Master of Engineering - ME (Big Data Analytics)

Course Name : Principles of Data Visualization Lab

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Course Code : BDA 5182

Academic Year : 2024 - 25

Semester : I

Name of the Course Coordinator : SATYANARAYAN SHENOY

Name of the Program Coordinator : Dr. PRATHVIRAJ N

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Signature of Program Coordinator Signature of Course Coordinator

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Table of Contents

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Program Education Objectives (PEOs)

The overall objectives of the Learning Outcomes-based Curriculum Framework (LOCF) for ME (Big Data Analytics), program are as follows.

PEO No.	Education Objective
PEO 1	Develop in depth understanding of the key technologies in data engineering, data science and business analytics.
PEO 2	Practice problem analysis and decision-making using machine learning techniques.
PEO 3	Gain practical, hands-on experience with statistics, programming languages and big data tools through coursework and applied research experiences.

Program Outcomes (POs)

By the end of the postgraduate program in ME (Big Data Analytics), graduates will be able to:

PO1	Independently carry out research /investigation and development work to solve practical problems.

PO2 Write and present a substantial technical report/document.

PO3 Demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level

higher than the requirements in the appropriate bachelor program.

PO4 Develop and implement big data analysis strategies based on theoretical principles, ethical considerations, and detailed

knowledge of the underlying data.

PO5 Demonstrate knowledge of the underlying principles and evaluation methods for analyzing data for decision-making.

1. Course Plan

1.1 Primary Information

Course Name : Principles of Data Visualization Lab [BDA 5132]

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L-T-P-C : 0-0-3-1

Contact Hours : 36 Hours

Pre-requisite : Programming with Python, Power BI

Core/ PE/OE : Elective

1.2 Course Outcomes (COs), Program outcomes (POs) and Bloom's Taxonomy Mapping

CO	At the end of this course, the student should be able to:	No. of Contact Hours	Program Outcomes (PO's)	BL
CO1	Experiment web scrapping techniques to extract data from websites.	9	PO4	4
CO2	Implement NumPy and Pandas for data science operations	6	PO3	3

with examples.

CO3 Organize data for visualization using data manipulation 6 PO4 4

techniques.

CO4 Experiment different visualization techniques 6 PO4 4

CO5 Use power BI for analytics and to manage workspace. 9 PO5 3

1.3 Assessment Plan

Components Lab Test Flexible Assessments (2 - 3 in number) End semester/ Makeup examination

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Duration 90 minutes To be decided by the faculty. 180 minutes

Weightage 0.3 0.2 0.5

Typology of questions Applying; Analyzing. Applying; Analyzing. Applying; Analyzing.

Pattern Answer all the questions. Maximum marks 30. Assignment: (Solving Use case using scraping and visualization techniques.) Answer all the questions. Maximum marks 50

Schedule As per academic calendar. Assignment submission: November 2024 As per academic calendar.

Topics covered Scraping tools, NumPy, Pandas, PowerBI Comprehensive examination covering the full syllabus.

1.4 Lesson Plan

L. No. TOPICS Course Outcome Addressed

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L0 Course delivery plan, Course assessment plan, Course outcomes, Program outcomes, CO-PO mapping, reference books ---

Lab 1 Web scraping using Beautiful soups CO1

Lab 2 Web scraping using Scrapy framework CO1

Lab 3 Web scraping using Scrapy framework CO1

Lab 4 Panda, NumPy: Implement NumPy and Pandas for data science operations with examples. CO2

Lab 5 Panda, NumPy: Implement NumPy and Pandas for data science operations with examples. CO2

Lab 6 Data Wrangling - Clean, Transform, Merge, Reshape CO3

IT1 IT1 Internal lab test CO1, CO2, CO3

Lab 7 Data Aggregation and Group Operations. CO3

Lab 8 Visualization techniques: time series, statistical distributions. CO4

Lab 9 Visualization techniques: maps - Data visualization for web. CO4

Lab 10 Visualize data and analysis in Power BI CO5

Lab 11 Manage workspaces and datasets in Power BI. CO5

Lab 12 Create and use analytics reports with Power BI. CO5

1.5 References

- 1. Website Scraping with Python: Using BeautifulSoup and Scrapy, Gábor & Hajba, APRESS Publications, 1st Edition, 2018.

- 2. Web Scraping with Python: Collecting More Data from the Modern Web, Ryan Mitchell Shroff, O'Reilly, 2nd Edition, 2018.

- 3. Designing Data Visualizations, Julie Steele and Noah Iliinsky; O'Reilly Media; 1st Edition, 2011.

- 4. Python for Data Analysis, Wes McKinney; Shroff; O'Reilly; 2nd Edition, 2018.

- 5. https://learn.microsoft.com/en-us/certifications/exams/pl-300/

1.6 Other Resources (Online, Text, Multimedia, etc.)

- 1. Web Resources: Blog, Online tools and cloud resources.

- 2. Journal Articles.

1.7 Course Timetable

st Semester Big Data Analytics 1   Room: LG1 LH 8 Lab: Data Science Lab

	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON								
TUE		PDV						
WED								
THU	PDV LAB		PDV					
FRI								
SAT	PDV							

1.8 Assessment Plan

Cos		Marks & Weightage			
CO No.	CO Name	Mid Semester (Max. 50)	Assignment (Max. 20)	End Semester (Max. 100)	CO wise Weightage
CO1	Experiment web scrapping techniques to extract data from websites.	10	4	20	0.34
CO2	Implement NumPy and Pandas for data science operations with examples.	10	4	-	0.14
CO3	Organize data for visualization using data manipulation techniques.	-	4	20	0.24
CO4	Experiment different visualization techniques.	10	4	-	0.14
CO5	Use power BI for analytics and to manage workspace.	-	4	10	0.14
	Marks (weightage)	0.3	0.2	0.5	1.0

Note:

- In-semester Assessment is considered as the Internal Assessment (IA) in this course for 50 marks, which includes the performances in lab participation, assignment work, lab work, lab tests, quizzes etc.

- End-semester examination (ESE) for this course is conducted for a maximum of 50.

- End-semester marks for a maximum of 50 and IA marks for a maximum of 50 are added for a maximum of 100 marks to decide upon the grade in this course.

Weightage for CO1 = (Lab Test marks for CO1 + Assignment marks for CO1 + ESE marks for CO1)

/100 = (5 + 2 +5)/100 = 0.12

1.9 Assessment Details

The assessment tools to be used for the Current Academic Year (CAY) are as follows:

Sl. No.	Tools	Weightage	Frequency	Details of Measurement (Weightage/Rubrics/Duration, etc.)
1	Internal Test	0.3	1	- Performance is measured using lab internal test attainment level. - Reference: question paper and answer scheme. - Lab internal test is assessed for a maximum of 30 marks.
2	Assignments	0.2	1	- Performance is measured using assignments attainment level. - Assignment is evaluated for a maximum of 20 marks.
3	ESE	0.5	1	- Performance is measured using ESE attainment level. - Reference: question paper and answer scheme. - ESE is assessed for a maximum of 50 marks.

1.10 Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1		Y			
CO2	Y				
CO3		Y			
CO4	Y				
CO5		Y			
Average Articulation Level			*	*	*