In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import datetime as dt
import seaborn as sns
```

In [2]:
```
df=pd.read_csv('/Users/4star/Desktop//retail_sales_dataset.csv')
```

In [3]:
```
df
```

Out[3]:

	Transaction ID	Date	Customer ID	Gender	Age	Product Category	Quantity	Price per Unit	Am
0	1	2023-11-24	CUST001	Male	34	Beauty	3	50	
1	2	2023-02-27	CUST002	Female	26	Clothing	2	500	
2	3	2023-01-13	CUST003	Male	50	Electronics	1	30	
3	4	2023-05-21	CUST004	Male	37	Clothing	1	500	
4	5	2023-05-06	CUST005	Male	30	Beauty	2	50	
...	...	...	...	...	...	...	...	...	
995	996	2023-05-16	CUST996	Male	62	Clothing	1	50	
996	997	2023-11-17	CUST997	Male	52	Beauty	3	30	
997	998	2023-10-29	CUST998	Female	23	Beauty	4	25	
998	999	2023-12-05	CUST999	Female	36	Electronics	3	50	
999	1000	2023-04-12	CUST1000	Male	47	Electronics	4	30	

1000 rows × 9 columns

In [4]:
```
#information about dataset
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 9 columns):
 #   Column            Non-Null Count  Dtype 
---  ------            --------------  ----- 
 0   Transaction ID    1000 non-null   int64 
 1   Date              1000 non-null   object
 2   Customer ID       1000 non-null   object
 3   Gender            1000 non-null   object
 4   Age               1000 non-null   int64 
 5   Product Category  1000 non-null   object
 6   Quantity          1000 non-null   int64 
 7   Price per Unit    1000 non-null   int64 
 8   Total Amount      1000 non-null   int64 
dtypes: int64(5), object(4)
memory usage: 70.4+ KB
```

In [5]:
```
#checking description
df.describe()
```

Out[5]:

	Transaction ID	Age	Quantity	Price per Unit	Total Amount
