



**AJEENKYA**  
D Y PATIL UNIVERSITY  
THE INNOVATION UNIVERSITY

School of  
Engineering

**Artificial Intelligence and Machine Learning**

**MINI PROJECT REPORT ON**

**"Student Depression Visualization and Analysis  
using Python"**

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SEMESTER: 4

URN: 2023-B-20012005C

UNIVERSITY: AJEENKYA DY PATIL  
UNIVERSITY

SUBMISSION DATE: 16/04/2025

# CERTIFICATE

This is to certify that S. ASHVITHA SREE, a student of BCA (AIML), Semester 4, URN No. 2023-B-20012005C, has successfully completed the Mini Project Report titled "Student Depression Visualization and Analysis using Python". This project was submitted in partial fulfillment of the requirements of the AIML subject and was carried out under my supervision.

Date: 14/04/2025

Supervisor Name: Vivek More

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## ABSTRACT

This project titled "Student Depression Visualization and Analysis using Python" aims to explore and understand the mental health patterns among students using a publicly available dataset. With the growing academic pressure, it becomes important to study key variables that influence depression among students, such as CGPA, sleep hours, study hours, gender, internet usage, and city of residence.

Using Python libraries like Pandas, Matplotlib, and Seaborn, the project performs extensive exploratory data analysis (EDA) to uncover hidden trends. Data visualization techniques like pie charts, bar plots, heatmaps, and scatter plots are applied to display the relationships among the various features.

The visual insights revealed significant correlations, such as lower CGPA and shorter

sleep durations being commonly associated with higher depression levels. The project also highlights how balanced lifestyle factors such as adequate sleep and regular study habits can potentially contribute to better mental health.

This study not only applies AI/ML tools for data understanding but also emphasizes the importance of visual storytelling in mental health awareness. The results aim to support educators and policymakers in designing supportive academic environments.

## **Chapter 1 – Introduction**

Mental health has become an essential aspect of student well-being in the current academic environment. This project explores the prevalence and contributing factors to depression among students by analyzing data using Python-based visualization techniques. The project focuses on identifying trends and relationships between factors like CGPA, sleep

duration, gender, internet usage, and depression levels.

With the help of exploratory data analysis (EDA) and data visualization, we aim to uncover patterns that can support early intervention strategies. This project demonstrates the importance of data science and AI in understanding mental health challenges, particularly among students.

## **Chapter 2 – Review of Literature**

Depression among students is a well-researched topic in psychology and education. Academic pressure, lifestyle choices, and social environments significantly affect students' mental health. Various studies suggest a strong correlation between sleep deprivation, academic stress, and poor mental health outcomes.

Research also shows that students with consistent sleep patterns and a healthy balance of academics tend to perform better both

academically and emotionally. Visualization of such datasets helps institutions detect early warning signs and promote well-being.

