ABOUT THE COURSE: FOUNDATION OF CODING WITH PYTHON

TOTAL DURATION :	45HRS
MODE OF DELIVERY	ONLINE TRAINING / SELF LEARNING
TOTAL MARKS:	**75**

TABLE 1	
OVERALL COURSE OBJECTIVE:	Object Oriented Programming (OOP) is a real world approach to problem solving. OOP allows us to represent data as real-world objects. This course will introduce basic concepts of OOP like classes and objects and its implementation. OOP principles namely Encapsulation, Abstraction, Inheritance and Polymorphism are discussed and implemented. The course delves into class relationships and its implementation. This course would enable a beginner to build a robust code, organize the code as a collection of classes and solve real life problems using OOP. Participants would also be equipped with executing, testing, and debugging the OOP code.
LEARNING OUTCOME:	● Explore the object-oriented class design and write code using an OO programming language ● Use classes, objects and methods for computational problem solving ● Write reusable code using inheritance ● Bring flexibility into coding using polymorphism ● Write robust code using exception handling

TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME				
SL.NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	OOP fundamentals	OOP Introduction, Practice problems, Class	Explore the object-oriented class design and write code using	**3**

		& Object, Constructor and Self, reference variable, coding standards	an OO programming language	
2	Programming using classes and objects	Abstraction and Encapsulation, Try-out exercises, assignments, Pass by reference, Collection of objects, Hands on	Use classes, objects and methods for computational problem solving	**5**
3	Relationships and static concept	. Static variables, static vs reference variables, static methods, Class relationships, assignments and try outs	Use classes, objects and methods for computational problem solving	**11**
4	Inheritance	Inheritance introduction, Independent classes and connected classes, Inheritance types, Inheritance constructor, methods and attributes exercises and quiz	Write reusable code using inheritance	**7**
5	Polymorphism	Abstract class, Abstract method, need and instantiating, Quiz and exercise	Bring flexibility into coding using polymorphism	**3**
6	Exception Handling	Exception Handling,	Write robust code using exception	**16**

		custom exceptions, In built exceptions, Assignment set, common mistakes, Practice problems	handling	

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES		
● Read the object-oriented class design and write code using an OO programming language ● Use classes, objects and methods for computational problem solving ● Write reusable code using inheritance ● Bring flexibility into coding using polymorphism ● Write robust code using exception handling	**ASSESSMENT CRITERIA** Completion of the assignments, try-outs and practice problems	**USECASES** ATM money distribution Sequential Removal String validation II Number Operations Duplicate Number Intersection of two arrays First unique character Reverse vowels Twin Prime Electricity bill Discounted price Name password generation Student attendance record Permutations Set matrix zeroes Minimum swap Tongue twister String decoding Matrix Multiplication Coin Change

TABLE 4: COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 75)				
ASSESSMENT CRITERIA	**DESCRIBE THE CRITERIA OF THE BELOW CATEGORY PERFORMANCE**			**TOTAL MARKS**
	FAIR	**GOOD**	**EXCELLENT**	
Completion of Springboard courses (Completion of self-assessment with 60%)	● Completion of 1 mandatory course ● Completion of 5 use cases given	● Completion of 1 mandatory course ● Completion of 10 use cases given	● Completion of 1 mandatory course ● Completion of 15 use cases given	50
Project completion	As per scores in evaluation template which the faculty members in institutions will evaluate and fill			25

SHORTLISTED TRAINING PARTNER
INFOSYS:

The Infosys Foundation, established in 1996 as a not-for-profit initiative by Infosys Ltd., is dedicated to fulfilling the company's social responsibility and fostering a more equitable society. Through its various programs, the foundation extends support to initiatives in education, rural development, healthcare, arts and culture, and destitute care. Their CSR course provides students with access to high-quality educational resources and training materials, enhancing their learning experience and have the opportunity to develop essential skills that are relevant to their academic and professional growth.

Based on the previous experience of the training partners, number of approved bilingual trainers available and other deliberations conducted it was decided to map the following departments to the training partners to conduct the Naan Mudhalvan odd Semester Upskilling Course for Arts and Science for the financial year 2024-25.

