

**Certificate/ Diploma Course in Artificial Intelligence and Data
Science
Semester I**

CCAD-1-02T: Introduction to AI and DS

Total Marks: 100

External Marks: 70

Internal Marks: 30

Credits: 6

Pass Percentage: 40%

Objective: This course will enable students to understand the fundamentals of logic. Students will be able to infer the concept Logic and inference.

SECTION A:

Unit I: Introduction to Artificial Intelligence: Definitions of AI, Intelligent Agents, Problem solving. Knowledge, Reasoning and Planning: Logical Agents, Classical Planning, Knowledge Representation and Reasoning. Learning: Learning from examples, Knowledge in learning.

Unit II: Communicating, Perceiving and Acting: Communication, Natural Language Processing, Perception, Computer Vision, Robotics.

Unit III: AI Applications (General): Speech Recognition, Image Recognition, Natural Language Processing, Autonomous Transportation. Natural Language understanding, Recognizing objects and describing images, Dimensionality reduction, feature selection and feature extraction.

Unit IV: AI Applications (Specific): Virtual Personal Assistants/ Chatbots, Gaming, Smart Cars, Drones, Fraud Detection, Software Testing and Development, Business, Health Care, Education, Finance.

SECTION B

Unit I: Introduction to Data Science: Data Science-a discipline, Landscape-Data to Data science, Data Growth-issues and challenges, data science process. Foundations of data science.

Unit II: Data Exploration and Preparation: Structured vs unstructured data, Quantitative vs qualitative data. Four levels of data – nominal, ordinal, interval, ration. Messy data, Anomalies and artifacts in datasets.Cleaning data.

Unit III: Data Representation and Transformation: Forms of data-tabular, text data, graph-based data. Modern databases- text files, spreadsheets, SQL databases, NoSQL databases, distributed databases, live data streams. Representation of data of special types-acoustic, image, sensor and network data.

Unit IV: Computing with Data: Overview of various tools Data Modeling: Basics of Generative modeling and Predictive modeling. Data Visualization and Presentation: Charts-histograms, scatter plots, time series plots etc. Applications of Data Science in Business, Insurance, Energy, Health care, Biotechnology, Manufacturing, Utilities, Telecommunication, Travel, Governance, Gaming, Pharmaceuticals, Geospatial analytics and modeling

Suggested Readings:

1. S.J. Russell and P.Norving: "Artificial Intelligence: A Modern Approach", Pearson.

2. SinanOzdemir, "Principles of Data Science", Packt Publishing.

E.Rich, K.Knight, S.B. Nair: "Artificial Intelligence", Tata McGraw Hill Ed Pvt Ltd.

Joel Grus: "Data Science from Scratch", O'Reilly. 3. Foster Provost & Tom Fawcett: "Data Science for Business" O'Reilly (SPD)