

**Point Loma Nazarene University**  
**CSC 3002: Python and UNIX Scripting (2 units)**  
**Spring 2020**

**Instructor:**

Dr. Lori Carter

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**Office hours:**

TR 8:30-9:30, 11:00 – 12:15. Most Wednesdays 9:00-2:00

**Course Time and Location:**

TR 10:00-10:55 RLC 108

**Text:**

*Practical Computing for Biologists*, Haddock and Dunn.

**Additional Supplies:**

MAC laptop, PC with Ubuntu Feature enabled, or PC with VM installed. **Please bring laptops to class.**

**Catalog Description**

An introduction to UNIX and Python scripting in the context of applications to scientific research. Students will become competent users of the UNIX operating system. They will learn to find and manipulate data from various file formats (including text, FASTA, HTML) using regular expressions with UNIX and Python scripts. They will learn to use Python for data analysis and for more specialized purposes using third party modules including NumPy, BioPython, and Tkinter.

**Class Learning Outcomes:**

- Students will be able to write correct and robust software.
- Students will be able to apply their technical knowledge to solve problems.

**Course Organization:**

**Lectures:** Cover the highlights of chapters assigned – not a substitute for reading. Student versions of the lecture slides can be obtained from Canvas.

**Labs:** In general, lab assignments should be completed individually. **If your lab looks too similar to that of someone else, both parties could receive a zero on that assignment.** Occasionally I will ask you to work in groups, but I will make that clear. **No late labs are accepted.** However, I will drop the lowest lab grade and you may turn in any unfinished lab on time for partial credit. Most labs will be turned in on Canvas.

**3 minute interdisciplinary presentations:** The expectation is that **everyone will do one 3 minute presentation** with peers providing a ranking, comments, and a summary. The 3-minute presentation is a presentation on something in your discipline, directed to people not in your discipline, providing a “just enough” understanding of a topic in words they can understand. The presentation as well as the audience summaries will be graded. Your presentation will hold the weight of 3 summaries. The 3 lowest summary scores will be dropped but your presentation score cannot be dropped. **Peer reviews will be completed via Canvas so please bring an internet-ready device to each class.** Summaries cannot be made up but a missed presentation can be given the next class period for ½ credit.

**Quizzes:** In addition to the midterm and final exam, you will have 2 quizzes to help you keep current on both theory and practice. Quizzes are not cumulative but will cover material from both **lecture and lab.** Quizzes are

scheduled for 2/4 and 3/26. **If you miss a quiz without giving me prior notice for an excused function, there is a good chance you will receive a zero unless, of course, there was a documented emergency.**

**Exams:** There will be 2 exams, a midterm and a final. If you will miss an exam for a school function, you must arrange to take it in advance. **If you ever miss an exam without giving me prior notice, there is a good chance you will receive a zero unless, of course, there was clearly an emergency.** Exam content can include material from lectures, the textbook, labs, and 3 minute presentations. Exams are cumulative. The midterm is scheduled for **Feb 25**. It will cover chapters 1 – 6 in your textbook.

The final exam is scheduled for **Tuesday of finals week at 10:30** and will emphasize chapters 8-10 in your textbook plus labs and lecture material covered since the last exam. There will be some questions from earlier in the semester.

### **Grading:**

3 min. presentations	15%	Labs	30%
Midterm	15%	Quizzes	15%
Final Exam	25%		

Final grades will be determined as follows:

100-93%	A	80-82.9%	B-	67-69.9%	D+
90-92.9%	A-	77-79.9%	C+	63-66.9%	D
87-89.9%	B+	73-76.9%	C	60-62.9%	D-
83-86.9%	B	70-72.9%	C-	0-59.9%	F

### **University Mission:**

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

### **Department Mission:**

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

### **Attendance:**

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class\\_Attendance](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance) in the Undergraduate Academic Catalog.

### **Class Enrollment:**

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

### **Academic Accommodations:**

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary

aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. ([DRC@pointloma.edu](mailto:DRC@pointloma.edu) or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

### **Academic Honesty**

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty) for definitions of kinds of academic dishonesty and for further policy information.

### **Final Exam: Date and Time:**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

### **Copyright Protected Materials:**

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### **Credit Hours:**

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 2 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

## CSC 3002 Expected Schedule Spring 2020

Mon	Tues	Wed	Thurs	Fri
	14 Monday sched	15	16 Intro, Sign up for 3 min Intro to Regular Expressions Regular Expression intro lab due 1/21	17
20 mlk	21 <b>3 min lat/long</b> More Regular Expressions	22	23 <b>3 min periodic tables, HTML</b> Assign RE Lab 1 due 1/28	24
27	28 More Regular Exp – custom char sets, boundaries Ch 3 <b>3 min on stock market</b> Stock Data lab Due 1/30	29	30 <b>3 min OS, Intro Linux/Unix, Virtual Machines</b> Lecture on OS, basic UNIX (Ch 4) Intro to Unix tutorial due 2/4	31
Feb 3	4 Quiz on RE's Continue with Unix and Grep	5	6 Chapter 5 more grep <b>3 min on CURL , IP addresses</b> Assign Grep/IP lab due 2/11	7
10	11 Unix scripting from chapter 6 assign first scripting lab due 2/18	12	13 Dr. Carter gone Work on intro to scripting lab	14
17	18 More scripting with loops, if/else, assign second scripting lab due 2/20	19	20 Review for midterm, intro python Intro Python lab due 2/27	21
24	25 Midterm exam ch 1-6	26	27 Python day 2 <b>3 min Codons, Amino Acids, Proteins</b> Assign Python lab 2 due Mar 3	28
Mar 2	3 <b>3 min DNA Melting, Java functions</b> Python day 3 (loops, functions)	4	5 <b>3 min on ORFS 3</b> Python day 4: Lists, slices Assign ORF finding lab due mar 19	6
9	10 Sp break	11	12 Sp break	13
16	17 Python day 5: Dictionaries <b>3 min probability</b>	18	19 <b>3 min mathematical sets</b> Python menus, sets, start Lab 4	20
23	24 More Python, some working time	25	26 Python quiz	27
30	31 <b>3 min restriction sites</b> Python Files Download anaconda for HW	Apr 1	2 Intro turtle module, work on Turtle lab due 4/7	3
Apr 6	7 <b>3 min Alleles, computer simulation</b> Lab 4 due, Intro random module, simulations	8	9 Easter break	10
13	14 Predictive algorithms Intro Pandas modules, in-class exercise	15	16 Assign Sales Commission Simulation due 4/21 – Potentially some lab time	17
20	21 <b>3 min image processing</b> Introduction to PixelMath and Image processing	22	23 Intro image processing with python Assign frame projects – due 4/30	24
27	28 Talk about BioPython Lab time on frame projects	29	30 Test frame projects review	May 1
4 finals	5 Final exam 10:30	6	7	8