PROSPECTUS – 2025

Admission to

Certificate Programme

on

Data Science and Machine Learning

Last Date of Submitting e-Applications: 30th June 2025

Department of Computer Science Engineering

National Institute of Technical Teachers Training and Research

(Deemed to be University Under Distinct Category)

Sector – 26, Chandigarh – 160 019

Phone: 0172-2759687/769

Website: www.nitttrchd.ac.in

Salient Features

1. **Duration of the Programme:** 4 weeks
2. **Date of Commencement of the Classes:** July 2025
3. **Entry Qualification:** Pursuing Diploma/Degree in any branch
4. **Number of Seats:** 20 (Allocated on a First-Come, First-Served basis; the total number of seats may be subject to increase or decrease at the discretion of the competent authority)
5. **Programme Structure:** Multi Point Entry and Exit in alignment with the National Education Policy (NEP) 2020
6. **Mode of Delivery:**
    a. Contact/Offline Mode: Participants shall attend sessions five days a week in person at the NITTTR Campus. (3 Hrs per day)
7. **Fee Structure:**

a. Contact/Offline Mode: INR 5,000/- + GST

- Boarding and lodging expenses, if required, are to be borne by the participants. Accommodation in the Institute's guest house/Hostel may be availed on a first-come, first-served basis, as per the rates prescribed by the Institute.

8. **Evaluation Scheme:**
    a. Formative Assessment: Continuous assessment through daily practice tasks.
    b. Summative Assessment: Upon successful completion of the entire programme, participants will be awarded a Programme Completion Certificate.

Module 1: Python Programming

Rationale

Python is one of the most popular programming languages. It's simple to use, packed with features and supported by a wide range of libraries and frameworks. Its clean syntax makes it beginner-friendly.

Learning Outcomes (LO)

- Introduction to Python Programming and Python IDEs
- Data Types, Operators, Program Execution, Flow Control Statements
- Python Data Structures: Lists, Tuples, Sets, Dictionaries
- File Handling
- Exception Handling
- Functions and Modules
- Object oriented Programming Concepts

Module 2: Data Science with Python

Rationale

Data Science has become one of the fastest-growing fields in recent years, helping organizations to make informed decisions, solve problems and understand human behavior. As the volume of data grows so does the demand for skilled data scientists. The most common languages used for data science are Python and R.

Learning Outcomes (LO)

- Overview of Data Science
- Statistics
- Numpy and Pandas
- Data Preprocessing
- Exploratory Data Analysis (EDA)
- Data Visualization
- Hands-on EDA Project

Module 3: Supervised Machine Learning Techniques

Rationale

Supervised Learning is a paradigm where algorithms learn from labeled training data to make predictions or decisions. The learning process involves mapping input data to corresponding output labels, guided by the examples provided during the training phase. The primary goal is for the algorithm to generalize its learning to accurately predict outcomes for new, unseen data.

Learning Outcomes (LO)

- Introduction to Machine Learning
- Classification Techniques and Implementation
- Evaluation metrics for Classification (accuracy, precision, recall, F1 score)
- Regression Techniques and Implementation
- Evaluation metrics for Regression (MSE, RMSE, R^2)
- Practical exercises on Classification and Regression Techniques
- Model Deployment

Module 4: Unsupervised Machine Learning Techniques

Rationale

Specify the definition of unsupervised machine learning.Apply k-means clustering, hierarchical clustering, and association rules to solve data analytic problems in Python

Learning Outcomes (LO)

- Clustering Techniques and Types
- Association Analysis
- Dimensionality Reduction and PCA (Principal Component Analysis)
- Evaluation metrics (Silhouette score, Davies-Bouldin index)
- Model Deployment
- Project Development
- Project Presentation