Mechanical Electrical Systems (MES)

MES 200 Introduction to Engineering Systems (2 credit hours)
This course introduces students to foundational topics necessary for success in engineering and real-world problem solving. Through hands-on activities, students will become familiar with the basic mechanical and electrical components to be used in their future engineering designs and the manufacturing tools and technologies required to realize them. Students will be introduced to professionalism in engineering and develop a personal professional development plan. This course requires a field trip to a local business, and students will be required to provide or arrange for their own transportation. The course contains a required laboratory component.

Corequisite: MAE 206 or ECE 200
Typically offered in Fall only

MES 201 Engineering Systems Lab 1 (2 credit hours)
Course provides an introduction to the theory and practice of manual and computer assisted laboratory measurement techniques, data analysis, design of experiments and technical writing. Students learn to successfully conduct and document an engineering experiment. This course requires a field trip to a local business and students will be required to provide or arrange for their own transportation.

Prerequisite: MES 200 and C- or better in MAE 206 or C- or better in ECE 200
Typically offered in Spring only

MES 300 Systems Engineering (3 credit hours)
This course introduces the theory and practice of formal systems engineering. Students are exposed to systems thinking, systems modeling, and performing engineering design within a formal systems engineering framework. While experiencing the complete design/build cycle, students perform requirements definition and analysis, system architecting, test and integration plan development, and formal technical reviews.

Prerequisite: MES 301
Typically offered in Spring only

MES 301 Engineering Systems Junior Design Lab (2 credit hours)
This course centers around a team-based semester-long design project in which students engage in the full cycle of the engineering design process by designing and building a measurement device. Based on the provided requirements, student groups brainstorm conceptual designs, develop a detailed design, and then fabricate a device under supervision. Students gain practical experience with engineering design, manufacturing, industry standards, measurement device specifications, accuracy and resolution requirements, and LabVIEW software.

Prerequisite: MES 201
Typically offered in Fall only

MES 302 Mechanical Engineering Systems Lab 1 (2 credit hours)
This is the first course in a series of two mechanical engineering systems laboratory courses (MES 302 and MES 400). In each course, students apply the measurement and experimental techniques learned in MES 201 to explore and verify key theoretical mechanical engineering concepts. Students learn to write a variety of common technical reports such as engineering memos and formal engineering laboratory reports. MES 302 focuses on the fields of mechanical vibrations, fluid mechanics, dynamics of machines, PID controls, and Simulink programming. The course requires a field trip to a local business, and students will be required to provide or arrange for their own transportation.

Prerequisite: MES 301 and MAE 308 and MAE 315; Corequisite: MAE 435
Typically offered in Spring only

MES 304 Electrical Engineering Systems Lab 1 (2 credit hours)
This is the first course in a series of two electrical engineering systems laboratory courses (MES 304 and MES 404) designed to give students fundamental knowledge of mechanical engineering topics and practical experience with designing and troubleshooting complex electrical systems. In MES 304, students learn about statics and fluid mechanics, developing and working with complex electrical system schematics, and troubleshooting electrical systems. Students explore requirements definition, interfaces, and industry standards and specifications through a design project. The course requires a field trip to a local business, and students will be required to provide or arrange for their own transportation.

Prerequisite: MES 301 and ECE 302; Corequisite: ECE 212
Typically offered in Spring only

MES 305 Mechanical Engineering Systems Lab I (1 credit hours)
Course provides an introduction to the theory and practice of manual and computer assisted laboratory measurement techniques, data analysis, design of experiments and technical report writing. Students learn to successfully conduct and document an engineering experiment. For MES Majors only.

Prerequisite: MSE 201 and MAE 206
Typically offered in Spring only

MES 400 Mechanical Engineering Systems Lab 2 (2 credit hours)
This is the second course in a series of two mechanical engineering systems laboratory courses (MES 302 and MES 400). In each course, students apply the measurement and experimental techniques learned in MES 201 to explore and verify key theoretical mechanical engineering concepts. Students learn to write a variety of common technical reports such as engineering memos and formal engineering laboratory reports. MES 400 focuses on thermodynamics, fluid mechanics, and heat transfer. It also incorporates project management, formal drawing packages, and an introduction to computerized finite element analysis.

Prerequisite: MES 302; Corequisite: MAE 310
Typically offered in Fall only

MES 401 MES Capstone Design I (3 credit hours)
This course is the first of a two-semester engineering design experience. This capstone experience culminates the MES student's undergraduate education experience. Working in teams, students perform engineering design to solve a real-world engineering problem supplied by an industry partner. In MES 401, students follow a formal systems engineering approach to manage their design project through the completion of a System Requirements Review and a Conceptual Design Review. Students develop written and verbal communication skills through reports and presentations. Students also gain insight into engineering design practices through guest lectures from local engineers. The course requires travel to a sponsor, and students must provide or arrange for their own transportation.

Prerequisite: MES 300; Corequisite: MAE 413 or ECE 303
Typically offered in Fall only

MES 402 MES Capstone Design II (4 credit hours)
This course is second in a two semester engineering design and manufacturing experience which is the culmination of the MES student's undergraduate education experience. In teams, students solve a real-world engineering problem supplied by an industry partner. In the two courses, students follow a formal systems engineering approach to manage their project through the following reviews: System Requirements, Conceptual Design, Preliminary Design, and Critical Design. Students develop written and verbal communication skills and gain insight into engineering design practices through guest lectures from local engineers. Students must provide any transportation needed for this class. MES students only.

Prerequisite: MES 401
Typically offered in Spring only

MES 403 MES Capstone Design II (3 credit hours)
This course is the second of a two-semester engineering design experience. This capstone experience culminates the MES student's undergraduate education experience. Working in teams, students perform engineering design to solve a real-world engineering problem supplied by an industry partner. In MES 403, students follow a formal systems engineering approach to manage their design project from Concept Review through the completion of a Preliminary Design Review and a Critical Design Review. Students develop written and verbal communication skills through reports and presentations. Students also gain insight into engineering design practices through guest lectures from local engineers. The course requires travel to a sponsor, and students must provide or arrange for their own transportation.

Prerequisite: MES 401
Typically offered in Spring only

MES 404 Electrical Engineering Systems Lab 2 (2 credit hours)
This is the second course in a series of two electrical engineering systems laboratory courses (MES 304 and MES 404) designed to give students fundamental knowledge of mechanical engineering topics and practical experience with designing and troubleshooting complex electrical systems. In MES 404, students learn about fluid mechanics, heat transfer, and mechanical vibrations. They explore practical applications of electromechanical components, sensors, and PID controllers. Through hands-on projects, students are introduced to industrial controls. Students build the electrical system designed in MES 304. The course requires a field trip to a local business, and students will be required to provide or arrange for their own transportation.

Prerequisite: MES 304
Typically offered in Fall only

MES 405 Mechanical Engineering Systems Lab II (2 credit hours)
In this course, students apply the measurement and experimental techniques learned in MES 305 to explore, experience and verify key theoretical concepts from the fields of thermal science, fluid mechanics, solid mechanics, and dynamics and controls. Students learn to successfully design, conduct, analyze, document and present a statistically sound engineering experiment. For MES students only.

Prerequisite: MES 305 and MAE 314 and MAE 308; Corequisite: MAE 435 and MAE 310
Typically offered in Fall only