CSC 3022/3021:
Data Management for Computational Science
3022 – 2 units 3021 – 1 unit
Fall 2025

Point Loma Nazarene University
College of Natural and Social Sciences
Mathematical, Information, and Computer Sciences

PLNU 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.

Instructor:

Professor Noah Spahn
nspahn@pointloma.edu
619 849 2491
RS 210

Meeting Times and Locations:

TR 7:25-8:20 Rohr Science 365

Tentative Office Hours:

TR 8:30 - 9:30 (Office)
By appointment as needed

Final Time:
Friday December 19th 1:30-4:00 p.m.

Required Text (3022)

Collect, Combine, and Transform Data Using Power Query in Excel and Power BI
Gil Raviv Microsoft Press; 1st edition (October 25, 2018)
ISBN-13 : 978-1509307951

Course Description:

CSC3022

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 that they might encounter in future work, along with ways to uncover and deal with them.

CSC3021
A brief introduction to various computing tools for students already competent in computer programming. Students will gain experience in using Excel with VBA, Visual Basic, Microsoft Access, HTML, and JavaScript. The goal of this course is to help expand student awareness of available computing tools and the strengths and weaknesses of each.

Learning Outcomes:

CSC3022
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, ETL process, ...) 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

CSC3021
Students will understand how data is used in their specific scientific field
Students will be able to recommend the correct data management tool to use for a particular 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

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.

Additional Course Information:

Expected time: As this is a 2-unit class (or one unit over half the class), it is normal you may spend 4 - 8 hours outside of class on this material (especially while you are learning the harder concepts).

Cheating: PLNU requires that each student turns in their own work. Turning in someone else's work, turning in work generated by an AI, turning in code a tutor wrote, or turning it code you found online is cheating. This activities will result in a 0.

Cheating on an exam will result in a 'F' in the class.

In addition, if Professor Spahn suspects that you are not turning in your own work or a student does not understand something they turned in or Professor Spahn suspects cheating for any other reasons, that student will have the privilege of explaining to Professor Spahn the assignment, project, or exam in question as well as closely related questions to demonstrate they really do understand the material. Failure to correctly explain this will result in a 0 and/or any other consequences.

Chat GPT (and other online tools) are banned from this class and their use is considered academic dishonesty (e.g., cheating).

Missed Classes: Homework missed due to PLNU activities (i.e., sports teams, choirs, etc), can be turned in the day after the student is back. Missed exams due to emergencies can be made up once the dean of students informs Professor Spahn that PLNU has approved the reason. Non-emergency missed exams will result in a zero. It is the student's responsibility to inform the professor of when they will be gone. Missed class activities, which are due to a non-dean of students' approved emergency, will result in a zero.

Late Assignments: Late assignments will not be accepted in this class.

Grading:

Prepared for Class: Before each class session, students will be given work to complete and concepts to research as part of class participation. Students who attend class and can demonstrate their respective assigned activities in class will be awarded full credit for class on that day. Students who are not fully prepared will earn less than full credit and possibly no credit for the class session. A missed class session will result in zero points for the day. Each Quad, students will be given two grace days where they may choose to earn full credit for a day they might not have been able to fully prepare for or a day which they missed class.

Tests: There will be a test given after each major module in the course. These tests will be assessed and graded to assist students in preparing for the Midterm and Final exam.

Midterm: The midterm is scheduled for October 16th (for those in the single quad class, it will be the final) and will cover all the lecture, discussion, and lab material to that point. These may have "how-to" questions, 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 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 week 16 (Thursday 7:30a).
It will contain questions similar to those on both the midterm and tests.

Assignments are weighted by group:

Group	**Weight**
Class Participation & Assignments	60%
Tests	15%
Final	25%

Grading scale

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

Final Examination Policy

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the Traditional Undergraduate Records: Final Exam Schedules site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

PLNU Policies

PLNU Academic Accommodations Policy

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2533). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an

Accommodation Plan (AP) that outlines allowed accommodations. Professors are able to view a student's approved accommodations through Accommodate.

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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

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. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any accommodations.

LomaBooks Instructions for Students

This course is part of our course material delivery program, **LomaBooks**. *The bookstore will provide each student with a convenient package containing all required physical materials; all digitally delivered materials will be integrated into Canvas.*

You should have received an email from the bookstore confirming the list of materials that will be provided for each of your courses and asking you to select how you would like to receive any printed components (in-store pick up or home delivery). If you have not done so already, please confirm your fulfillment preference so the bookstore can prepare your materials.

Additional Course Information

Additional PLNU policies and practices that apply to this course can be found at the following link: https://docs.google.com/document/d/11BgAANLOJ9tjt837d24EZ181ukM2qzHF/edit

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 4 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.

Expected Schedule

Wk	Topics	Tuesday	Thursday
1	Setup	Introductions and Overview	Excel Basics Overview

2	Data Analysis with Excel + ToolPak	Excel DM - week 1 and 2	Excel DM - week 1 and 2
3	Pivot Tables + Data Analysis Techniques	Excel DM - week 3 and 4	Excel DM - week 3 and 4
4	Data Visualization + Dashboard Design + Practical Case Studies	Excel DM - week 5 and 6	Excel DM - week 5 and 6
5	Visual Basic Introduction + Macros	**Excel DM exam** and wrap up	Excel VBA - week 7
6	VBA Project 1	Excel VBA - week 8	Excel VBA - week 8
7	VBA Project 2 + Final/Mid-Term Exam	Excel VBA - Custom Prob	**Final/Mid-Term**
8	Introduction to Power Query	Excel Power Bi Ch 1	Fall Break
9	Basic Data Prep Challenges	Excel Power Bi Ch 2	Excel Power Bi Ch 2
10	Combining Data from Multiple Sources	Excel Power Bi Ch 3	Excel Power Bi Ch 3
11	Combining Mismatched Tables	Excel Power Bi Ch 4	Excel Power Bi Ch 4
12	Preserving Context	Excel Power Bi Ch 5	Excel Power Bi Ch 5
13	Unpivoting Tables	Excel Power Bi Ch 6	Thanksgiving
14	Advanced Unpivoting Tables	Excel Power Bi Ch 7	Excel Power Bi Ch 7
15	Addressing Collaboration Challenges	Excel Power Bi Ch 8	Presentations
16	Final Exam		**Final** Thursday 7:30-10:00 a.m.