



B.Pharm Semester 1

PHARMACY | PEOPLE | A HEALTHIER TOMORROW

Science
Meets
Solutions

MEDICINES
DATA
IDEAS
BETTER HEALTH

Basics of Python Programming for Pharmaceutical Sciences

Unit 4

Data Handling with Pandas

PPT Notes



Learn



Code



Explore

Pharmaceutical Data

Drug Name	Category	Dose (mg)	Bioavailability (%)	Formulation
Paracetamol	Analgesic	500	85	Tablet
Amoxicillin	Antibiotic	250	75	Capsule
Metformin	Antidiabetic	500	50	Tablet
Amlodipine	Antihypertensive	5	90	Tablet
Omeprazole	Antulcer	20	60	Capsule



Filter



Sort



Group By

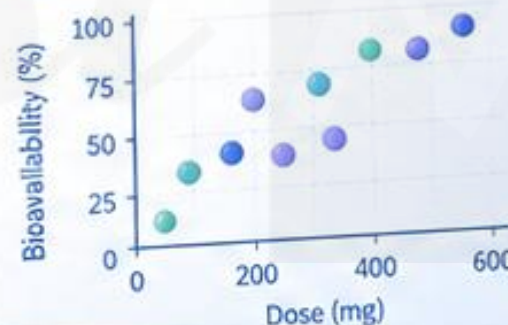


Aggregate



Analyze

Dose vs. Bioavailability



Python for
Data Analysis

Pharmaceutical Data

Real-World Applications

```
1 import pandas as pd
2
3 # Load and explore data
4 df = pd.read_csv("drug_data.csv")
5 df.head()
6
7 # Clean, filter and analyze
8 df[df['Bioavailability'] > 50]
9 df.groupby('Drug_Class').mean()
```

Drug Class Distribution



Pharma
Data
Insights

KNOWLEDGE TODAY
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INTRODUCTION TO PANDAS LIBRARY

Features, Applications and Import

- Pandas is an open-source Python library for analyzing and manipulating data.
- It stores tables, cleans records, selects rows, groups data and calculates summaries.

Features

- Read CSV, Excel, JSON and database tables.
- Handle missing values. Sort, filter, combine and summarize datasets.

Applications

- Pharmaceutical research: PK concentration data, ADR reports and clinical records.
- Other uses: laboratory results, business data and teaching.

Installation command, entered in a terminal:

```
pip install pandas
```

Import in Python:

```
import pandas as pd
```

- `pd` is the usual alias. Pandas works well with NumPy and plotting libraries.

PANDAS SERIES STRUCTURE

Series

- A Series is a one-dimensional labelled collection.
- It has values and an index that labels them.

```
import pandas as pd
numbers = pd.Series([10, 20, 30, 40])
print(numbers)
```

Index and value pairs: 0:10, 1:20, 2:30, 3:40.

Custom Labels

```
marks = pd.Series([85, 90, 95],
                  index=["A", "B", "C"])
print(marks["A"])
```

Output: 85

Index	Value
A	85
B	90
C	95

Useful methods: head(), tail(), count(), sum(), mean(), max() and min().
count counts non-missing values. mean gives the arithmetic average.

PANDAS DATAFRAME STRUCTURE

DataFrame

- A DataFrame is a two-dimensional labelled table.
- Rows hold records. Columns hold variables.
- Different columns can have different data types.

Python Code

```
import pandas as pd
data = {
    "Name": ["Alice", "Bob", "Charlie"],
    "Age": [20, 22, 21],
    "Marks": [85, 90, 95]
}
df = pd.DataFrame(data)
print(df)
```

Output

index	Name	Age	Marks
0	Alice	20	85
1	Bob	22	90
2	Charlie	21	95

- The default row index starts at zero.
- A DataFrame can be created from a dictionary of equally sized lists.

PANDAS DATAFRAME STRUCTURE

Accessing and Inspecting DataFrames

Accessing data

```
print(df["Name"])  
print(df[["Name", "Marks"]])  
print(df.loc[0])  
print(df.iloc[1])
```

- Name selects one Series.
- A list of column names selects a DataFrame.
- loc[0] selects row label 0: Alice, age 20, marks 85.
- iloc[1] selects row position 1: Bob, age 22, marks 90.

Properties

```
print(df.shape)  
print(df.columns)  
print(df.index)  
print(df.dtypes)
```

- shape output: (3, 3).
- columns gives names.
- index gives row labels.
- dtypes gives each column's type.

Note: Properties such as shape have no parentheses. Methods such as head() use parentheses.



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