count	1000.000000	1000.00000	1000.000000	1000.000000	1000.000000
mean	500.500000	41.39200	2.514000	179.890000	456.000000
std	288.819436	13.68143	1.132734	189.681356	559.997632
min	1.000000	18.00000	1.000000	25.000000	25.000000
25%	250.750000	29.00000	1.000000	30.000000	60.000000
50%	500.500000	42.00000	3.000000	50.000000	135.000000
75%	750.250000	53.00000	4.000000	300.000000	900.000000
max	1000.000000	64.00000	4.000000	500.000000	2000.000000

In [6]:
```
#size
df.size
```

Out[6]: 9000

In [7]:
```
#shape of dataset
df.shape
```

Out[7]: (1000, 9)

In [8]:
```
#checking for Null values
null_count =df.isnull().sum()
null_count
```

Out[8]:
```
Transaction ID      0
Date                0
Customer ID         0
Gender              0
Age                 0
Product Category    0
Quantity            0
Price per Unit      0
Total Amount        0
dtype: int64
```

In [9]:
```
# Convert 'Date' column to datetime format
df['Date'] = pd.to_datetime(df['Date'])
```

In [10]:
```
print(df['Date'].dtypes)
```

```
datetime64[ns]
```

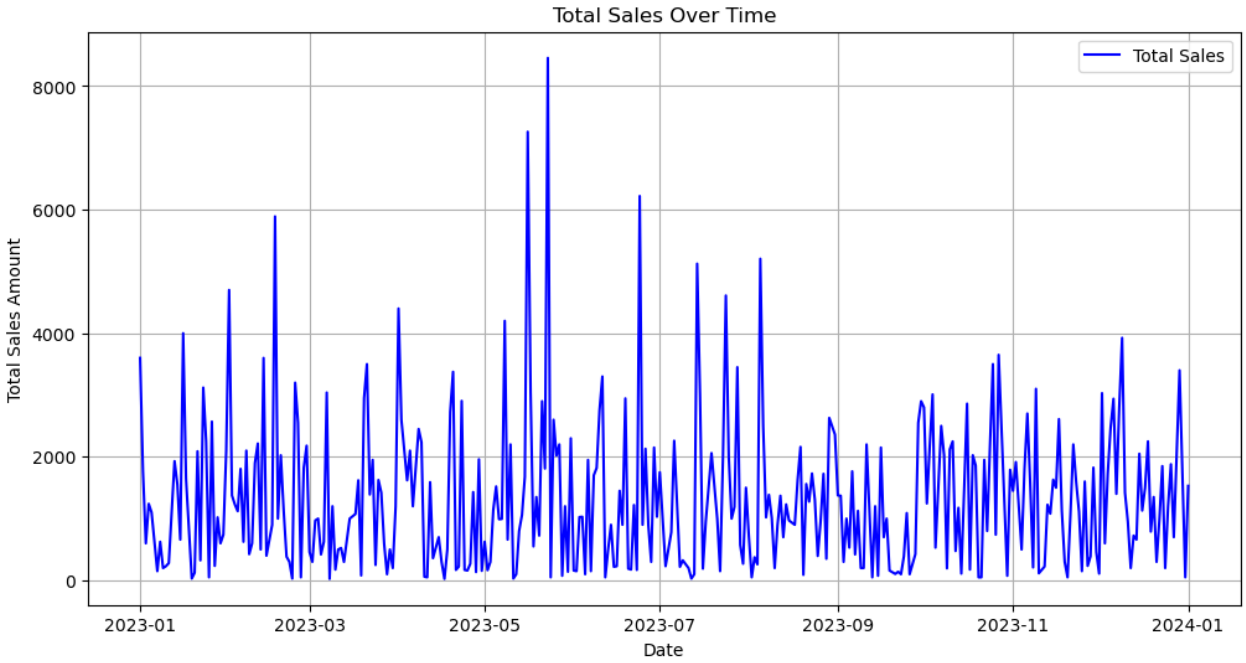
In [11]:
```
# Grouping the data by date to analyze sales trends over time
sales_trends = df.groupby('Date').agg({
    'Total Amount': 'sum',
    'Transaction ID': 'count'
}).rename(columns={'Transaction ID': 'Number of Transactions'})

sales_trends.head()
```

Out[11]:

Date	Total Amount	Number of Transactions
2023-01-01	3600	3
2023-01-02	1765	4
2023-01-03	600	1
2023-01-04	1240	3
2023-01-05	1100	3

In [12]:
```
plt.figure(figsize=(12, 6))
plt.plot(sales_trends.index, sales_trends['Total Amount'], label='Total S
