5. FY_GEs (H)_approved Sem2

GE2a: Data Analysis and Visualization using Python

	TOPICS/UNITS	Chapter	Ref
Week 1 to 3	**Unit 1 Introduction to basic statistics and analysis:** Fundamentals of Data Analysis, Statistical foundations for Data Analysis, Types of data, Descriptive Statistics, Correlation and covariance, Linear Regression, Statistical Hypothesis Generation and Testing Python Libraries: NumPy, Pandas, Matplotlib	**Ch1: pg 11-24, pg 29-35, pg 37-p38** **Ch 1: 1.3 (pg 4-6)**	**[2]** **[1]**
Week 4 to 6	**Unit 2 Array manipulation using Numpy:** NumPy array: Creating NumPy arrays, various data types of NumPy arrays Indexing and slicing, swapping axes, transposing arrays, data processing using Numpy arrays	**Ch4:4.1 (pg 85-105), Usage of rand(), nrand() and randint() functions of NumPy**	**[1]**
Week 7 to 11	**Unit 3 Data Manipulation using Pandas:** Data Structures in Pandas: Series, Data Frame, Index objects, loading data into Panda's data frame, Working with Data Frames: Arithmetics, Statistics, Binning, Indexing, Reindexing, Filtering, Handling missing data, Hierarchical indexing, Data wrangling: Data cleaning, transforming, merging and reshaping	**Ch 5: 5.1, 5.2 excluding Arithmetic and data alignment,axis indexes with duplicate labels, 5.3** **Ch 6: 6.1 (pg 169-172, 175)** **Ch 7: 7.1 (pg 191-197), 7.2 till binning (pg 197-205)** **Ch 8: 8.1 (pg 221-226), 8.2 (pg 227-231) 8.3 (pg 243-245)**	**[1]**
Week 12 to 15	**Unit 4 Plotting and Visualization:** Using Matplotlib to plot data: figures, subplots, markings, color and line styles, labels and legends, Plotting functions in Pandas: Lines, bar, Scatter plots, histograms, stacked bars, Heatmap	**Ch 9: 9.1 (pg 253-267), 9.2 (pg 269-282)** **Ch 5 : pg 281-282**	**[1]** **[2]**

References

1. McKinney W. *Python for Data Analysis: Data Wrangling with Pandas*, *NumPy and IPython*. 2nd edition. O'Reilly Media, 2018..
2. Molin S. *Hands-On Data Analysis with Pandas*, Packt Publishing, 2019.
3. Gupta S.C., Kapoor V.K., *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, 2020.