Course Syllabus

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POINT·LOMA NAZARENE UNIVERSITY 19 02	**Department: Mathematical, Information and Computer Sciences** **CSC 3002: Python and Unix Scripting for Computational Science** **Number of Units: 2**
Spring 2022	

Meeting days, times, locations:	Instructor title and name:
TR 10:00 - 10:50 LA 1	Dr. Lori Carter, Professor of Computer Science
Phone: (619) 849-2352	**Email:** loricarter@pointloma.edu
Final Exam: Tuesday 10:30	**Office Location:** RS 210 **Please email me to set up a zoom call. I will also respond to email questions.**

PLNU Mission

To Teach ~ To Shape ~ To Send

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 is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

MICS 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.

COURSE 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.

COURSE LEARNING OUTCOMES

- Students will be able to write correct and robust software.
- Students will be able to apply their technical knowledge to solve problems.
- Students will be able to communicate effectively to an interdisciplinary audience.

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. Labs are due on Mondays at midnight. You can turn them in on Tuesday before class for 80%. **After that, late labs are not 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 feedback. 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 responses will be graded. Your presentation will hold the weight of 3 responses. The 2 lowest response 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.** Responses 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 2/1 and 3/24. **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 22.** 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.

ASSESSMENT AND GRADING

3 min. presentations	10%
Midterm	20%
Final Exam	25%
Labs	30%
Quizzes	15%

Final grades will be based on the following:

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

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Practical Computing for Biologists, Haddock and Dunn.

COURSE CREDIT HOUR INFORMATION

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. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 75 total hours meeting the course learning outcomes. An approximate breakdown of the time spent follows:

Assignments	Total Course Hours
Reading: Text and Notes	10
3 minute presentations and preparation	4
Lectures	20
Labs	25

Quizzes and preparation	4
Exams and preparation	12
TOTAL	75

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on **State Authorization (https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures)** to view which states allow online (distance education) outside of California.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are due Monday at midnight. They may be turned in for 70% the next Tuesday before class. Beyond that, late labs are not accepted, but one will be dropped.

Incompletes will only be assigned in extremely unusual circumstances.

PLNU COPYRIGHT POLICY

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.

PLNU ACADEMIC HONESTY POLICY

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 **Academic Policies   (https://catalog.pointloma.edu/content.php?catoid=52&navoid=2919#Academic_Honesty)** for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (**EAC@pointloma.edu** **(https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=EAC@pointloma.edu)** or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

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 th 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.

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.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of 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.

In some courses, a portion of the credit hour content will be delivered **asynchronously** and attendance will be determined by submitting the assignments by the posted due dates. See **Academic Policies** **(https://catalog.pointloma.edu/content.php?catoid=52&navoid=2919#Academic_Honesty)** in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Asynchronous Attendance/Participation Definition

A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result in an absence for that day. Instructors will determine how many asynchronous attendance days are required each week.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

 If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the Office of Spiritual Development.

USE OF TECHNOLOGY

In order to be successful in the online or hybrid environment, you'll need to meet the minimum technology and system requirements; please refer to the *Technology and System Requirements* (https://help.pointloma.edu/TDClient/1808/Portal/KB/ArticleDet?ID=108349) information. Additionally, students are required to have headphone speakers, microphone, or webcams compatible with their computer available to use. Please note that any course with online proctored exams require a computer with a camera (tablets are not compatible) to complete exams online.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

ASSIGNMENTS AT-A-GLANCE

Mon	Tuesday	Wed	Thursday	Fri
	Jan 11	12	13 Intro to course, 3 min presentations, Regular Expressions	14
17 MLK Intro RE lab due	18 **3 min lat/long** More Regular Expressions	19	20 **3 min HTML** Using REs to Extract Web data	21
24 RE lab 1 due	25 Custom char sets, boundaries Ch 3 **3 min on stock information**	26	27 Intro Linux/UNIX Intro to UNIX tutorial to be started in class	28
31 Stock, Intro Unix labs due	Feb 1 Quiz on RE's	2	3 More basic UNIX Chapter 5 with Grep	4

7	8 **3 min on IP addresses** Start work on Grep/IP lab	9	10 Unix Scripting from chapter 6 Start working on First Scripting lab	11
14 Grep/IP, First scripting labs due	15 More scripting with loop, if/else Start 2nd scripting lab	16	17 Review for midterm Intro python, start python lab	18
21 2nd scripting lab, short Python lab due	22 Midterm exam ch 1-6	23	24 Go over midterm Python day 2	25
28	Mar 1 **3 min Codons, Amino Acids, Proteins** Start Python lab 2	2	3 **3 min Java functions** **3 min on DNA Melting** Python day 3 including python loops, functions	4
7 Spring break	8 Spring break	9 Spring break	10 Spring break	11 Spring break
14 Python lab 2 due	15 Python day 4 **ORFS 3 min** Lists, slices, finding ORFs	16	17 Python day 5 **3 min on probability** Dictionaries, blast**,** and probability of finding match	18
21 ORF lab due	22 **3 min on mathematical sets** Menus, mathematical sets	23	24 Python quiz	25

	Introduce lab 4			
28	29 **3 min restriction sites** Files Introduce Anaconda	30	31 Intro turtle module – start python turtle lab	Apr 1
4 Python lab 4 due Turtle lab due	5 **3 min Allele (haploid) presentation** **3 min computer simulations** random module	6	7 Intro Pandas module with in-class exercise	8
11 Pandas lab due	12 **Ethics module on predictive algorithms**	13	14 Easter brk	15 Easter brk
18 Easter brk	19 **3 min image processing** Intro image processing	20	21 Intro image proc with python Introduce image processing labs	22
25 Image processing labs due 4/28	26 Talk about biopython Lab time on frame projects	27	28 Test frame projects review	29
May 2	Final 10:30			

Course Summary:

Date	Details	Due
Mon Mar 8, 2021	📄 **RE and HTML video**	to do: 11:59pm
Mon Mar 15, 2021	📄 **Week 3 video - Intro to Linux/UNIX**	to do: 11:59pm

Date	Details	Due
Mon Mar 22, 2021	📄 **Week 4 video: Grep and other UNIX instructions**	to do: 11:59pm
Mon Mar 29, 2021	📄 **Week 5 videos: More UNIX scripting**	to do: 11:59pm
Mon Apr 12, 2021	📄 **Week 7 videos: Python Strings, Printing, If Statement**	to do: 11:59pm
Mon Apr 19, 2021	📄 **Week 8 video: Loops and Functions in Python**	to do: 11:59pm
Mon Apr 26, 2021	📄 **Week 9 videos: None this week**	to do: 11:59pm
Mon May 3, 2021	📄 **Week 10 videos**	to do: 11:59pm
	📄 **Week 10: Python sets and menus - video**	to do: 11:59pm
Mon May 10, 2021	📄 **Week 11 videos (there are 3 this week!)**	to do: 11:59pm
Mon May 17, 2021	📄 **Week 12 videos**	to do: 11:59pm
Mon May 24, 2021	📄 **Week 13 video: Image Processing in Python**	to do: 11:59pm
Sat Jan 15, 2022	📝 **3 min signups - available at 11:00 AM Thursday** **(https://canvas.pointloma.edu/courses/60912/assignments/751234)**	due by 11:59pm
Mon Jan 17, 2022	📝 **Intro to RE lab** **(https://canvas.pointloma.edu/courses/60912/assignments/751233)**	due by 11:59pm
Thu Jan 20, 2022	📝 **3 min HTML** **(https://canvas.pointloma.edu/courses/60912/assignments/751222)**	due by 10:50am
Mon Jan 24, 2022	📝 **RE Lab 1** **(https://canvas.pointloma.edu/courses/60912/assignments/755269)**	due by 11:59pm
Tue Jan 25, 2022	📝 **3 min Stocks** **(https://canvas.pointloma.edu/courses/60912/assignments/751220)**	due by 10:50am
Mon Jan 31, 2022	📝 **Intro to Linux/Unix lab** **(https://canvas.pointloma.edu/courses/60912/assignments/763206)**	due by 11:59pm

Date	Details	Due
	📝 **Stock Market Data Transformation Lab** **(https://canvas.pointloma.edu/courses/60912/assignments/763205)**	due by 11:59pm