THE UNIVERSITY OF TEXAS AT AUSTIN
Department of Aerospace Engineering and Engineering Mechanics

COE 111L -- ENGINEERING COMPUTATION LAB
SPRING 2017

SYLLABUS

Unique Number: 13645

Instructor: Amir Shahmoradi
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Time: Wed 9-10 AM

Location: WRW 209

Teaching Assistant.: To be assigned

Web Page: http://www.shahmoradi.org/ECL2017S/

Catalog Description:

COE 111L ENGINEERING COMPUTATION LAB
Restricted to computational engineering majors.
Programming exercises and applications of numerical methods.
Prerequisite: Credit with a grade of at least C- or registration for Aerospace Engineering 211K or Computational Engineering 211K.

Course Objectives: Upon successful completion of this course, students will be able to,

- Identify/characterize/define a computational engineering problem
- Design a computer program to solve the problem
- Write modern style scientific code
- Read and write Python code
- Maintain code using available version control systems.

Prerequisites: Credit with a grade of at least C- or registration for Aerospace Engineering 211K or Computational Engineering 211K.

Knowledge, Skills, and Abilities Students Should Have Before Entering This Course:

Prior familiarity with topics in and Numerical and Computational Engineering is essential.
Basic familiarity with some computer programming is desired.

Knowledge, Skills, and Abilities Students Gain from this Course (Learning Outcomes):

Upon successful completion of this course, students should be able to,

- Identify/characterize/define a computational engineering problem
- Design a computer program to solve the problem

- Write modern style scientific code
- Read and write Python code
- Maintain code using available version control systems.

Relationship of Course to Program Outcomes:
This course contributes to the following ABET Criterion 3 outcomes and those specific to the EAC accredited program.

Outcome	√	Outcome	√
a. An ability to apply knowledge of mathematics, science, and engineering	√	g. An ability to communicate effectively	√
b. An ability to design and conduct experiments, as well as to analyze and interpret data		h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	√	i. A recognition of the need for and an ability to engage in life-long learning	
d. An ability to function on multi-disciplinary teams		j. A knowledge of contemporary issues	
e. An ability to identify, formulate, and solve engineering problems	√	k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	√
f. An understanding of professional and ethical responsibility			

ABET Program Criteria Achieved:
Program criteria are unique to each degree program and are to be compiled from the program criteria given for each degree program and listed in table format below. The faculty should check which of the program criteria are achieved in the course.

Criterion	√	Criterion	√	Criterion	√
A. Aerodynamics		G. Orbital Mechanics		M. Preliminary/Conceptual Design	
B. Aerospace Materials		H. Space Environment		N. Other Design Content	
C. Structures		I. Attitude Determination and Control		O. Professionalism	
D. Propulsion		J. Telecommunications		P. Computer Usage	√
E. Flight Mechanics		K. Space Structures			
F. Stability and Control		L. Rocket Propulsion			

Topics:
1. Faculty-Student Connection, Programming History (1 class) (a, c, g, k)
2. Version Control System (1 class) (a, c, g, k)
3. Numerical Computation with Python (1 class) (a, c, g, k)
4. Functions and Branching (1 class) (a, c, g, k)

5. Input / Output and Error Handling (1 class) (a, c, g, k)
6. Array Computing and Exception Handling (1 class) (a, c, g, k)
7. Strings and Dictionaries (1 class) (a, c, g, k)
8. Object-Oriented Programming (3 class) (a, c, g, k)
9. Wrappers, and Cross-language Interoperability (1 class) (a, c, g, k)
10. Debugging, Code Optimization and Compilation (1 class) (a, c, g, k)

Computer: Python

Text: Class Lecture Notes

Class Format:
Lectures and active participation of students.

Class Schedule:
The topics will be covered in the order listed below with the amount of time spent on each topic subject to the progress of the class. Every class, will begin with a short quiz from the previous class material. In addition to weekly quizzes, one out of class exam will be given along with the final exam.
Exam midterm: Wednesday March 28th
Final Exam

Class Outline:
1. Faculty-Student Connection, Programming History
2. Version Control System
3. Numerical Computation with Python
4. Functions and Branching
5. Input / Output and Error Handling
6. Array Computing and Exception Handling
7. Strings and Dictionaries
8. Object-Oriented Programming
9. Wrappers, and Cross-language Interoperability
10. Debugging, Code Optimization and Compilation

Grading:
Homework: 25% (Each assignment might not be weighted the same)
Weekly Quizzes: 25%
Midterm Exam: 25% each (40%)
Final Exam: 25%

Homework Policy:
There will be approximately one homework per lecture. Assignments will be due **before lecture begins**, and should be added to an online repository determined by the instructor. No late assignment will be accepted. No exceptions to the homework policy will be made without prior instructor approval.

Examinations:
The midterm exam will cover the topic from the beginning of the semester to the date of exam. The final exam will be more focused on the topics covered after midterm exam.

Attendance:
Regular attendance is expected. Any absence requires prior approval from the instructor, or compelling evidence of illness or an official letter from the university administration.

Office Hours:
Will be determined upon start of the classes to find the most convenient time for both students and instructor.

Important Dates:

- February 1, Wednesday:
  Last day to drop a class for a possible refund.
- April 3, Monday:
  Last day an undergraduate student may, with the dean's approval, withdraw from the University or drop a class except for urgent and substantiated, nonacademic reasons.

Special Notes:
The University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TDD or the Cockrell School of Engineering Director of Students with Disabilities at 471-4321.

Evaluation:
Note that the Measurement and Evaluation Center forms for the Cockrell School of Engineering will be used during the last week of class to evaluate the course and the instructor. You may also want to note any other methods of evaluation you plan to employ.

Prepared by: Amir Shahmoradi Date: January 1, 2017