

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI101 - Fundamentals of Python Programming

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI101	Core-1	Fundamentals of Python Programming	2	0	0	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	I	40	60	100

Course Objectives

- This course focuses on the core concepts of Python programming, including syntax, control structures, and commonly used data structures
- It enhances problem-solving and logical thinking abilities through the development of modular programs using functions and structured programming techniques
- It introduces object-oriented programming principles and exception handling mechanisms for building efficient and reliable Python applications

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	understand basic programming concepts and Python syntax.	K1,K2,K3,K4,K5
CO2	apply control structures to solve problems.	K1,K2,K3,K4,K5
CO3	develop modular programs using functions and files.	K1,K2,K3,K4,K5
CO4	use Python data structures effectively.	K1,K2,K3,K4,K5
CO5	implement OOP concepts and handle exceptions in Python.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	3	2
CO2	2	3	2	3	3	2	2	3	2	3
CO3	2	2	3	3	2	2	3	2	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	2	2	3	3	2	3	3	2
Total	12	12	12	13	13	11	11	14	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

Unit-I Introduction to Python Programming

(L-6 hrs)

Introduction to programming - Features of Python - Applications of Python - Structure of a Python program -

Variables and data types - Standard data types - Input and output statements - Type casting.

Unit-II Control Structures

(L-6 hrs)

Conditional statements - Looping statements - for loop, while loop - Loop control statements - break, continue, pass - Indentation in Python.

Unit-III Functions and Modules

(L-6 hrs)

Functions - Types of arguments - Return values -Recursive functions - Anonymous (lambda) functions - Modules - Importing modules - Standard modules (math, random).

Unit-IV Data Structures

(L-6 hrs)

Strings - String operations- Lists - Creation, indexing, slicing, methods - Tuples - Sets - Operations - Dictionaries - Keys, values, methods - Applications of data structures in problem-solving.

Unit-V File Handling and Object-Oriented Programming

(L-6 hrs)

File handling - Opening, reading, writing, and appending files - Working with text files - Introduction to Object-Oriented Programming -Classes and objects - Constructors.

Text Books

1. Thareja, R. Python programming using problem solving approach. Oxford University Press(2017).

Reference Books

1. Learning Python, Lutz, M. Learning Python (5th ed.). O'Reilly Media(2013).
2. Python Crash Course, Matthes, E. Python crash course (2nd ed.). No Starch Press(2019).
3. Core Python Programming, Chun, W. J. Core Python programming (3rd ed.). Prentice Hall(2012)..

Web Resources

1. <https://docs.python.org/3/>
2. <https://www.w3schools.com/python/>
3. <https://www.geeksforgeeks.org/python-programming-language/>

Course Designer

Dr.S.Suganthi, Assistant Professor, Department of Computer Science

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI102 - Basics of Data Science & AI

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI102	Core-2	Basics of Data Science & AI	2	0	0	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	I	40	60	100

Course Objectives

- This course focuses on the fundamental concepts of Data Science and Artificial Intelligence, including data preprocessing, visualization, and basic statistical analysis
- It develops analytical thinking and problem-solving skills through data-driven approaches and introduces the core concepts of machine learning and AI techniques
- It familiarizes students with practical applications of Data Science and Artificial Intelligence in real-world scenarios

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	understand the basic concepts of Data Science and Artificial Intelligence.	K1,K2,K3,K4,K5
CO2	apply data preprocessing and visualization techniques for analyzing datasets.	K1,K2,K3,K4,K5
CO3	demonstrate knowledge of basic statistical methods and data analysis.	K1,K2,K3,K4,K5
CO4	apply fundamental machine learning algorithms for predictive analysis.	K1,K2,K3,K4,K5
CO5	analyze real-world problems and design AI-based solutions.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	3	2	2
CO2	2	3	2	3	3	2	2	3	3	2
CO3	2	2	3	3	2	2	3	2	3	2
CO4	3	2	3	3	3	2	2	3	3	3
CO5	2	3	3	3	3	3	2	3	3	2
Total	12	12	13	14	13	11	11	14	14	11

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

Unit-I Introduction to Data Science & AI

(L-6 hrs)

Introduction to Data Science - Data Science lifecycle - Types of data - Introduction to Artificial Intelligence -

AI techniques and applications – Data Science vs AI – Tools and platforms for Data Science.

Unit-II Data Collection and Preprocessing

(L-6 hrs)

Data collection methods – Structured and unstructured data – Data cleaning – Handling missing values – Data transformation – Introduction to data preprocessing tools.

