



# Master of Engineering - ME (Big Data Analytics)

Course Name : Principles of Data Visualization

--- --- ---

Course Code : BDA 5132

Academic Year : 2024 - 25

Semester : I

Name of the Course Coordinator : SATYANARAYAN SHENOY

Name of the Program Coordinator : Dr. PRATHVIRAJ N

### Course File

Signature of Program Coordinator   Signature of Course Coordinator

--- ---

with Date   with Date

Table of Contents

--- ---

1. Course Plan 6

1.1 Primary Information 6

1.2 Course Outcomes (COs), Program outcomes (POs) and Bloom's Taxonomy Mapping 7

1.3 Assessment Plan 8

1.4 Lesson Plan 9

1.5 References 11

1.6 Other Resources (Online, Text, Multimedia, etc.) 11

1.7 Course Timetable 12

1.8 Assessment Plan 13

1.9 Assessment Details 15

1.10 Course Articulation Matrix 16

2. Assessment Details 17

2.1	Student Details:	17
2.2	Assessment outcomes	19
2.3	Analysis of Assessment outcomes	21
2.4	Attainment of Course Outcomes (Direct)	22
--- ---		
2.5	Attainment of Course Outcomes (Indirect): Course End Survey (CES) Questionnaire	23
2.6	Attainment of Course Outcomes (Indirect): Analysis	24
3.	CO-PO Assessment	25
4.	Observations and Comments	26
4.1	Observations from Course Coordinator based on the direct and indirect assessments	26
4.2	Comments/Suggestions by the Course Coordinator	27

## ## 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 [BDA 5132]

---

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

Contact Hours : 36 Hours

Pre-requisite : Basic Programming with Python

Core/ PE/OE : Elective



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

No. of Contact Program Outcomes CO At the end of this course, the student should be able to:

BL

---

Hours (PO's)

Implement web scrapping techniques to extract data from CO1 12 PO4 3  
websites.

Organize raw data for analysis using data manipulation CO2 12 PO1 4

techniques.

Use powerBI for preparation and modelling of data for CO3 4 PO4 3  
analysis.

CO4 Interpret data using various data visualization techniques. 4 PO5 3

Report data for analytics and to manage workspace using CO5 4 PO3 2

Power BI



### ### 1.3 Assessment Plan

Components Internal Test 1 Flexible Assessments (2 - 3 in number) End semester/ Makeup  
examination

--- --- --- ---

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. Understanding. Applying;  
Analyzing; Understanding.

Pattern Answer all 5 questions of 10 marks each. Assignment: (Solving Use case using scraping  
and visualization techniques.) Answer all 10 full questions of 10 marks each.

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

Topics covered Web scraping, Data Analysis, Data Analysis, Data Visualization Web scraping,  
Data Analysis and Data Visualization. Comprehensive examination covering the full syllabus.  
Students are expected to answer all questions.



### #### 1.4 Lesson Plan

L. No. TOPICS Course Outcome Addressed

--- --- ---

L0 Course delivery plan, Course assessment plan, Course outcomes, Program outcomes, CO-PO

mapping, reference books ---

L1 Web scraping: Introduction CO1

L2 Web scraping models and techniques CO1

L3 Web scraping models and techniques CO1

L4 Usecases: BeautifulSoup CO1

L5 Usecases: Scrapy CO1

L6 Usecases: Scrapy CO1

L7 Data Analysis: introduction CO2

L8 Data structures for analysis: numpy CO2

L9 Data structures for analysis: numpy CO2

L10 Data Structures for analysis: Pandas CO2

L11 Data Structures for analysis: Pandas CO2

L12 Data Wrangling - Clean, Transform, Merge, Reshape CO2

L13 Data Wrangling - Clean, Transform, Merge, Reshape CO2



L14 Data Aggregation and Group Operations CO2

--- --- ---

L15 Power BI Introduction CO3

L16 Prepare data for analysis using Power BI CO3

L17 Prepare data for analysis using Power BI CO3

L18 Model data in Power BI CO3

IT1 Internal test 1 CO1, CO2, CO3

L19 Data Visualization: Introduction CO4

L20 Visualization techniques: time series CO4

L21 Visualization techniques: time series CO4

L22 Visualization techniques: statistical distributions CO4

L23 Visualization techniques: statistical distributions CO4

- L24 Visualization techniques: statistical distributions CO4
- L25 Visualization techniques: maps - Data visualization for web. CO4
- L26 Visualization techniques: maps - Data visualization for web. CO4
- L27 Visualization techniques: maps - Data visualization for web. CO4
- L28 Visualize data in Power BI. CO5
- L29 Data analysis in Power BI CO5
- L30 Data analysis in Power BI CO5
- L31 Manage workspaces and datasets in Power BI CO5
- L32 Manage workspaces and datasets in Power BI CO5



- L33 Create and use analytics reports with Power BI CO5

--- --- ---

- L34 Create and use analytics reports with Power BI CO5
- L35 Manage workspaces power BI CO5
- L36 Manage workspaces 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/>

### ### 5.1 Other Resources (Online, Text, Multimedia, etc.)

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



### ### 5.2 Course Timetable

1<sup>st</sup> Semester Big Data Analytics      Room: LG1 LH 8

--- --- --- --- --- --- --- --- ---

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



### #### 5.3 Assessment Plan

Cos    Marks & Weightage

--- --- --- --- --- ---

CO No.    CO Name    Mid Semester    Assignment    End Semester    CO wise

(Max. 50)    (Max. 20)    (Max. 100)    Weightage

CO1    Implement web scrapping techniques to extract data from websites.    20    2    20    0.2

CO2    Organize raw data for analysis using data    30    2    30    0.29

manipulation techniques.

CO3    Use powerBI for preparation and modelling of data -    2    10    0.15

for analysis.

CO4    Interpret data using various data visualization -    2    30    .25

techniques.

CO5    Report data for analytics and to manage workspace -    2    10    .11

using Power BI

Marks (weightage)    0.2    0.1    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 class participation, assignment work, class tests, mid-term tests, quizzes etc.

- End-semester examination (ESE) for this course is conducted for a maximum of 100 and the same will be scaled down to 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 = (IT1 marks for CO1 / 2.5 + IT2 marks for CO1 / 2.5 + Assignment marks for CO1 + ESE marks for CO1 / 2)/100 = (25/2.5 + 0 + 0 + 20/ 2)/100 = 0.2



#### #### 5.4 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	0.4	2	- Each internal test is assessed for a maximum of 50 marks and scaled down to 40 marks.
2	Assignments	0.1	1	- Performance is measured using assignments/quiz attainment level. - Assignments/quiz are evaluated for a maximum of 10 marks. - Performance is measured using ESE attainment level.
3	ESE	0.5	1	- Reference: question paper and answer scheme. - ESE is assessed for a maximum of 100 marks and scaled down to 50 marks.



#### ### 5.5 Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5



--- -- -- -- --

CO1      Y

CO2 Y      Y

CO3      Y

CO4      Y

CO5      Y

Average Articulation Level   \*   \*   \*   \*