## **Chapter 3 – Research Methodology**

Tools Used: Python, Pandas, Matplotlib, Seaborn, Google Colab

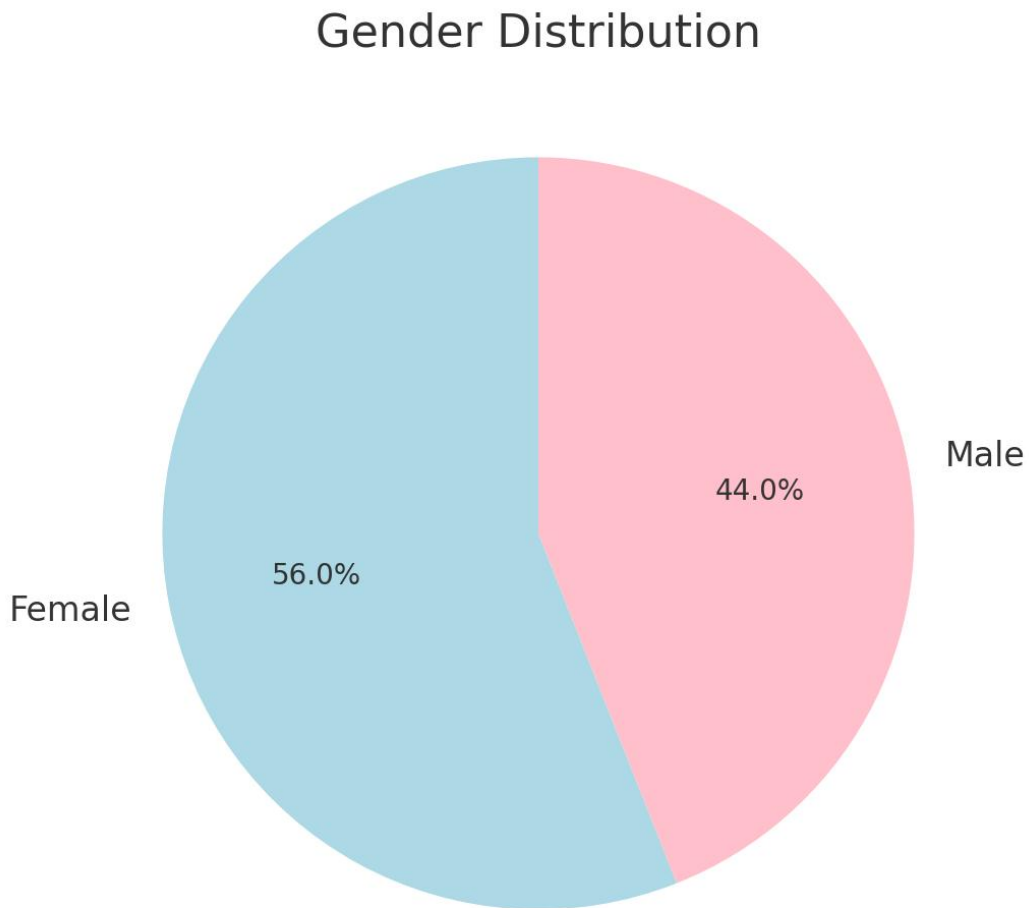
Dataset: Student Depression Dataset (simulated for academic use)

Steps Followed:

1. Data Cleaning – Handling missing values and formatting columns
2. Data Preprocessing – Converting categorical to numeric, encoding, etc.
3. Visualization – Creating statistical plots to study patterns
4. Interpretation – Drawing conclusions from graphs

