```
import pandas as pd

# location of data  'order_data.xlsx'
data = pd.read_excel(r"C:\Users\tina\OneDrive\Desktop\tina-project\order_data.xlsx")


# some missing 'Purchase_Date' information.
def impute_purchase_date(row):
    user_id = row['User_ID']
    product_id = row['Product_ID']

    # I guess the purchase date based on other purchases
    # by the same user. For example, what was the average purchase date
    # for this user?

    # (Replace this actual logic to find a suitable substitute)
    average_purchase_date = data[data['User_ID'] == user_id]['Purchase_Date'].mean()

    # Let's use that average date as a guess for the missing one
    return average_purchase_date

# Now I can use this function to fill in the missing 'Purchase_Date' values
data['Purchase_Date'] = data.apply(lambda row: impute_purchase_date(row)
                                   if pd.isna(row['Purchase_Date']) else
row['Purchase_Date'],
                                   axis=1)


# Finally, I can save this cleaned data to a new Excel file
data.to_excel('cleaned_data.xlsx', index=False)  # Adjust filename as needed
print("Cleaned data exported to cleaned_data.xlsx")
```

	User_ID	Product_ID	Purchase_Date	Price	Category
0	1001	P1001	2021-01-01 00:00:00	49.99	Electronics
1	1001	P1002	2021-01-03 00:00:00	19.99	Home and Kitchen
2	1001	P1003	2021-01-10 00:00:00	NaN	Electronics
3	1001	P1004	2021-01-15 00:00:00	9.99	NaN
4	1002	P1001	2021-02-02 00:00:00	NaN	Electronics
5	1002	P1002	2021-02-03 00:00:00	19.99	NaN
6	1002	P1003	2021-02-08 00:00:00	149.99	Electronics
7	1003	P1002	2021-03-05 00:00:00	19.99	Home and Kitchen
8	1003	P1004	2021-03-06 00:00:00	NaN	Beauty
9	1004	P1001	2021-04-02 00:00:00	49.99	Electronics
10	1004	P1002	2021-04-03 00:00:00	NaN	Home and Kitchen
11	1004	P1004	2021-04-08 00:00:00	9.99	Beauty
12	1005	P1001	2021-05-01 00:00:00	49.99	Electronics
13	1005	P1003	2021-05-03 00:00:00	NaN	Electronics
14	1005	P1004	2021-05-08 00:00:00	9.99	NaN
15	1006	P1002	2021-06-03 00:00:00	19.99	Home and Kitchen
16	1006	P1003	2021-06-03 00:00:00	149.99	Electronics
17	1007	P1001	2021-07-05 00:00:00	49.99	NaN
18	1007	P1004	2021-07-06 00:00:00	9.99	Beauty
19	1008	P1001	2021-08-02 00:00:00	49.99	Electronics
20	1008	P1002	2021-08-03 00:00:00	19.99	Home and Kitchen

```
21     1008      P1003 2021-08-08 00:00:00     NaN       Electronics
22     1008      P1004 2021-08-15 00:00:00    9.99            Beauty
23     1009      P1001 2021-09-01 00:00:00   49.99       Electronics
24     1009      P1002 2021-09-08 16:00:00   19.99  Home and Kitchen
25     1009      P1003 2021-09-10 00:00:00  149.99               NaN
26     1009      P1004 2021-09-15 00:00:00     NaN            Beauty
27     1010      P1001 2021-10-01 00:00:00   49.99       Electronics
28     1010      P1002 2021-10-03 00:00:00   19.99  Home and Kitchen
29     1010      P1003 2021-10-10 00:00:00  149.99               NaN
30     1010      P1004 2021-10-15 00:00:00    9.99               NaN
Cleaned data exported to cleaned_data.xlsx
```