```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import LabelEncoder
df=pd.read_csv('/content/Student_Satisfaction_Survey.csv',encoding='latin1')
```

```
df
```

	SN	Total Feedback Given	Total Configured	Questions	Weightage 1	Weightage 2	Weightage 3	Weightage 4	Weightage 5	Average/ Percentage	Course Name	C
0	1	1	12	How much of the syllabus was covered in the cl...	0	0	1	0	0	3.00 / 60.00	FY B.VOC FOOD TECHNOLOGY	B.VOC TECHNC
1	2	1	12	How well did the teachers prepare for the clas...	0	0	0	0	1	5.00 / 100.00	FY B.VOC FOOD TECHNOLOGY	B.VOC TECHNC
2	3	1	12	How well were the teachers able to communicate?	0	0	0	0	1	5.00 / 100.00	FY B.VOC FOOD TECHNOLOGY	B.VOC TECHNC
3	4	1	12	The teacher□s approach to teaching can best be...	0	0	1	0	0	3.00 / 60.00	FY B.VOC FOOD TECHNOLOGY	B.VOC TECHNC
4	5	1	12	Fairness of the internal evaluation process by...	0	0	0	1	0	4.00 / 80.00	FY B.VOC FOOD TECHNOLOGY	B.VOC TECHNC
...	...	...	...	...	...	...	...	...	...	...	...	...
575	16	9	170	The institute/ teachers use student-centric me...	1	0	0	2	6	4.33 / 86.67	TYBSC	BACH OF SC
576	17	9	170	Teachers encourage you to participate in extra...	0	0	0	3	6	4.67 / 93.33	TYBSC	BACH OF SC
577	18	9	170	Efforts are made by the institute/	0	0	1	2	6	4.56 / 91.11	TYBSC	BACH OF SC

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
questions=df['Questions'].unique()
questions
```

```
array(['How much of the syllabus was covered in the class?',
       'How well did the teachers prepare for the classes?',
       'How well were the teachers able to communicate?',
       'The teacher\x92s approach to teaching can best be described as',
       'Fairness of the internal evaluation process by the teachers.',
       'Was your performance in assignments discussed with you?',
       'The institute takes an active interest in promoting internships, student exchange, field visit opportunities for
students.',
       'The teaching and mentoring process in your institution facilitates you in cognitive, social and\nemotional growth.',
       'The institution provides multiple opportunities to learn and grow.',
       'Teachers inform you about your expected competencies, course outcomes and program\noutcomes.',
       'Your mentor does a necessary follow-up with an assigned task to you.',
       'The teachers illustrate the concepts through examples and applications.',
       'The teachers identify your strengths and encourage you to provide the proper level of challenges.',
       'Teachers are able to identify your weaknesses and help you to overcome them.',
       'The institution makes effort to engage students in the monitoring, review and continuous quality improvement of the
teaching-learning process.',
       'The institute/ teachers use student-centric methods, such as experiential learning, participative learning and problem-
solving methodologies for enhancing learning experiences.',
       'Teachers encourage you to participate in extracurricular activities.',
       'Efforts are made by the institute/ teachers to inculcate soft skills, life skills and employability skills to make you
ready for the world of work.',
       'What percentage of teachers use ICT tools such as LCD projectors, Multimedia, etc. while teaching?',
       'The overall quality of the teaching-learning process in your institute is very good.'],
      dtype=object)
```

```
df.isnull().sum()
```

	0
SN	0
Total Feedback Given	0
Total Configured	0
Questions	0
Weightage 1	0
Weightage 2	0
Weightage 3	0
Weightage 4	0
Weightage 5	0
Average/ Percentage	0
Course Name	0
Basic Course	0
Average_Numeric	0
Participation Rate	0
Calculated_Avg	0
Difference	0

```
df.duplicated().sum()
```

```
np.int64(0)
```

```
df['Average_Numeric'] = df['Average/ Percentage'].str.extract(r'(^\d+(?:\.\d+)?)').astype(float)
```

```
Start coding or generate with AI.
```

Top 5 and Bottom 5 Courses by Average Rating

```
course_avg = df.groupby('Course Name')['Average_Numeric'].mean().sort_values()

print("📉 Bottom 5 Courses by Average Rating:")
print(course_avg.head(5))

print("\n📈 Top 5 Courses by Average Rating:")
print(course_avg.tail(5))
```

```
📉 Bottom 5 Courses by Average Rating:
Course Name
MSC DATA SCIENCE - 1    2.7340
SYBSC                   3.2215
SY COMPUTER SCIENCE     3.3545
MSC DATA SCIENCE - 3    3.3670
MSC MICROBIOLOGY - 1    3.3835
Name: Average_Numeric, dtype: float64