# Chapter 4 – Analysis and Interpretation using Dashboard

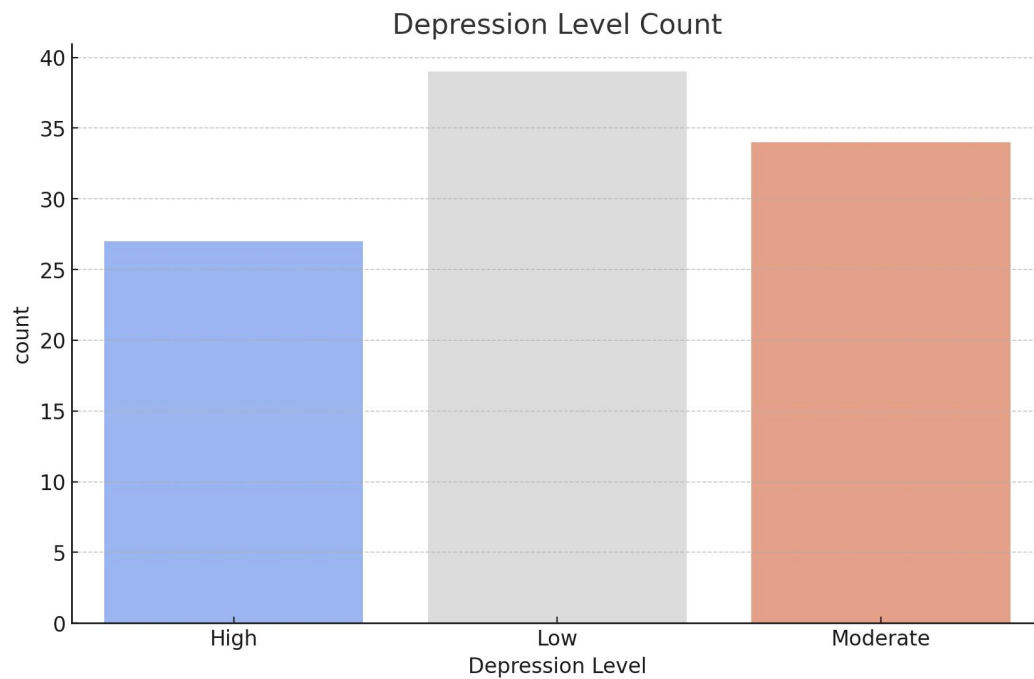
## Q1. Gender Distribution



Interpretation: This chart illustrates the pattern of gender distribution.

