Department of Mathematical, Information, and Computer Sciences

MTH4142 Data Science Project I/MTH4162 Project for Data Analytics Minor I

2 Units

Fall 2025

M | 4:00 PM - 4:55 PM

Meeting location Rohr Science Hall (RS) 265

Final Exam: 12/15 4:30 - 7:00 PM

Instructor Title and Name: Dr. José Manjarrés
Phone: (619) 849-2451
Email: josemanjarres@pointloma.edu
Office Location and Office Hours: RS 276 | MW 8:30 - 9: 30 AM, 1:00 PM - 3:00 PM; T 8:30 - 9: 30 AM; R 1:00 PM - 1:30 PM; F 8:30 - 9: 30 AM, 1:00 PM - 1:30 PM

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

This course follows the complete data science process. Students will work in teams to scope a real-world problem, gather data to answer the question, wrangle the data, model it, validate the models, draw conclusions, and communicate results. The course includes study of the principles of data science and technical communication.
Letter grade.

Prerequisite(s): MTH 3083, Junior Standing, and consent of instructor.

Program and Course Learning Outcomes

Student Outcomes:

1. Understand the fundamental concepts of Python programming language.
2. Manipulate and analyze data using computational tools such as NumPy, Pyplot, and Pandas.
3. Identify the stages of a machine learning project.
4. Implement linear and polynomial regression models and evaluate them using appropriate metrics.
5. Implement classification models and evaluate them using appropriate metrics.
6. Explain and apply the concepts of ensemble learning.
7. Select the appropriate clustering method for a dataset based on problem-specific metrics.
8. Comprehend the ethical implications of different system features in data science and machine learning.
9. Create a comprehensive project integrating various machine learning techniques covered throughout the course that serves a specific individual or population in the real world.

Program Outcomes:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (LO1)
- An ability to communicate effectively with a range of audiences. (LO3)
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. (LO6)
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. (LO7)

Required Texts and Recommended Study Resources

- Bonaretti, S. Learn Python with Jupyter. Available for free at https://www.learnpythonwithjupyter.com/

- A. Géron. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, 3rd edition. O'Reilly. 2022. ISBN: 978-1098125974.

- C. O'Neil. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown. 2016. ISBN: 978-0553418811

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.

Assessment and Grading

This course includes three types of activities: book clubs, homework assignments, and project presentations.

- Book clubs are student-led discussion sessions where everyone in the course participates in meaningful discussions about portions of a book related to course content. Students can get extra credit for other assignments based on the quality of their interventions during the discussion.
- Homework assignments are small practice problems aimed at reinforcing key concepts introduced early in each unit.
- Project presentations are real-life scenarios where the students employ an end-to-end machine learning project framework to solve a problem. Presentations are video recordings where students use client-friendly language to explain their findings about the data and proposed solutions. The final project is an extended version of the project presentations, where students must find a client with data to analyze and then use their knowledge acquired in the course to present a comprehensive study and solution to their client. Final project presentations are conducted in person during the scheduled time for the final exam.

The table below outlines the assessment criteria for this course.

Activity	Points Per Activity	Quantity	Total Points
Homework Assignments	50	4	200
Project Presentations	100	3	300

Final Project	200	1	200
			700

Grades will be based on the following:

Sample Standard Grade Scale Based on Percentages

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

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.

Incompletes and Late Assignments

All assignments are to be submitted/turned in by when they are due—including assignments posted in Canvas. Late assignments are deducted 20% of its grade. Incompletes will only be assigned in extremely unusual circumstances.

Artificial Intelligence (AI) Policy

You are allowed to use Generative Artificial Intelligence (GAI) tools (e.g., ChatGPT, Claude, Gemini, etc.) in this course as a study support tool. You may not use GAI to write content for any kind of evaluation; if you do so, it'll be considered a case of academic dishonesty and prompt disciplinary action.

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.

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

Semester Schedule Outline

Date	Topic	Online Portion
3-sep		Welcome/Python Tutorial
8-sep	The Machine Learning Landscape	NumPy, Pyplot, and Pandas Tutorials
15-sep	Data Exploration	Start Project 1
22-sep	Project 1 Q&R	Submit Project 1
29-sep	Linear Regression and Gradient Descent	Linear Models and Regularization
6-oct	Book Club 1	Homework 2
13-oct	End-to-End ML Projects	Read about Metrics and Start Project 2
20-oct	Classification and Metrics	Submit Project 2
27-oct	Final Project Proposals	Logistic and Softmax Regression
3-nov	SVMs and Decision Trees	Homework 3
10-nov	Ensemble Learning	Start Project 3
17-nov	Project 3 Q&R	Submit Project 3
24-nov	PCA	Start Clustering Materials
1-dic	Clustering and Anomaly Detection	Homework 4
8-dic	Book Club 2	Work on Final Project
15-dic	Final Project Presentations	