📈 Top 5 Courses by Average Rating:
Course Name
SYBMS                           4.357
MSC INFORMATION TECHNOLOGY - 1  4.500
TYBSC                           4.524
MSC ANALYTICAL CHEMISTRY SEM I  4.525
FYBA                            4.550
Name: Average_Numeric, dtype: float64
```

Most and Least Satisfying Questions Overall

```
question_avg = df.groupby('Questions')['Average_Numeric'].mean().sort_values()

print("❌ Least Satisfying Questions:")
print(question_avg.head(3))

print("\n✅ Most Satisfying Questions:")
print(question_avg.tail(3))
```

```
❌ Least Satisfying Questions:
Questions
The teaching and mentoring process in your institution facilitates you in cognitive, social and\nemotional growth.    3.577931
What percentage of teachers use ICT tools such as LCD projectors, Multimedia, etc. while teaching?                    3.582759
The teachers identify your strengths and encourage you to provide the proper level of challenges.                     3.615172
Name: Average_Numeric, dtype: float64

✅ Most Satisfying Questions:
Questions
How well did the teachers prepare for the classes?              4.090000
How well were the teachers able to communicate?                 4.197241
Fairness of the internal evaluation process by the teachers.    4.215517
Name: Average_Numeric, dtype: float64
```

Participation Rate Analysis

```
df['Participation Rate'] = df['Total Feedback Given'] / df['Total Configured']

participation_stats = df.groupby('Course Name')['Participation Rate'].mean().sort_values()

print("🟢 Top 5 Participation Rates:")
print(participation_stats.tail(5))

print("\n🔴 Bottom 5 Participation Rates:")
print(participation_stats.head(5))
```

```
🟢 Top 5 Participation Rates:
Course Name
SY COMPUTER SCIENCE               0.562500
MSC MICROBIOLOGY - 3              0.583333
FY BCOM (BANKING & INSURANCE)     0.606061
FY BCOM (ACCOUNTING & FINANCE)    0.621849
MSC ORGANIC CHEMISTRY - 3         0.772727
Name: Participation Rate, dtype: float64

🔴 Bottom 5 Participation Rates:
Course Name
FYBA                              0.006944
TYBMS                             0.038095
SYBSC                             0.044025
MSC ANALYTICAL CHEMISTRY SEM I    0.047619
MSC INFORMATION TECHNOLOGY - 1    0.047619
Name: Participation Rate, dtype: float64
```

Department-wise (Basic Course) Performanc

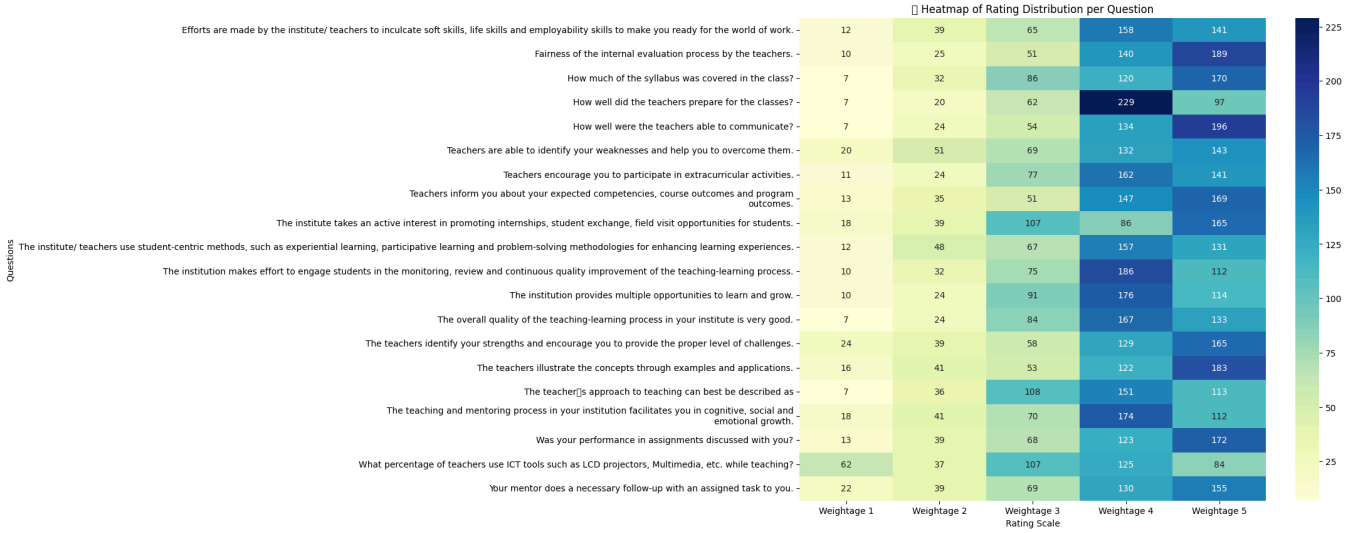
```
dept_avg = df.groupby('Basic Course')['Average_Numeric'].mean().sort_values()

