Sample Data Science for All Course Proposal

Summary Description

1. **Course [Prefix, Number, Generic Title](#):** DATA 101

2. **Specific Name (title) of Selected Topic** *(title will appear in class schedule and on a student's transcript and is limited to 30 characters):*

Options:

- Data Science for All
- Data Science Principles
- Data Science Foundations

3. **Course Description**

Explore fundamental concepts and tools in data science, including data analysis, visualization, and basic statistical techniques. Suitable for students of all majors, with an emphasis on practical applications across diverse fields. No prior coding or statistics experience required.

7. **Briefly explain the need for the course**

This course is a strategic addition to our curriculum, offering essential data science skills to students of all majors. It prepares them for a data-centric world, enhancing their analytical and critical thinking abilities. This foundational knowledge will support their academic success across disciplines and boost their future career prospects.

II. Syllabus

Note:
- Excerpts from already prepared materials may be "copied & pasted" into this section. **Please do not attach a separate document.**

A. **Learning Outcomes**
What should students know or be able to do after taking this course?

By the end of this course, the students will be able to:

1. Translate information needs into precise questions answerable with data
2. Identify data sources and methods of collecting data
3. Use tools to organize, manipulate, summarize, and analyze tabular data
4. Use software to produce data visualizations, including: scatterplots, bar charts, line graphs, and other multivariable visualizations
5. Interpret descriptive statistics, including measures of relative frequency, central tendency, variability, association, and comparison

6. Interpret probabilities and measures of risk, and recognize factors affecting decision-making when faced with uncertainty
7. Recognize limitations and ethical implication of data sources, measurements, analyses, and decisions, with emphasis on how these elements affect marginalized groups
8. Critique decisions and claims that involve using data and statistical analysis

*Prompt engineering is the art of asking the right questions to get the best output from a large language model.

B. **Expanded Course Content**
Provide a week-by-week outline (include readings, discussion topics, lab experiments, activities, assignments, etc.)

Textbook: *Data Science for All* by Hunter Glanz (Cal Poly) and Brennan Davis (Cal Poly), forthcoming from Pearson.

Week	Topic	Readings	Assignment
1	An Overview of Data Science	Chapter 1: What is Data?	*Data challenge 1*
2 and 3	Preprocessing data	Chapter 2: Data Wrangling	*Data challenge 2*
4 and 5	Visualization techniques	Chapter 3: Data Visualization	*Data challenge 3*
6 and 7	Explore data through analysis	Chapter 4: Exploratory Data Analysis	*Data challenge 4*
8 and 9	Manage data through queries	Chapter 5: Data Management	*Data challenge 5*
10 and 11	Probability and uncertainty in data science	Chapter 6: Understanding Uncertainty	*Data challenge 6*
12 and 13	Make inferences from data	Chapter 7: Drawing Conclusions from Data	*Data challenge 7*
14	Generate and interpret machine learning results	Chapter 8: Machine Learning	*Data challenge 8*
15	Supervised learning	Chapter 9: Supervised Learning	
16	Unsupervised learning	Chapter 10: Unsupervised Learning	Final Project

C.	**Assessment Methodologies** List and describe the assessment methodologies that will be used to determine the extent to which students have achieved the Learning Outcomes. 1) Vocabulary and Skill Building – weekly close-ended assessments including multiple choice and numeric answers 2) Applying the Concepts –data challenges that solve problems 3) Final Project – solve a business problem using a dataset applying all weeks' topics