

Course Evaluation & Student Feedback Analysis

This project uses **student course evaluation survey data** to demonstrate how to transform raw feedback into actionable insights using **Python for analysis**.

It highlights how universities and instructors can better understand **teaching effectiveness, course design, and student support systems**.

1. Project Overview

The project integrates one survey dataset:

- **Course Evaluation Data** (student responses to teaching, assignments, clarity, support, and course relevance).

The objective is to extract insights that answer:

- What are the strongest and weakest aspects of teaching?
- How do students rate knowledge, clarity, support, and relevance?
- Are there correlations between categories (e.g., clarity vs overall satisfaction)?
- Which factors influence overall satisfaction the most?

2. Data Understanding

Dataset Used

1. **Course Evaluation Data (feedback_responses.csv)**
 - Fields:
 - Student ID
 - Subject Knowledge
 - Concept Clarity
 - Presentation Use
 - Assignment Difficulty
 - Doubts Solving
 - Course Structure
 - Student Support
 - Course Relevance
 - Granularity: Student-level responses.

3. Methodology

The analysis followed a structured pipeline:

- 1. Data Cleaning (Python, Pandas)**
 - Removed unnecessary columns.
 - Standardized field names.
- 2. Feature Engineering (Python)**
 - Created an **Overall Satisfaction Score** (average of all ratings).
 - Encoded Student IDs into anonymized form.
- 3. Exploratory Data Analysis (Python, Seaborn, Matplotlib)**
 - Descriptive stats for each category.
 - Distribution plots of ratings.
 - Word cloud for open-ended complaints.
- 4. Statistical Analysis (Statsmodels)**
 - Correlation heatmap to check interdependencies.
 - Regression analysis (OLS) to test drivers of overall satisfaction.

4. Results

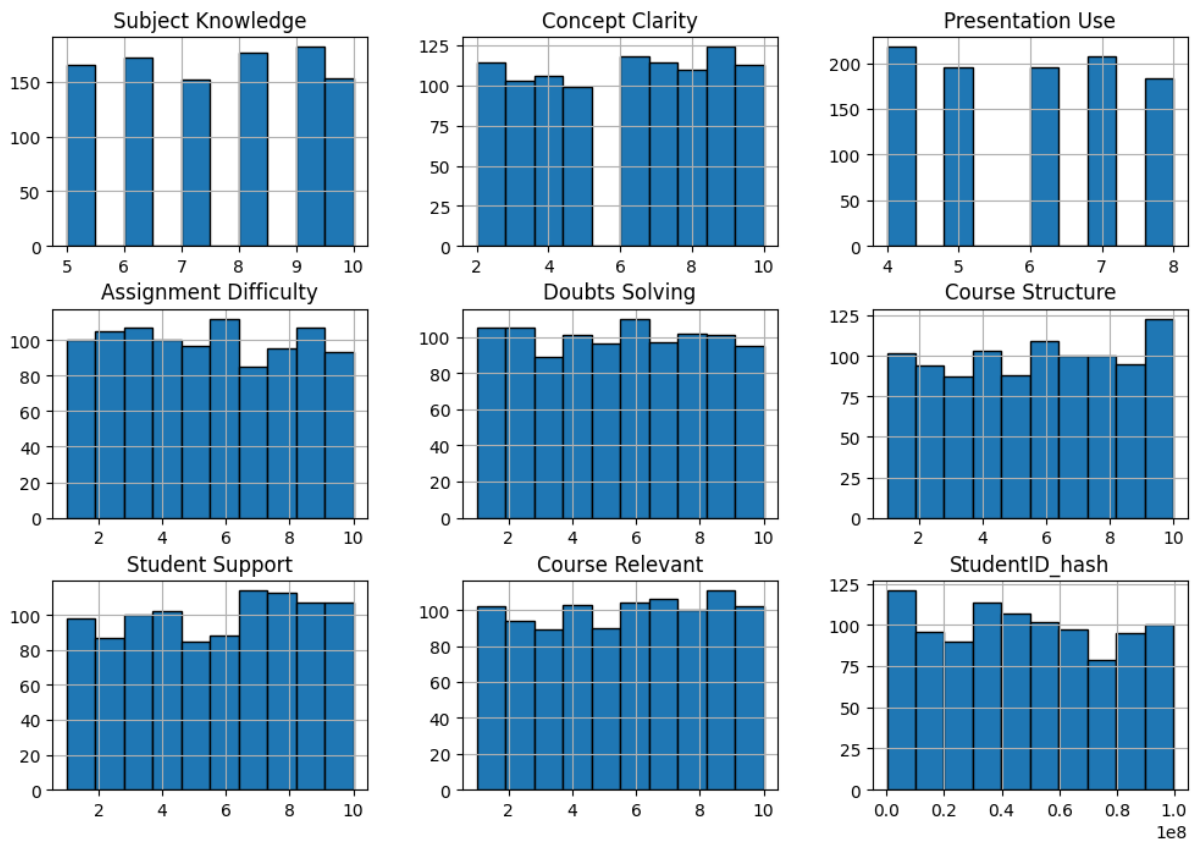
Summary Statistics (Extract)

