

CM 151 – Introduction to Computational Science – Fall 2014

Instructor: Eric S. Ho (hoe@lafayette.edu)

Office: Kunkel 13

Office hours: TTh 2-4 pm (or by appointment)

Lecture: MWF 9:00-9:50 am, Venue: AEC 513

Lab: F 1:10-4:00 pm, Venue: AEC 519

Course Description:

The goal of this course is to instill computational thinking in problem solving. Students will learn techniques in formulating computational solutions to solve problems using the general-purpose computer language Python. Python is a simple but not shallow programming language, which is widely acclaimed by scientists, engineers, economists, mathematicians, IT developers, etc. for its simplicity, portability, versatility, and extensibility. Through hands-on programming exercises, students will acquire basic techniques in writing and troubleshooting Python programs.

Learning Outcomes:

At the completion of this course, students should be able to:

- Think algorithmically
- Formulate programming approach to solve problems
- Master semantics and syntax of Python
- Define and utilize Python's built-in data structures: list, dictionary, and set
- Read and store information in files
- Draw simple graphics
- Design simulations to study complex problems

Grading Policy:

- 9 lab reports – 4% each (total 36%)
- Two lab exams – 10% each (total 20%)
- Three 1.5-hour in-class cumulative exams. The first, second, and third exams carry 10%, 15%, and ~~20~~ 15%, respectively (total ~~45~~ 40%)
- A four-page essay (5%)

Lab reports require individual work. They are mostly programming exercises adopted from the required textbook. Lab reports are usually due 24 hours after lab.

Late report:

- If submission is late but within 24 hours of due time (Moodle time), it will still be graded but 50% of the actual earned points will be deducted, e.g. a lab report has scored 2 points out of 4, only 1 point will be given.
- If submission is late by more than 24 hours, it will not be graded and receive zero point.

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Lab exams will be conducted **during lab hours**. Lab exams are closed book/notes and Internet access is forbidden. Two categories of questions will appear in lab exams: debugging, and problem solving. In the former, you are given programs that contain syntax and/or semantics errors. Your task is to mend them so that they produce expected output. In the latter, your task is to write programs to solve problems similar to what you did in labs.

Three written exams will be scheduled **during lab hours (no final exam)**. Check the timetable included at the end of this document. Exams are cumulative. Exam is conducted in closed book/notes format. Test materials are based on lectures, reading assignments, and lab works. Past exam questions and extra practice problems will be posted in Moodle.

Final grade is based on the percentage of total points earned for the course i.e. 3 written exams, 2 lab exams and 9 lab reports. Letter grades are assigned according to the following scale:

A	93-100%	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	0-59

Required Textbook:

Python programming in context 2nd, Bradley N. Miller, David L. Ranum. Jones & Bartlett Learning.

Students are required to read the assigned reading from the textbook. Exams are based on materials from lectures, labs AND the textbook.

Attendance Policy:

Attendance and class participation are critical to learning. Although attendance will not be taken for lectures, statistics tells that attendance highly correlates with the final grade. If there is in-class quiz, absentees will receive a zero for that quiz.

Federal Credit Hour Policy:

The student work in this course is in full compliance with the federal definition of a four [two or one as appropriate for half and quarter unit courses] credit hour course. Please see the Registrar's Office web site (<http://registrar.lafayette.edu/additional-resources/cep-course-proposal/>) for the full policy and practice statement.

Academic Honesty:

You are expected to abide by the college policy on Intellectual Honesty (see student handbook and attached document).

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Disability Statement:

In compliance with Lafayette College policy and equal access laws, I am available to discuss appropriate academic accommodations that you may require as a student with a disability. Requests for academic accommodations need to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made. Students must register with the Office of the Dean of the College for disability verification and for determination of reasonable academic accommodations.

Privacy Policy:

Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA). Disclosure to unauthorized parties violates federal privacy laws. Courses using Moodle will make student information visible to other students in this class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class. Questions can be referred to the Registrar's Office.

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Week	Major Topics	Assigned Reading	
1	Aug 25 Aug 27	Introduction and overview of the course IDLE and Python interpreter	Ch 1
Lab 1	Aug 29	Computing with numbers	
2	Sep 1 Sep 3	Variables Turtle graphics	Ch 1
Lab 2	Sep 5	Functions & For-loop & Accumulator	
3	Sep 8 Sep 10 Sep 12	Code jam Code jam Sep 12: Lab exam 1	Ch 1 + additional exercises
4	Sep 15 Sep 17	Lab exam1 review & Problem solving Problem solving	Ch 2
Lab 3	Sep 19	Archimedes & math library	
5	Sep 22 Sep 24 Sep 26	Leibniz & Wallis Monte Carlo Sep 26: Exam 1 (week 1-5)	Ch 3
6	Sep 29 Oct 1	Exam 1 review Strings	Ch 4
Lab 4	Oct 3	Strings	
7	Oct 6 Oct 8	Built-in string functions Transposition	Ch 5
Lab 5	Oct 10	Transposition & Substitution	
8	Oct 13 Oct 15 Oct 17	<i>Oct 13 - Fall break</i> Code jam Oct 10: Lab exam 2	Ch 1-5
9	Oct 20 Oct 22	Lists Lists	Ch 4
Lab 6	Oct 24	Lists	
10	Oct 27 Oct 29	Dictionaries Dictionaries	Ch 4
Lab 7	Oct 31	Dictionaries	
11	Nov 3 Nov 5 Nov 7	File operations File operations Nov 14: Exam 2 (week 1-11)	Ch 5
12	Nov 10 Nov 12	Exam 2 Review File operations, while-loop	
Lab 8	Nov 14	Matplotlib installation	
13	Nov 17 Nov 19	Pylab graphics Pylab graphics	
Lab 9	Nov 21	Pylab graphics	
14	Nov 24 Nov 27 Nov 29	Stock chart <i>Thanksgiving</i> <i>Thanksgiving</i>	
15	Dec 1 Dec 3 Dec 5	Code jam Code jam Dec 5: Final exam (week 1-15)	

Useful Links:

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1. Python: <http://python.org/>
2. Stackoverflow: <http://stackoverflow.com/>
3. pythonanywhere <https://www.pythonanywhere.com/>
4. <http://www.econpy.org/> (tailored for economists)