Instructor

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IMPORTANT: Include [CS2316] in the subject of course-related email, e.g., “Subject: [CS2316] Exam 2 Question.” Professors are deluged with email. If we don’t respond, don’t take it personally. Just resend your email with a friendly reminder.

Course Description

This course will provide background and experience in reading, manipulating, and exporting data for engineering, business and scientific applications. Specific topics include file I/O, string processing, web scraping, writing HTML and basic interfacing with SQL databases (reading / writing data in pre-existing tables). Students will learn to build programs controlled by basic graphical user interfaces. Assignments will be modeled after business, engineering, and scientific problems.

Learning Outcomes

Student in the class will achieve the following learning objectives:

(Competency) Students will be able to:

1. Write programs using various data types, and using basic techniques such as assignment, method calls, while loops, for loops, and conditionals.
2. Use and manipulate several language provided data structures such as: Lists, Dictionaries, and Strings.
3. Read and write data to and from text files, both as plain text and in structured formats (such as CSV).
4. Read a textual representation of numerical data and convert it to the appropriate (integer/float) data type.
5. Load HTML pages with a program, and extract specific pieces of information from the HTML.
6. Write a program that can generate a report in text or HTML format which includes elements under program control.
7. Connect to existing SQL databases and insert and retrieve data from the database.
8. Program interactive graphical user interfaces consisting of a graphically organized set of widgets, including a minimum of one from each of the following classes (Label, Button, Text Field).
9. Implement simple business or mathematical algorithms (calculating interest payments, averaging a row of data, calculating standard deviation) into a program.
10. Use compound data structures provided by the programming language such as lists, arrays, and dictionaries to hold sequences or sets of data, including two-dimensional (tabular) data.
11. Use objects and associated methods provided by the programming language.
12. Write programs that are easy to understand so that others may modify and improve them.

(Movement) Students will increase their:

1. Familiarity with compound data structures (lists, arrays, dictionaries), including nested data structures (multi-dimensional arrays, etc...) and indexing into multi-dimensional data structures.
2. Speed and accuracy in converting problem statements into programs.
3. Understanding of and ability to quickly use basic program structures such as iteration, conditionals, and function calls due to repeated practice of these concepts.
4. Understanding of the event driven programming model, specifically as applied to graphical user interfaces.
5. Ability to break a medium sized problem down into smaller parts and solve each sub-problem individually.
6. Ability to test and debug programs.

(Experience) Students will:

1. Practice the process of constructing moderately sized (100-300 line) programs from written requirements.
2. Deal with data that may include missing elements or malformed representations.
3. Work in pairs to solve programming problems.

Requirements

Grading
• Homework: 35%
• Exams: 40%
• Participation: 5%
• Final Exam: 20%

Grade Cutoffs: A: 90, B: 80, C: 70, D: 60

Assignments

Two or three in-class written midterm exams, a final exam, in-class participation exercises, and 8-12 homework assignments, assigned approximately every week. Your last homework assignment may be due the week preceding final exams. Assignments must be turned in before the date and time indicated as the assignment’s due date.

Class Participation

Various classes and recitations will have small assignments due in class. These may be submitted via paper, T-Square, or PRS (clicker) devices. The majority of your Attendance & Participation score will be derived from these assignments, which cannot be "made-up" if you do not attend the class. It’s a violation of the Academic Honor Code to submit work or "sign-in" for other students.

Academic Integrity and Collaboration

We expect academic honor and integrity from students. Please study and follow the academic honor code of Georgia Tech: http://www.policylibrary.gatech.edu/student-affairs/code-conduct. You may collaborate on homework assignments, but your submissions must be your own. You may not collaborate on in-class programming quizzes or exams.

Due Dates, Late Work, and Missed Work

• Programming quizzes are due by the end of class. Homework assignments are due at 23:59 on the due date. Multiple resubmissions are allowed, so submit early and often so you aren't in a rush on the due date. Late submissions receive a 0.

• There are no makeup exams. Exceptions are only considered under special circumstances such as serious illness, hospitalization, death in the family, judicial procedures, military service, or official school functions. Provide us with a copy of your letter from the registrar in advance for official school functions. For other excused absences you must provide documentation within one week of your return from illness/activity. Excusals from coursework or make-up opportunities are granted at the sole discretion of your instructor.

Grade contest

To contest any grade you must submit an official regrade form within one week of the assignment's original return date. The original return date is the date the exam was first made available for students to pick up or the grade was posted online in the case of homework assignments and programming quizzes.

Course Outline

• Weeks 1 - 2: Programming in Python
• Weeks 4 - 6: Data input and storage (file IO, CSV files, XML, databases)
• Weeks 7 - 9: The Web (HTML, web scraping, web applications)
• Weeks 10 - 11: Graphical user interface programs

Prerequisites

At least one of:

• Undergraduate Semester level CS 1301 Minimum Grade of C
• Undergraduate Semester level CS 1315 Minimum Grade of C
• Undergraduate Semester level CS 1321 Minimum Grade of C
• Undergraduate Semester level CS 1371 Minimum Grade of C

Course Materials
Non-Discrimination

The Institute does not discriminate against individuals on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation, gender identity, or veteran status in the administration of admissions policies, educational policies, employment policies, or any other Institute governed programs and activities. The Institute’s equal opportunity and non-discrimination policy applies to every member of the Institute community.

For more details see http://www.policylibrary.gatech.edu/policy-nondiscrimination-and-affirmative-action (http://www.policylibrary.gatech.edu/policy-nondiscrimination-and-affirmative-action)