print("🏛️ Department-wise Average Scores:")
print(dept_avg)
```

```
🏛️ Department-wise Average Scores:
Basic Course
MSC DATA SCIENCE                                3.050500
B.SC. COMPUTER SCIENCE                          3.354500
B.VOC FOOD TECHNOLOGY                           3.400000
MSC PHYSICS                                     3.425000
MSC MICROBIOLOGY                                3.538000
MA PSYCHOLOGY                                   3.600500
BACHELOR OF COMMERCE                            3.719000
MSC COMPUTER SCIENCE                            3.845500
BACHELOR OF SCIENCE                             3.852667
MSC ORGANIC CHEMISTRY                           3.972500
MSC ANALYTICAL CHEMISTRY                        4.033750
BACHELOR OF COMMERCE (ACCOUNTING AND FINANCE)   4.075500
BACHELOR OF MANAGEMENT STUDIES                  4.092167
BACHELOR OF ARTS                                4.335000
BACHELOR OF COMMERCE (BANKING AND INSURANCE)    4.350000
MSC INFORMATION TECHNOLOGY                      4.354500
Name: Average_Numeric, dtype: float64
```

Heatmap of Weightage Distribution per Question

```
import seaborn as sns
import matplotlib.pyplot as plt

heatmap_data = df.groupby('Questions')[['Weightage 1', 'Weightage 2', 'Weightage 3', 'Weightage 4', 'Weightage 5']].sum()

plt.figure(figsize=(12, 10))
sns.heatmap(heatmap_data, annot=True, cmap='YlGnBu', fmt='g')
plt.title("🔥 Heatmap of Rating Distribution per Question")
plt.xlabel("Rating Scale")
plt.ylabel("Questions")
plt.tight_layout()
plt.show()
```

```
/usr/local/lib/python3.11/dist-packages/seaborn/utils.py:61: UserWarning: Glyph 146 (\x92) missing from font(s) DejaVu Sans.
  fig.canvas.draw()
/tmp/ipython-input-41-1958092823.py:11: UserWarning: Glyph 128293 (\N{FIRE}) missing from font(s) DejaVu Sans.
  plt.tight_layout()
/tmp/ipython-input-41-1958092823.py:11: UserWarning: Tight layout not applied. The left and right margins cannot be made large enoug
  plt.tight_layout()
/usr/local/lib/python3.11/dist-packages/IPython/core/pylabtools.py:151: UserWarning: Glyph 146 (\x92) missing from font(s) DejaVu Sa
  fig.canvas.print_figure(bytes_io, **kw)
/usr/local/lib/python3.11/dist-packages/IPython/core/pylabtools.py:151: UserWarning: Glyph 128293 (\N{FIRE}) missing from font(s) De
  fig.canvas.print_figure(bytes_io, **kw)
```



Validation of Given vs Calculated Average Scores

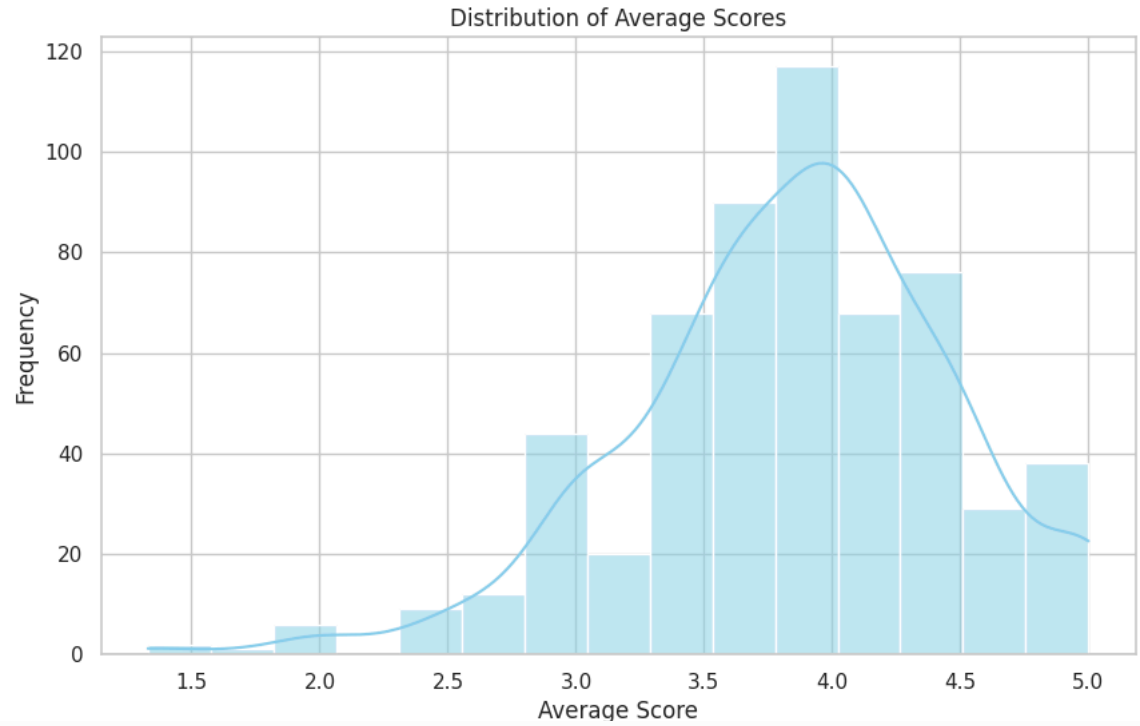
```
df['Calculated_Avg'] = (
    df['Weightage 1']*1 +
    df['Weightage 2']*2 +
    df['Weightage 3']*3 +
    df['Weightage 4']*4 +
    df['Weightage 5']*5
) / df['Total Feedback Given']

