

**MVLA  
2024-2025  
COURSE INFORMATION SHEET**

**Course Title:** Advanced Data Science and Statistics

**School:** Los Altos High School

**UC/CSU requirement:** C/C or Yes/Yes

**MVLA Graduation requirement:** May be used to count toward the two-year math requirement for MVLA graduation.

**Textbook and/or other learning resources:** Interactive Textbook available through Canvas

**Course Description/Student Learning Outcomes:**

This course offers a foundational introduction to statistics and data analysis. Students will learn how to convert real-world variation into data, explore and model this data, and evaluate their models. Students will interact with an online textbook that provides real time feedback and an online notebook (Jupyter) with a gentle introduction to programming in 'R' language.

**Learning Outcomes**

**General Outcomes:**

1. **Analytic Strategy Selection:** Choose appropriate analytic methods based on data characteristics.
2. **Data Organization and Entry:** Use standardized packages (e.g., R) for data management.
3. **Data Analysis Implementation:** Perform analyses manually and using statistical software.
4. **Assumption Checking:** Verify that statistical assumptions are not violated.
5. **Results Interpretation:** Understand and interpret analytical outputs.
6. **Results Reporting:** Present results using APA format (written, tabular, graphical).

**Specific Outcomes:**

1. **Descriptive Statistics:** Describe and apply measures of central tendency and variability.
2. **Sampling and Populations:** Understand the differences between samples and populations, and statistics and parameters.
3. **Variable Types:** Recognize different variable types and levels of measurement.
4. **Statistical Notation:** Use GLM notation for data modeling.
5. **Data Presentation:** Use tabular and graphical methods to present data effectively.
6. **Distribution Characteristics:** Describe the normal curve and related probability issues.
7. **Bivariate Data:** Understand and describe relationships in bivariate data (correlation and regression).
8. **Statistical Procedures:** Differentiate between parametric and nonparametric statistics, including their assumptions and processes.
9. **Probability and Hypothesis Testing:** Understand basic probability, statistical significance, and error types.
10. **Critical Thinking:** Evaluate data, select appropriate analyses, check assumptions, and present findings creatively.

**Course Outline/Units of Study**

1. Statistics: A Modeling Approach, R
2. Understanding Data: Measurement, Values and Variables
3. Examining Distributions
4. Explaining Variation
5. Modeling Variation
6. Quantifying Error
7. Adding an Explanatory Variable to the Model
8. Digging Deeper in Group Models

9. Models With A Quantitative Explanatory Variable
10. The Logic of Inference
11. Model Comparison with F
12. Parameter Estimation and Confidence Intervals

**Assessment and Grading (BP 5121 / AR 5121):** To ensure that every student has an equal opportunity to demonstrate their learning, the course instructors implement aligned grading practices and common assessments with the same frequency.

1. Grading categories and their percentage weights:
  - 45% Assignments (Completing Reading and Interactive Text)
  - 45% Formative Assessments (Jupyter Notebook)
  - 10% Summative Assessment
2. Achievement evidence collected within each grading category:  
Students will be informed of the aligned quantity, weight, and due dates of assignments/assessments in each grading category as much in advance as possible.
3. Grading scales:  
**A** 90% to 100%    **B** 80% to 89%    **C** 70% to 79%    **D** 60% to 69%    **F** 40% to 59%
4. Homework/outside of class practices ([AR 6154](#)):  
Homework is assigned every day the class meets and is due by the next class session unless otherwise stated. Completion of HW is necessary to fully engage in the next class session.
5. Excused absence make up practices ([Education Code 48205\(b\)](#)):  
**Homework/Classwork:** All assignments should be completed according to the due dates. If you are absent, you will have one day to complete the assignment for each day you are absent; but you will be required to keep up with current assignments while you are making up work. For one-day excused absences, homework is due and tests must be taken the day a student returns to class. Upon returning from excused absences, contact your teacher for any assessments that you may have missed. Homework must be turned in before the corresponding exam to receive partial credit. Students with an excused absence must communicate with instructor on material missed.
 

**Quizzes:** Missed quizzes due to excused absence will be replaced by the unit test score.

**Tests:** Arrangements must be made by the student with the instructor to make up a missed test in the testing center by the next class meeting.
6. **Academic integrity violation practices ([LAHS Academic Integrity Policy](#)):**  
Honesty, trust and integrity are vital components of the education process. The Governing Board believes that academic honesty and personal integrity are fundamental components of a student's education and character development. The Board expects that students will not cheat, lie, plagiarize or commit other acts of academic dishonesty. Students and families should understand and act upon the values of academic integrity and should encourage the highest standards of academic behavior from themselves and their peers.

It is assumed that all work completed for a class is original work created for that class, for a specific assignment. Please refer to the Academic Integrity policy in the student handbook. For categories A and B, the "V" will be worth zero with no opportunity of point recovery. For violations in category C students will receive a failing grade in the course.

Below are examples of each category:

**Category A: Minor Violations**

This category involves violations related to smaller assignments such as classwork and homework.

Examples:

- Using an online answer key (either teacher-made or from a third party) and claiming the work as one's own.

- Using technology in an unethical manner to complete assignments, including but not limited to cell phone applications (such as PhotoMath, Mathway, Symbolab, etc.), use of Ai technology, and sharing pictures via social media websites.

### **Category B: Major Violations**

This category involves violations related to major grade book entries such as quizzes, tests, projects, and final exams.

Examples:

- Sharing or requesting any information from a test with another student who has or has not taken the test.
- Unauthorized use of technology during an exam (e.g., cell phone, smart watch, etc.).
- Violating any assessment rule provided by the teacher within the parameters of the assessment.

### **Category C: Severe Violations**

This category involves severe violations that compromise the integrity of the educational process.

Examples:

- Accessing a teacher's gradebook to alter grades.
- Stealing any assessment from the class that is not authorized by the teacher to leave the classroom.

7. Late work practices:

**Homework:** No late assignments will be accepted for unexcused absences. It is the student's responsibility to determine what work is missing when they are absent.

8. Revision practices:

9. Extra credit practices: None

10. Additional grading practices: None

11. LMS Used: CANVAS

### **Instructors' email addresses:**

[Laraine.Ignacio@mvla.net](mailto:Laraine.Ignacio@mvla.net)

### **Additional information:**

SIS will be updated every two weeks.

Supply list:

- Computer, charged everyday
- Notebook or Binder Paper
- Binder