



ENGR 2304-101H2
Programming for Engineers
Fall 2024
Tuesday, Thursday 2:00 pm – 5:00 pm
8 Weeks (16 Classes)

Instructor Information:

Instructor: Dr. Carl McIntyre
Email: emcintyre1@com.edu
Office: 409-933-8281
Cell Phone: 337-693-2624

Student hours and location:

Monday, Wednesday 10:00 a.m. – 11:00 a.m.
Tuesday, Thursday (In Person) 11:00 a.m. – 12:30 p.m.
Room: STEAM 325-28
Friday (Virtual) 10:00 a.m. – 11:30 a.m.

Required Textbook/Materials:

Textbook: None (Readings and Handouts Will Be Provided)
Materials: Notebooks, Cell Phones with online access, Calculators
Online Resources: COM Brightspace

Course Description:

Programming principles and techniques for matrix and array operations, equation solving, and numeric simulations applied to engineering problems and visualization of engineering information; platforms include spreadsheets, symbolic algebra packages, engineering analysis software, and laboratory control software.

Prerequisite: MATH 1314 with a grade of "C" or better

Course requirements:

Homework Assignments

- Homework has deadlines and must be completed on time for full credit.
- Homework is completed outside of class as part of the hybrid online course

In Class Programs

- In Class programs are done in class with the help of the instructor for the purpose to help you learn programming through hands on participation.

Excel Programs

- You will design excel programs as a beginner to help you with using the computation in spreadsheets as an engineering tool.

Projects and Mini-Projects

- There will be design projects including a full formal project report.

Determination of Course Grade/Detailed Grading Formula:

Grade Item	% of Final Grade	Pts
In Class Programs	25%	15 Programs (20 pts Each) 300 pts
Projects	50%	3 Projects (200 pts Each) 600 pts
Homework Programs	15%	9 Programs (20 pts Each) 180 pts
Quiz/Class Work	10%	Top 12 Works (10 pts Each) 120 pts
Attendance Discount	-10%	Unexcused Absences/Tardiness

Percentage	Letter Grade
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

Late Work, Make-Up, and Extra-Credit Policy:

Any deviations from the policies described below are at the sole discretion of the instructor.

Late Work - Late work will be accepted ONE WEEK late ONLY and given half credit:

Late Project submittal will **NOT** be accepted.

COM recognizes no excused absences other than those prescribed by law: religious holy days and military service <https://www.com.edu/student-services/student-handbook.html>.

Make-Up:

Should you anticipate an absence, you must contact your instructor by phone, email, or in person PRIOR to the absence. Each situation will be evaluated independently. Make-Up policy will be allowed for a death in the family or a documented student illness. You must provide legitimate proof for your excuse.

Exams – There are NO MAKE-UP EXAMS. You may be allowed to replace ONE missed exam with HALF the value of your LOWEST exam grade. Any additional missed exams will be issued a ZERO.

Extra-Credit:

During the semester there may be opportunities for extra credit. Students are responsible for submitting any extra credit work by the due date and no late work for extra credit will be accepted.

Attendance Policy:

COM recognizes no excused absences other than those prescribed by law: religious holy days and military service <https://www.com.edu/student-services/student-handbook.html>.

- Students are expected to attend all class sessions as listed on the course calendar.
- Attendance will be taken at the beginning of each class.
- Leaving early from class (without approval from the instructor) may result in an absence for that day.
- IF you do have to miss class, it is your responsibility to obtain notes from a classmate.
- Missing lectures may affect your all over class performance.
- Should you anticipate an absence, you must contact your instructor by email PRIOR to the absence.
- Each situation will be evaluated independently.
- You must provide legitimate proof for your absence.

Communicating with your instructor: ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means. (Faculty may add additional statement requiring monitoring and communication expectations via D2L or other LMS)

Students can expect a response within 24 hours of receiving an email during the week. Students can expect a response within 48 hours of receiving an email during the week.

Student Learner Outcomes for this Course

Upon successful completion of this course, students will successfully demonstrate mastery of the Student Learner Outcomes listed below.

1. Use matrix and array operations for equation solving.
2. Identify the strengths and weaknesses of the conventional programming languages.
3. Use spreadsheets and their built-in features to solve a variety of engineering problems.
4. Describe methods for the design of programs that control equipment or analyze data.
5. Write computer programs to solve engineering problems and perform engineering simulations.
6. Graphically present engineering data, results, and conclusions.

FOR STUDENTS ONLY

Student Learning Outcomes (SLOs) like those listed above for this course are clear, concise statements that outline what students should know, understand, or be able to do at the end of a learning experience. They are designed to be measurable and observable. They also focus on the outcomes, not the processes or activities used to achieve them.

