

An introduction to Computational Science and Modeling CS 151L - Fall 2013

Instructors:

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Course Website: <http://www.cs.unm.edu/~joel/cs151/>

Course Description:

CS-151L - An introduction to Computational Science and Modeling (also known as *Computer Science for All*) - is a dual-credit computational science course open to high school as well as college students. CS-151L is a hybrid course, meaning that a significant part of the course content is on-line and the remaining part is taught in-person. This hybrid course uses a style of pedagogy called a “flipped course”. That is, most content is delivered during out-of-class times via videos and reading materials while in-class time is used for hands-on activities, project work, questions and other interactive learning.

In this course, the student will author original computer programs using an agent-based modeling environment (or programming language) called NetLogo. NetLogo runs on Windows and Mac operating systems. NetLogo is free to use and is open source. Students will gain experience designing, building, testing, debugging and running experiments with some simple computer models and with some complex adaptive systems. Students will also learn and apply mathematics relevant to modeling and simulation such as probability and statistics, and data analysis.

This course also introduces students to “great ideas” in computer science that impact their daily lives with topic including “big data”, algorithms for search engine page ranking, pattern recognition, and data compression.

Required Textbooks and Supplies:

1. Computer (Mac or Windows) with NetLogo 5.0.4 (free software downloadable from <http://ccl.northwestern.edu/netlogo/>)
2. Internet access
3. USB Flash Drive
4. Internet Access to Course Website: <http://www.cs.unm.edu/~joel/cs151/> for all video lectures and other content.
5. Internet Access to Blackboard Learn: <https://learn.unm.edu/> for on-line class discussions, quizzes and exams.
6. Textbook: “*Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion*” by Hal Abelson, Ken Ledeen, Harry Lewis. This textbook is available for free download on the web at <http://www.bitsbook.com/>

A hard copy is available at Amazon.com and other bookstores.

Grading:

Each student's final course grade is determined by the total points earned:

- 1) Programming Assignments: 14 assignments at 20 points each for a total of 280 points
- 2) Class participation: (5 points per week for 16 weeks) total of 80 points.
- 3) On-line, proctored quizzes: 14 quizzes at 10 points each where each student's lowest quiz score is dropped for a total of 130 points.
- 4) On-line, proctored Midterm Exam 100 points.
- 5) On-line, proctored Final Exam 150 points.

Total Points: 740

Note: On both the midterm and final exam, each student may use both sides of an 8½×11 sheet of *handwritten* notes.

Course Letter Grade: Each student's numerical course grade is:

Total Points earned/740

The course letter grade is calculated from the numerical course grade by using the table below.

Letter Grade Score Ranges					
>101%	A+	93 – 101%	A	90 – 92%	A-
88 – 89%	B+	83 – 87%	B	80 – 82%	B-
78 – 79%	C+	73 – 77%	C	70 – 72%	C-
68 – 69%	D+	50 – 67%	D		
		< 50%	F		

Late Assignments:

Usually, each assignment will have the same due date in all schools. However, due to differences in vacation schedules, school-wide testing schedules and school closures, some assignments will have different due dates in different schools.

Assignments turned in late will have 10% per day deducted from the grade. No assignment may be turned in more than 7 days late. Note that in this there is no distinction made for unexcused versus excused lateness. The primary reason for this is that students turning in assignments on-time, need to be able to see and go over solutions to those assignments in a timely manner. This is not possible when other students, for what might be very good reasons, are still working on the assignment.

Each assignment will have extra credit options. If a student missed a past assignment, then that student can make up those points by doing one of the extra credit options.

If a student has some illness or other adversity beyond the student's control causes him or her to miss many classes, then the student will not be able to complete the course within the semester. In such cases, UNM has a system whereby the student can apply for a grade of Incomplete. With a grade of Incomplete, the student can retake any missed parts of the course in the following semester, without registering for the course again. Then, at the end of the next semester, the completed work will be applied to the original semester in which the work was not completed and the course grade for that semester will be changed from Incomplete to whatever grade the student earned.

Academic Honesty

Students are encouraged to help each other on labs through personal interaction and through the WebCT discussions. There is, however, a difference between helping and cheating. Cheating includes:

1. Copying another person's work,
2. E-mailing or giving an electronic version of your work to anyone other than a course instructor.
3. Leaving a paper or an electronic version of your work where others can get it: you are responsible for your own computer security. If you save a local copy of your work on a lab computer, delete it and empty the trash before logging off!
4. Having another person complete any portion of your work.

The first time a student is caught cheating; the student will receive a negative grade for the assignment (i.e. if the assignment is worth 100 points, then a score of -100 is assigned).

E-mail Communications (Subject: always include CS-151):

TO COMMUNICATE WITH SOMEONE VIA E-mail, YOU MUST GET THE RECIPIENT TO READ THE E-mail. Lots of e-mail that arrives in people's inbox is never read. In an e-mail message, the *sender field* and the *subject field* are usually the only two pieces of information used to determine whether an e-mail is read. If you want the subject field to get the recipient's attention, then it must be something that is *meaningful to the recipient*. The subject "!!!!IMPORTANT!!!!", for example, is meaningless since it is oft used by mass marketers. The subject "computer science class" might be meaningful to you because you might have only one computer science class. However, is meaningless to the recipient who teaches multiple computer science classes and receives many e-mails advertising computer science classes at other institutions. If you want to get an instructor's attention (that is, if you want the instructor to read your email), then begin the subject field with "CS-151" and follow it with something that is meaningful to me. For example: "**CS-151: Lab 1 grading error**".

This applies to e-mails sent to me (joel@unm.edu), the course instructor as well as to any of the regional support instructors and to local high school instructors.

We want to read your e-mails. We do not want to read advertisements, scams, solicitations or other junk. When the recipient does do not recognize a person's name, he or she will use the e-mail subject to choose between what to trash and what to read.

Note: This syllabus is based on a standard UNM, 16 week course. However, as CS-151 is a hybrid course with, for dual-enrollment students, part of the course being taught the student's local high school, the exact schedule will vary from school to school with local vacation schedules, inclement weather interruptions and varying starting dates.

CS-151L Syllabus	
Week 1	What is Computer Science and Getting started with NetLogo
Week 2	Introduction to Computational Thinking
Week 3	Introduction to Abstraction / Data Representation
Week 4	Introduction to Modeling
Week 5	Agent Based Modeling and more Computer Science Constructs
Week 6	Agent-Based Modeling and Experimentation
Week 7	Running Experiments with NetLogo Models
Week 8	Review and Midterm Exam
Week 9	Algorithms
Week 10	More Algorithms
Week 11	Lists and Recursion
Week 12	Modeling Epidemics – Part 1: Building the Model
Week 13	Modeling Epidemics – Part 2: Experimentation
Week 14	Modeling: Ecosystems – Part 1: Building the Model
Week 15	Modeling: Ecosystems – Part 2: Experimentation
Week 16	Review and Final Exam

I _____, a student enrolled in the University of New Mexico, dual enrollment course CS-151L have read and understood the course policies and syllabus.

signature

date

I _____, a parent or legal guardian of the above student, have read and understood the UNM CS-151L course policies and syllabus.

signature

date

This course is made possible through cooperative efforts of the University of New Mexico, The Santa Fe Institute, and many school districts throughout New Mexico.

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