Computer Science Department
ICS 552: Machine Learning and Data Science
FINAL PROJECT

Course Code: ICS 552
Semester: Semester I: September to December, 2025
Assigned Date: 1st December 2025
Due Date: 16th December 2025, 11:59pm
Total Points: 100
Weighting: 40% of final grade

Student ID No.: _____

Instructors:

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ASHESI

Masters in Intelligent Computing Systems
Machine Learning and Data Science (September 2025)

Problem Situation 5 (PROSIT 5): Bringing It All Together

Purpose: To test each student's personal mastery of the entire machine learning pipeline, ethical reasoning, and communication skills.

It is the last month of the semester, and the Provost has called a special joint meeting of the Academic Affairs Committee, the Dean of Students, the Admissions Office, the Registrar, and the Ashesi Judicial Council (AJC).

Papers, dashboards, and charts from your previous prosits are scattered across the room.

The Provost begins with a firm but hopeful tone:

"You have helped us understand how students enter Ashesi, how they engage, how they progress, and how early signs can be interpreted responsibly. Now we need to put all the pieces together."

The New Challenge

Ashesi Leadership has provided some additional data:

- Admissions evaluation data for admitted students for selected year groups, indicating which high school they attended, and their results in key subjects (english, math, science, elective subjects).

- Ashesi Judicial Council (AJC) records indicating cases, type (academic misconduct or social misconduct), and verdict (guilty/not guilty).

You now have fragmented but interconnected windows into the student journey, from admissions to graduation.

The following are questions that the leadership has struggled with. Your task is to integrate these data responsibly and **try to answer as many of them as possible**.

- Are there patterns in the admissions data that can be used to predict if a student is likely to struggle academically in their first year?

- Are there patterns in admissions data that can be used to predict if a student is likely to get into trouble (e.g. have an AJC case or be found guilty in an AJC case)?

- Are there patterns in the admissions data and **year 1** data that can be used to predict whether a student is likely to do well in a given major?

- Are there patterns in the admissions data and **year 1** data that can be used to predict whether a student is likely to do poorly in a particular major (e.g. end up failing out or changing their major)

- Are there patterns in the admissions data and **year 1 and 2** data that can be used to predict whether a student is likely to do well in a given major?

- Are there patterns in the admissions data and **year 1 and 2 data** that can be used to predict whether a student is likely to do poorly in a particular major (e.g. end up failing out or changing their major)?

- Is there a significant difference in overall performance (e.g. measured by graduation GPA, number of semesters to graduate, number of failed courses or some other metric) between the groups of students who start out on the different math tracks (calculus track, pre-calculus track, college algebra track)

- Is someone who starts out on the college algebra track likely to be successful in the computer science major?

- Is it possible to have an early prediction (possibly by major) of whether a student will need more than the standard 8 semesters to graduate?

Your Deliverables

- 15-minute in-class presentation, followed by an oral defense
    - Consider the Ashesi Leadership as the audience for your presentation.
    - The oral defense will take the form of a Question and Answer session after the presentation, where we will probe your understanding of the approaches you have used.

- All code/scripts used

Learning Outcomes

- Learning Outcomes from Prosit 1 to Prosit 4

Resources

- Resources from Prosit 1 to Prosit 4