df['Difference'] = abs(df['Calculated_Avg'] - df['Average_Numeric'])

mismatches = df[df['Difference'] > 0.1]  # threshold can be adjusted
print("⚠️ Rows where average score might be miscalculated:")
print(mismatches[['Course Name', 'Questions', 'Average_Numeric', 'Calculated_Avg', 'Difference']])
```

```
⚠️ Rows where average score might be miscalculated:
Empty DataFrame
Columns: [Course Name, Questions, Average_Numeric, Calculated_Avg, Difference]
Index: []
```

```
df['Numeric Average'] = df['Average/ Percentage'].str.split('/').str[0].astype(float)

# Descriptive statistics for the numeric average scores
descriptive_stats = df['Numeric Average'].describe()
data=df.copy()
descriptive_stats
```

	Numeric Average
count	580.000000
mean	3.842793
std	0.629038
min	1.330000
25%	3.500000
50%	3.920000
75%	4.250000
max	5.000000

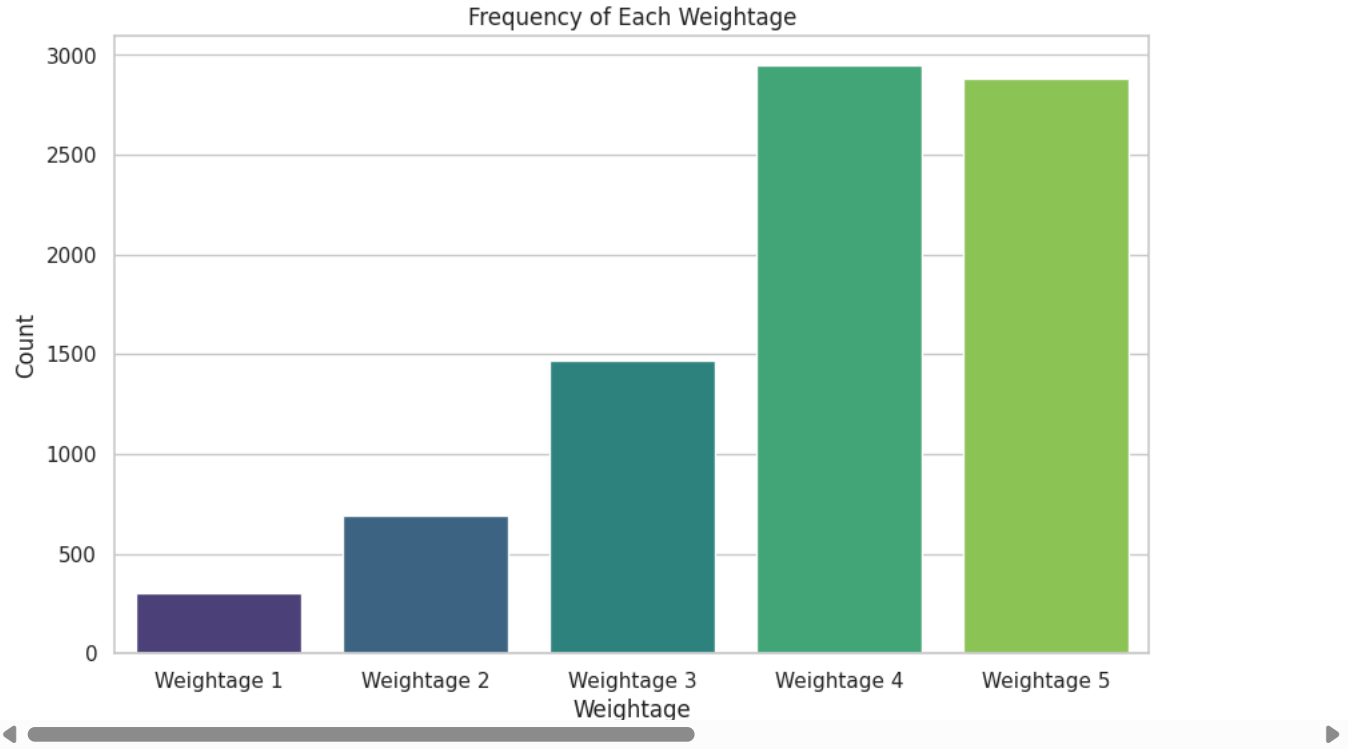
```
import matplotlib.pyplot as plt
import seaborn as sns