plt.title('Total Sales Over Time')
plt.xlabel('Date')
plt.ylabel('Total Sales Amount')
plt.grid(True)
plt.legend()
plt.show()
```

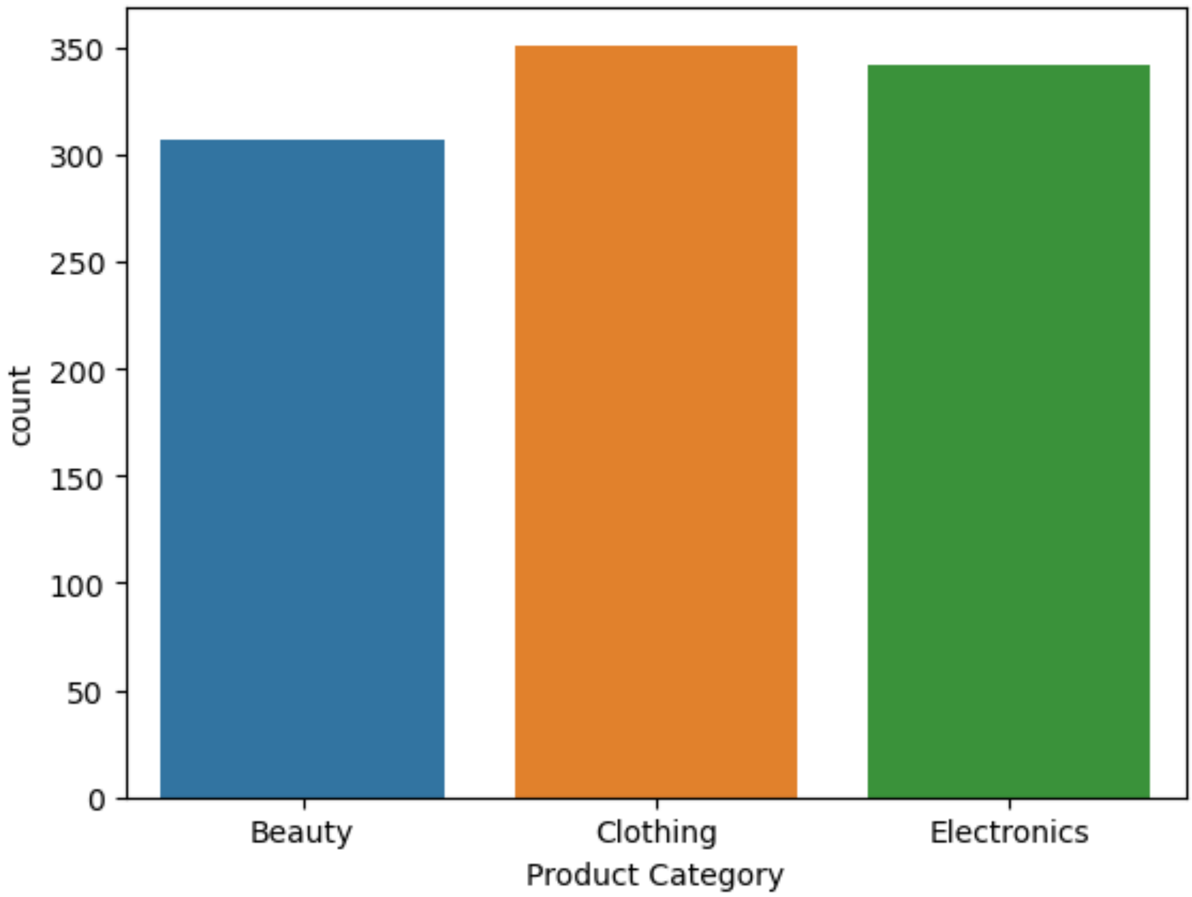


In [13]:
```
df['Product Category'].value_counts()
```

Out[13]:
```
Product Category
Clothing       351
Electronics    342
Beauty         307
Name: count, dtype: int64
```

In [14]:
```
sns.countplot(x=df['Product Category'])
```

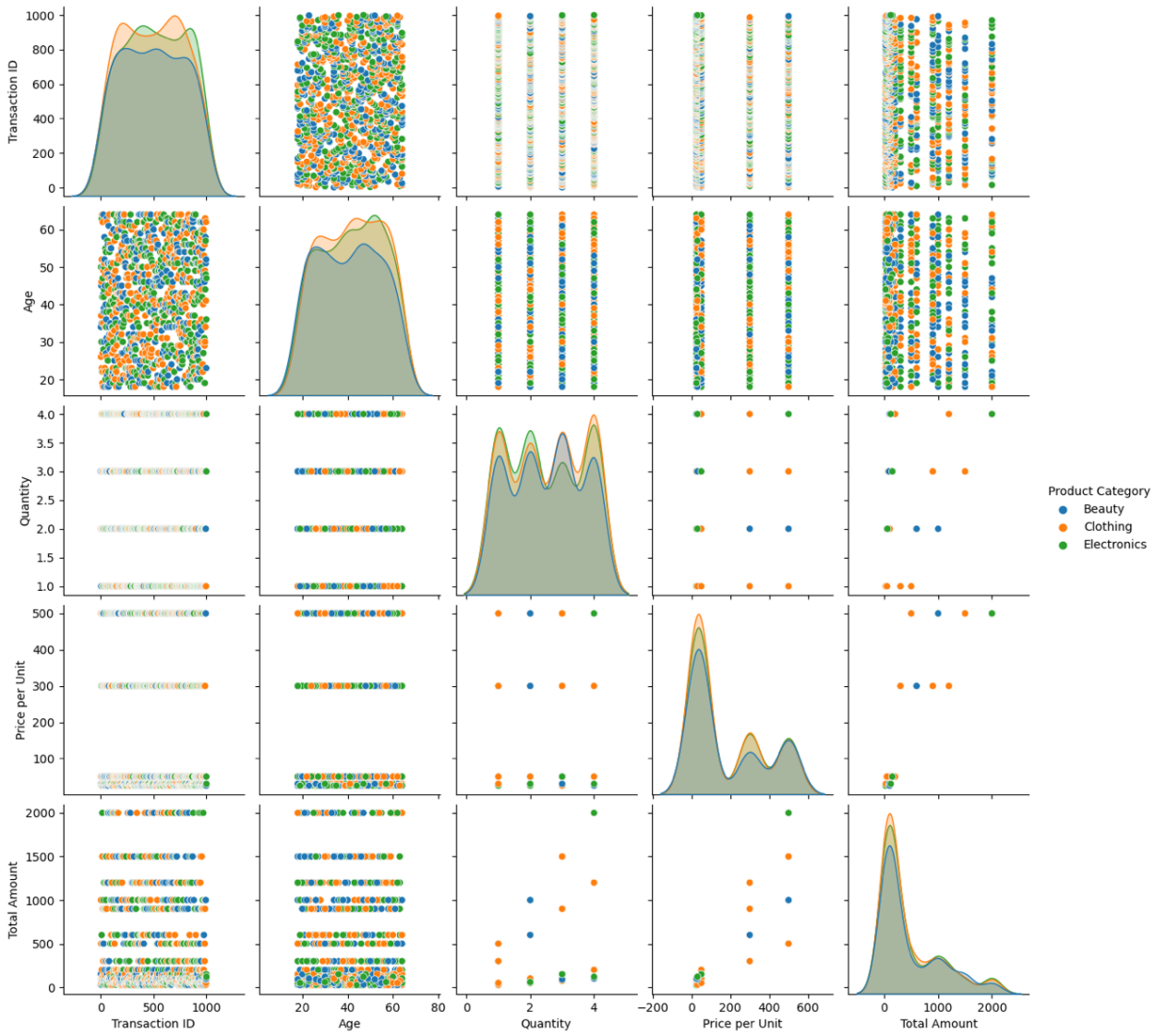
Out[14]:
```
<Axes: xlabel='Product Category', ylabel='count'>
```



In [18]:
```
sns.pairplot(data=df, hue="Product Category")
```

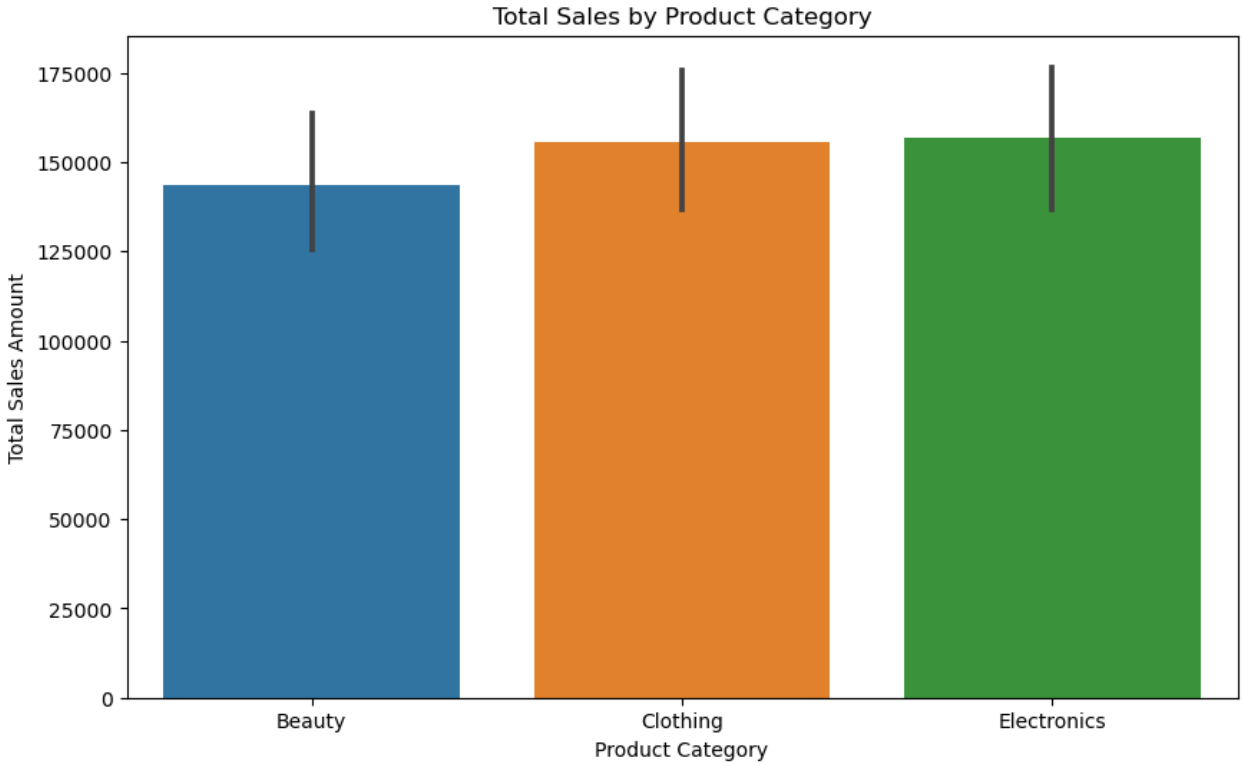
```
/opt/anaconda3/lib/python3.11/site-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/opt/anaconda3/lib/python3.11/site-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/opt/anaconda3