



ChE 26

Fundamentals of Programming for Chemical Engineers

Course Description: Concepts and methods of programming as a computational tool; computer generated solutions to mathematical problems in chemical engineering.

Course Prerequisite: Math 53

Course Credit: 3.0 units (2 h lecture, 3 h laboratory)

Program Educational Objectives (BS Chemical Engineering)

The program aims to educate students such that three to five years from graduation, they:

1. take leadership roles in their respective fields and/or effectively work in or manage a team;
2. are equipped with the extensive knowledge and relevant skills necessary to succeed in their chosen careers and to become responsive citizens;
3. are able to demonstrate strong research & innovative capability as they recognize and address opportunities and challenges in their respective spheres of influence;
4. have shown strong commitment to the ethical practice of their profession; to health, safety and environment; and service to society.

Course Outcomes

At the end of the course, the students should be able to:

1. Apply programming knowledge to problems in mathematics, science, and engineering; and
2. Write algorithms and translate them into a programming language (MATLAB) to solve multidisciplinary problems

Student Outcomes Satisfied by Course Outcomes

- [a] Ability to apply knowledge of mathematics and science to solve engineering problems
[e] Ability to identify, formulate, and solve engineering problems
[k] Ability to use the techniques, skills, and modern tools for engineering practice

Course Content

WEEK	Lecture	Laboratory
Week 1	Module I: Basics of Linear Algebra <ul style="list-style-type: none">• Vectors and Matrices• Operations on Vectors and Matrices	Module II: The MATLAB® Environment <ul style="list-style-type: none">• MATLAB® as a Calculator• Variable Assignment Statements• MATLAB® Built-in Functions• Characters and Strings
Week 2	Module III: Vectors and Matrices <ul style="list-style-type: none">• Creating & Editing Vectors and Matrices• The Colon Notation• Built-in Vectors and Matrices• Vector and Matrix Operations• MATLAB® Functions for Vectors and Matrices	Module III: Machine Exercises

WEEK	Lecture	Laboratory
Week 3	Module IV: Plotting Functions <ul style="list-style-type: none"> Basic 2D Plotting Basic 3D Plotting 	Module IV: Machine Exercises
Week 4	Module V: Scripts and Function Files <ul style="list-style-type: none"> Creating Script Files Input/Output Functions Creating Function Files Function Within a Function 	Module V: Machine Exercises
Weeks 5 - 7	Module VI: Basic Programming <ul style="list-style-type: none"> Conditional Statements Looping Statements: The For Loop Looping Statements: The While Loop Flow Controls Coding Exercises 	Module VI: Machine Exercises (3 weeks lec & lab)
Week 8	MACHINE PROBLEM 1	
Week 9	Root Finding Methods Applications of Root Finding Methods	MEX: Root Finding
Week 10	Numerical Integration & Differentiation Applications of Numerical Integration & Differentiation	MEX: Numerical Integration and Differentiation
Week 11	Least-Squares Regression Applications of Least-Squares Regression	MEX: Least-Squares Regression
Weeks 12 - 14	More Exercises and Problems	
Week 15	MACHINE PROBLEM 2	

Course Assessment

Machine Exercises	70%
Machine Problems (2)	30%

Course Policies

- ATTENDANCE.** Attendance will be checked every meeting, but will not be a part of the final grade. Worksheets will be given at the start of each session, and will be collected at the end. These will serve as proofs of the student's attendance during meetings.
- MACHINE EXERCISES.** Machine exercises will be given during laboratory sessions. All exercises must be done and submitted for checking within class hours. Machine exercises that do not run may be redone by the student, provided that there is still enough time for checking. No machine exercises will be checked beyond class hours. Students are allowed to consult with each other during these sessions. Copying of codes, however, is strictly prohibited. No make-up Machine Exercises will be given for missed sessions.
- MACHINE PROBLEMS.** Machine problems will be given before the start of a lecture and laboratory session. These must be done during class hours. An entire week will be allotted for the student to accomplish a machine problem (made up of two parts). Students ARE NOT ALLOWED to consult with each other during these sessions. No make-up Machine Problems will be given for missed sessions. If the reason for the missed Machine Problem is valid (i.e. death in the family, illness), the student must present an official excuse slip/letter (death certificate, medical certificate from the University Health Service) before the next Machine Problem to remove the missed problem from the computation of the final grade. Only one missed Machine Problem is allowed.
- OTHERS.** University rules on absences, cheating, dropping, and filing of LOA apply. This is a pass or fail course. No removal/comprehensive exams will be given. **The instructor reserves the right to make changes in the course policies when deemed necessary.**

Grading System

1.00	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.00	5.00
[92,100]	[88,92)	[84,88)	[80,84)	[76,80)	[72,76)	[68,72)	[64,68)	[60,64)	[0,60)

List of Instructors

Prof. Myron Alcanzare

Prof. Karl Ezra Pilario

Prof. Miguel Francisco Remolona

Prof. Kristian July Yap

Engr. Bemboy Niño Subosa

Engr. Marlon Mopon, Jr.

Engr. Aldren Ribalde

Reference

Chapra, SC: *Applied numerical methods with MATLAB for engineers and scientists*