# Setting the style
sns.set(style="whitegrid")

# Creating a histogram for the distribution of average scores
plt.figure(figsize=(10, 6))
sns.histplot(data['Numeric Average'], bins=15, kde=True, color="skyblue")
plt.title('Distribution of Average Scores')
plt.xlabel('Average Score')
plt.ylabel('Frequency')
plt.show()
```



The histogram above shows the distribution of average scores. Most scores are clustered around the mean of approximately 3.84, with a noticeable peak near the maximum score of 5.00. This suggests a generally positive feedback trend with a skew towards higher scores.

```
weightage_columns = ['Weightage 1', 'Weightage 2', 'Weightage 3', 'Weightage 4', 'Weightage 5']
weightage_counts = data[weightage_columns].sum()
plt.figure(figsize=(10, 6))
sns.barplot(x=weightage_counts.index, y=weightage_counts.values, palette='viridis')
plt.title('Frequency of Each Weightage')
plt.xlabel('Weightage')
plt.ylabel('Count')
plt.show()
```

```
/tmp/ipython-input-48-3457095170.py:4: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `le

  sns.barplot(x=weightage_counts.index, y=weightage_counts.values, palette='viridis')
```



The bar chart illustrates the frequency of each weightage across all survey responses. It appears that "Weightage 5" is the most frequently assigned score, indicating that on many questions, the highest rating was given. This aligns with the positive skew observed in the average scores.