/lib/python3.11/site-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/opt/anaconda3/lib/python3.11/site-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
/opt/anaconda3/lib/python3.11/site-packages/seaborn/_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

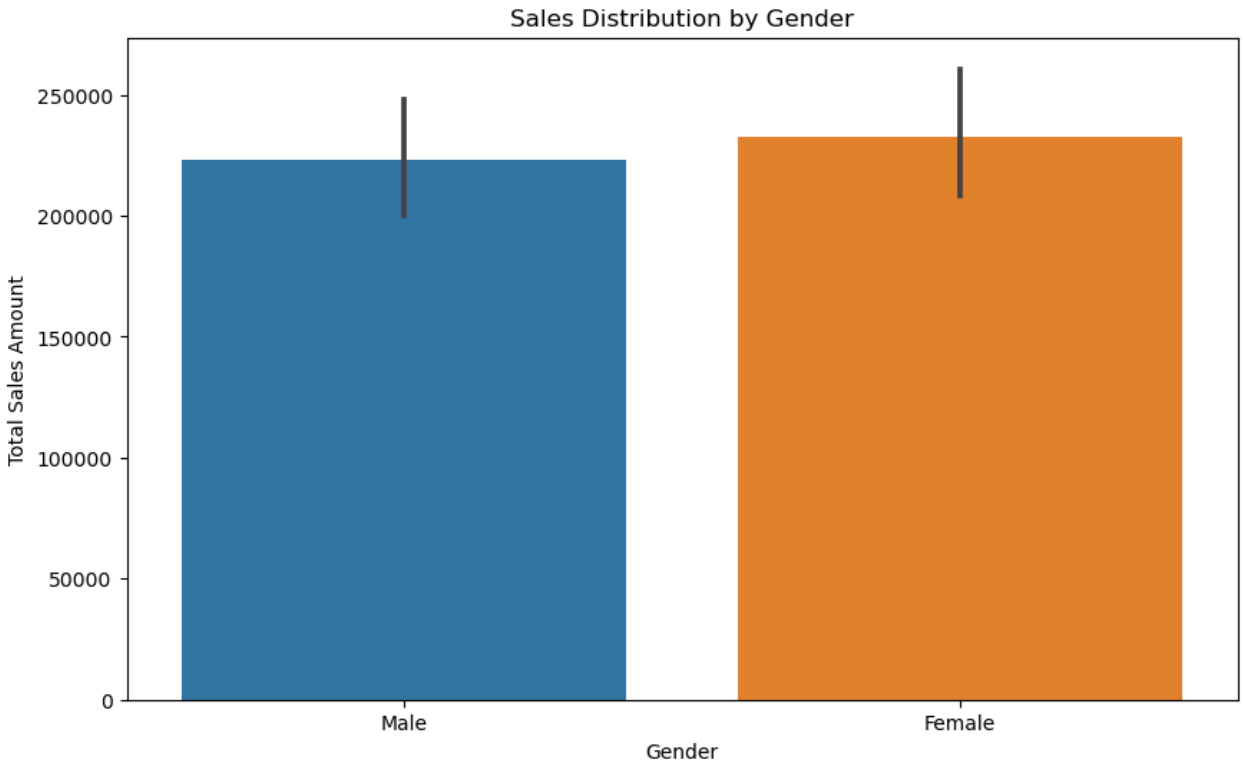
Out[18]: <seaborn.axisgrid.PairGrid at 0x128854950>



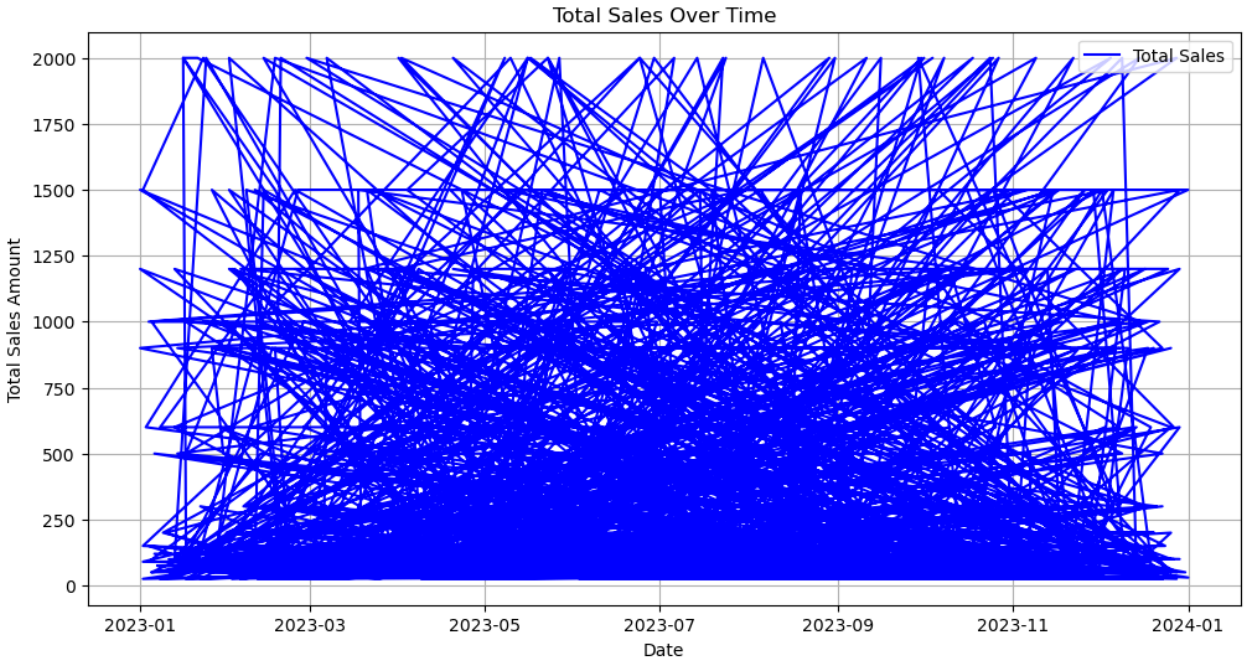
In [19]:
```
# Total Sales by Product Category
plt.figure(figsize=(10, 6))
sns.barplot(x='Product Category', y='Total Amount', data=df, estimator=su
plt.title('Total Sales by Product Category')
plt.ylabel('Total Sales Amount')
plt.show()

# Sales Distribution by Gender
plt.figure(figsize=(10, 6))
sns.barplot(x='Gender', y='Total Amount', data=df, estimator=sum)
plt.title('Sales Distribution by Gender')
