ECE 160: Foundations of Computer Engineering I

Spring 2023

Electrical and Computer Engineering Department
University of Massachusetts Dartmouth

Instructor:	Dr. Liudong Xing, Science & Engineering 213C, Phone: (508)999-8883, Email: lxing@umassd.edu
Time, Room, & Mode:	Lecture: Mon./Wed./Fri. 9:00am ~ 9:50am; Lab: Mon. (L1)/Wed. (L2) 10:00am ~ 11:50am @ Science & Engineering 222 (Face-to-face Modality)
Office Hours:	Mon./Wed. 3:30pm ~ 4:30pm (In-person) and Fri. 10am ~ 12pm (In-person) or other time by appointment via email.
TA & Office Hours:	Mr. Guixiang Lyu, Email: glv@umassd.edu Office hours: Tue./Thu. 10:00am ~ 11:00am @ Science & Engineering 224 (In-person)
Feedback:	Send Prof. Xing anonymous feedback using *Yahoo* account: ID: feedback02747 PWD: feedback4xing
Catalog Description:	Algorithm development, syntax, and semantics of the C programming language stressing computer systems concepts. Concepts of the machine model, procedural programming and program development including coding, debugging, and testing of programs are covered. The use of libraries, header files and macros are covered. Engineering examples are used. Variables, operators, control, input/output, arrays, structures, functions, pointers, and files are covered using engineering examples.

Main Course Objectives & Outcomes:

Students successfully completing this course will be able to learn
- How a computer stores data, and conversion between various number bases
- The fundamentals of using the C compiler and C preprocessor
- How to use a modern environment to create, compile, execute, debug C programs
- How to use procedures to modularize a program, and how to pass parameters by value and by reference
- The syntax of the C language, including arrays, structures, and file access
- How to use and manipulate strings using the C language.
- How to use system libraries within a program
- How to program, and how to design well-written, maintainable programs

Course Credit: 4-credit hour, the course is required of all CPE and ELE majors in Freshmen level.

Course Website: https://xing160.sites.umassd.edu/

All important class information including lecture, homework assignments, lab assignments, exams, and major deadlines will be posted to this site. The website also includes a frequently asked questions (FAQ) section for homework, exams, and labs. Check the website frequently since new announcements and information about the class will be added regularly.

Resources:
- **Lecture notes** prepared by Prof. Xing, available from the class website
- **Textbook:** The C Programming Language (Second Edition), by B. W. Kernighan and D. M. Ritchie, Publisher: Prentice Hall
- **Reference books:**
  1. Let Us C (8th Ed.), by Y. P. Kanetkar, Infinity Science Press, 2008
  2. C How to Program (8th Ed.), by H. M. Deitel and P. J. Deitel, Publisher: Prentice Hall
  3. C Programming for Engineering and Computer Science (B.E.S.T. Series) by H. H. Tan and T. B. D'Orazio, Publisher: McGraw-Hill Companies
  4. An Introduction to the C Programming Language and Software Design, by Tim Bailey; http://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf
  5. C Language Tutorial, by Gordon Dodrill; https://phy.ntnu.edu.tw/~cchen/ctutor.pdf

Topic Outline:	This is a tentative topic outline that is subject to changes based on class performance and exceptional cases

- Computer history
- Number conversions
- Data types
- Variables and assignment statements
- Functions
- Expressions

- If-Else statements and switch statements
- Loops (while, do-while, for, nested for)
- Text files
- Arrays and passing arrays
- Sorting (Bubble sort, Selection sort)
- Strings and pointers

Grading Policy:	The final grade will be calculated as a weighted average:

- **Homework/Lab Assignemnts**: 20%
- **Exams (Feb. 17; Mar. 24; Apr. 21; Best 2 out of 3 exam scores will be used)**: 50%
  - There will be a "review session" prior to each exam
- **Final Exam** (**May 1, Monday, 8am ~ 11am**): 30%
  - Refer to https://www.umassd.edu/registrar/finalexams/

The letter grades will be assigned using the following approximate scale:
(A+, A) [100-90]   (A-,B+,B) (90-80]   (B-, C+,C) (80-70]   (C-,D+,D) (70-60] (D-) (60-57] F [<57]
Refer to the UMass Dartmouth grading system:
https://catalog.umassd.edu/content.php?catoid=62&navoid=5015#Grades_and_Grading_System

