ENGR 102-5xx – FALL 2018
ENGINEERING LAB I: COMPUTATION

INSTRUCTOR INFORMATION: [DR. J. C. RICHARD]
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Office hours: by appointment to guarantee your personal 1-on-1 time most likely Thursday afternoon

Course Description and Prerequisites

Catalog Description: Introduction to the design and development of computer applications for engineers; computation to enhance problem solving abilities; basic concepts of software design through the implementation and debugging of student-written programs; introduction to engineering majors, career exploration, engineering practice within realistic constraints, e.g. economic, environmental, ethical, health and safety, and sustainability; pathways to success in engineering.

Prerequisites: C or better in MATH 151 or concurrent enrollment; admission to the college of engineering.

This course provides an introduction into the design and development of computer applications for engineers. No prior experience in programming is necessary. Students will learn to use computation to enhance their problem solving abilities. The course will cover basic concepts of software design through the implementation and debugging of student-written programs. This course also introduces engineering majors that are available to students, types of work engineers in their field do, engineering practice within realistic constraints, e.g. economic, environmental, ethical, health and safety, and sustainability, and the paths to success in their chosen field.

Course Expectations:
You are expected to:
- **Always use your @tamu.edu e-mail account to send correspondence between yourself and the teaching team. Always include your section number in the subject line for all correspondence. Check your @tamu.edu email account daily.**
- Use your eCampus account (*http://ecampus.tamu.edu/*) to access course information, assignments and your grades.
- Be an active problem solver, contributor, and discussant in class.
- Be prepared and accountable for class by reading the assigned material ahead of time and be able to answer simple questions over said material.
- Be held accountable for all assigned material that is, or is not, explicitly discussed in class.
- Have a public presence in the class.
- Attend class as a community expectation.

Learning Outcomes or Course Objectives

Upon successful completion of this course, students will be able to:
- Demonstrate the use of basic programming techniques in the construction of computer programs, including techniques to:
  - Collect, store, and manipulate data within a computer program
  - Collect, create, store, and manipulate data in larger structures such as arrays, matrices, and lists
  - Use control structures, such as conditionals and loops, in computer programs
  - Declare and use functions to solve computing-related problems
  - Analyze data from a file and output processed results to a file
  - Decompose a complicated task into more manageable pieces
- Apply programming techniques to solve problems in engineering and calculus, including
  - Applying vector and matrix manipulation of data to solve engineering problems
  - Graphically plotting data to visualize basic calculus concepts
  - Manipulating data to numerically calculate derivatives in the context of engineering applications
  - Applying conditionals and loops to implement numerical methods, such as bisection and Newton's method
- Complete a team programming assignment that ties together concepts learned in the class
- Complete the required homework assignments for introduction to engineering majors, engineering practice, and student success.

Textbook and/or Resource Material

The course has one required textbook:
> *Programming in Python* - Publisher: Zybooks

> Important! – This is an electronic book. You can purchase an access code either at the bookstore, or online through the course eCampus web site. Do not buy at both the bookstore and online!

It is not recommended to purchase a book and code package from other retailers, since their codes will not give you proper access to the publisher's online materials.

OTHER REQUIRED MATERIALS/SUPPLIES:

1.   Your BYO computer. You should have the required course software (Microsoft Office, Anaconda, PyCharm, and Python 3) installed. Microsoft Office is available from TAMU Software. Python 3 et al. will be installed in class.

2.   Access to your TAMU Google Drive. This is a free service arranged by TAMU, and will make teamwork much easier.

3.   A Scientific Calculator. The calculator can have as many features as you deem necessary. However, please note that for exams you will only be able to use the calculator's addition, subtraction, multiplication, division, logarithmic and trigonometric functions capabilities. Any other capabilities of your calculator will specifically be forbidden from being used. Please also note, for exams your phone will not be considered a calculator even if you have a calculator app. PHONES CANNOT BE USED DURING EXAMS, FOR ANY PURPOSE!