Unit-III Data Visualization and Statistics

(L-6 hrs)

Data visualization concepts – Charts and graphs – Tools for visualization – Introduction to statistical concepts – Mean, median, mode – Standard deviation – Correlation and regression – Data interpretation.

Unit-IV Machine Learning Fundamentals

(L-6 hrs)

Introduction to Machine Learning – supervised, unsupervised, reinforcement learning – Classification and regression – Basic algorithms – Model training and evaluation.

Unit-V Applications of AI and Data Science

(L-6 hrs)

Natural Language Processing – Computer Vision – Recommendation systems – AI in healthcare, agriculture, and business – Ethical issues in AI – Future trends in Data Science and AI.

Text Books

1. Han, J., Kamber, M., & Pei, J. Data mining: Concepts and techniques (3rd ed.). Morgan Kaufmann(2012).

Reference Books

1. Data Science for Business, Provost, F., & Fawcett, T. Data science for business. O'Reilly Media (2013)..
2. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow Géron, A. Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow (2nd ed.). O'Reilly Media. (2019).
3. Introduction to Machine Learning, Alpaydin, E. Introduction to machine learning (4th ed.). MIT Press.(2020).

Web Resources

1. <https://www.ibm.com/topics/data-science>
2. <https://developers.google.com/machine-learning/crash-course>.
3. <https://www.kaggle.com/learn>

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI1P1 - Python Programming Lab

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI1P1	Core Lab-1	Python Programming Lab	0	0	3	4
Year	Semester	Internal Marks(CIA)	External Marks(ESE)		Total Marks	
I	I	50	50		100	

Course Objectives

- This course deals with the practical aspects of Python programming and helps students understand how programming concepts are applied to solve real-world problems
- It strengthens logical reasoning and problem-solving skills through the development of programs using control structures, functions, and data handling techniques
- It introduces file management and object-oriented programming concepts, enabling students to create simple and efficient Python-based applications

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	write and execute Python programs using basic syntax and control structures.	K1,K2,K3,K4,K5
CO2	develop programs using functions and modules.	K1,K2,K3,K4,K5
CO3	apply Python data structures for solving computational problems.	K1,K2,K3,K4,K5
CO4	implement file handling and exception handling in Python.	K1,K2,K3,K4,K5
CO5	design simple applications using Python programming concepts.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	2	2
CO2	2	3	2	3	3	2	2	3	3	2
CO3	2	2	3	3	2	2	2	3	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	3	3	3	2	2	3	3	3
Total	12	12	13	14	13	10	10	15	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

List of Practicals

(P-3 hrs)

1. Write a Python program to perform basic arithmetic operations.
2. Programs using conditional statements (if, if-else, nested if).

3. Programs using loops (for, while).
4. Programs using functions (with and without arguments).
5. Programs using strings and string functions.
6. Programs using lists, tuples, sets, and dictionaries.
7. File handling programs (read/write operations).

Text Books

1. Programming in Python 3: A Complete Introduction to Python Language, Mark Summerfield, Second Edition, Addison-Wesley Publications.

Reference Books

1. Core Python Programming, Second Edition, Wesley J. Chun, Prentice Hall
2. Mark Summerfield, Programming in Python 3--A Complete Introduction to the Python Language, Second Edition, Addison Wesley
3. Phuong Vo.T.H , Martin Czygan, Getting Started with Python Data Analysis, Packt Publishing Ltd

Web Resources

1. <https://docs.python.org/3/>
2. <https://www.w3schools.com/python/>
3. <https://www.geeksforgeeks.org/python-programming-language/>

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Dr.S.Suganthi, Assistant Professor, Department of Computer Science

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI1P2 - Data Analysis Lab(Excel & SQL)

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI1P2	Core Lab-2	Data Analysis Lab(Excel & SQL)	0	0	3	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	I	50	50	100

Course Objectives

- This course focuses on the essential techniques of data analysis using Excel and SQL, including database management and query processing concepts
- It develops practical skills in data cleaning, manipulation, and visualization for extracting meaningful insights from real-world datasets
- It enables students to apply data-driven approaches and analytical methods to support effective decision-making

