



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2023-2024
Course Handout Part II

Date: 03-08-2023

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : CS F441
Course Title : Selected Topics from Computer Science (Data Visualization)
Instructor-in-Charge : Dr. Sumanta Pattanaik, Visiting Professor.
Dr. Tathagata Ray (Hyderabad Campus)

Scope and Objective of the Course:

Data is being generated at an ever-increasing rate in all fields. Data visualization provides the most effective way to help us understand this data and communicate it to others. Data graphic enables us to represent the data by charts and graphs to create the visualization. In this course the students will learn basics of the graphical representations and key principles of data visualization.

The objective of the course is to

- O1. Understand the importance of data visualization for effective communication of information inherent in the data.
- O2. Understand the importance of data acquisition and data cleaning.
- O3. Distinguish between different types of data and choose plots for appropriate visualization of the data.
- O4. Hands on experience in creating plots for different types of visual analysis.
- O5. Learn interpreting data from the plots.

The class activities will include regular face-to-face lectures, hands on programming, and in-class quizzes. Students will be evaluated regularly with quizzes, exams, and assignments. There will be a final project. Students will use [Python](#), [Matplotlib](#), [Plotly](#) to code and practice creating the visualization for this class.

Textbook:

- T. [Fundamentals of Data Visualization](#) (Online publicly accessible book)

Note: *The book uses R as the scripting language. In this course we will use Python instead.*

Reference materials:

- R1. [Pandas: Getting started](#) (Online publicly accessible pages)
- R2. [Numpy: Quick start](#) (Online publicly accessible pages)
- R3. [Data Presentation](#) (Online publicly accessible pages)
- R4. [Gestalt Principles](#) (Online publicly accessible pages)



Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
01-02	O1	Importance of data visualization, data visualization framework	
03-06	O2	Data preparation (data cleaning and organizing data)	R1, R2
07-08	O1	Space and Spatial Scales, Color and Color Scales	T: Ch: 2-5
09-21	O2, O3, O4, O5	Visual presentations of Data for diverse types of visual analysis	T: Ch 6-14
22	O3, O4, O5	Statistical Modeling: Simple and multiple linear regression	T: Ch 14
23-26	O3, O4, O5	Multidimensional data visualization, Dimension reduction	T: Ch 12
27-33	O3, O4, O5	Geographical data visualization on maps	T: Ch 15
34-36	O3, O4, O5	Network and hierarchy visualization, Text Visualization	T: Ch 11
35-37	O1	Visual perception, Interaction	R4
38-39	O1	Guidelines and best principles of data visualization	T: Ch 17-26, R3

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Mid Term	90 minutes	20	TBA	Closed Book
Weekly Online Quiz (Time Bound)	10-15 minutes Every week	20	Monday Every Week. Time: TBA	Open Book
Practice Assignments	-	20	At Regular Intervals Time: TBA	Take-Home
Project	-	10	TBA	Take-Home
Comprehensive	180	30	TBA	Closed Book

Chamber Consultation Hour: TBA**Notices:** Will be displayed on the CMS. Specific instructions will be often given in the class only.

Make-up Policy: Makeup is highly discouraged for this course. Makeup will be given only in genuine cases and that too with prior notification only (following AUGSD rules). Makeup in Comprehensive Exam will be decided as per the guidelines issued by AUGSD.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE
Sumanta Pattanaik

