GIS 502 Syllabus

9 October 2013

Welcome to GIS 502. This course is part of an online certificate program on *Mobile GIS Application Development.*

Description

In this course, students learn the essentials of application development using an object-oriented programming language. The course addresses three main areas: coding with functions, objects, and data structures; learning application programming interfaces for GIS libraries; and accessing geographic databases using SQL and other query systems. Students complete frequent programming assignments that emphasize rudiments but mimic real GIS applications.

Contact Information

Instructor: Prof. Christopher League, Ph.D.

Email: `christopher.league@liu.edu` – please include the course number in the subject.

Google Hangout: cleague@gmail.com

AIM: `chrysleague`

Skype: `chrisleague`

Office hours: Monday, Wednesday 2–2:50 (US Eastern) or make an appointment at `https://liucs.net/bookme`

Office phone: +1 718 488 1274

Office location: LLC 206, LIU Brooklyn

Resources

Web site: `https://blackboard.liu.edu/`

Software: We will use the Java Software Development Kit from Oracle and the IntelliJ IDEA Community Edition from JetBrains. See the orientation instructions for configuring your machine.

Text book: *Think Java: How to Think Like a Computer Scientist* by Allen B. Downey, an edition customized for this course. See the **Resources** section on Blackboard to download the PDF.

Requirements

Your performance in the course will be scored on a 1,000-point scale. There are three categories of activities that contribute toward your final grade:

There will be *10 programming assignments* (one per week), worth **80 points each.** The lowest assignment score will be dropped, so only 9 assignments count, for a total of **720 points.** Exception: the final assignment, because it will tie together all the skills and objectives of the course, cannot be dropped.

There will be *5 time-limited online quizzes* administered throughout the term, worth **50 points each.** The lowest quiz score will be dropped, so only 4 quizzes count, for a total of **200 points.** The purpose of the quizzes is to ensure you are following along with the readings and concepts introduced.

There will be *4 check-in opportunities* throughout the term, generally held on weeks without a quiz. The format can vary, but these are meant to ensure your participation and interaction with the instructor and other students. Examples could be an online discussion, contributing to a wiki, or online research about some technology. These check-ins are worth **20 points each,** for a total of **80 points.**

On the 1,000-point scale, you can expect an A if you earn 930 points or more, an A– for 900 points, B+ for 870, B for 830, B– for 800, etc. In the end, the instructor may adjust the scale slightly, but such adjustments would never lower your grade compared to these designated standards.

Time commitment

The Mobile GIS certificate program consists of four ten-week courses of three credits each. The time commitment within a course is intense. New York State defines one credit as a total of 15 hours instructional time, plus 30 hours of student preparation. Thus, a three-credit course will amount to 45 hours instruction plus 90 hours preparation.

In the online format of this course, we interpret the New York State guidelines as follows. Students should expect to spend about 3.5 hours per week with instructional resources such as the text book, online tutorials, and video screen-casts. An additional two 2 hours per week will be spent actively preparing for check-ins or quizzes. (On quiz weeks, the quiz itself will take half an hour of that time.) Finally, programming assignments will take roughly 8 hours per week; perhaps less time in the beginning, and more time as the program complexity steadily increases. Please plan accordingly! The sum is 3.5 + 2 + 8 = 13.5 hours per week, for 10 weeks, totaling 135 hours.

Warning: because the productivity of novice programmers varies tremendously, the numbers above are meant only as guidelines. Some students may need to spend more time, while others can get by with less.

Policies

No late assignments will be accepted, because we will discuss and evaluate your work promptly after the deadline. This helps to ensure that everyone receives timely feedback, and that you can learn from mistakes while they are still fresh in your mind.

There will be no extra credit. Students usually ask for extra credit late in the semester after they have already messed up their original opportunities. Be sure to start your work early, so that we can detect and solve any problems before they can affect your grade.

Plagiarism is the use or presentation of ideas, words, or work that is not one's own and that is not common knowledge, without granting credit to the originator. Plagiarism is a practice that is not only unacceptable, but which is to be condemned in the strongest terms possible on the basis of moral, educational and legal grounds. Under University policy, plagiarism may be punishable by a range of penalties from a failing grade in the assignment or course to dismissal from the School of Business, Public Administration and Information Sciences. All students are required to read the handbook on avoiding plagiarism by visiting `https://liucs.net/u2`

Cheating includes, but is not limited to the following: falsification of statements or data; listing sources that have not been used; having another individual write your paper or do your assignments; writing a paper or creating work for another student to use without proper attribution; purchase of paper or research work for one's submission as his/her own work; using written, verbal, or electronic or other sources of aid during an examination (except when expressly permitted by the instructor, depending on the nature of the examination) or knowingly providing such assistance to aid other students.