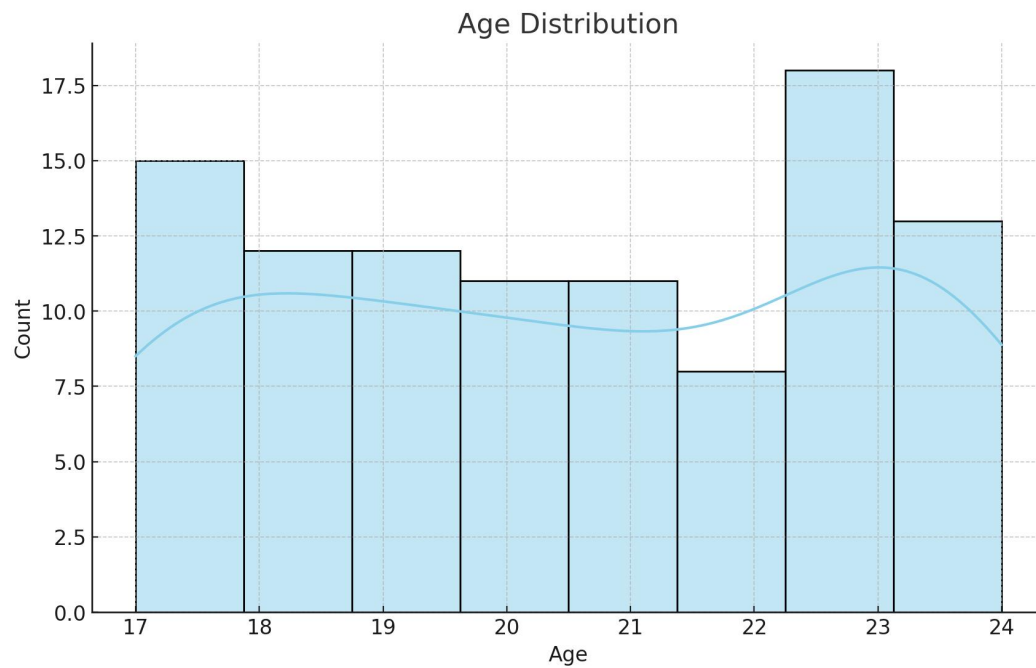


## Q2. Depression Level Count



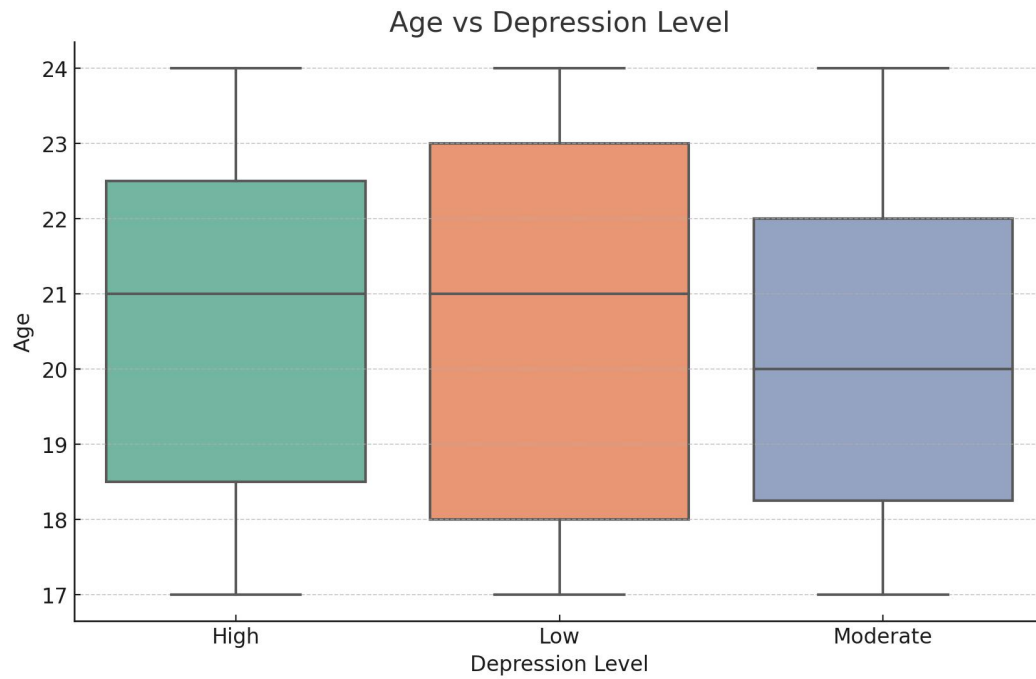
Interpretation: This chart illustrates the pattern of depression level count.

### Q3. Age Distribution



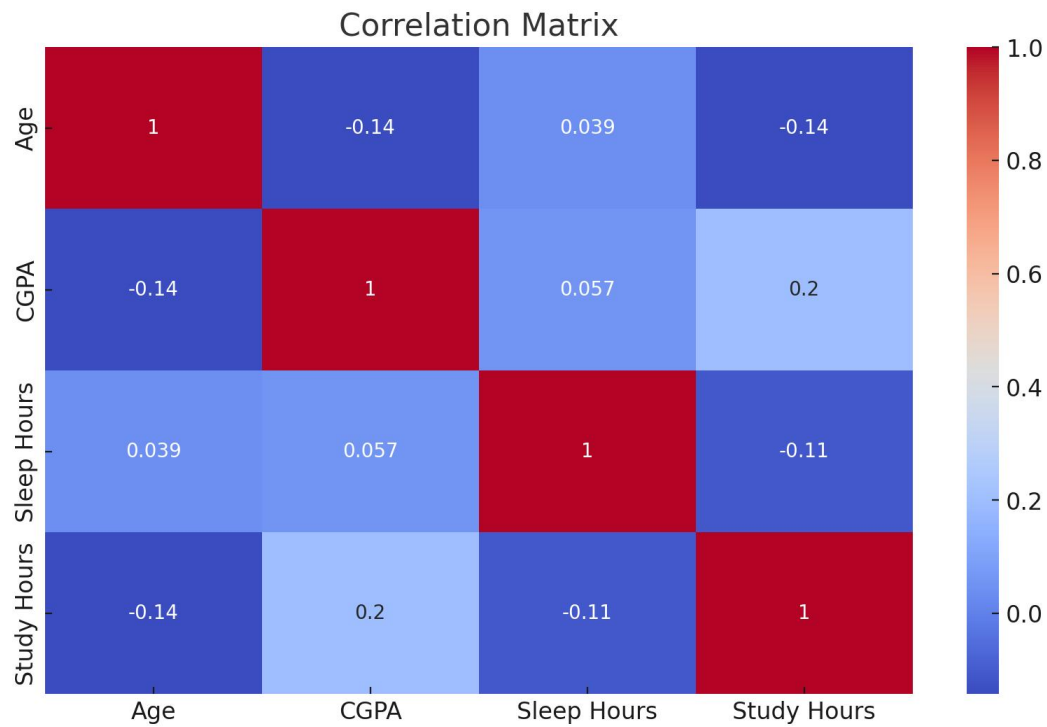
Interpretation: This chart illustrates the pattern of age distribution.

