role of creativity in engineering,
☐ develop a recognition of the benefits of the new curriculum, and
☐ be encouraged to have fun learning.

Each course in the curriculum has been developed around a set of course goals and objectives that support these seventeen curriculum goals.

**ES201 Conservation & Accounting Principles** 4R-0L-4C  F,W  Pre: MA 113, PH 111  Co: MA 221

A common framework for engineering analysis is developed using the concepts of a system, accounting and conservation of extensive properties, constitutive relations, constraints, and modeling assumptions. Conservation equations for mass, charge, momentum and energy, and an entropy accounting equation are developed. Applications taken from all engineering disciplines stress constructing solutions from basic principles.

**ES 202 Fluid & Thermal Systems** 2 2/3R-1L-3C  W,S  Pre: ES 201  Co: ES 203, ES 204


**ES 203 Electrical Systems** 2 2/3R-1L-3C  W,S  Pre: ES 201, MA 221, PH 112  Co: ES 202, ES 204


**ES 204 Mechanical Systems** 2 2/3R-1L-3C  W,S  Pre: ES 201  Co: ES 202, ES 203

Conservation and accounting equations applied to mechanical systems. Kinematics and kinetics of particles in space and of rigid bodies in plane motion.

**ES 205 Analysis & Design of Engineering Systems** 4R-3L-5C  S,F  Pre: MA 222, ES 202, ES 203, ES 204

Modeling and analysis of linear dynamic systems. Common elements of mechanical, fluid, thermal and electrical systems. First, second, and higher-order systems. Time and frequency response. Introduction to the design process with emphasis on design specifications.