ENGR-1020 Programming and Problem Solving Syllabus Spring 26

"Responsibility for learning belongs to the student, regardless of age" Robert Martin

Contents

Your Instructor

William A Loring

Mailing Address: 1601 E 27th St, Scottsbluff, NE 69361

Scottsbluff Office: Room B7F Office Phone: 308.635.6163

E-mail: loringw@wncc.edu (Preferred contact method)

Scottsbluff Office Hours: MW 1-2 pm, TTh 10-11 am or by appointment

Online Office Hours: By appointment. www.calendly.com/loringw

"There are no stupid questions. Ask questions whenever something isn't completely clear. You can't remember what you don't understand."

Tolerate chaos, uncertainty, and vagueness. "Figuring it out" is part of learning.

Prerequisite

High school math (Trigonometry and Pre-Calculus recommended) and high school science recommended.

Class Meeting Times

- **Face to Face Class Location:** Scottsbluff Campus, Room D1

- **Scheduled Online Location:** Zoom link in Blackboard

- **Time:** Mon & Wed, 11:00-12:00 pm

Catalog Description

This is a freshman engineering course that introduces students to the engineering problem solving process in the context of high level structured computer programming. The course consists of a sequence of programming assignments that require students to write computer programs to solve basic engineering problems. All of the computer programming assignments will be written in MATLAB and Python.

3.0 semester hours

(3/45/0/0/0/0) See Figure 1

Course Objectives

Using this course as an instructional medium, the instructor will:

1. Demonstrate the fundamental concepts and logic behind generic computer programming and code development.

2. Demonstrate and assist the students in writing structured programs, including the use of function calls and file input and output using MATLAB.

3. Discuss and demonstrate data structures such as arrays in computer programs using MATLAB.

4. Outline and demonstrate how students should write, debug and demonstrate the accuracy of computer programs written in MATLAB.

5. Demonstrate how to properly document source code.

6. Assist students in applying problem solving skills to the computer solution of engineering problems.

7. Assist students in developing skills to communicate programming concepts in both written and oral format.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

1. Understand the fundamental concepts and logic behind generic computer programming and code development [GE 2; MATH Goal 4 & 7].

2. Write structured programs, including the use of function calls and file input and output using MATLAB [GE 2; MATH Goal 4 & 7].

3. Utilize data structures such as arrays in computer programs using MATLAB [GE 2; MATH Goal 4 & 7].

4. Write, debug and demonstrate the accuracy of computer programs written in MATLAB [GE 2; MATH Goal 4 & 7].

5. Properly document source code [GE 1 & 3].

6. Apply problem solving skills to the computer solution of engineering problems [GE 2; MATH Goal 4 & 7].

7. Develop skills to communicate programming concepts in both written and oral format [GE 1; MATH Goal 6 & 7].

Instructional Materials

Textbook MATLAB: A Practical Introduction to Programming and Problem Solving, Latest Edition, by Stormy Attaway, Elsevier.

eText Rental is also available.

Course Schedule

Course content may vary from this outline to meet the needs of this group.

Week	Activities	Assignments
Week 1 01/13 - 01/19	Introduction to Course Install MATLAB Chapter 1: Introduction to MATLAB Read Chapter 1.1, 1.2, 1.3, 1.4	Getting Started Activities in Blackboard Introduction Discussion MATLAB Online Tutorials Week 1 MATLAB Activities
Week 2 01/20 - 01/26	Chapter 1: Introduction to MATLAB Read Chapter 1.5, 1.6, 1.7, 1.8	Learn to Code with MATLAB MATLAB Online Tutorials Week 2 MATLAB Activities Chapter 2 Quiz
Week 3 01/27 - 02/02	Chapter 2: Vectors and Matrices Read Chapter 2.1, 2.2	Learn to Code with MATLAB MATLAB Online Tutorials Week 3 MATLAB Activities

