Virginia Western Community College
EGR 121
Foundations of Engineering

Prerequisites
ENG 111 eligible, MTH 162/167 or equivalent; or departmental approval

Course Description
Introduces the engineering profession and its impact on society and the environment, including engineering problem solving, the engineering design process, and professional practices. Covers fundamental engineering calculations, descriptive statistics, basic spreadsheet and mathematical scripting language applications, professional ethics, teamwork, and communication.

Semester Credits: 2 Lecture Hours: 2 Lab/Clinical/Internship Hours: 0

Required Materials

Textbook:
Thinking Like an Engineer 5th Edition with MyLab, Stephan, Bowman, Park, Sill, Ohland, ©2022, ISBN-13: 978-0-13-693220-8, Publisher: Pearson. For example: https://www.pearson.com/en-us/subject-catalog/p/thinking-like-an-engineer/P200000003151/9780137446711.
(For this course, you need a code for MyLab Engineering access.)

Other Required Materials:
Scientific Calculator: TI-83 or higher (TI-89 or higher recommended), Engineering Computation Paper

Course Outcomes

At the completion of this course, the student should be able to:

Problem Solving:

- Identify and solve problems using engineering methodologies

Information Literacy:

- Find, evaluate, and effectively use technical information, including scholarly literature

Technology Application

- Use spreadsheet, word processing and presentation software to collect, organize, analyze and present engineering data

Communication:

- Effectively communicate engineering work in oral, written, and visual formats, using graphical information as relevant

Collaboration:

- Form, plan, and complete team-based engineering work

Intro to Engineering Profession:

- Demonstrate knowledge of the Engineering profession including engineering disciplines, professional societies, accreditation, and licensing

Professional Ethics:

- Demonstrate an understanding of basic engineering ethics concepts using a professional engineering society code of ethics

Problem Solving:

- Use systematic methods to create a proper engineering solution including formulation, representation, assumptions, questioning, communication, and evaluation
- Analyze flowchart algorithms using standard symbols

Design Process:

- Demonstrate basic understanding of the engineering design process including needs identification, specification, analysis of design alternatives, planning, prototyping, testing, and delivery
- Consider sustainability and global, societal and environmental impacts of design options

Significant Figures and Dimensional Analysis:

- Understand and apply significant figures and appropriate number representations
- Solve problems using unit conversions in both AES and SI units, and dimensional analysis

Technology Skills:

- Utilize basic spreadsheet software skills including built-in and user-defined functions, graphing, and trendlines
- Create mathematical software scripts, including inputs, outputs, graphing, and conditional statements

Technology Application:

- Build and use data to control a simple physical system with input and output
- Analyze data using basic descriptive statistics, histograms, and linear trendlines

Topical Description

1. **Problem Solving**
2. **Information Literacy**
3. **Technology Application**
4. **Communication**
5. **Collaboration**
6. **Intro to Engineering Profession**
7. **Professional Ethics**
8. **Problem Solving**
9. **Design Process**
10. **Significant Figures and Dimensional Analysis**
11. **Technology Skills**
12. **Technology Application**

Notes to Instructors

- All instructors teaching this course in any given semester will use the same textbooks.
- This course and its grades will be structured around a minimum of one in-semester test, a final exam, homework assignments, and one group project.
- A broad overview, comprehensive final exam will be given, which must be at least 10% of the final course grade.
- The content of this course will be updated every few years in collaboration with engineering faculty from across the VCCS and at 4-year public institutions in Virginia.

ADA Statement (PDF)
Title IX Statement (PDF)