Grading Policies

- Exams (30%) – There will be one 60 minute exam (10% of your grade) and one 2-hour comprehensive final exam (20% of your grade).
- Lab assignments (40%) – Lab assignments will be assigned weekly and are designed to help students understand the course material, provide practical programming experience, and help improve problem-solving abilities. Labs will consist of both in-class activities and take-home assignments. While many assignments will be individual, some lab assignments will be done in teams. Lab attendance is required and will be used as part of the lab grade.
- Quizzes (20%) – There will be at least 10 quizzes throughout the semester consisting of questions concerning material in the lecture and the lab assignments. The purpose of the quizzes is to help you stay caught up on the lecture material in the class as well as to test your understanding of the lab assignments. Quizzes may be given in class and without warning or online with a given completion deadline.
- Video Module Homework assignments (8%) - It is mandatory that each student complete the assignments having to do with the introduction of the disciplines, engineering practice, and student success to receive a passing grade in the course.
- Industry Night Essay (2%) - The Student Engineering Council (SEC) sponsors the "SEC Industry Nights." These are informational events featuring different companies that hire engineering graduates. You need to attend one (1) Industry Night, and submit a 250 word summary of the presentation. Information on dates and companies will be forthcoming.

The following grading scale will be used to determine your semester course grade:

$$100 \geq A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F$$

Other Pertinent Course Information

Languages: The primary language used in this course will be Python 3. Supplementary material will be provided to demonstrate how concepts can be realized in Matlab.

Introduction to Majors: A 25-30 minute online module will be required each week to improve student understanding of the breadth of engineering disciplines to aid in their selection of a major and to introduce the practice of engineering.

Course Topics, Calendar of Activities, Major Assignment Dates

Week	Class Topics	Assignments	Featured Department	Engineering Module
1 (8/27-8/31)	Introduction to Course, Engineering, and Programming	Lab 1, 1b	BMEN	
2 (9/3-9/7)	Sequential Steps, Variables, Assignment	Lab 2, 2b	BAEN	Engineering Success
3 (9/10-9/14)	Input/Output and Data Types	Lab 3, 3b	CHEN	Academic Honesty (1)
4 (9/17-9/21)	Conditionals and Boolean Expressions	Lab 4, 4b	CVEN	Fischer Design Center
5 (9/24-9/28)	Creating and Testing Programs	Lab 5, 5b	CPSC	Academic Honesty (2)
6 (10/1-10/5)	Loops and Iteration	Lab 6, 6b	ECEN	Engineering Ethics (1)
7 (10/8-10/12)	Arrays and Lists of Data (last topic on Midterm)	Lab 7, 7b	ETID	Engineering Ethics (2)
8 (10/15-10/19)	Top-Down Design of Programs	Lab 8, Study for midterm	ISEN	Engineering Ethics (3)
9 (10/22-10/26)	Midterm exam (10/22 or 10/23), File Input and Output	Lab 9 (short), 9b	MSEN	Student Counseling
10 (10/29-11/2)	Using Functions, Parameters, Return Values, Modules	Lab 10, 10b	MEEN	Global Program Opportunities
11 (11/5-11/9)	Writing Functions, Scope	Lab 11, 11b	NUEN	Zachry Leadership Program
12 (11/12-11/16)	Functions and use in top-down/bottom-up design	Lab 12, 12b	AERO	Entrepreneurship Program
13 (11/19-11/20 MT only)	Systematic Debugging	Lab 13, Team Project assigned	OCEN/ITDE	
14 (11/26-11/30)	Topic TBD (MT), Final exam (WR)		PETE	ENGR[X]
15 (12/3-12/5 TW only)	Topic TBD			
Finals Week	NO FINAL	Team Project due		

IMPORTANT DATES:

August 27 – First day of fall semester classes.

August 31 – Last day (by 5 p.m.) for adding/dropping courses for the fall semester.

October 15 – Mid-semester grades due.

November 16 – Last day (by 5 p.m.) to drop courses with no penalty (Q-drop) or to officially withdraw from the University

November 21 – Reading day, no classes

November 22-23 – Thanksgiving Holiday

December 3 – A Monday, but students attend Friday classes

December 4 – A Tuesday, but students attend Thursday classes

December 5 – Last day of classes

December 7-12 – Final exams

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Attendance:
Attendance in class is mandatory. TAMU policies regarding student attendance/absences are defined in Part I, Section 7 of the TAMU Student Rules. In addition to those rules, the following policies will apply in this course:
1. An excused absence will be required for any day in which a graded assignment was due or exam was given.
2. There will be no opportunity to makeup in-class or out-of-class assignments, exams, RATs, CFU or any other "graded" materials due to an unexcused absence.

Student Rules:
TAMU Student Rules are posted at *http://student-rules.tamu.edu*. You should be familiar with these by now. Any issue not addressed explicitly in this syllabus will be governed by the Student Rules.

Academic Integrity:
"An Aggie does not lie, cheat, or steal or tolerate those who do." Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: http://aggiehonor.tamu.edu.