Core Objectives for College of the Mainland Used Within This Course

1. **Critical Thinking Skills:** Critical thinking skills include creative thinking, innovation, inquiry as well as analysis, evaluation and synthesis of information. For engineers critical thinking is always included as a part of problem solving. (Check out the book Strategies for Creative Problem Solving. An Engineering book by Dr. Fogler a chemical engineering professor)
2. **Empirical and Quantitative Skills:** Empirical and Quantitative skills include the ability to manipulate and analyze numerical data or observable facts resulting in informed conclusions. As an engineer you learn to go beyond math and collecting data. You develop the skills to analyze lots of data and use the information that the data provides you with to transform how things are made and built in the real world.
3. **Communication Skills:** Communication skills include effective development, interpretation, and expression of ideas through written, oral and visual communication. As an engineer your ability to communicate will determine how far you are able to get in your career. While some call these “soft skills” those who master the students who master these are the ones that companies are always looking to hire. As a professional engineer you will spend half of your time communicating either in written reports or orally. (See Engineering Communication a textbook for professional workplace communication)
4. **Teamwork:** Teamwork includes the ability to consider different points of view and to work effectively with others to support a shared purpose or goal. Engineers almost always work in teams so learning to team is essential to success in the workforce. Finally on teaming assignments remember that “failure to team is...failure.”
5. **Social Responsibility:** Social responsibility includes intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national and global communities. Upon graduation you will be given the opportunity to become a member of the “Order of the Engineer”. You will make a pledge to practice integrity, serve humanity

and give knowledge for the public good. As a professional engineer you must be aware and be able to exercise not just analysis for what works but also what is good for society.

6. Personal Responsibility: Personal responsibility includes the ability to connect choices, actions and consequences to ethical decision making. As an engineer you have to own your mistakes. Every choice you make has consequences and understanding how your choices results in those consequences is a part of being an engineer.

FOR STUDENTS ONLY

The six core objectives are expected of any student who completes the core curriculum here at the College of the Mainland. These objectives given above were developed by the Texas Core Curriculum.

Mapping Student Learner Outcomes to Core Objectives and Assessing them.

The table given below is shown so that as students you can see how the Student Learner Objectives for this course are now linked to the Core Objectives for College of the Mainland.

Student Learner Outcome	Maps to Core Objective	Assessed via this Assignment
1. Use matrix and array operations for equation solving.	Empirical and Quantitative Skills <i>(Analyze Numerical Data)</i>	Homework Programs
2. Identify the strengths and weaknesses of the conventional programming languages.	Critical Thinking Skills <i>(Evaluation of Tools and Information)</i>	Projects
3. Use spreadsheets and their built in features to solve a variety of engineering problems.	Empirical and Quantitative Skills <i>(Engineering Analysis to Reach Informed Conclusions)</i>	In Class Programs
4. Describe methods for the design of programs that control equipment or analyze data.	Communication Skills <i>(Expression of ideas through written communication)</i>	Projects
5. Write computer programs to solve engineering problems and perform engineering simulations.	Critical Thinking Skills <i>(creative thinking, innovation, inquiry as well as analysis to build a program)</i>	Mini-Projects
6. Graphically present engineering data, results and conclusions.	Communication <i>(Visual Communication of Data and trends)</i>	Excel Programs

Semester Topics For Programming for Engineers

- 1. Variables**
 - **Declaring, Defining, Variables**
- 2. Looping in Programming (If Then, For Next, Do While)**
- 3. Datatypes in Programming**
 - **Numeric (Long, Double, Short)**
 - **NonNumeric (Strings)**
- 4. UserForm Design in Visual Basic for Applications with Excel**
 - **Textboxes, Label Boxes, Command Buttons (Code)**
- 5. Algorithm Design for Problems in Engineering**
 - **Pseudocode, Flowcharts**
 - **Using Modular Program Design**
- 6. Input Boxes and Message Boxes**
 - **Types of Message Boxes: Ok/Cancel, Yes/No, etc.**
 - **Inputting variables with Input Boxes**
- 7. Using Data Arrays**
 - **Creating a List to Store Multiple Variables**
 - **Creating a 2D Array Matrix for Data**
 - **Creating a 3D Array for Advanced Calculations**
 - **Using Control Arrays in Forms in Visual Basic**
- 8. Using Subroutines and Procedures in Programming**
 - **Functions, Modules and Procedures**
- 9. Arrays in Combo Boxes and Other Controls**
 - **Designing Combo Boxes**
 - **Adding a List to A Combo Box**
 - **Using an array to Create Menu Items**
- 10. Working with Graphics in Visual Basic Programs**

Designing equation to be visually displayed in programs
- 11. Designing Programs with Multiple Windows and Multiple Forms**

Switching between Forms

Using Multiple Forms to Guide the User through Multiple Processes
- 12. Numerical Method that can be utilized in Engineering**
 - **Newton Raphson Method**
 - **Bisection Method**
 - **Graphical Integration (Rectangular Rule)**