```
unique_questions = data['Questions'].unique()
unique_questions
```

```
array(['How much of the syllabus was covered in the class?',
       'How well did the teachers prepare for the classes?',
       'How well were the teachers able to communicate?',
       'The teacher\x92s approach to teaching can best be described as',
       'Fairness of the internal evaluation process by the teachers.',
       'Was your performance in assignments discussed with you?',
       'The institute takes an active interest in promoting internships, student exchange, field visit opportunities for
students.',
       'The teaching and mentoring process in your institution facilitates you in cognitive, social and\nemotional growth.',
       'The institution provides multiple opportunities to learn and grow.',
       'Teachers inform you about your expected competencies, course outcomes and program\noutcomes.',
       'Your mentor does a necessary follow-up with an assigned task to you.',
       'The teachers illustrate the concepts through examples and applications.',
       'The teachers identify your strengths and encourage you to provide the proper level of challenges.',
       'Teachers are able to identify your weaknesses and help you to overcome them.',
       'The institution makes effort to engage students in the monitoring, review and continuous quality improvement of the
teaching-learning process.',
       'The institute/ teachers use student-centric methods, such as experiential learning, participative learning and problem-
solving methodologies for enhancing learning experiences.',
       'Teachers encourage you to participate in extracurricular activities.',
       'Efforts are made by the institute/ teachers to inculcate soft skills, life skills and employability skills to make you
ready for the world of work.',
       'What percentage of teachers use ICT tools such as LCD projectors, Multimedia, etc. while teaching?',
       'The overall quality of the teaching-learning process in your institute is very good.'],
      dtype=object)
```

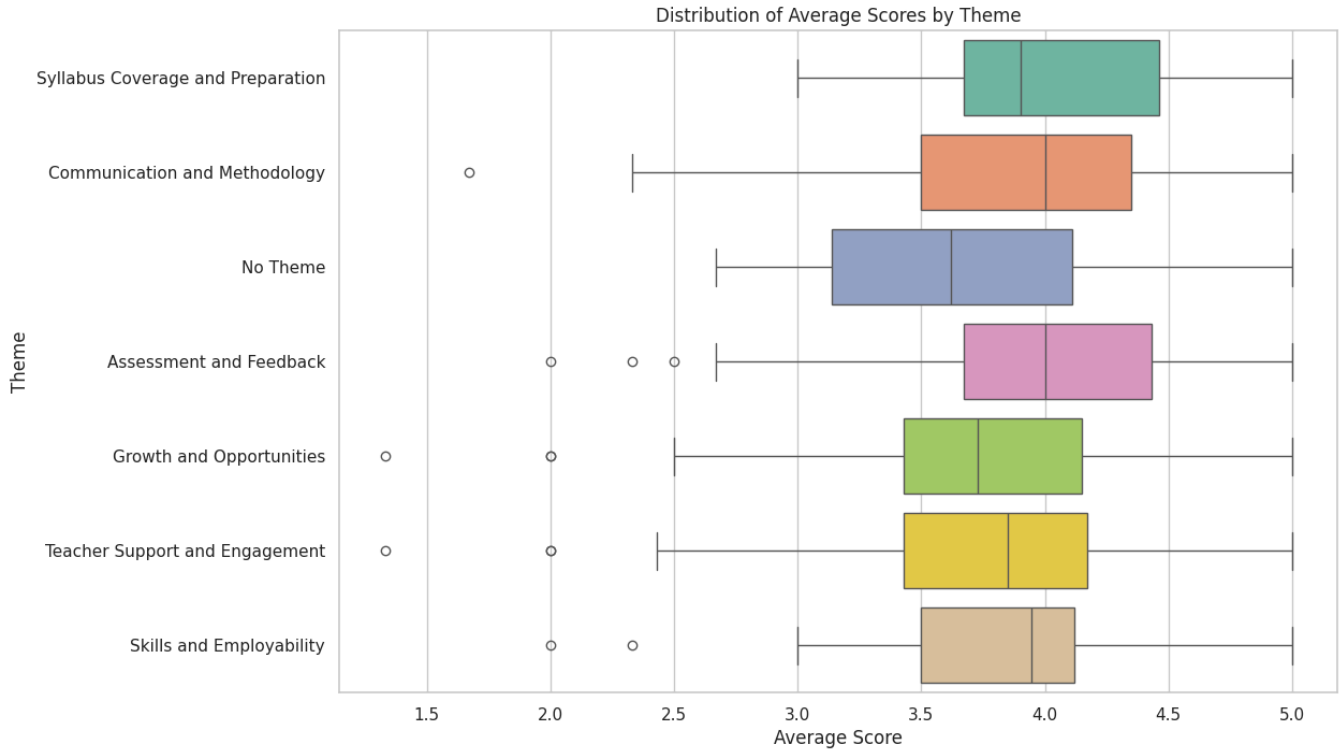
```
themes_mapping = {
    'Syllabus Coverage and Preparation': ['How much of the syllabus was covered in the class?',
                                          'How well did the teachers prepare for the classes?'],
    'Communication and Methodology': ['How well were the teachers able to communicate?',
                                      'The teacher’s approach to teaching can best be described as',
                                      'Teachers illustrate the concepts through examples and applications.',
                                      'The institute/ teachers use student-centric methods, such as experiential learning, participative l
                                      'What percentage of teachers use ICT tools such as LCD projectors, Multimedia, etc. while teaching?'
    'Assessment and Feedback': ['Fairness of the internal evaluation process by the teachers.',
                                'Was your performance in assignments discussed with you?',
                                'Your mentor does a necessary follow-up with an assigned task to you.'],
    'Growth and Opportunities': ['The institute takes an active interest in promoting internships, student exchange, field visit opportun
                                 'The teaching and mentoring process in your institution facilitates you in cognitive, social and emotion
                                 'The institution provides multiple opportunities to learn and grow.',
```

