

**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.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

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)