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	perform data analysis using Excel functions and tools.	K1,K2,K3,K4,K5
CO2	apply data cleaning and preprocessing techniques.	K1,K2,K3,K4,K5
CO3	use SQL queries for data retrieval and manipulation.	K1,K2,K3,K4,K5
CO4	analyze datasets and generate meaningful insights.	K1,K2,K3,K4,K5
CO5	develop reports and visualizations using Excel and SQL.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	2	2
CO2	2	3	2	3	3	2	2	3	3	2
CO3	2	2	3	3	2	2	2	3	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	3	3	3	2	2	3	3	3
Total	12	12	13	14	13	10	10	15	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

List of Practicals

(P-3 hrs)

1. Create worksheets and perform basic operations.

2. Use Excel formulas (SUM, AVERAGE, IF, VLOOKUP).
3. Data sorting and filtering.
4. Pivot tables and data summarization.
5. Create database and tables using SQL queries.
6. Insert, update, delete records using SQL queries.
7. Simple report generation using SQL queries.

Text Books

1. Gordon Linoff Data Analysis Using SQL and Excel 2nd Edition, Kindle Edition.

Reference Books

1. Learning SQL, Alan Beaulieu, Learning SQL: Generate, Manipulate, and Retrieve Data, 3rd Edition, O'Reilly Media, 2020.
2. SQL in 10 Minutes, Sams Teach Yourself, Ben Forta, SQL in 10 Minutes, Sams Teach Yourself, 5th Edition, Sams Publishing, 2020.

Web Resources

1. <https://www.coursera.org/learn/excel-basics-data-analysis-ibm>
2. [https://repo.darmajaya.ac.id/3906/1/Data Analysis Using SQL and Excel PDFDrive.pdf](https://repo.darmajaya.ac.id/3906/1/Data%20Analysis%20Using%20SQL%20and%20Excel%20PDFDrive.pdf)
3. <https://sqlspreads.com/blog/introduction-to-sql-for-excel-users/>

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Dr.S.Suganthi, Assistant Professor, Department of Computer Science

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P26DAI203 - Machine Learning

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI203	Core-3	Machine Learning	2	0	0	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	II	40	60	100

Course Objectives

- This course introduces with the fundamental concepts and techniques of Machine Learning, including data analysis and predictive model development
- It develops the ability to understand and apply supervised and unsupervised learning methods for solving real-world problems
- It provides knowledge of model evaluation, optimization techniques, and practical applications of Machine Learning in various domains

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	understand the basic concepts and types of machine learning.	K1,K2,K3,K4,K5
CO2	apply supervised learning algorithms for classification and regression tasks.	K1,K2,K3,K4,K5
CO3	apply unsupervised learning techniques such as clustering and association.	K1,K2,K3,K4,K5
CO4	evaluate and optimize machine learning models using appropriate metrics.	K1,K2,K3,K4,K5
CO5	design and implement machine learning solutions for real-world problems.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	3	2
CO2	2	3	2	3	3	2	2	3	2	3
CO3	2	2	3	3	2	2	3	2	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	2	2	3	3	2	3	3	2
Total	12	12	12	13	13	11	11	14	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

Unit-I Introduction to Machine Learning

(L-6 hrs)

Introduction to Machine Learning – Types of Machine Learning – Supervised, Unsupervised and Reinforcement Learning – Data preprocessing – Training and testing datasets – Overfitting and underfitting – Bias and variance.

Unit-II Supervised Learning Regression**(L-6 hrs)**

Linear regression – Multiple regression – Polynomial regression – Model evaluation metrics – Mean Squared Error (MSE), Root Mean Squared Error (RMSE)– Gradient descent – Applications of regression.

Unit-III Supervised Learning Classification**(L-6 hrs)**

Classification concepts – Logistic regression – K-Nearest Neighbors (KNN) – Decision Trees – Naïve Bayes – Support Vector Machines (SVM) – Confusion matrix – Accuracy, precision, recall, F1-score.

Unit-IV Unsupervised Learning**(L-6 hrs)**

Clustering – K-Means clustering – Hierarchical clustering – DBSCAN – Association rule mining – Apriori algorithm – Dimensionality reduction – Principal Component Analysis (PCA).

Unit-V Model Evaluation and Applications**(L-6 hrs)**

Model validation techniques – Cross-validation – Hyperparameter tuning – Ensemble methods – Random Forest – Introduction to Neural Networks – Applications in healthcare, business, agriculture – Ethical issues in Machine Learning.

Text Books

1. Mitchell, T. M. Machine learning. McGraw-Hill(1997).

Reference Books

1. Pattern Recognition and Machine Learning, Bishop, C. M. (2006). Pattern recognition and machine learning. Springer.
2. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, Géron, A. (2019). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow (2nd ed.). O'Reilly Media.
3. Machine Learning Yearning, Ng, A. (2018). Machine learning yearning. DeepLearning.AI.