```
                                'Teachers inform you about your expected competencies, course outcomes and program outcomes.'],
    'Teacher Support and Engagement': ['The teachers identify your strengths and encourage you to provide the proper level of challenges.
                                'Teachers are able to identify your weaknesses and help you to overcome them.',
                                'The institution makes effort to engage students in the monitoring, review and continuous quality i
                                'Teachers encourage you to participate in extracurricular activities.'],
    'Skills and Employability': ['Efforts are made by the institute/ teachers to inculcate soft skills, life skills and employability ski
                                'The overall quality of the teaching-learning process in your institute is very good.']
}

data['Theme'] = pd.NA
for theme, questions in themes_mapping.items():
    data.loc[data['Questions'].isin(questions), 'Theme'] = theme
data[['Questions', 'Theme']].drop_duplicates().head(20)
```

	Questions	Theme
0	How much of the syllabus was covered in the cl...	Syllabus Coverage and Preparation
1	How well did the teachers prepare for the clas...	Syllabus Coverage and Preparation
2	How well were the teachers able to communicate?	Communication and Methodology
3	The teacher□s approach to teaching can best be...	<NA>
4	Fairness of the internal evaluation process by...	Assessment and Feedback
5	Was your performance in assignments discussed ...	Assessment and Feedback
6	The institute takes an active interest in prom...	Growth and Opportunities
7	The teaching and mentoring process in your ins...	<NA>
8	The institution provides multiple opportunitie...	Growth and Opportunities
9	Teachers inform you about your expected compet...	<NA>
10	Your mentor does a necessary follow-up with an...	Assessment and Feedback
11	The teachers illustrate the concepts through e...	<NA>
12	The teachers identify your strengths and encou...	Teacher Support and Engagement
13	Teachers are able to identify your weaknesses ...	Teacher Support and Engagement
14	The institution makes effort to engage student...	Teacher Support and Engagement
15	The institute/ teachers use student-centric me...	Communication and Methodology
16	Teachers encourage you to participate in extra...	Teacher Support and Engagement
17	Efforts are made by the institute/ teachers to...	Skills and Employability
18	What percentage of teachers use ICT tools such...	Communication and Methodology
19	The overall quality of the teaching-learning p...	Skills and Employability

```
unmatched_questions = {
    'The teacher’s approach to teaching can best be described as': 'Communication and Methodology',
    'The teaching and mentoring process in your institution facilitates you in cognitive, social and\nemotional growth.': 'Growth and O
    'Teachers inform you about your expected competencies, course outcomes and program\noutcomes.': 'Growth and Opportunities',
    'The teachers illustrate the concepts through examples and applications.': 'Communication and Methodology'
}


data['Questions'].fillna('No Question Provided', inplace=True)
data['Theme'].fillna('No Theme', inplace=True)

for question, theme in unmatched_questions.items():
    data.loc[data['Questions'].str.contains(question, na=False, case=False), 'Theme'] = theme
data['Numeric Average'].fillna(data['Numeric Average'].mean(), inplace=True)
data['Theme'].fillna('No Theme', inplace=True)

plt.figure(figsize=(12, 8))
sns.boxplot(x='Numeric Average', y='Theme', data=data, palette='Set2')
plt.title('Distribution of Average Scores by Theme')
plt.xlabel('Average Score')
plt.ylabel('Theme')
plt.show()
```

```
/tmp/ipython-input-53-1405582078.py:9: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chainec
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col

  data['Questions'].fillna('No Question Provided', inplace=True)
/tmp/ipython-input-53-1405582078.py:10: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chaine
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col

  data['Theme'].fillna('No Theme', inplace=True)
/tmp/ipython-input-53-1405582078.py:14: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chaine
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col

  data['Numeric Average'].fillna(data['Numeric Average'].mean(), inplace=True)
/tmp/ipython-input-53-1405582078.py:15: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chaine
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col

  data['Theme'].fillna('No Theme', inplace=True)
/tmp/ipython-input-53-1405582078.py:18: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `le

