# ENGR 110: Introduction to Engineering: Modeling and Analysis

# Syllabus Winter 2020

Stephanie Bostwick

[sbostwick@nwic.edu](mailto:mgladstone@nwic.edu)

(360) 392-4275

building #4 office #210

Credits: 5

Class Time: TBD, & Canvas online classroom

Office Hours:

***NWIC MISSION STATEMENT***

*Through education, Northwest Indian College promotes indigenous self-determination and knowledge*

**Course Prerequisites:** ENGR 100, CMPS 101

# Required Text

Thinking Like an Engineer: An Active Learning Approach.

# Course Description

Project-based introduction to engineering analysis, problem-solving, and mathematical modeling. Working in teams, students will complete a series of hands-on projects designed to emphasize a systematic, analytical problem solving approach and explore the engineering disciplines at a technical level. Topics include: introductory engineering concepts, engineering for sustainability, teamwork skills, the application of mathematics, physics, and chemistry in engineering.

# Course Outcomes

# At the completion of this course students will be able to:

1. Investigate relationships between physical quantities by applying dimensional and unit analysis
2. Manipulate mathematical models to analyze sensitivity of a system to changes in one or more variables
3. Use estimation to make order of magnitude calculations in the absence of data
4. Properly apply the rules for handling significant figures in arithmetic
5. Prepare and interpret graphs following accepted standards in engineering and science
6. Demonstrate application of engineering problem solving processes
7. Describe elements of the engineering design process
8. Participate in functional project teams

# Institutional Outcomes

1. Effectively communicate in diverse situations, from receiving to expressing information, both verbally and non-verbally

1. Meet the technological challenges of a modern world
2. Work cooperatively toward a common goal

**Course Requirements and Expectations**

Students who have a valid issue that prevents them from attending class need to notify the instructor prior to the start of class, email messaging is preferred but phone message is acceptable. It is understood in some situations an absence will be unavoidable. In those situations students will be given the opportunity to make up attendance and participation by watching recordings of the class session that has been missed. Embedded in the recorded class session will be participation questions. If those questions are answered and submitted to the instructor within 1 week of the scheduled class session, attendance and participation points will be awarded based on the agreement reached between student and instructor.

Any exceptions to this attendance policy must be approved by the Department Chair and the instructor in writing before the start of the quarter.

***It will not be possible to earn a passing grade if a student misses more than 30% of this class without notifying the instructor.***

**Evaluation & Assessment**

|  |  |
| --- | --- |
| Homework | 20% |
| Projects | 40% |
| Quizzes | 25% |
| Homework Binder | 5% |
| Class Participation | 10% |

Grading will be on a percentage system as detailed below:

* 1. Homework – Students will be using Microsoft Excel and MATLAB R2008A for homework. One homework assignment will be accepted late one day late. All other late assignments will receive a 10% deduction for each late day past the due date. weight – 20%
  2. Projects – There will be an individual Arduino projects assigned throughout the quarter. Each student will be required to submit a video for each individual project assigned showing completion of the project. There will also be a final individual MATLAB project and a final group Arduino project. – 40%
  3. Quizzes – There will be daily quizzes on the course website based on the previous lecture. Quizzes will be given during the first 10 minutes of class, so be on time. A code will be given at the beginning of class to unlock the quiz; you MUST be in class to receive credit. No make-up quizzes will be given, but the lowest score will be dropped. weight – 25%
  4. Homework Binder – Each student will be required to keep a digital ‘binder’ with all notes and completed assignments. Your binder will be checked for completeness throughout the quarter. weight – 5%
  5. Class Participation – Attendance and participation are important to your success in this course. We will walk through many examples and practice problems in class each day, so it is important that you actively participate and ask questions as they come up. weight – 10%

Students who have a valid issue that prevents them from attending class please notify the instructor prior to the start of class, email messaging is preferred but phone message is acceptable. It is understood in some situations an absence will be unavoidable. In those situations students will be given the opportunity to make up attendance and participation.

Any exceptions to this attendance policy must be approved by the Department Chair and the instructor in writing before the start of the quarter.

***It will not be possible to earn a passing grade if a student misses more than 30% of this class without notifying the instructor.***

# Course and Assignment Schedule:

|  |  |  |
| --- | --- | --- |
| Tentative Schedule | |  |
| **Week** | **Topic** | **Reading** |
| 1 | Introduction to Excel Workbooks | Ch. 10 |
| 2 | Graphical Solutions | Ch. 11 |
| 3 | Models & Systems | Ch. 12&13 |
| 4 | Statistics | Ch. 14 |
| 5 | Algorithms | Ch. 15 |
| 6 | Introduction to MATLAB; variables and data types | Ch. 16 |
| 7 | Programs and Functions | Ch. 17 |
| 8 | Input/Output in MATLAB | Ch. 18 |
| 9 | Logic and Conditionals | Ch. 19 |
| 10 | Loops | Ch. 20 |
| Finals | **Final Project Due** |  |

**Instructor(s) Discretion:**

Should it be deemed necessary, the instructor(s) of this course reserves the right to make alterations, at any time, to the course materials or what is contained within this syllabus in order to improve the course itself, the learning environment or the opportunity for student success. If such a change is made, it will be made in a timely manner so as not to impede the learning process or interfere, in any way, with student success.