Course Title	Data Science Applications for Social Problems	Instructor(s)	Tunn Cho Lwin
		E-mail	
Class Style	Active Learning and Discussion	Office Hours	
Track		Mode of Instruction	
Credits		Allocated Year	
Active Learning	2-(3) Presentations 3-(5) Symbolized Paraphrases and Summaries 4-(9) Group Work on Questions	Compulsory or Elective	

Course Overview	This course introduces students to the practical use of data science for understanding real-world social problems. Students will learn how to work with data using Python programming, clean and prepare datasets, explore patterns through visualization, build basic regression models, and interpret results in meaningful social contexts. Through guided project work, students will apply what they learn to a social problem dataset and develop experience in data analysis, report writing, and group presentation. The course is designed for students who want to gain useful analytical skills while also learning how data can support better understanding and decision making in society.
Course Objectives	Upon completion of this course, students will be able to: • apply data science concepts to the analysis of real-world social problems. • use Python to import, clean, preprocess, visualize, and analyze data. • build and evaluate basic regression models for prediction and interpretation. • communicate data analysis results clearly and responsibly in written and oral forms.
Prerequisite	None

Course Schedule

No	Contents	Homework
1	Introduction to Social Problems and Data-Driven Thinking	Complete the Python setup.
2	Introduction to Data Science and Understanding the Data	None
3	Python Fundamentals for Data Science	Exercise 1: Practice basic Python tools using the dataset provided in the handout.
4	Python Programming Basics: Conditions, Loops, and Functions	Exercise 2: Practice loops and conditional statements using the flowchart provided in the handout.
5	Data Cleaning and Preprocessing for Data Analysis	**Assignment 1**: Complete the sample dataset preprocessing report and submit it by e-mail.
6	Exploratory Data Analysis and Data Visualization in Python	Exercise 3: Exploratory Data Analysis and Visualization. Read the Matplotlib library materials provided in the handout.
7	Introduction to Regression Models and Prediction I	Exercise 4: Read the handout for regression fundamentals and complete the reading exercise.

	8	Introduction to Regression Models and Prediction II	Exercise 5: Complete the practice exercises provided in the handout.
	9	Model Evaluation and Refinement	Exercise 6: Read the handout on model evaluation and complete the related practice exercises.
	10	**Midterm Test** and Guided Project I: Dataset Introduction and Project Setup	None
	11	Guided Project II: Exploratory Data Analysis and Visualization	**Assignment 2**: Write the findings of the exploratory data analysis section with figures and interpretation and submit it by e-mail.
	12	Guided Project III: Regression Modeling and Results Interpretation	**Assignment 3**: Write the model and results section of the report and submit it by e-mail.
	13	Ethical, Fair, and Responsible Use of Data in Social Problem Analysis	Exercise 7: Read the handout on the ethical use of data.
	14	Preparation for Final Group Work Presentation	Prepare slides and finalize presentation.
	15	**Final Group Work Presentation**	Submit the final group work presentation file and data sources.
Grading	**<u>Assessment</u>** Assignment 1: 15% Assignment 2: 15% Assignment 3: 15% Midterm Test: 25% Final Group Work Presentation: 30% Each group will select or be assigned a raw dataset, report, chart, or statistical topic related to a social issue. Using appropriate analytical tools, the group will organize, analyze, and interpret the data, explain the key findings, identify possible limitations or misleading aspects, and present their conclusions clearly in class.		
Textbooks	No fixed textbook. Handouts and instructor-prepared materials will be used in class.		
References	1. Downey, A. Think Python: How to Think Like a Computer Scientist. Green Tea Press. 2. Downey, A. B. Think Stats: Probability and Statistics for Programmers. Green Tea Press. 3. Pandas; Matplotlib Documentations		
NOTES	Regular attendance and punctuality are expected throughout the course. A respectful and cooperative attitude toward class activities and discussion is required. Electronic devices may be used only for learning purposes during class. In the case of absence, prior notice by e-mail is required whenever possible. Additional instructions will be provided as needed.		