

Certificate Course on DS Fundamentals and ML

Detailed Curriculum

Name of Unit of Qualification	:	1. Introduction to DS & ML (Course Familiarization)
Duration	:	1 Hour
Topics	:	DS Fundamentals and ML Concepts

Performance Criteria (OUTCOME) No.	Contents	Hrs.
1. Understanding of DS & ML and its significant	Outlines, Discussion on DS & ML introduction and exposure in the real world scenario	1

Name of Unit of Qualification	:	2. Python Programming Basics with respect to DS & ML
Duration	:	14 Hours
Topics	:	Introduction to Python, Programming constructs, variable and declarations, Programming environment and concepts.

Performance Criteria (OUTCOME) No.	Contents	Hrs.
1. Understanding of Environment Configuration	Installation and Environment Setup	1
2. Learn the basics of Python	Introduction <ul style="list-style-type: none"> • Conceptual introduction to Computer Programming • Python Programming Tools Familiarization • Various development environments for Python and environment configuration • Python data types, variable, assignments, immutable, operators, expressions and comments Programming Constructs <ul style="list-style-type: none"> • Strings, List/Arrays, Functions and Printing • String Methods, Concatenation, formatting Strings • Numbers – Numeric Operations, Functions • Conditions and loops – if/else, while, for • Nested for loops, Functions, Pass, break, continue 	4
3. Learn Python	Data Structures in Python	9

programming for development		
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Name of Unit of Qualification	:	3. Data Analysis, Visualization and Exploration
Duration	:	30 Hours
Topics	:	Python Packages NumPy, Pandas, Matplotlib and other useful ML Packages.

Performance Criteria (OUTCOME) No.	Contents	Hrs.
1. Understanding Data with respect to Data Analysis in ML.	Data Analysis using Python Packages,	15
2. Understanding of the various Data Visualization Techniques and Data Exploration.	Data Visualization and exploration in machine learning Domain.	15

Name of Unit of Qualification	:	4. Machine Learning and Its Application
Duration	:	30 Hours
Topics	:	ML Learning Algorithms and its Implementation using programming and demonstration of applications

Performance Criteria (OUTCOME) No.	Contents	Hrs.
1. Understanding of Machine Learning Algorithms along with implementation using respective python packages.	Python Packages <ul style="list-style-type: none"> • Introduction, Categories, role/Future Scope • Introduction Scikit-learn • Hyperparameters and Model Validation • Feature Engineering • Machine Learning Algorithms (Linear regression, vector machine, decision tree, k-means clustering, Multiclass classification Decision Tree and random forest) 	30

Name of Unit of Qualification	:	5. Mini Project
Duration	:	15 Hours
Topics	:	Understanding of Mini Project, Practical Implementation

	of Mini Project with given Direction
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Performance Criteria (OUTCOME) No.	Contents	Hrs.
1. Understanding of ML Model Development	Apply machine learning algorithm with given data Evaluation and visualization of performance.	10
2. Understanding of Model Training and Prediction (or Outcome).	Make predictions using ML Algorithms.	5

Note: The given Course is more in machine learning domain, other than that, only fundamentals of Data Science also have to be covered which are common to both the domain.