J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: EGR 121 Credits: 2

Course Title: Foundations of Engineering

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. Prerequisite: ENG 111 eligible; MTH 162 or MTH 167, or equivalent; or departmental approval. Lecture 2 hours. Total 2 hour per week. 2 credits

General Course Purpose:

Prepare students for further study in any Engineering curriculum.

Course Prerequisites/Corequisites:

MTH 162 or MTH 167 or equivalent and ENG 111 eligible, or departmental permission.

Course Objectives:
Upon completing the course, the student will 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

Major Topics to be Included:

- Problem Solving
- Information Literacy
- Technology Application
- Communication
- Collaboration
- Introduction Engineering Profession
- Professional Ethics
- Problem Solving
- Design Process
- Significant Figures and Dimensional Analysis
- Technology Skills
- Technology Application

Effective Date/Updated: August 1, 2023