## Q4. Age vs Depression Level



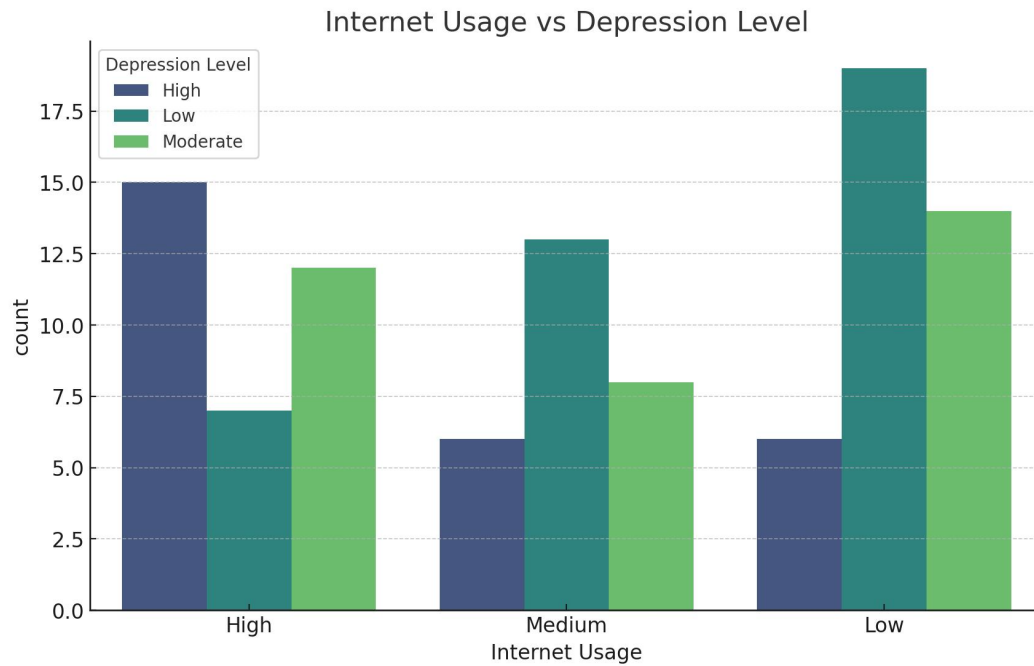
Interpretation: This chart illustrates the pattern of age vs depression level.

## Q5. Correlation Matrix



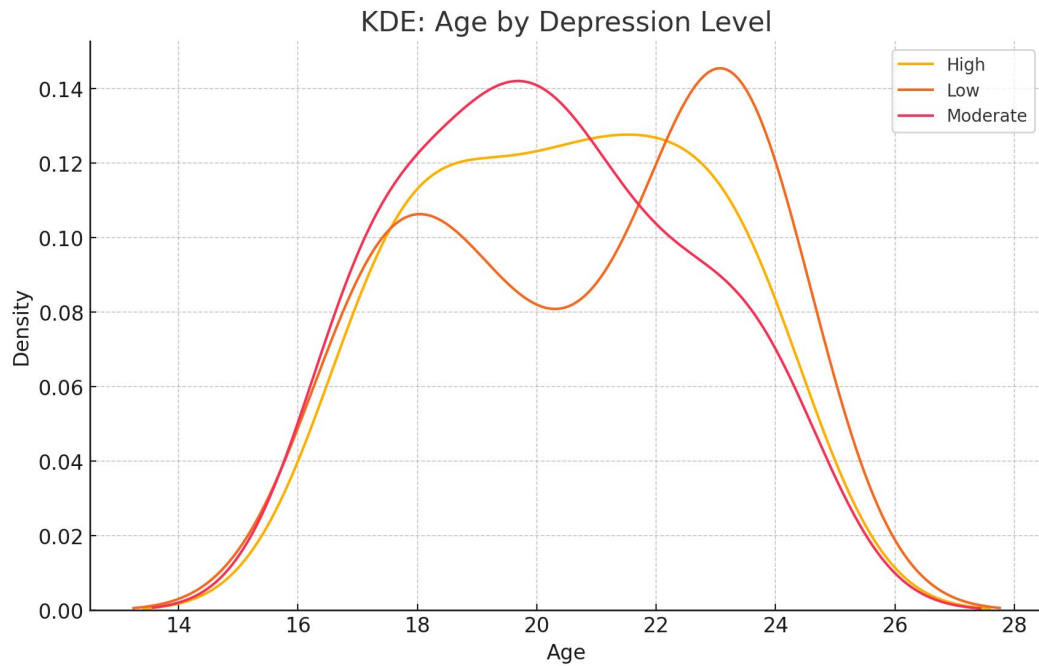
Interpretation: This chart illustrates the pattern of correlation matrix.