Week 4 02/03 - 02/09	Chapter 2: Vectors and Matrices Read Chapter 2.3, 2.4	Learn to Code with MATLAB MATLAB Online Tutorials Week 4 MATLAB Activities Chapter 2 Quiz
Week 5 02/10 - 02/16	Chapter 3 Introduction to MATLAB Programming Read Chapter 3.1, 3.2, 3.3, 3.4	Learn to Code with MATLAB MATLAB Online Tutorials Week 5 MATLAB Activities Week 5 Chapter 2 Getting Started with Python Activities
Week 6 02/17 - 02/23	Chapter 3 Introduction to MATLAB Programming Read Chapter 3.5, 3.6, 3.7	MATLAB Online Tutorials MATLAB Statistics Activities Week 6 MATLAB Activities Week 6 Chapter 3 Python Decisions Activities Chapter 4 Quiz
Week 7 02/24 - 03/02	Chapter 4 Loop Statements and Vectorizing Code Read Chapter 4.1, 4.2, 4.3	MATLAB Online Tutorials Week 7 MATLAB Activities Week 6 Chapter 4 Python Loops Activities
Week 8 03/03 - 03/07	Chapter 4 Loop Statements and Vectorizing Code Read Chapter 4.4, 4.5	MATLAB Online Tutorials Week 8 MATLAB Activities Week 6 Chapter 5 Python Functions Activities
03-10 – 03-16	Spring Break	

Week 10 03/17 – 03/23	Chapter 5 Loop Statements and Vectorizing Code Read Chapter 5.1, 5.2	MATLAB Online Tutorials Week 10 Raspberry Pi Activities Week 10 MATLAB Activities Week 6 Chapter 5 Python Functions Activities
Week 11 03/24 – 03/30	Chapter 5 Loop Statements and Vectorizing Code Read Chapter 5.3, 5.4	MATLAB Online Tutorials Week 11 Raspberry Pi Activities Week 11 MATLAB Activities Week 11 Jupyter Notebook Activities
Week 12 03/31 – 04/06	Chapter 6 MATLAB Programs Ready Chapter 6.1, 6.2	MATLAB Online Tutorials Week 12 Raspberry Pi Activities Week 12 MATLAB Activities Week 12 Jupyter Notebook Activities
Week 13 04/07 – 04/13	Chapter 6 MATLAB Programs Read Chapter 6.3, 6.4	MATLAB Online Tutorials Week 13 Raspberry Pi Activities Week 13 MATLAB Activities Week 13 Jupyter Notebook Activities
Week 14 04/14 – 04/20	Chapter 13 Sights and Sounds Read Chapter 13.1, 13.4	MATLAB Online Tutorials Week 14 Raspberry Pi Activities Week 14 MATLAB Activities Week 14 Jupyter Notebook Activities

Week 15 04/21 – 04/27	Chapter 11 OOP Read Chapter 11.1, 11.2, 11.3	MATLAB Online Tutorials Week 15 Raspberry Pi Activities Week 15 MATLAB Activities Week 15 Jupyter Notebook Activities
Week 16 04/28 – 05/04		MATLAB Online Tutorials Week 16 Raspberry Pi Activities Week 16 MATLAB Activities Week 16 Jupyter Notebook Activities
Finals 05/05 - 05/09		Final Project Submission

Academic Integrity

The academic integrity policy for this course includes the Institutional Academic Integrity Policy listed at the end of this document.

1. Do your own work.

2. You can ask for help if you get stuck. It is OK to have a study buddy to help with problems or issues. It is not OK to turn in the same assignment as someone else.

3. If you use someone else's work for a small quote or reference, cite the source.

4. Use your own words.

5. Do your own work. We are here to learn. You can't learn without doing the work.

Artificial Intelligence (AI)

AI is best used ethically and responsibly.

1. AI (ChatGPT, etc.) is a tool, just like a pencil, a computer, or Google. All work submitted must be your own. You may not submit any work generated by an AI program as your own.

2. You will be working with AI in the workplace. Certain homework assignments will involve the use of AI technologies. The aim of these assignments is to familiarize you with practical AI applications.

3. If an assignment permits AI: Include the AI name, the prompt and the result.

4. Do not pass AI work off as your own.

NOTE: If an assignment seems out of character or not in the style we have been using in class: you will receive a 0 until you contact the instructor to explain how you arrived at this code.

AI use indicators:

No AI use: It is important for acquiring skills that you are able to do this assignment on your own.

AI can be used as a debugger or tutor. Include the prompt and results.

AI can be used as a code helper. Include the prompt and results.

Minor Violations: First offense: Grade of 0 for the assignment.

Major Violations: Second offense: Grade of F for the class.

Do your own work.

Assignment Creativity

As long as your assignment submission meets the requirements of the tutorial or assignment, you are free to embellish the resulting work as much as you wish before submission. This is where the real learning starts.

Attendance

In addition to the WNCC Attendance policy (in the WNCC Master Syllabus Contents) you are required to turn in your weekly notes to be considered attending this class.

WNCC Master Syllabus Contents

This link contains the common WNCC Syllabus policies.