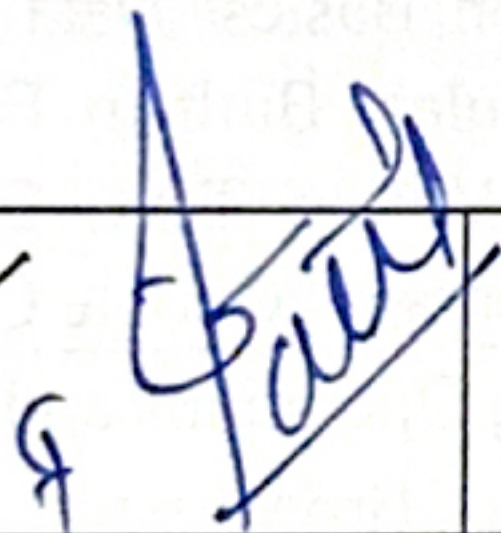
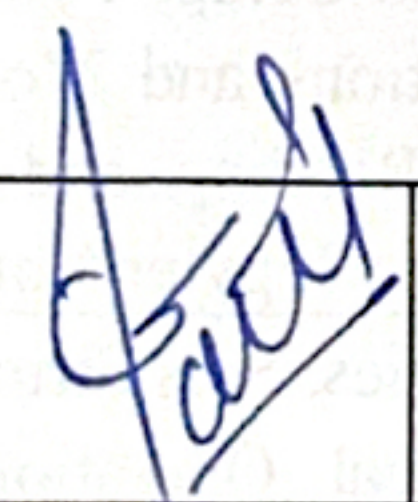
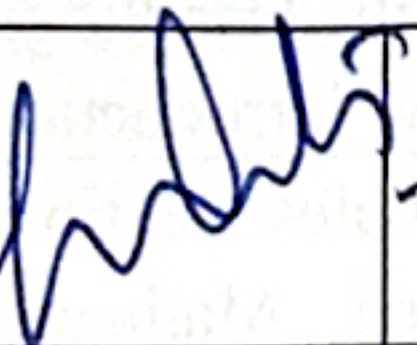


	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur- 441108 NAAC Accredited (A+ Grade) An Autonomous Institute affiliated to RTMNU Nagpur		
Second Year (Semester-IV) B.Tech. (CSE)			
Course Code: BCS32425 Python for AI & Data handling (Honor)			
Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	CT-1	15 Marks
Tutorial	-	CT-2	15 Marks
Total Credit	3	CA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 03Hrs 00Min.	
Course Objective:			
1	To understand Python basics, data types, functions, modules, and file handling		
2	To apply Python data structures, NumPy, and Pandas for data manipulation.		
3	To analyse data through visualization, exploratory analysis, and real-world datasets.		
4	To implement data pre-processing, feature engineering, and basic machine learning workflows.		
5	To develop AI-ready data pipelines using TensorFlow/Keras and automate data collection and cleaning		
Course Contents			
Unit I	Overview of Python: Features, Applications, and Setup, Python Basics: Data Types, Variables, Operators, Conditional Statements, Loops, Functions and Modules: Built-in Functions, Lambda Functions, Importing Modules, File Handling: Reading and Writing Text, CSV, JSON Files, Exception Handling and Debugging, Introduction to Jupyter Notebook / Google Colab.		
Unit II	Python Data Structures: Lists, Tuples, Dictionaries, Sets String Operations and Comprehensions, NumPy: Arrays, Indexing, Slicing, Mathematical Operations, Broadcasting, Pandas: Series, DataFrame, Import/Export Data, Handling Missing Values, Filtering, Data Manipulation and Aggregation.		
Unit III	Introduction to Data Visualization, Matplotlib: Line, Bar, Scatter, Histogram, and Pie Charts, Seaborn: Heatmaps, Pairplots, Distribution Plots, and Regression Plots, Exploratory Data Analysis (EDA): Summary Statistics, Correlation, and Outlier Detection, Real-World Dataset Visualization (Kaggle / UCI Datasets).		
Unit IV	Data Preprocessing: Encoding, Normalization, Standardization, Splitting Data: Train-Test Split, Cross-Validation Feature Engineering: Feature Extraction, Selection, and Scaling, Introduction to Scikit-learn: Basic ML Workflow and Dataset Utilities, Simple Linear Regression and Model Evaluation Metrics.		
Unit V	Working with Real Datasets (CSV, JSON, APIs, Web Scraping), Introduction to Data Pipelines Basics of TensorFlow and Keras for Data Handling, Automating Data Collection and Cleaning Tasks, Mini Project: Build a small AI-ready dataset and perform EDA + Visualization.		
Text Books			
T1	Dr. Charles R. Severance, <i>Python for Everybody</i> , CreateSpace.		
T2	Mark Lutz, <i>Learning Python</i> , O'Reilly.		
Reference Books			
R1	Aurélien Géron, <i>Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow</i> , O'Reilly.		
R2	John V. Guttag, <i>Introduction to Computation and Programming Using Python</i> , MIT Press.		

Useful Links	
1	https://docs.python.org
2	https://numpy.org/doc/

Sr. no.	Course Outcomes	CL	Class Session
1	Understand Python programming, functions, modules, and file handling.	2	9
2	Apply data structures, NumPy arrays, and Pandas for data analysis.	2	9
3	Analyze and visualize datasets using Matplotlib, Seaborn, and EDA techniques.	5	9
4	Preprocess data, perform feature engineering, and implement basic ML models.	6	9
5	Build AI-ready datasets, automate data pipelines, and perform exploratory analysis	6	9

				Apr. , 2025	1.00	Applicable for AY 2025-26 Onwards
Chairman HOD	Dean Academics	Vice Principal (Academics)	Principal	Date of Release	Version	

Department of Computer Science & Engineering
Suliramji Gaikwad Patil College
Engineering & Technology

Vice Principal
(Academics)
Dr. Chaitanya K. Patil
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Principal
Dr. Chaitanya K. Patil