

Syllabus : Data Management for Computational Science



Mathematical, Information, and Computer Sciences

CSC 3022: Data Management for Computational Science

Units: 2

Meeting: TR 12:25-1:20 RS 365

Fall 2021 | August 31-December 10

Instructor: Dr. Lori Carter, Ph.D.

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**Dr. Carter is available at these times for
Office Hours:**

M,W 8:30-9:30, 10:30-12:00

T,R 1:30-2:30

F 10:30-12:00

Please email me to set up a time via zoom
or outside in person.

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.

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 data management in the context of scientific research. Students will explore the data storage and manipulation requirements for biology, chemistry, and physics and learn to choose the correct data management tool for a given situation. Tools include Microsoft Excel (with VBA), Visual Basic, and Microsoft Access. Students will learn to design, create, and query relational databases using the SQLite DBMS and SQL query language.

In addition, students will gain experience with data cleaning, HTML, and JavaScript. Students will be exposed to ethical dilemmas which they might encounter in future work along with ways to uncover and deal with them.

COURSE ORGANIZATION

Class time will be a mixture of lecture and lab time. All slides used during presentations will be available on Canvas.

COURSE LEARNING OUTCOMES

1. Students will understand how data is used in their specific scientific field
2. Students will be able to recommend the correct data management tool (spreadsheet, flat file, database, scripting language, webpage, or other) to use for a particular scientific application
3. Students will be able to build a basic RDBMS and create basic queries
4. Students will gain practice loading and configuring software
5. Students will be able to recognize unclean data and make informed choices on how to clean it
6. Students will consider ethical issues with data management

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

None

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 course delivered over 15 weeks. Specific details about how the class meets the credit hour requirement can be provided upon request. (Based on 37.5 hours of student engagement per credit hour.)

Distribution of Student Learning Hours

Assignment	Hours
Reading: Papers and Notes	10
Lectures and class activities	25
Labs, Lab assignments and other written assignments	30
Written Exams and quizzes including preparation	10
Total	75

ASSESSMENT AND GRADING

Graded Components

Labs, classwork, and homework: Labs and homework are to be completed on an individual basis unless otherwise stated. Points for lab assignments that look too similar will be divided between the participants. When group work is allowed, all group members must be present. Most work will be turned in on Canvas and is due Monday night before midnight. There is a grace period until noon on Tuesday where you can turn in homework and receive up to 80%. Beyond that, **late labs, classwork, and homework are not accepted.** Partial credit can be awarded on incomplete work turned in on time. Students will receive credit for classwork only if they are present, or are absent for a verified emergency. The lowest lab, classwork, or homework grade will be dropped.

Quizzes: There will be 2 synchronous quizzes which will together are worth 15% of your grade. They will cover only material that has not already been tested. They will be more “how-to” and terminology regarding the tools that we have covered in that section. If you will miss a quiz for a school function, you must arrange to take it in advance. If you miss a quiz without giving me prior notice, there is a good chance you will receive a zero unless, of course, there was clearly an emergency. Quizzes are currently scheduled for **September 28 and November 16.** Quizzes will not take the entire class period.

Midterm: The midterm is scheduled for **October 14** and will cover all lecture, discussion, and lab material to that point. These may have “how-to” questions on them, but will also ask questions about the appropriateness or ethical use of a particular tool. If you will miss the midterm for a school function, you must arrange to take it in advance. If you miss the exam without giving me prior notice, there is a good chance you will receive a zero unless, of course, there was clearly an emergency.

Final Exam: The cumulative final exam is scheduled for the Thursday of finals week at 1:30. It will contain questions similar to those on both the midterm and quizzes.

Grading Distribution	Percent
Homework, classwork and Labs	40
Quizzes	15
Midterm	20

Final Exam	25
Total	100

Grading Scale

Approximate minimal percentages required to obtain a given grade are:

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

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 \(https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures\)](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 to be submitted/turned in by the date indicated on Canvas. 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](#) (<http://catalog.pointloma.edu/content.php?catoid=18&navoid=1278>) 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 [_ \(https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=EAC@pointloma.edu\)](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.

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.

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.

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.

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](https://www.pointloma.edu/offices/spiritual-development) (<https://www.pointloma.edu/offices/spiritual-development>)

Expected Schedule

Wk	Mon	Tuesday	Wed	Thursday	Friday
1		Aug 31 (Monday sched)	Sep 1	2	3

				Course organization discussion Classwork on data management. Review/Learn basic Excel – Excel lab 1 assigned	
2	6 Labor Day	7 Excel with more advanced features Excel lab 2 is assigned	8	9 Introductory VBA presentation -introductory labs assigned	10
3	13	14 Introduce If statements and loops in VBA.	15	16 More VBA - Teen births VBA lab	17
4	20	21 More VBA	22	23 Introduce and work on VBA group project – proposal assigned Userforms introduction and online quiz for Homework	24
5	27	28 VBA Quiz in class Intro HTML and the Web	29	30 Work on HTML and group VBA project	Oct 1

6	4	5 Present VBA projects Intro to JavaScript	6	7 Presentation on full stack development Dark Patterns ethics module	8
7	11	12 Discuss e-commerce and dark patterns. Q & A on midterm	13	14 Midterm	15
8	18	19 Introduction to Access and relational databases	20	21 Discuss normalization Access labs assigned	22 Fall Break
9	25	26 Database creation classwork	27	28 Introduce SQLite and SQL Simple DB creation lab with SQL	29
10	Nov 1	2 Presentation on Loading data from text files, where command, view	3	4 SQLite lab 2	5

11	8	9 Present pattern matching and Aggregate functions	10	11 SQLite lab 3	12
12	15	16 SQL Quiz Joins, referential integrity	17	18 Introduction to Data cleaning SQL join lab	19
13	22	23 Data Cleaning in-class exercises part 1	24 Thanks giving	25 Thanksgiving	26 Thanks- giving
14	29	30 Data Cleaning part 2	Dec 1	2 Ethics in data cleaning	3
15	6	7 Ethics in Data Cleaning lab/classwork	8	9 Discuss data cleaning ethics lab Q&A for final	10
finals	13	14	15	16 1:30 final	17