STUDENT MAPPING AND TRAINING PARTNERS				
SEMESTER	**COLLEGE TYPE**	**DEPARTMENT**	**NO. OF STUDENTS MAPPED**	**TRAINING PROVIDER**
3	Government (Autonomous), Government (Non-Autonomous), Aided (Non-Autonomous), Self- Financing (Non-Autonomous)	CS/IT/BCA	64784	INFOSYS

Mode of Delivery		
1.	Faculty Development Programme **As part of the Faculty Development Program (FDP), a comprehensive 6-day training session will be provided by the training partner. This includes 4 days dedicated to course training and 2 days focused on assessment training.**	Physical (Paid-600/- per faculty)
2.	Student Implementation	Hybrid

COMMERCIALS:
There is no cost involved as it is a **CSR Project.**

If agreed, the Board may resolve to approve the proposal.

Managing Director

TNSDC **AGENDA NO: 4.31**
DATED: 12.06.2024

BOARD NOTE

Sub:	**TNSDC – Naan Mudhalvan – 2024 ODD Semester - Arts and Science– Data Analytics using Visualisation tools - Training Partners shortlisted – 1. OPENMENTOR - CSR – Departments Mapped - Proposal submitted for Approval – Reg.**

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TNSDC invited Expressions of Interest through public notice via newspaper advertisement dated: 03.11.2023(Adv No: DIPR/5882/Tender/2023) and 15.03.2024 (Adv No: DIPR/1623/Tender/2024) from interested industries / institutions to act as training partners to provide skill training to the students of Arts and Science colleges under Naan Mudhalvan Programme for the Financial year 2024-25. The EoI applications were received through Naan Mudhalvan Portal from 03.11.2023 to 22.11.2023 and 15.03.2024 to 15.04.2024. The courses were invited from the following sectors such as Agriculture, Apparel, Archaeology, Aviation, BFSI, Employability Skills, Entrepreneurship, Environmental Science, Fire and Safety, Fisheries, Food Industry, Foreign Languages, GIS, Green Jobs, Healthcare, IT/ITES, Journalism, Life science, Healthcare, Livestock, Logistics, Media and Entertainment, Packaging, Plastic, Retail, Tamil, Facility Management and Tourism and Transportation.

EoIs were received for the course Data Analytics using Visualisation tools. Initial scrutiny of the applicants was conducted based on the eligibility conditions and the required documents. The shortlisted applicants were called for a direct discussion and presentation to the Academic and Expert Committee which consisted of subject experts, professors, members of Directorate of Collegiate Education, TN Council for Higher Education and TNSDC Naan Mudhalvan from 27.02.2024 to 29.02.2024, 08.03.2024 and 29.04.2024. The shortlisted applicants were further called for price discussion and negotiation by the Financial Committee at the office of

TNSDC on 13.05.2024 and 14.05.2024. The details of the EoIs for the course is as follows:

SL. NO	COURSE	EOIs RECEIVED	NO. OF TPs SHORTLISTED FOR SECOND LEVEL EVALUATION	NO. OF TP SHORTLISTED FOR COST NEGOTIATION BASED ON THE SECOND LEVEL EVALUATION	FINAL SHORTLISTED TPs
1.	Data Analytics using Visualisation tools	15	10	6	1

ABOUT THE COURSE

OVERALL COURSE OBJECTIVE:	To equip participants with practical skills in data analysis using Python, focusing on real-world data scenarios and applications.
LEARNING OUTCOME:	● Explore the scope and responsibilities of a data scientist ● Perform data analysis and visualization using R ● Utilize Matlab for complex data analysis ● Conduct data analysis using Python libraries ● Master techniques for data preprocessing ● Conduct statistical analysis and interpret results ● Integrate and apply skills in a real- world data analysis project.