Category	Mean	Std Dev	Min	25%	50%	75%	Max
Subject Knowledge	7.50	1.69	5.0	6.0	8.0	9.0	10.0
Concept Clarity	6.08	2.60	2.0	4.0	6.0	8.0	10.0
Presentation Use	5.94	1.42	4.0	5.0	6.0	7.0	8.0
Assignment Difficulty	5.43	2.87	1.0	3.0	5.0	8.0	10.0
Doubts Solving	5.47	2.87	1.0	3.0	6.0	8.0	10.0
Course Structure	5.64	2.92	1.0	3.0	6.0	8.0	10.0
Student Support	5.66	2.89	1.0	3.0	6.0	8.0	10.0
Course Relevance	5.60	2.89	1.0	3.0	6.0	8.0	10.0

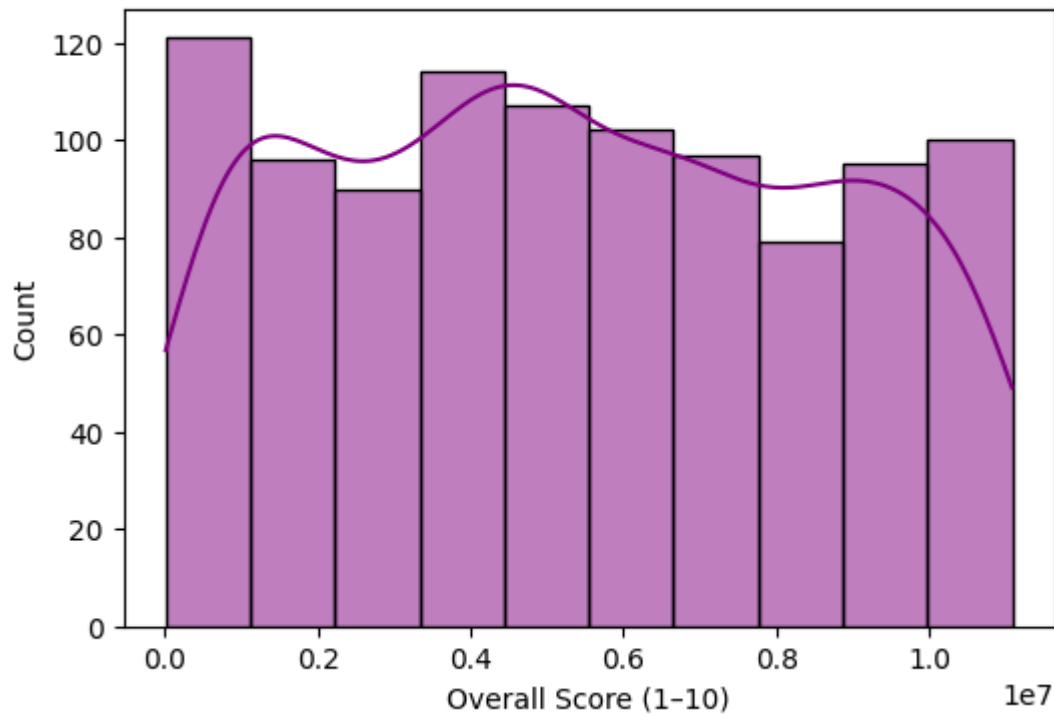
Average Ratings (Overall)

- **Subject Knowledge: 7.50** (highest)
- Concept Clarity: 6.08
- Presentation Use: 5.94
- Student Support: 5.66
- Course Structure: 5.64
- Course Relevance: 5.60
- Doubts Solving: 5.47
- Assignment Difficulty: **5.43** (lowest)

Distribution of Ratings



Distribution of Overall Satisfaction Scores



Regression Analysis (OLS Results)

To understand which factors **drive overall satisfaction**, an OLS regression was performed with *Overall Rating* as the dependent variable and the eight categories as predictors.

Key Findings:

- **$R^2 = 0.012$** → The model explains only 1.2% of variation in overall satisfaction.
- **No single factor is a strong predictor**, but trends were observed:
 - **Student Support** ($p \approx 0.067$) and **Assignment Difficulty** ($p \approx 0.083$) were *marginally significant*.
 - Subject Knowledge, Concept Clarity, Presentation Use, and Course Relevance were **not statistically significant**.

🔴 Interpretation:

Overall satisfaction appears to be influenced by many small factors together, rather than one dominant driver. Improving student support services and balancing assignment difficulty may have the most noticeable positive effect.

5. Key Insights

1. Instructors are knowledgeable (highest average score: 7.5).
2. Concept clarity and presentation need improvement scores are closer to 6.
3. Assignment difficulty, doubts solving, and course relevance are the weakest areas.
4. Student support systems have room to improve, as ratings are below 6 on average.
5. Regression analysis confirms that support and assignment design matter most for satisfaction.

6. Recommendations

1. Maintain strong subject expertise, but focus on delivery and clarity.
2. Balance assignment difficulty so students feel challenged but not overwhelmed.
3. Enhance doubt-solving support (tutorials, Q&A sessions, office hours).
4. Improve course structure and relevance to align with student expectations and industry trends.
5. Strengthen student support to raise overall satisfaction levels.

7. Conclusion

This project demonstrates how survey analytics using Python can uncover both strengths and weaknesses in teaching and learning.

It showcases a complete workflow:

- Data Cleaning → Statistical Analysis → Insights → Recommendations.

8. Tools & Tech Stack

- **Python (Pandas, NumPy)** → Data Cleaning & Pre-processing
- **Seaborn & Matplotlib** → Visualizations
- **Statsmodels** → Regression Analysis
- **WordCloud** → Text Mining (complaints)