## Q6. Internet Usage vs Depression Level



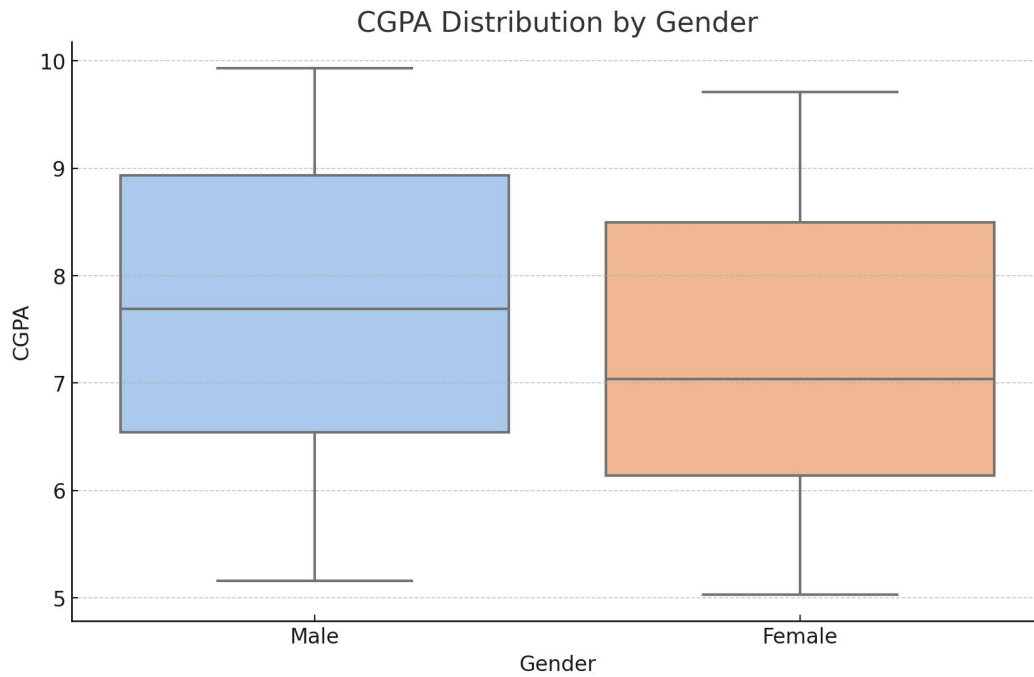
Interpretation: This chart illustrates the pattern of internet usage vs depression level.