plt.ylabel('Total Sales Amount')
plt.show()
```



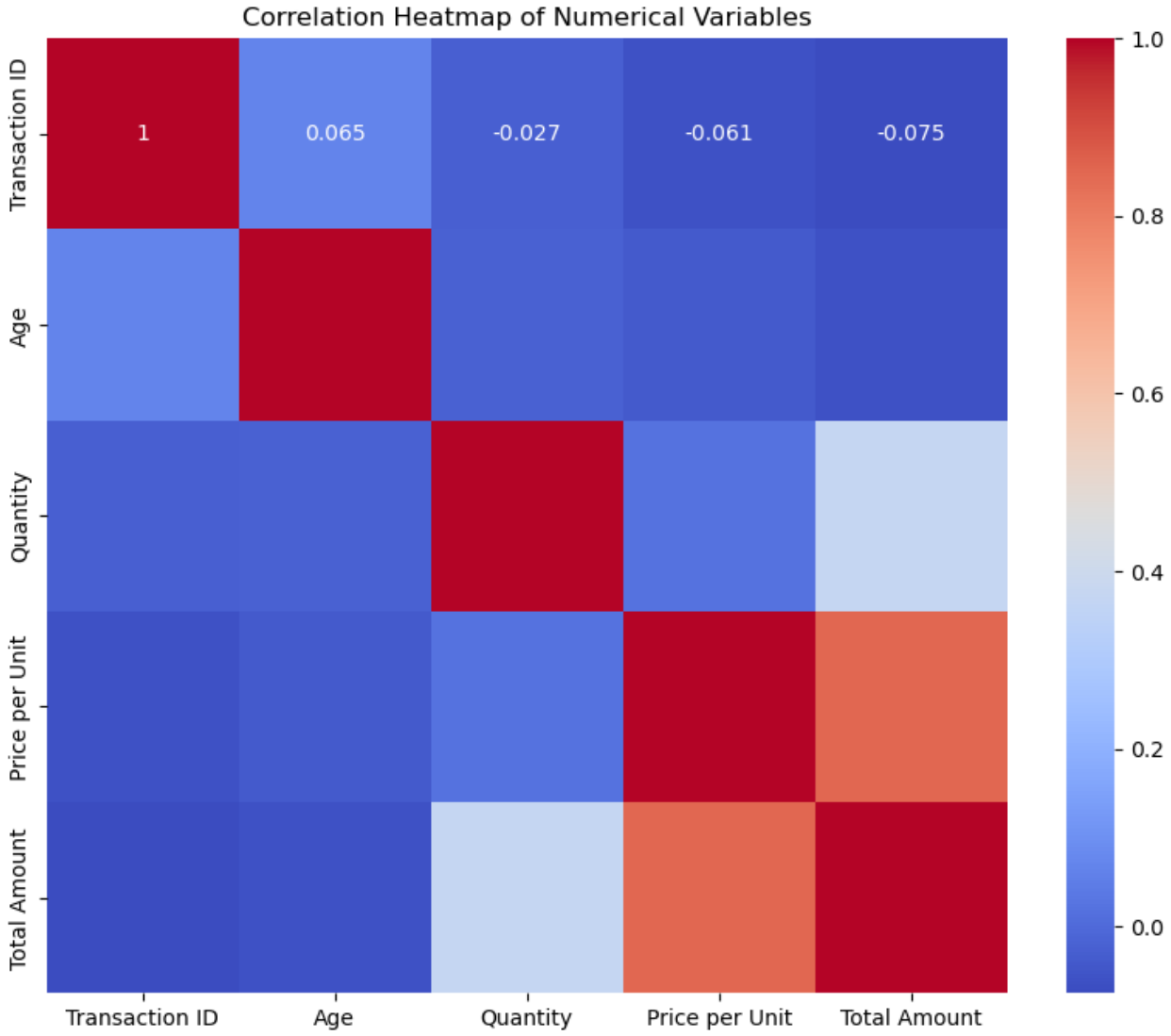


In [20]:
```
# Sales Trends Over Time
plt.figure(figsize=(12, 6))
plt.plot(df['Date'], df['Total Amount'], label='Total Sales', color='blue
plt.title('Total Sales Over Time')
plt.xlabel('Date')
plt.ylabel('Total Sales Amount')
plt.grid(True)
plt.legend()
plt.show()
```



In [25]:
```
# Select only numerical columns
numerical_df = df.select_dtypes(include=['number'])

# Correlation Heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(numerical_df.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap of Numerical Variables')
plt.show()
```


Correlation Heatmap of Numerical Variables
Transaction ID
Age
Quantity
Price per Unit
Total Amount
1
0.065
-0.027
-0.061
-0.075
1.0
0.8
0.6
0.4
0.2
0.0

In [ ]: