# Point Loma Nazarene University
# CSC 3022: Data Management for Computational Science
# (2 units)
# Fall 2019

**Instructor:**
Dr. Lori Carter, Professor of Computer Science (619) 849-2352
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**Office hours:**
M,W,F 10:30-12:00 TR 8:00-9:30, 1:30-2:00

**Meeting Times and Location:**
TR 12:25-1:20 RS 365

**Text:**
None

**Additional Supplies:**
Laptop

**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.

**Course Learning Outcomes**
- Students will understand how data is used in their specific scientific field
- 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
- Students will be able to build a basic RDBMS and create basic queries
- Students will gain practice loading and configuring software
- Students will be able to recognize unclean data and make informed choices on how to clean it
- Students will consider ethical issues with data management

**Course Organization:**
**Class time** will be divided between lecture and lab.

**Lectures:** Student versions of the lecture slides can be obtained from canvas.pointloma.edu.

**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 **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. The 2 lowest lab, classwork, or homework grades will be dropped.

**Quizzes:** There will be 2 quizzes which will together have the same weight as the midterm. 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 **October 3** and **November 19**. Quizzes will not take the entire class period.

**Midterm:** The midterm is scheduled for **October 24** 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:**

| | |
|---|---|
| Homework, classwork and Labs | 45% |
| Quizzes | 15% |
| Midterm | 15% |
| Final Exam | 25% |

Final grades will be determined as follows:

| | | | | | |
|---|---|---|---|---|---|
| 100-93% | A | 80-82% | B- | 67-69% | D+ |
| 90-92% | A- | 77-79% | C+ | 63-66% | D |
| 87-89% | B+ | 73-76% | C | 60-62% | D- |
| 83-86% | B | 70-72% | C- | 0-59% | F |

**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 you will spend a minimum of 37.5 participation hours per credit hour in your course. The estimated time expectations for this course are shown below:

| Assignments | Total Course Hours |
|---|---|
| Reading: Papers and Notes | 15 |
| Written Assignments | 7 |
| Lectures | 20 |
| Labs and Lab assignments | 28 |
| Written Exams and quizzes | 5 |
| | |
| TOTAL | 75 |

**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 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.

**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. In the Undergraduate Academic Catalog please see http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance

**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 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 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.

**Anticipated Schedule**

| Mon | Tues | Wed | Thurs | Fri |
|---|---|---|---|---|
| Labor day sept 2 | 3 | 4 Classes start | 5 Syllabus, exercise on data management | 6 |
| 9 | 10 Discuss DM, Mini lecture on Excel | 11 | 12 Excel labs 1 and 2 | 13 |
| 16 | 17 Discuss Excel labs, lecture on VB | 18 | 19 VB Lab | 20 Tapia |
| 23 | 24 Lecture on VBA VBA exercise, VBA lab | 25 | 26 Intro HTML, Web | 27 |
| 30 | Oct 1 HTML Tutorial | 2 | 3 **Quiz** (through VBA) Intro to JavaScript, complete webpage | 4 |
| 7 | 8 Intro to Access and relational DBs | 9 | 10 Access labs 1 and 2 | 11 |
| 14 | 15 Access forms, reports, dashboard | 16 FIE | 17 **FIE – Dr. Carter gone** E-commerce and dark pattern module on your own | 18 FIE |
| 21 | 22 Go over ethics module Introduce SQL from Access and SQLite, Install SQLite and do SQL lab 1 | 23 | 24 **Midterm** | 25 Fall Break |
| 28 | 29 Loading data from text files, where command, view | 30 | 31 SQLite lab 2 | Nov. 1 |
| 4 | 5 pattern matching, string, and Aggregate functions | 6 | 7 SQLite lab 3 | 8 |
| 11 | 12 Relational database exercise Joins and referential integrity, lab | 13 | 14 Normalization, Normalization exercise | 15 |
| 18 | 19 **Quiz** Introduce data cleaning | 20 | 21 Meet with groups – work on presentations | 22 |
| 25 | 26 Give data cleaning presentations | 27 Thanksgiving | 28 Thanksgiving | 29 Thanksgiving |
| 2 | 3 Data cleaning exercises | 4 | 5 Continue data cleaning exercises | 6 |
| 9 | 10 Data Cleaning ethics | 11 | 12 Data cleaning ethics Review | 13 |
| 16 | 17 | 18 | 19 final exam 1:30 | 20 |