Web Resources

1. <https://www.coursera.org/learn/machine-learning>
2. <https://developers.google.com/machine-learning/crash-course>
3. <https://scikit-learn.org/stable/>

Course Designer

Dr.S.Suganthi, Assistant Professor, Department of Computer Science

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI204 - Data Visualization & AI Tools

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI204	Core-4	Data Visualization & AI Tools	2	0	0	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	II	40	60	100

Course Objectives

- This course focuses on the techniques and significance of data visualization for presenting and interpreting data effectively through charts, graphs, and dashboards
- It develops practical skills in utilizing modern visualization platforms and analytical tools to interpret and present data meaningfully
- It introduces AI-based tools for data analysis and automation, while familiarizing students with their applications in real-world decision-making environments

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	understand the fundamentals and importance of data visualization.	K1,K2,K3,K4,K5
CO2	apply various visualization techniques to represent data effectively.	K1,K2,K3,K4,K5
CO3	leverage visualization tools to design and develop charts, dashboards, and analytical reports.	K1,K2,K3,K4,K5
CO4	utilize AI tools for data analysis, automation, and decision-making.	K1,K2,K3,K4,K5
CO5	design interactive visualizations and apply them to real-world scenarios.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	3	2
CO2	2	3	2	3	3	2	2	3	2	3
CO3	2	2	3	3	2	2	3	2	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	2	2	3	3	2	3	3	2
Total	12	12	12	13	13	11	11	14	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

Unit-I Introduction to Data Visualization

(L-6 hrs)

Introduction to data visualization – Types of data – Data visualization process – Principles of effective visualization – Charts and graphs – Bar chart, line chart, pie chart – Data storytelling concepts.

Unit-II Visualization Techniques and Tools (L-6 hrs)

Advanced visualization techniques – Histograms, scatter plots, heat maps – Dashboards –Interactive visualization – Introduction to tools such as Excel, Power BI, Tableau – Data preparation for visualization.

Unit-III Data Analysis using Visualization Tools (L-6 hrs)

Data cleaning and transformation – Creating reports and dashboards – Data filtering and aggregation – Visual analytics – Case studies using visualization tools – Interpretation of visual data.

Unit-IV Introduction to AI Tools (L-6 hrs)

Overview of AI tools – AI for data analysis – Chatbots and virtual assistants – Introduction to tools like ChatGPT, Google AI tools – Automation using AI – AI in business and decision-making.

Unit-V Applications and Ethical Issues (L-6 hrs)

Applications of data visualization and AI tools in healthcare, education, business, agriculture – Real-time dashboards – Data-driven decision making – Ethical issues in AI – Data privacy and security – Future trends.

Text Books

1. Knaflic, C. N. Storytelling with data: A data visualization guide for business professionals. Wiley(2015).

Reference Books

1. The Visual Display of Quantitative Information Tufte, E. R. (2001). The visual display of quantitative information (2nd ed.). Graphics Press.
2. Data Science for Business Provost, F., & Fawcett, T. (2013). Data science for business. O'Reilly Media.
3. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow Géron, A. (2019). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow (2nd ed.). O'Reilly Media.

Web Resources

1. <https://www.tableau.com/learn>
2. <https://learn.microsoft.com/en-us/power-bi/>
3. <https://datastudio.google.com/>

Course Designer

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI2P3 - Machine Learning Lab

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI2P3	Core Lab-3	Machine Learning Lab	0	0	3	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	II	50	50	100

Course Objectives

- This course focuses on the practical implementation of Machine Learning concepts using appropriate tools and libraries for data analysis and prediction
- It develops skills in data preprocessing, building predictive models, and applying machine learning algorithms to solve real-world problems
- It enables students to evaluate, optimize, and improve the performance of machine learning models using real-world datasets

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	implement basic machine learning algorithms using programming tools.	K1,K2,K3,K4,K5
CO2	perform data preprocessing and feature selection techniques.	K1,K2,K3,K4,K5
CO3	apply supervised learning algorithms for prediction tasks.	K1,K2,K3,K4,K5
CO4	apply unsupervised learning techniques for clustering and pattern discovery.	K1,K2,K3,K4,K5
CO5	evaluate Machine Learning models and interpret results.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	2	2
CO2	2	3	2	3	3	2	2	3	3	2
CO3	2	2	3	3	2	2	2	3	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	3	3	3	2	2	3	3	3
Total	12	12	13	14	13	10	10	15	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

List of Practicals

(P-3 hrs)

1. Installation of Python and required libraries (NumPy, Pandas, Matplotlib, Scikit-learn).
2. Data preprocessing – handling missing values and encoding categorical data.

