| Course Code | Course Name | Course Type | Cd | L | T | P | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional | Final Exam | Total |
| COM-702(C) | Applied Data Science | PEC | 3 | 3 | 0 | 0 | 50 | 100 | 150 |

**Course Outcomes:**

| At the end of the course the students will be able to: | |
|---|---|
| CO1 | Describe the importance of data science and the various operations involved. |
| CO2 | Articulate the different steps involved in the data acquisition ecosystem and their relevance. |
| CO3 | Assess diverse machine learning techniques for data analysis for different applications. |
| CO4 | Develop data visualization and analytics skills using different libraries and tools. |
| CO5 | Apply various AI models and techniques for Text and Natural Language Processing |

**Detailed Syllabus**

**Section A**

**Unit 1:** Introduction to Data Science: Overview of data science and its applications, Introduction to data analysis using Python and Jupyter notebooks, Data preprocessing and cleaning techniques, Exploratory data analysis and visualization. (**9 Hrs.)**

**Unit 2:** Data Wrangling and Preparation: Data acquisition and integration from various sources, Handling missing data and outliers, Feature engineering and transformation, Data quality assessment and validation. **(10 Hrs.)**

**Unit 3:** Machine Learning Techniques: Introduction to supervised and unsupervised learning, Regression and classification algorithms, Clustering and dimensionality reduction, Model evaluation and selection. (**11Hrs.)**

**Section B**

**Unit 4:** Data Visualization and Communication: Data visualization principles and best practices, Visualizing data using Python libraries (e.g., Matplotlib, Seaborn), Storytelling with data, Communicating data insights effectively. (**10 Hrs.)**

**Unit 5:** From Text to Deep Learning: Text mining and natural language processing, Time series analysis and forecasting, Recommendation systems, Deep learning, and neural networks. (**11 Hrs.)**

**Textbooks**

| S. No. | Name of the Books | Author | Publisher | Edition (Pub. Yr.) |
|---|---|---|---|---|
| 1 | Python for Data Analysis | Wes McKinney | O'Reilly Media | 2nd (2017) |
| 2 | Data Analytics using Python | Bharti Motwania | Wiley | 1st (2020) |

**Reference Books**

| S. No. | Name of the Books | Author | Publisher | Edition (Pub. Yr.) |
|---|---|---|---|---|
| 1 | Data Science and Machine Learning using Python | Dr. Reema Thareja | McGraw Hills | (2017) |