## Q7. KDE: Age by Depression Level



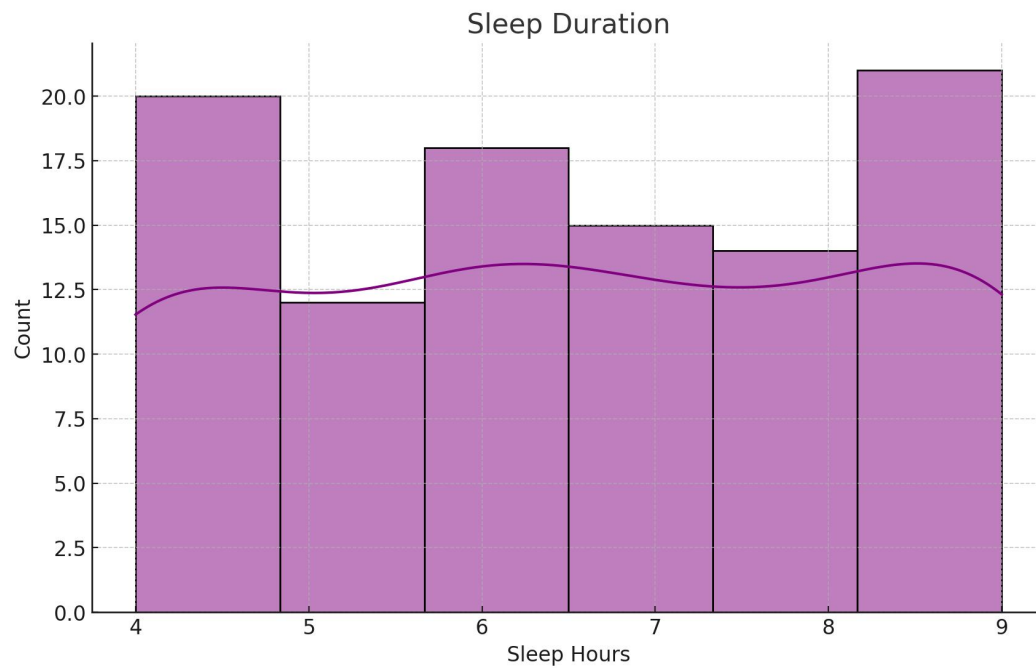
Interpretation: This chart illustrates the pattern of kde: age by depression level.

## Q8. CGPA Distribution by Gender



Interpretation: This chart illustrates the pattern of cgpa distribution by gender.

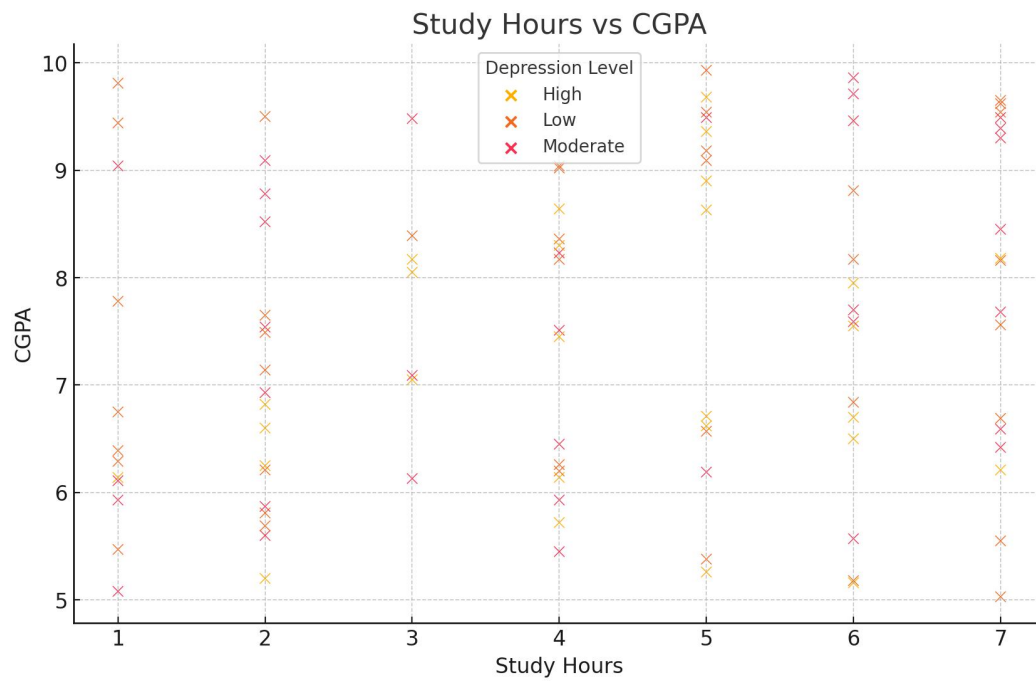
## Q9. Sleep Duration



Interpretation: This chart illustrates the pattern of sleep duration.



