SYLLABUS

For

Value Added Course

Certificate Course in Data Science

Offered by
Department of Computer Applications

TECNIA INSTITUTE OF ADVANCED STUDIES

NAAC ACCREDITED GRADE 'A' INSTITUTE

3 PSP, Institutional Area, Sector – 14, Rohini, Delhi - 110085

COURSE MODULE

Code No.: MCA-603   **Duration: 30 Hrs**
                                                         Credits: 2

Paper: Certificate Course in Data Science

INSTRUCTIONS TO PAPER SETTERS:

1. A quiz will be conducted consisting of 20 questions, containing 5 questions from each unit, covering entire syllabus.
2. A practical must be conducted based on the topics covered in the entire syllabus to evaluate analytical/technical skills of candidate.

OBJECTIVE: *The purpose of this course is to equip students with the knowledge, skills, and tools necessary to work effectively with data and derive meaningful insights from it. The course will make students to be able to understand the basic concepts of data collection, cleaning, exploration and visualization, allowing them to apply their knowledge and skills to solve practical problems.*

PRE-REQUISITE:

None

Unit 1

Introduction to Data Science- Understand the fundamental concepts and techniques used in data science, including data manipulation, cleaning, and exploration, Mathematics and Statistics for Data Science –statistical analysis to explore and analyze data, identify patterns, and make data- driven decisions, Programming for Data Science [7 Hrs]

Unit 2

Data Wrangling and Pre-processing - Solving predictive and classification problems, linear regression, logistic regression, decision trees, and clustering, Exploratory Data Analysis - Understand anduse popular data science libraries and frameworks such as Pandas, Sci-kit and TensorFlow, etc, Machine learning Algorithms [9 Hrs]

Unit 3

Big Data Technologies – Working with real-world datasets, clean and preprocess data, applying appropriate feature engineering techniques, Data Mining and Pattern Recognition - Understanding ethical considerations and best practices in data science, data privacy, security, and responsible data usage. [6 Hrs]

Unit 4

Deep Learning and Neural Networks -data science projects, applying a systematic and iterative approach to problem-solving, Data Visualization and Communication - Current technologies, algorithms, and industry trends Ethical and Legal Considerations in Data Science - critical thinking, analytical skills to frame data-driven questions, design experiments, and interpret results [8 Hrs]

Text Books

1. "Data Visualization", by Andy Kirk, 2012.
2. "Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking", by Foster Provost, 2013.
3. "The Data Science Design Manual", by Steven S. Skiena, 2018.

References

1. **"**Python for Data Analysis", by Wes McKinney, 2012

2. "The Elements of Statiscal Learning" by Trevor Hastie, Robert Tibshirani and Jerome Friedman, 2008.

3. "Big Data: A revolution that will transform How We Live, Work and Think", by Viktor Mayer- Schonberger and Kenneth Cukier, 2013.

Evaluation Pattern

On the basis of Quiz and Practical conducted on the syllabus, followed by Viva.