ECE 175
Computer Programming for Engineering Applications
Fall 2016
University of Arizona

Credits: 3

Instructors:

Gregory Ditzler, Ph.D.	Office Hours: M/T 10-11AM
Section 1	
Office: ECE 556D	ditzler@email.arizona.edu
Robert McBride, Ph.D.	Office Hours: T/Th 6:15-8:00PM (SEL Rm 200S)
Section 2	
Office: ECE 456M	rmcbride@email.arizona.edu
Jerzy Rozenblit, Ph.D.	Office Hours: Th 2:30-3:30PM, W 11-12
Section 1	
Office: ECE 506	jerzyr@email.arizona.edu

Lecture:

- (Section 1) T & TH 12:30 PM – 1:45 PM, Science and Engineering Library, Room 200S
- (Section 2) T & TH 5:00 PM – 6:15 PM, Science and Engineering Library, Room 200S

Course Website:
and the D2L website (HW submission and grades).

TAs:
All emails concerning ECE175 should be addressed to the course email, NOT the instructor of the class.
General questions about the course and assignments should be posted on Piazza.
Email: uaece175@gmail.com

Office hours (Room ECE-250):
M 4 PM – 7 PM
T 9 AM – 11 AM

Course description:
ECE 175 introduces undergraduate students to the fundamental principles of programming for solving engineering problems, using the *C* programming language. It familiarizes students with the process of computational thinking and the translation of real-life engineering problems to computation problems. No specific prior experience in programming or prerequisites are assumed. Therefore, the course is an introductory exposition of the principles and techniques underlying the design and development of effective computer programs. The learning approach will blend conceptual elements with "hands-on" experience. The ultimate goal of the course is to develop application-oriented, problem-solving skills of the students while also ensuring that they understand the importance of proper program design and structuring techniques. This class prepares students for more advanced programming courses.

Text:
Zyante's Programming in C interactive textbook, available at: https://zybooks.zyante.com/

- Sign up at zybooks.com
- Enter the Zybook code
- Click Subscribe

The cost to subscribe is $48.

Recommended Supplement:
C: From Theory to Practice, George Tselikis and Nikolaos Tselikas, CRC Press, 1st edition

Course objectives:
Upon the completion of this course, students should have achieved the following objectives:

- Conceptualize engineering problems as computational problems
- Code basic computing problems using the *C* language
- Learn fundamental software design principles and commonly used techniques

Specifically, students will gain fundamental understanding of the following topics:

Introduction to computer systems

- Engineering problems as computational problems
- Overview of computer systems
- Software design

Introduction to *C*

- Code build process (editing, compiling, linking, executing)
- Elements of a *C* program; preprocessor directives; statements and expressions; functions; coding formatting style
- Identifiers; simple data types; constants and variables; type casting; binary arithmetic representations
- The IDE environment

Branching

- Conditional expressions; relational operators; logical operators; precedence rules
- Selection structures; if-else statements; while statements; switch statements

Loops

- Repetition and loop statements; for statements; do-while statements
- Increment/decrement operators; nested loops; loop tracing

Modular programming

- User functions; library functions; function declaration and definition; function calls; pass by value; scope rules; programs with multiple functions
- Pointers and addresses; pass by reference; pointer arithmetic
- File input/output

Simple data structures

- Arrays; declaration and initialization; multi-dimensional arrays; searching and sorting arrays; pointers and arrays
- String arrays; string library functions; substrings; concatenation; strings vs. characters

- Engineering applications; matrix algebra; numerical integration and differentiation; quadratic equations
- Recursion
- Structures; structures and functions; arrays of structures; dynamic data structures

Important dates:
Last day to drop a course so it does not appear on the record of enrollment: **September 4, 2016.**
Last day to drop a course with a withdrawal of W: **October 30, 2016**. Students must be passing the course in order to withdraw at this time. Signature of the Instructor is required.

Course assignments and exams:
- Weekly homework assignments on the topics covered in class (approximately 10)
- Two midterm exams
- One final project

There will be no final exam.

