

Montgomery County Community College
EGR 102
Introduction to Engineering
3-2-2

COURSE DESCRIPTION:

This course introduces students to the foundational skills necessary to pursue collegiate study in the field of Engineering. Students learn to work in teams, as well as independently, to research Engineering-related topics and to demonstrate effective math and science-based problem-solving techniques. Students participate in technology-based design projects, investigate foundational applications of Engineering through applied class activities, and share their findings with the class by way of papers, posters, and presentations. The course also introduces professional and societal issues appropriate to engineering. Various forms of technical communication are emphasized.

REQUISITES:*Previous Course Requirements*

- MAT 011 Beginning Algebra or MAT 011B Beginning Algebra with Review of Arithmetic
- REA 011 Fundamentals of College Reading or REA 017 Vocabulary and Reading Comprehensive Development II

Concurrent Course Requirements

None

| LEARNING OUTCOMES Upon successful completion of this course, the student will be able to: | LEARNING ACTIVITIES | EVALUATION METHODS |
|--|--|--|
| 1. Compose clear and concise oral presentations and written synopses about selected topics in engineering. | Lecture Written Assignments Oral Presentations Class Activities | Section Examinations Writing and Presentation Review |
| 2. Conduct research on ethical issues related to engineering: formulate and justify positions on these issues. | Lecture Independent Research Paper Class Activities | Section Examinations Research Paper Review |

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|---|--|---|
| 3. Demonstrate the ability to function on multidisciplinary teams to design a simple system, component or process to meet stated need. | Lecture Team Design Class Activities | Section Examination Team Design Presentation Review |
| 4. Design an Experiment to prove or disprove a learned theory while evaluating process variability and measurement uncertainty associated with an experimental procedure, and interpret the validity of experimental results. | Lecture Design of Experiments Class Activities | Section Examination Design of Experiments Review |
| 5. Make estimations through visualizing common units and conducting simple measurement, calculations, and comparisons. | Lecture Class Activities | Section Examinations Class Activity Review |
| 6. Solve engineering problems through application of basic principles from mathematical and physical sciences. | Lecture Class Activities | Section Examinations Class Activity Review |
| 7. Accurately identify and express information related to basic and applied physical parameters such as distance/force/temperature/density/energy/pressure/power in appropriate unit systems, and convert between different unit systems. | Lecture Class Activities | Section Examinations Class Activity Review |

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|---|-----------------------------|---|
| 8. Investigate future challenges for Engineering including topics such as Alternative Energy generation, transportation and new product and service | Lecture Class Activities | Section Examinations Class Activity Review |
| 9. Identify, develop, and present on a new high-tech product idea for public consumption | Lecture Class Activities | Presentation Review |

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS (may vary in the order presented):

1. **Introduction to Engineering**
 - a. History of Engineering
 - b. Majors in Engineering
 - c. Statistical Profile of Engineering Employment
2. **Principles of Critical Thinking to Enhance Engineering Study**
 - a. Traits of the Disciplined Mind
 - b. Critical Thinking (CT) Standards
 - c. CT Decision Making and Problem Solving
 - d. Stages of CT Development
3. **Ethical Practices and Engineering**
 - a. Foundation for Ethical Practice
 - b. The Engineers Creed and Code of Ethics
 - c. Case Studies
4. **The Design Process in Engineering**
 - a. What is Engineering Design?
 - b. The Engineering Process
5. **Critical Considerations for Working in Teams**
 - a. Effective Team Behavior
 - b. Selecting Team Leadership
 - c. Key to Successful Team Development
6. **Communication Techniques in Engineering**
 - a. Basic presentation skills
 - b. Sample presentations
 - c. Basic technical writing skills
 - d. Common technical communication formats

7. **Steps to Developing a New Product Idea**
 - a. Key to Identifying a Worthwhile Product
 - b. Crossing The Chasm
 - c. Necessary Elements to Successful Product Launch
8. **Project Management**
 - a. Critical Pathing
 - b. Assigning Tasks
 - c. Proper Documentation
9. **Computer Tools for Engineers, Software and Hardware**
 - a. Software Tools
 - b. Hardware Tools
 - c. Communication and System Support Tools
10. **Keys to Success in the Classroom**
 - a. Effective methods for study success
 - b. Leveraging Resources
 - c. Time and Space Utilization

LEARNING MATERIALS:

Present selected text:

Oakes, William C., Leone, Les L.. *Engineering Your Future* (9 th ed.). Oxford University Press. ISBN: 9780190279264

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Dr. David Brookstein, Dean of STEM

Date: 3/9/2013

VPAA/Provost or designee Compliance Verification:

Victoria L. Bastecki-Perez, Ed.D.

Date: 4/16/2013

Revised by: William H. Brownlowe

Date: 12/21/2017

VPAA/Provost or designee Compliance Verification:

Date: 1/10/2018



This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.