3. Data visualization using Matplotlib/Seaborn.
4. Implementation of Linear Regression.
5. Implementation of Logistic Regression.
6. Implementation of K-Nearest Neighbors (KNN).

Text Books

1. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, 3rd Edition, O'Reilly Media, 2022.
2. Python for Data Analysis, Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter, 3rd Edition, O'Reilly Media, 2022.

Reference Books

1. Introduction to Machine Learning with Python, Andreas C. Müller and Sarah Guido, Introduction to Machine Learning with Python: A Guide for Data Scientists, 1st Edition, O'Reilly Media, 2016.
2. Python Data Science Handbook, Jake VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, 1st Edition, O'Reilly Media, 2016.

Web Resources

1. <https://www.geeksforgeeks.org/machine-learning/machine-learning/>
2. <https://developers.google.com/machine-learning/crash-course>
3. <https://data-flair.training/blogs/machine-learning-tutorials-home/>

Course Designer

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Department of PG Diploma in Artificial Intelligence & Data Science

P26DAI2P4 - Visualization Lab(Power BI / Tableau)

Code	Category	Course Title	Lecture Hours	Tutorial Hours	Practical Hours	Credits
P26DAI2P4	Core Lab-4	Visualization Lab(Power BI / Tableau)	0	0	3	4

Year	Semester	Internal Marks(CIA)	External Marks(ESE)	Total Marks
I	II	50	50	100

Course Objectives

- This course focuses on practical applications of data visualization tools for creating interactive dashboards and analytical reports
- It develops skills in analyzing and interpreting data using visualization techniques and real-time data representation methods
- It enables students to apply visualization concepts effectively for data-driven decision-making in real-world scenarios

Course Outcomes

Upon completion of the Course, students will be able to

CO	Course Outcome	Knowledge Level(RBT)
CO1	use visualization tools like Power BI and Tableau.	K1,K2,K3,K4,K5
CO2	perform data cleaning and transformation for visualization.	K1,K2,K3,K4,K5
CO3	design and develop charts, graphs, and interactive dashboards.	K1,K2,K3,K4,K5
CO4	analyze data and generate insights using visual tools.	K1,K2,K3,K4,K5
CO5	design interactive dashboards for real-world applications.	K1,K2,K3,K4,K5

(K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create)

CO - PO & PSO Mapping

CO	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	3	2	2
CO2	2	3	2	3	3	2	2	3	3	2
CO3	2	2	3	3	2	2	2	3	3	2
CO4	3	2	3	3	2	2	2	3	3	3
CO5	2	3	3	3	3	2	2	3	3	3
Total	12	12	13	14	13	10	10	15	14	12

(3-Strong, 2-Medium, 1-Weak, 0-No Correlation)

Course Content

List of Practicals

(P-3 hrs)

1. Installation and overview of Power BI / Tableau interface.

2. Importing datasets into Power BI / Tableau.
3. Data cleaning and transformation.
4. Creating basic charts (bar, pie, line).
5. Creating advanced charts (scatter plot, heat map).
6. Data filtering and sorting techniques.
7. Creating calculated fields and measures.

Text Books

1. Excel Data Analysis For Dummies, Stephen L. Nelson, Excel Data Analysis For Dummies, 3rd Edition, Wiley Publishing, 2021.
2. Microsoft Excel 365 Bible, Michael Alexander, Dick Kusleika, and John Walkenbach, Microsoft Excel 365 Bible, 1st Edition, Wiley Publishing, 2021.

Reference Books

1. Learning SQL, Alan Beaulieu, Learning SQL: Generate, Manipulate, and Retrieve Data, 3rd Edition, O'Reilly Media, 2020.
2. SQL in 10 Minutes, Sams Teach Yourself, Ben Forta, SQL in 10 Minutes, Sams Teach Yourself, 5th Edition, Sams Publishing, 2020.

Web Resources

1. <https://www.scribd.com/document/809796753/Dv-Lab-Manual1>
2. <https://www.datacamp.com/tutorial/data-visualisation-powerbi>
3. <https://learn.microsoft.com/en-us/training/powerplatform/power-bi>

Course Designer

Dr.S.Suganthi, Assistant Professor, Department of Computer Science