  sns.boxplot(x='Numeric Average', y='Theme', data=data, palette='Set2')
```

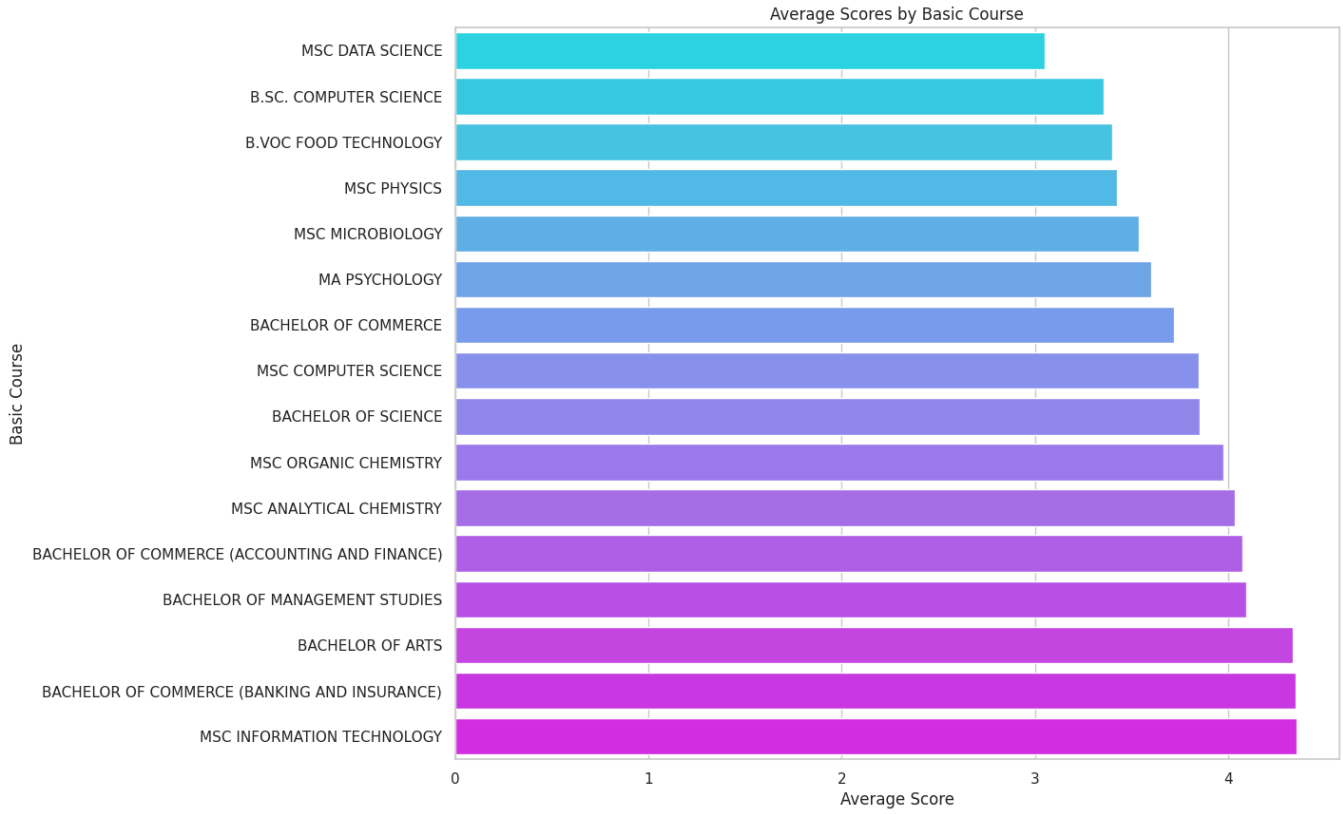


The box plot above displays the distribution of average scores by theme. It shows variation in the median scores and the spread (interquartile range) across different themes, with some themes generally receiving higher average scores than others. This visualization helps in identifying which aspects of the teaching-learning process are viewed more favorably by students and which might need improvement.

```
# Calculating mean scores for each basic course
mean_scores_by_basic_course = data.groupby('Basic Course')['Numeric Average'].mean().sort_values()

# Plotting the average scores by basic course
plt.figure(figsize=(12, 10))
sns.barplot(x=mean_scores_by_basic_course.values, y=mean_scores_by_basic_course.index, palette='cool')
plt.title('Average Scores by Basic Course')
```

```
plt.title('Average Scores by Basic Course')
plt.xlabel('Average Score')
plt.ylabel('Basic Course')
plt.show()
```

```
/tmp/ipython-input-54-4144644196.py:6: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `le

  sns.barplot(x=mean_scores_by_basic_course.values, y=mean_scores_by_basic_course.index, palette='cool')
```



The bar chart above shows the average scores by basic course, providing insights into which courses are receiving more favorable feedback. Courses at the top of the chart have higher average scores, indicating better student satisfaction with the teaching-learning process.

```
Start coding or generate with AI.
```