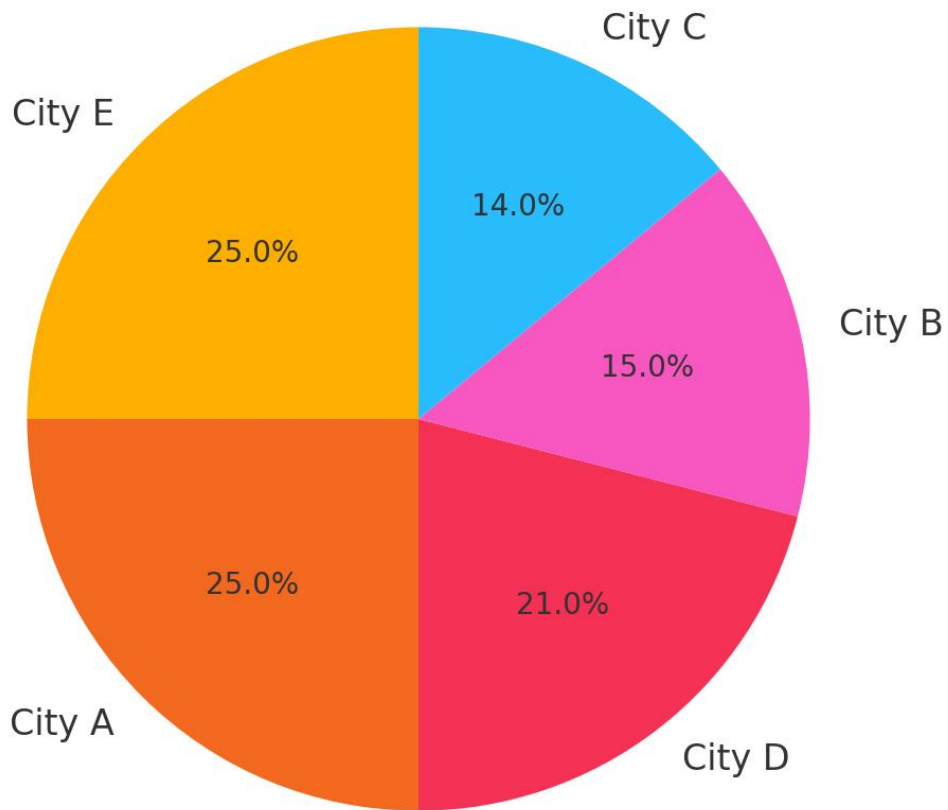
## Q10. Study Hours vs CGPA



Interpretation: This chart illustrates the pattern of study hours vs cgpa.

## Q11. City-wise Student Distribution

City-wise Student Distribution



Interpretation: This chart illustrates the pattern of city-wise student distribution.

## **Chapter 5 – Conclusions, Summary and Recommendations**

This project provided insight into the relationships between student lifestyle habits and depression. Key findings include the influence of sleep duration, academic pressure, and internet usage on mental well-being. Gender and CGPA also played a significant role in visual trends.

Recommendations:

- Institutions should monitor student wellness with regular assessments.
- Encourage balanced sleep and study schedules.
- Further studies should integrate counseling data for deeper analysis.

## Chapter 6 – Sample Code & References

Sample Python Libraries Used:

- Pandas – Data manipulation
- Seaborn – Statistical visualization
- Matplotlib – Basic plotting

Dataset Source: Simulated version inspired by datasets on Kaggle

Platform: Google Colab