Class	Wk	Day	Date	Topics
1	1	Tuesday	10/15/2024	Introduction to Class Introduction to MS Excel Introduction to MS Excel VBA Introduction to Matlab
2	1	Thursday	10/17/2024	Controls Variables Datatypes Userforms
3	2	Tuesday	10/22/2024	Looping in Programing (If-Then, For Next, Do While)
4	2	Thursday	10/24/2024	Algorithm Design for Problems in Engineering (Pseudocode, Flowcharts, Using Modular Program Design)
5	3	Tuesday	10/29/2024	Input Boxes and Message Boxes (Types of Message Boxes: Ok/Cancel, Yes/No, etc.) (Inputing variables with Input Boxes)
6	3	Thursday	10/31/2024	Using Data Arrays (Creating a List to Store Multiple Variables) (Creating a 2D Array Matrix for Data) (Creating a 3D Array for Advanced Calculations) (Using Control Arrays in Forms in Visual Basic)
7	4	Tuesday	11/05/2024	Arrays in Combo Boxes and Other Controls Designing Combo Boxes Adding a List to A Combo Box Using an array to Create Menu Items
8	4	Thursday	11/07/2024	Using Subroutines and Procedures in Programming (Functions, Modules and Procedures)
9	5	Tuesday	11/12/2024	Designing Programs with Multiple Windows and Multiple Forms Switching between Forms Using Multiple Forms to Guide the User through Multiple Processes
10	5	Thursday	11/14/2024	Defining and Solving Systems of Linear Equations in MS Excel and Matlab
11	6	Tuesday	11/19/2024	Defining and Solving Roots of Polynomial Equations Graphically
12	6	Thursday	11/21/2024	Numerical Differentiation in Engineering Problems #1
13	7	Tuesday	11/26/2024	Numerical Differentiation in Engineering Problems #2
14	7	Thursday	11/28/2024	COM CLOSED THANKSGIVING
15	8	Tuesday	12/03/2024	Numerical Integration in Engineering Problems #1
16	8	Thursday	12/05/2024	Numerical Integration in Engineering Problems #2

Academic Dishonesty: Any incident of academic policy will be dealt with in accordance with college policy and the Student Handbook. Academic dishonesty – such as cheating on exams is an extremely serious offense and will result in a grade of zero on that exam and the student will be referred to the Office of Student Conduct for the appropriate discipline action.

1. **Cheating:** Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a “cheat sheet” on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher.
2. **Plagiarism:** Careless or deliberate use of the work or the ideas of another; representation of another’s work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another’s paper or answers, failure to identify information or essays from the Internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another’s words with quotation marks.
3. **Multiple Submission:** Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.
4. **Conspiracy:** Agreeing with one or more persons to commit an act of academic/scholastic dishonesty.
5. **Fabrication of Information/Forgery:** Use or submission of contrived, invented, forged, or altered information in any assignment, laboratory exercise, or test; tampering with or production of a counterfeit document, particularly documents which make up the student’s academic record. Examples: making up a source or citing nonexistent publication or article; representing made up data as real for an experiment in a science laboratory class; forging a change of grade or student withdrawal record; falsifying any document related to a student academic exercise.

AI Use In Engineering Courses We recognize that with the introduction of AI tools students need guidance on when and how these tools can be used in the classrooms. We may use artificial intelligence (AI) tools and applications (such as Chat GPT, Gemini, Copilot, DALL-E, etc.) in some circumstances in this course as they support the course learning objectives. The specifics of when, where and how these tools are permitted will be included with each assignment, along with guidance for attribution. Any use of these tools other than where indicated is a violation of this course’s expectations and can be detected which will result in a zero for the assignment.

Student Concerns: If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact Prof. Sheena Abernathy Department Chair for Science and Engineering at 409-933-8330 or sabernathy@com.edu

Course outline: See Above

Institutional Policies and Guidelines

Grade Appeal Process: Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook https://www.com.edu/student-services/docs/Student_Handbook_2023-2024_v2.pdf. *An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.*

Academic Success & Support Services: College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement: Any student with a documented disability needing academic accommodations is requested to contact:

Kimberly Lachney, Student Accessibility Services Coordinator

Phone: 409-933-8919

Email: AccessibilityServices@com.edu

Location: COM Doyle Family Administration Building, Student Success Center

Textbook Purchasing Statement: A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy: Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 8-week session is October 2. The last date to withdraw from the 16-week session is November 15. The last date to withdraw for the 2nd 8-week session is November 26.

FN Grading: The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

Early Alert Program: The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been

asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

Resources to Help with Stress:

If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here <https://www.com.edu/community-resource-center/>. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at deanofstudents@com.edu or communityresources@com.edu.

Nondiscrimination Statement:

The College District prohibits discrimination, including harassment, against any individual on the basis of race, color, religion, national origin, age, veteran status, disability, sex, sexual orientation, gender (including gender identity and gender expression), or any other basis prohibited by law. Retaliation against anyone involved in the complaint process is a violation of College District policy.