In a course with programming assignments, it is usually okay to work with and learn from other students to **some** extent, but what you submit in the end needs to be your own. The most reliable way to do that would be to set aside whatever code you created together, and then recreate it from scratch on your own.

Long Island University seeks to provide **reasonable accommodations for all qualified persons with disabilities.** This University will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to register with Special Education Services (SES) as early as possible and to provide faculty members with the formal communication from SES for suitable accommodations. All accommodations must be approved through SES. Contact Information: 718 488 1221 or 718 488 1044.

The **Family Educational Rights and Privacy Act** (FERPA) gives students control over the disclosure of their educational records. During this course you may have the opportunity to create accounts or register with certain public online services. In these cases, you need not make any personally identifying information public. You may use a pseudonym or online handle, as long as you identify yourself to the instructor.

Topic schedule

There will be a programming assignment due each week, and online quizzes scheduled every second week.

0. Orientation, tool configuration, chapter 1.
1. Chapter 2: variables and types.
2. Chapter 3: methods.
3. Chapters 4 and 5: conditionals.
4. Chapters 5 and 6: methods.
5. Chapter 7: iteration.
6. Chapters 8 and 9: strings.
7. Chapters 10 and 11: objects.
8. Chapters 12 and 13: arrays.
9. Chapters 14 and 15: OOP.
10. Chapter 16 and appendix A: graphics.

Goals and objectives

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

11. Write significant programs in the Java programming language.
12. Use geographic software libraries and databases from within their programs.

Specifically, students are expected to demonstrate the following skills:

13. programming-in-the-small, such as constructing loops and reasoning about variables and functions.
14. programming-in-the-large, such as decomposing programs into objects and modules.
15. basic data structures such as lists, maps, and trees.
16. understanding how geographic data can be represented and accessed within programs.
17. ability to research and employ a software library via its application programming interface.

Programmatic assessment of learning

This course is part of a post-baccalaureate certificate program in Mobile GIS App Development. The following table relates programmatic objectives with objectives and assessment instruments used in this course.

Program-level objective	Related course objective	Assessment instrument	Direct measure
(1) understand how geospatial data is unique, and how it can be analyzed and visualized in mobile applications.	(4) understand how geographic data can be represented and accessed within programs. [practiced]	Final programming assignment, requiring use of geographic API.	Rubric to assess understanding of the use of geospatial data in a program.
(2) understand the basic concepts critical to object-oriented programming.	(1) exhibit skills for programming-in-the-small, such as constructing loops and reasoning about variables and functions. (2) exhibit skills for programming-in-the-large, such as decomposing programs into objects and modules. [introduced]	Programming assignment in week 7, requiring both procedural and object-oriented programming.	Rubric to assess correctness, readability, suitability, and style of various programming constructs, such as loops, functions, objects, and modules.
(3) An understanding of database structures and methods by which the data can be accessed.	(3) understand basic data structures, such as lists, maps, and trees. [introduced]	Programming assignment in week 8, requiring use of basic data structures.	Rubric to assess correctness and suitability of data structures in a program.
(4) An understanding of application programming interfaces and the use of libraries.	(5) research and employ a software library via its application programming interface. [introduced]	Final programming assignment, requiring use of geographic API.	Rubric to assess sophisticated use of an external API in a program.

The remaining program objectives (5–7) are not applicable to CS502, although this course serves as a prerequisite to elective courses covering those objectives:

5. use Objective-C to create geospatial applications for devices using iOS, such as the iPhone, iPad, and iPod Touch.
6. use the Java Virtual Machine to create geospatial applications for devices using the Android operating system, such as Android-based smartphones and tablets.
7. use server technology and web mapping applications to work in concert with mobile GIS applications.

Schedule

Sun 13 Oct **Check-in 1** due at midnight.

Tue 15 Oct **Assignment 1** due at midnight.

Sun 20 Oct **Quiz 1** due at midnight.

Tue 22 Oct **Assignment 2** due at midnight.

Sun 27 Oct **Check-in 2** due at midnight.

Tue 29 Oct **Assignment 3** due at midnight.

Sun 3 Nov **Quiz 2** due at midnight.

Tue 5 Nov **Assignment 4** due at midnight.

Sun 10 Nov **Check-in 3** due at midnight.

Tue 12 Nov **Assignment 5** due at midnight.

Sun 17 Nov **Quiz 3** due at midnight.

Tue 19 Nov **Assignment 6** due at midnight.

Sun 24 Nov **Check-in 4** due at midnight.

Tue 26 Nov **Assignment 7** due at midnight.

Tue 3 Dec **Assignment 8** due at midnight.

Sun 8 Dec **Quiz 4** due at midnight.

Tue 10 Dec **Assignment 9** due at midnight.

Sun 15 Dec **Quiz 5** due at midnight.

Tue 17 Dec **Assignment 10** due at midnight.