COURSE HANDOUT

INTRODUCTION TO DATA SCIENCE (BCAMJ-402)

BCA (HONS)-4TH SEMESTER

ACADEMIC YEAR (2025-26)

Ms. Amita Khanna

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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
BCAMJ-402	Introduction to Data Science	Major	4	4	0	0	**20**	**60**	100

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Describe key concepts, processes and significance of data science.
CO2	Explain and identify sources, collect, clean, preprocess data, and perform basic data exploration.
CO3	Analyze data using statistical measures and visualizations in Excel and Python.
CO4	Explain the fundamental concepts and definitions of machine learning.
CO5	Apply data science tools and algorithms to solve practical problems.

Unit-I

Introduction to Data Science: Introduction, Definition & scope, key concepts, Data Science Process, Roles in Data Science, Data Science Life cycle, Role of data scientist, Data science challenges.

(8 Hours)

Unit-II

Data Collection and Preparation: Structured v/s unstructured Data, Data Sources, Methods for Data Collection Data Cleaning and Preprocessing Techniques, Introduction to Data Exploration.

(12 Hours)

Unit-III

Introduction to Data Analysis: Basics of Statistical Analysis, Descriptive Statistics: Mean, Median, Mode, Variance, Standard Deviation, Data Visualization: Charts, Graphs, and Plots, Introduction to Tools: Excel, Python (Pandas).

(10 Hours)

Unit- IV

Machine Learning: Definition, Applications of machine learning in data science, Types of Machine learning ,supervised learning; semi supervised learning, un-supervised learning Linear regression, Decision tree classifier, Bayes - Naive bay.

(10 Hours)

Unit-V

Data Science tools & Algorithms: Introduction to data science tools, Linear Regression and Logistic Regression, K-nearest Algorithms, K means algorithm.

(8 Hours)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Data Science from Scratch	Joel Grus	O'Reilly	2nd(2019)
2.	Data Science for Beginners	Andrew Park	Eureka Online LTD	(2020)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Fundamental of Data Science	Sanjeev J. Wagh, Manisha S. Bhende, Anuradha D. Thakare	CRC Press	1st(2022)

COURSE PLAN

Unit-I Introduction to Data Science		
S.No	**Topics**	**Recommended Books**
1	Definition and Scope	Book 2, Ch.1
2	Key Concepts	Book 2, Ch.1
3	Data Science Process	Book 1, Ch.2
4	Roles in Data Science	Book 2, Ch.2
5	Data science life Cycle	Book 2, Ch.2
6	Role of Data Scientist	Book 2, Ch.2
7	Data scientist Challenges	Book 2, Ch.2
Unit-II Data Collection and Preparation		
8	Introduction to Structured and Unstructured Data	Book 1, Ch.2
9	Structured v/s Unstructured Data	Book 1, Ch.3
10	Data Sources	Book 2, Ch.3
11	Methods for Data Collection	Book 2, Ch.4
12	Data Cleaning	Book 2, Ch.4
13	Preprocessing Techniques	Book 2, Ch.4
14	Introduction to Data Exploration	Book 2, Ch.4
Unit-III Introduction to Data Analytics		
15	Basics of Statistical Analysis	Book 2, Ch.4
16	Introduction to Description Statistics	Book 2, Ch.4
17	Mean	Book 2, Ch.4
18	Median	Book 2, Ch.5
19	Mode	Book 2, Ch.5
20	Variance	Book 2, Ch.5
21	Standard Deviation	Book 1, Ch.11
22	Data Visualization : Charts Graphs and Plots	Book 1, Ch.12
23	Introduction to Tools Excel	Book 1, Ch.12
24	Introduction to Python Pandas	Book 1, Ch.12
Unit-IV Introduction to Machine Learning		
25	Definition	Book 2, Ch.12
26	Application of Machine Learning in Data Science	Book 1, Ch.8
27	Types of Machine Learning	Book 1, Ch.8
28	Supervised learning	Book 1, Ch.8
29	Semi Supervised learning	Book 1, Ch.8
30	Unsupervised learning	Book 1, Ch.8
31	Linear Regression	Book 1, Ch.8
32	Decision tree Classifier	Book 1, Ch.8
33	Bayes-Naïve bay	Book 1, Ch.8
Unit-V Data Science tools &Algorithms		
34	Introduction to Data Science tools	Book 1, Ch.7
35	Linear Regression	Book 1, Ch.7
36	Logistic Regression	Book 2, Ch.7
37	K-nearest Algorithm	Book 1, Ch.7
38	K-means Algorithm	Book 1, Ch.7
39	K-nearest Algorithm v/s K-means Algorithm	Book1, Ch. 7

ADDITIONAL WEB RESOURCES

1.	**MOOC:** Introduction Data Science https://www.coursera.org/programs/mca-faculty-learning-path-puykp/specializations/introduction-data-science?source=search
2.	**NPTEL:** Video lectures on Python Data Science Lecture Series by Prof. Ragunathan Rengasamy, Professor, IIT Madras https://onlinecourses.nptel.ac.in/noc25_cs60/preview

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks
- **Assignment**: 10 marks
- **Attendance**: 10marks
- **Final Examination**: 60 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday (10:25 AM – 11:15 AM)
  Friday (11:15 AM – 12:00 PM)

- **Contact Information**
  amita.bca@mietjammu.in