



Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441108
NAAC Accredited with A+ Grade
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)



Programme: B.Tech Second Year (CSE- Data Science)

Semester		Course Code		Course Name	
III		BDS32323		Introduction to Data Analytics	
Teaching Scheme		Examination Scheme(Th)		Examination Scheme(P)	
Theory(Th)	3Hrs/week	CT-I	15	-	-
Practical(P)	0	CT-II	15	-	-
Total Credits	3	CA	10	-	-
Duration of ESE: 3 Hrs		ESE	60	-	-
		Total Marks	100	-	-

Pre-Requisites:

Course Outcomes:

CO1	Explain the fundamentals of Python programming for data science.
CO2	Apply NumPy and file handling techniques for data processing.
CO3	Use Pandas and visualization libraries for data manipulation and presentation.
CO4	Perform exploratory data analysis using statistical and visualization techniques.
CO5	Demonstrate basic machine learning concepts and evaluate simple predictive models.

Course Content

Unit I	Introduction to Python and its applications in Data Science, Python installation and Jupyter Notebook, Variables, Data Types, Operators, Input/Output, Control Structures (if, elif, else, loops), Functions and Modules.
Unit II	File Handling (Text, CSV), Exception Handling, Introduction to NumPy, NumPy Arrays, Array Operations, Indexing, Slicing, Mathematical and Statistical Functions.
Unit III	Introduction to Pandas, Series and DataFrame, Data Import (CSV, Excel), Data Cleaning and Preprocessing, Data Transformation, Data Visualization using Matplotlib and Seaborn.
Unit IV	Working with Datasets, Exploratory Data Analysis (EDA), Descriptive Statistics, Data Summarization, Correlation Analysis, Feature Selection, Data Visualization for Analysis.
Unit V	Introduction to Machine Learning, Scikit-learn Library, Data Preparation for ML, Supervised Learning, Regression and Classification Algorithms, Model Training, Model Evaluation Techniques (Train-Test Split, Accuracy, Precision, Recall, F1-Score, Confusion Matrix).

Text Books

1	Wes McKinney, Python for Data Analysis, 2nd Edition, O'Reilly Media, 2017.
2	Jake VanderPlas, Python Data Science Handbook, 1st Edition, O'Reilly Media, 2016.

Reference Books	
1	John Paul Mueller and Luca Massaron, Python for Data Science For Dummies, 2nd Edition, Wiley, 2019.
2	Al Sweigart, Automate the Boring Stuff with Python, 2nd Edition, No Starch Press, 2019.
3	Chris Albon, Machine Learning with Python Cookbook, 1st Edition, O'Reilly Media, 2018.
Useful Links	
1	https://nptel.ac.in/courses/106106212