Artificial Intelligence & Data Science (Sem VI)

1. ADC601 : Data Analytics & Visualization
2. ADL601 : Data Analytics & Visualization Lab

Instructor : Mrs. Lifna C S

Topics

1. **Data Analytics & Visualization Sem VI Course Scheme**
2. ADC601: Data Analytics & Visualization - Course Objectives & Outcomes
3. ADC601: Data Analytics & Visualization - Assessment
4. ADC601: Data Analytics & Visualization - TextBooks, References & Online Resources
5. ADL601 : Data Analytics & Visualization Lab - Course Objectives & Course Outcomes
6. ADL601 : Data Analytics & Visualization Lab - TextBooks, References & Online Resources
7. ADL601 : Data Analytics & Visualization Lab - Assessment

Data Analytics & Visualization Sem VI Course Scheme

PROGRAM STRUCTURE FOR THIRD YEAR(AI and DS)

Scheme for Autonomous Program

Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract. Tut.	Theory	Pract.	Total
ADC601	Data Analytics and Visualization	3	--	3	--	3
ADL601	Data Analytics and Visualization Lab	--	2	--	1	1

Data Analytics & Visualization Sem VI Course Scheme

Course Code	Course Name	Examination Scheme						
		Theory				Term Work	Pract.	Total
		Internal Assessment		End Sem Exam	Exam. Duration (in Hrs)			
		Mid Term	CA					
ADC601	Data Analytics and Visualization	20	20	60	2	--	--	100
ADL601	Data Analytics and Visualization Lab	--	--	--	--	25	25	50

ADC601 : Data Analytics & Visualization - Course Objectives

Course Objectives: The course aims:	
1	To Introduce the concept of Data Analytics Lifecycle.
2	To Develop Mathematical concepts required for advance regression.
3	To Understand data modeling in time series and its process.
4	To create awareness about Text analytics and its applications.
5	To provide overview of Data analytics and visualization with R.
6	To provide overview of Data analytics and visualization with Python.

ADC601 : Data Analytics & Visualization - Course Outcomes

Course Outcomes: After successful completion of the course students will be able to:	
1	Comprehend basics of data analytics and visualization.
2	Apply various regression models on given data set and perform prediction.
3	Demonstrate advance understanding of Time series concepts and analysis of data using various time series models.
4	Analyze Text data and gain insights.
5	Experiment with different analytics techniques and visualization using R.
6	Experiment with different analytics techniques and visualization using Python.

ADC601 : Data Analytics & Visualization - Assessment (100 Marks)

Direct Assessment

- End Semester Exam (Full syllabus, Duration : 2 hours) : **60 Marks**
- Internal Assessment : **40 Marks**
  - Mid Term Test (50% syllabus, Duration : 1 hour) - **20 marks**
  - Continuous Assessment - **20 marks**

Indirect Assessment (Mini-Project cum Case Study) - 25 Marks

Rubrics considered for Continuous Assessment from Syllabus :

1. ** Certificate course (4 weeks +)
   NPTEL/ Coursera/Udemy/any MOOC - 10 marks
2. Content beyond syllabus presentation - 10 marks
3. Creating Proof of concept - 10 marks
4. Mini Project / Extra Experiments/ Virtual Lab /
   Competitive programming-based event / Group Discussion - 10 marks
5. Multiple Choice Questions (Quiz) - 5 marks (2 set of MCQ's)
6. GATE Based Assignment /Tutorials etc - 10 marks

** For sr.no.1, the date of certification exam should be within the term and in case a student is unable to complete the certification, the grading has to be done accordingly.

ADC601 : Data Analytics & Visualization - TextBooks & References

Textbooks:	
1	Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data,EMC Education services Wiley Publication
2	Data Analytics using Python: Bharati Motwani, Wiley Publications.
3	Forecasting : methods and applications- Spyros G Makridakis, Steven C wheelwright, Rob J Hyndman, 3rd edition Wiley publications
4	Practical Text Mining and statistical Analysis for non-structured text data applications,1st edition,Grey Miner,Thomas Hill.
5	Ritchie S. King, Visual story telling with D3' Pearson
References:	
1	Data Mining, Concepts and Techniques: 3rd edition, Jiawei Han, Micheline Kamber and Jian Pei
2	Python for Data Analysis: 3rd Edition, Wes McKinney ,Publisher(s): O'Reilly Media, Inc.
3	Ben Fry, 'Visualizing data: Exploring and explaining data with the processing environment', O'Reilly, 2008.

ADL601 : Data Analytics & Visualization Lab Objectives

Prerequisite: Basic Python	
Lab Objectives:	
1	To effectively use libraries for data analytics.
2	To understand the use of regression Techniques in data analytics applications.
3	To use time series models for prediction.
4	To introduce the concept of text analytics and its applications.
5	To apply suitable visualization techniques using R and Python.

ADL601 : Data Analytics & Visualization Lab Outcomes

Lab Outcomes:

At the end of the course, students will be able to —-

1	Explore various data analytics Libraries in R and Python.
2	Implement various Regression techniques for prediction.
3	Build various time series models on a given data set.
4	Design Text Analytics Application on a given data set.
5	Implement visualization techniques to given data sets using R .
6	Implement visualization techniques to given data sets using Python.

ADL601 : Data Analytics & Visualization Lab Assessment (50 Marks)

Direct Assessment

- Term Work : **25 Marks**
- Oral / Practical : **25 Marks**

Indirect Assessment (Mock Viva & Practical) : 25 Marks

Term Work (11 experiments)

- **Experiment - 15 Marks
- Attendance - 10 Marks

** *Experiments are graded (out of 15 Marks) based on the following rubrics:*

1. Task completion (In Lab) : 5 Marks
2. Timely Correction : 5 Marks (ideally within a week)
3. Viva based on the Expt. (In Lab) : 5 Marks

ADL601 : Data Analytics & Visualization Lab Experiments

No	Name of Experiment	LO's
1.	Getting introduced to data analytics libraries in Python and R.	LO1
2.	Simple Linear Regression in Python.	LO2
3.	Multiple Linear Regression in Python	LO2
4.	Time Series Analysis in Python	LO3
5.	Implementation of ARIMA model in python	LO3
6.	Implementation of Time series Decomposition and ACF and PACF	LO3
$ 7.	Design Text Analytics Application on a given data set.	LO4
8.	Set Up a D3.js Environment, Select Elements in D3, Modify Elements in D3,Data Loading in D3	LO5, LO6
9.	Create a World Map with d3.js	LO5, LO6
10.	Event Handling with D3.js	LO5, LO6
11.	Two visualization experiments in python using different Libraries.	LO5, LO6

Note : $ - Newly added experiment to map LO4

ADL601 : Data Analytics & Visualization Lab - TextBooks

References

1. Data Analytics using R, Bharati Motwani, Wiley Publications
2. Python for Data Analysis: 3rd Edition, WesMcKinney, Publisher(s): O'Reilly Media, Inc.
3. Better Data Visualizations A Guide for Scholars, Researchers, and Wonks, Jonathan Schwabish, Columbia University Press

Useful Links

1. https://www.geeksforgeeks.org/data-visualization-with-python
2. https://www.coursera.org/specializations/data-science-python
3. https://www.geeksforgeeks.org/data-visualization-in-r/
4. https://towardsdatascience.com/introduction-to-arima-for-time-series-forecasting-