The grading distribution for the course assignments and exams is as follows:
- Zyante Participation: 10%
- Homework Assignments: 25%
- Midterm 1: 20% (9/27, *tentative*)
- Midterm 2: 20% (11/8, *tentative*)
- Final Project: 25%
- Total: 100%

Grading scheme:

Percentage	Letter Grade
90%– 100%	**A**
80% – 89%	**B**
70% – 79%	**C**
60% – 69%	**D**
<60%	**E**

Homework assignment guidelines:
To receive a grade in the programming assignments, students must *demonstrate and explain their code* to the TAs during the mandatory lab hours. Moreover, they must complete the assignment handed out during those lab hours. The homework, exam and project grades will be based upon the following components:

- Output correctness on pre-specified inputs (50%).
- Code explanation (50%)

Recipe for success:
In order to be successful in this course a student must:

1) Regularly follow all lectures. Notes and examples given during lecture will be most helpful for completing the homework assignments. Surprise quizzes may be given the first few minutes of class
2) Turn in homework assignments on time and follow the submission guidelines. Each assignment is building upon previous ones. **Missing one assignment will make it difficult to complete the ones that follow**
3) Attend lab hours. **You need to demonstrate your code to receive a grade.** A submitted program that has not been demonstrated will not receive any grade
4) Ask for help from TAs and ULAS during office hours. TAs can provide you with many helpful hints
5) Spend extra care to make your turn-in assignments readable, concise, and complete
6) Collaborate with your group to timely complete the group project

Course grading policy:

- Homework is due every Wednesday 7:59AM unless otherwise specified by the instructor.
- There will be ZERO credit awarded to assignments submitted after 7:59AM Wednesday.
- Homework must be submitted via D2L
- Re-grading: Any request for re-grading must be submitted in writing **up to one week after** the grade has been received. In case of grade dispute, the entire homework assignment will be re-graded. After the one-week time limit, no changes can be made to an assigned grade

Make-up exams:

A make-up exam may only be given under extraordinary circumstances. The student requesting a make-up exam should contact the instructor well in advance and provide *written* documentation for the reason that he/she will not be able to attend the regularly scheduled exam. It is up to the discretion of the Instructor to accept the justification provided by the student.

Students with disabilities:

If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (520-621-3268; http://drc.arizona.edu) and notify your instructor of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. Make sure that such a request is set forth at least 2 weeks before the first exam to allow sufficient time for any preparations that may be needed.

Plagiarism policy:

The University's Code of Academic Integrity (Section 2.1a) is based on the guiding principle that a student's submitted work must be the student's own. In ECE 175, this policy will be applied to all work submitted for a grade, including exams, quizzes, homework, and lab assignments. Copying previously posted solutions, solution manuals, and work of other students is strictly forbidden; all work must be original. **The minimum penalty for submitting work that is not your own is an E grade**. The instructor **will** report violators of this policy to the Dean's office. Repeated violations may result in expulsion from the University. For further details, read the Student Code of Academic Integrity http://deanofstudents.arizona.edu/codeofacademicintegrity.

Absence policy:

According to University policy, the instructor will honor absences due to holidays or special events observed by organized religions and absences pre-approved by the UA Dean of Students (or Dean's designee).

Student conduct:
Students are expected to treat the class and the instructor with respect. No cellphone ringing and texting is allowed during the lecture. For further info, please see http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Relationship to Student Outcomes:
ECE 175 contributes directly to the following specific Electrical Engineering and Computer Engineering Student Outcomes of the ECE Department:

- an ability to apply knowledge of mathematics, science, and engineering (High)
- an ability to design and conduct experiments, as well as to analyze and interpret data (Medium)
- an ability to design a system, component, or process to meet desired needs (High)
- an ability to function on multi-disciplinary terms (Medium)
- an ability to identify, formulate, and solve engineering problems (High)
- a knowledge of contemporary issues (Low)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. (High)