Revised 08/2022

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
EGR 122 – ENGINEERING DESIGN (3 CR.)

Course Description

Applies engineering methods to a semester-long team design project with an emphasis on engineering software involving 2D and 3D computer aided design; data modeling and analysis; and iterative programming solutions. Covers design drawings and dimensioning; spreadsheet software usage; mathematical scripting language; and professional practices. 3 credits. Lecture 2 hours per week; lab 2 hours per week; total 4 hours per week.

General Course Purpose

Prepare students for further study in any Engineering curriculum

Course Prerequisites/Corequisites

Prerequisite: EGR 121 or departmental permission

Course Objectives

Upon completing the course, the student will be able to:

Problem Solving
- Identify and solve problems using engineering methodologies

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
- Improve teamwork skills through a semester-long project

Professional Ethics
- Explore important contemporary issues facing engineering through case study and/or design project

Design Process
- Apply the engineering design process including needs identification, specification, analysis of design alternatives, planning, prototyping, testing, and delivery
- Consider sustainability and economic, societal, and environmental impact of design options

Programming Skills
- Write computer programs for engineering analysis using mathematical scripting software to include looping structures and user-defined functions*
- Develop and apply flowcharts to create algorithms

Engineering Drawings
- Produce and interpret drawings appropriate to various engineering or related disciplines*
- Produce engineering sketches by hand*
- Demonstrate foundational skill with 2D and 3D computer aided engineering software, to include dimensioning, scaling, orthographic, isometric and exploded views, and assembly*
- Demonstrate an understanding of tolerances and precision

Data Modeling and Analysis
- Model systems and analyze data using linearization, correlation, and normal distribution

Design Project
- Apply the design process in a semester-long team project*
- Demonstrate a basic level of understanding of project management methods
- Demonstrate knowledge of basic intellectual property considerations

- Create appropriate design drawings*
- Create and evaluate a physical prototype*
- Write a formal design report documenting the considerations in the design process
- Deliver engineering presentation and demonstrate prototype
- Evaluate team dynamics, and project process and results

Major Topics to be Included

Problem Solving
Technology Application
Communication
Collaboration
Professional Ethics
Design Process
Programming Skills
Engineering Drawings
Data Modeling and Analysis
Design Project