TABLE 2: MODULE WISE COURSE CONTENT AND OUTCOME				
SL. NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	Introduction to Data Science	Overview of data science, role of a data scientist	Explore the scope and responsibilities of a data scientist	4
2	R for Data Analysis	Basics of R, data manipulation and visualization in R	Perform data analysis and visualization using R	12
3	Data Analysis with Matlab	Matlab for data analytics, working with matrices and functions	Utilize Matlab for complex data analysis	12
6	Python for Data Science	Python basics, pandas, NumPy, data manipulation in Python	Conduct data analysis using Python libraries	16
8	Data Preprocessing	Cleaning, transforming, and preparing data for analysis	Master techniques for data preprocessing	6
9	Statistical Analysis	Descriptive and inferential statistics,	Conduct statistical analysis and interpret	6

		hypothesis testing	results	
10	Capstone Project	Application of learned skills in a comprehensive project	Integrate and apply skills in a real- world data analysis project	4

TABLE 3: OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES		
LEARNING OUTCOME	**ASSESSMENT CRITERIA**	**USECASES**
Analyze and interpret data using multiple tools	Accuracy of analysis, tool proficiency	**Use Case 1**: Market Trend Analysis Task: Analyze market data to identify trends using R. **Use Case 2**: Operational Efficiency Task: Use Matlab to optimize operational processes based on data insights.
Create dynamic and interactive data visualizations	Creativity, clarity, and effectiveness of visualizations	**Use Case 1**: Interactive Sales Dashboard Task: Develop a dynamic sales dashboard using MatLab. **Use Case 2**: Educational Performance Tracker
Conduct comprehensive statistical		**Use Case 1**: Public Health Study Task: Perform statistical analysis

analysis	Depth of statistical methods, interpretation accuracy	on public health data using Python. **Use Case 2**: Financial Risk Assessment Task: Analyze financial data for risk assessment using Python.
Develop business intelligence reports and dashboards	Insightfulness, layout, and usability of reports	**Use Case 1**: Retail Business Intelligence Task: Create comprehensive BI reports for a retail chain using MatLab. **Use Case 2**: Supply Chain Analysis Task: Analyze and visualize supply chain data using Python.
Apply skills in a real-world data analysis project	Integration of tools, problem-solving, project execution	**Use Case 1**: E-commerce Customer Behavior Task: Analyze e-commerce data to understand customer behavior patterns. **Use Case 2**: Environmental Impact Study Task: Assess environmental data to identify impact trends.

TABLE 4: LIST OF FINAL PROJECTS	
SL. NO	**FINAL PROJECT**
1	Healthcare Data Analysis: Analyze patient data to identify health trends and predict outcomes.
2	Financial Market Forecasting: Use historical data to predict market trends and investment opportunities.
3	Social Media Sentiment Analysis: Analyze social media data to gauge public sentiment on various topics.
4	Sales Forecasting for Retail: Develop models to forecast future sales based on historical data.
5	Customer Segmentation in E-commerce: Segment customers based on purchasing behavior and preferences.
6	Climate Change Impact Study: Analyze environmental data to study the effects of climate change.
7	Real Estate Price Prediction: Predict real estate prices based on market data and trends.
8	Supply Chain Optimization: Analyze supply chain data to identify areas for efficiency improvement.
9	Sports Performance Analysis: Use data to analyze and improve sports team performance.
10	Energy Consumption Analysis: Study patterns in energy usage to suggest optimization strategies.
11	Traffic Flow Optimization: Analyze traffic data to improve city traffic management systems.
12	Crime Rate Prediction: Predict crime rates in different areas based on historical data.
13	Educational Outcomes Analysis: Study factors affecting educational outcomes in schools.
14	Marketing Campaign Effectiveness: Analyze marketing data to assess the impact of various campaigns.
15	Product Recommendation System: Develop a system for personalized product recommendations in e-commerce.
16	Employee Performance Analysis: Analyze employee data to identify patterns in performance and productivity.
17	Predictive Maintenance in Manufacturing: Use machine data to predict when maintenance is required.
18	User Experience Optimization: Analyze user interaction data to improve website or app design.
19	Telecommunication Network Analysis: Study network data to improve service quality and coverage.
20	Public Transportation Efficiency Study: Analyze data to improve efficiency and service in public transport.