Incomplete Grade Policy:	The incomplete policy is that at least 70% of the course must be already completed and an exceptional circumstance (e.g., medical issue) must exist. If you feel you require an incomplete for an exceptional reason, you need to email me and state your reasons for the incomplete in writing. We will then decide on a course of action.
Policy on Homework Assignments:	Homework assignments are always due by the beginning of class on the due date. Unless you have a legitimate reason and inform the instructor in advance, late homework assignments are subject to the following penalty: assignments one day late subtract 10%; two days late loses 25%; three days late loses 50%. After 3 days the assignments will be considered a ZERO.
Policy on Lab Assignments:	Lab assignments are always assigned on Monday and due by 5pm on Wednesday. Unless you have a legitimate reason and inform the instructor or TA in advance, late lab assignments will not be accepted.
Attendance Policy:	Students are expected to regularly attend classes and all other scheduled activities related to the course. The instructor reserves the right to record attendance from time to time (not regularly). Students who miss a lecture must self-study the missed material (available from the course website) and make arrangement with the instructor about any questions of the missed lecture when necessary.
	Students are encouraged to do the lab assignments during their enrolled lab sessions, where the instructor and TA are available to answer questions. However, you may complete the lab assignments outside the regular lab session time and do the submission of the lab results by the deadline (5pm on Wednesday).
Exam Policy:	It is your responsibility to take exams at the scheduled times and to make alternative arrangements **in advance** if you have a legitimate reason for not being able to take an exam at the scheduled time.
COVID-19 Management Policy:	Please follow the health and safety protocols (https://www.umassd.edu/covid/) when you come to the campus.
	Please refer to https://www.umassd.edu/covid/ if you test positive for COVID-19. For students who become ill or are required to isolate, please contact me as soon as possible; I will respond with information about my expectations for completion of course materials.
	If I test positive but my conditions allow, I will deliver lectures online using Zoom during the isolation; if my conditions require class cancellation or other changes for this course, I will send an email about alternative arrangements to the umassd.edu email account of all class members.
Special Needs:	Please feel free to contact the instructor if you have any special needs. Particularly, if you or a family member become sick that affects your submission of an assignment or participation in an exam, please feel free to email me to request an extension to complete the assignment without late penalty or alternative arrangements for the exam.

Communication Plan:	Please check the class website frequently; the *Recent Posts* section will be used as a primary means of notification of new assignments, deadlines, any class related announcements and information. Other than questions asking and answering during the specified office hours, you may also email me (lxing@umassd.edu) with your questions. You can expect a reply from me via email within 24 hours during the workweek. If the question a student asked is of a nature that even one other student in the course could benefit from the answer, the question and the answer will be posted in the FAQ section of the course website.
Academic Integrity:	Regarding homework/lab: homework assignments are designed to facilitate your learning of the concepts. It is important that you understand the solutions to all assigned problems, and the best way to gain an understanding is to work them out and write them up by yourself. However, there are occasions when outside help can be beneficial. Hence the **policy for homework**: you are free to talk to others about the problems at your discretion (though I strongly suggest you do this only when you are completely stuck), but you may not leave a discussion with any type of record or notes pertaining to the discussion. If you can recall the solution from memory, you probably understand it. **The actual write-up must be done entirely by yourself! You may not work together with another classmate in doing lab assignments**; but you feel free to seek help from TA or instructor. Regarding exams: all exams in this class are to be completed without help from others. Any collaboration with others or use of work completed by others for previous offerings of this class is considered to be unauthorized aid. In general, the penalty for cheating on an exam or otherwise covertly attempting to raise your grade on an exam shall be a 'ZERO' for the exam. For more details on academic integrity, refer to Student Handbook: https://www.umassd.edu/studentaffairs/studenthandbook/academic-regulations-and-procedures/
Cancelled Classes and Exams	If class is cancelled on the day an exam is scheduled, we will have the exam the next time the class meets. If class is cancelled for the session prior to the exam (the day for review and for asking questions), then the next class meeting will be the "review session", and the exam will take place in the class meeting after that.
Important Advice:	▪ Please attend every class (much of the material builds on itself sequentially, so missing a class will diminish your ability to follow the subsequent material). ▪ Please come to class prepared; the lectures will be more beneficial if you complete the assigned reading text before arriving at class. ▪ Please do not fall behind or procrastinate; "cramming" won't work in this class! ▪ Please feel free to ask questions at any time; I am here to help you. ▪ Please feel free to send any comments and feedbacks on how to improve lectures. If you have any interesting experiences on how to solve problems or do well in the class, please feel free to let me know too, so that I can share your tips with your classmates.
In Case of Difficulty:	If you feel yourself slipping behind, feel free to meet the instructor for advice. If you do decide the class is not happening for you at this semester, the last day to Add/Drop is **Tuesday, January 24, 2023**, and the last day to withdraw is **Friday, April 7, 2023**. However, before you withdraw, discuss your decision with the instructor and your academic advisor.
Academic Support Services:	Academic Resource Center (www.umassd.edu/arc/), Engineering Student Support & Services (ES3, https://www.umassd.edu/engineering/support/), STEM Learning Lab (https://www.umassd.edu/arc/stem-learning-lab/), Center for Access and Success (www.umassd.edu/dss/), Writing &Multiliteracy Center (www.umassd.edu/wmc/)
Title IX Information:	The purpose of a university is to disseminate information, as well as to explore a universe of ideas, to encourage diverse perspectives and robust expression, and to foster the development of critical and analytical thinking skills. In many classes, including this one, students and faculty examine and analyze challenging and controversial topics. If a topic covered in this class triggers post-traumatic stress or other emotional distress, please discuss the matter with the professor or seek out confidential resources available from the Counseling Center, http://www.umassd.edu/counselling/, 508-999-8648 or - 8650, or the Victim Advocate in the Center for Women, Gender and Sexuality, http://www.umassd.edu/sexualviolence/, 508-910-4584. In an emergency contact the Department of Public Safety at 508-999-9191 24 hrs./day.