Phase I: ETL

Week	Date	Topic	Learning Objectives
01	01/24	Introduction to BI and Data Viz	1. Describe the analytics journey 2. Define data visualization and its main goals 3. Describe the BI methodology and its main goals
	01/26	Introduction to R	1. Describe how and why we are using R in this course? 2. Understand the syntax, data structures and functions 3. Utilize the project workflow in R
02	01/31	Importing/Exporting Data in R	1. Subset data in R 2. Read text-files, binary files (Excel, SAS, SPSS, Stata, etc), json files, etc. 3. Export data in R
	02/02	Web Scraping to Extract Relevant Data	1. Understand when can we scrape data (i.e., robots.txt) 2. Scrape a webpage Using R 3. Utilize loops or purr::map to download data from multiple webpages
03	02/07	**Lab/Catch-Up**	1. Perform an extensive web scrape 2. Create reproducible reports/analyses using R Markdown
	02/09	Utilizing Web APIs to Extract Relevant Data	1. Describe what is an API 2. Download data using APIs
04	02/14	Transforming Data in R (Tidy Data)	1. Define tidy data 2. Perform pivot, rectangling and nesting operations in R
	02/16	Transforming Data Using R (Technically Correct Data)	1. Examine the different column types and their summaries 2. Recode factors and convert dates 3. Manipulate characters
05	02/21	Transforming Data Using R (Achieving Consistent Data)	1. Detect errors in a single variable (through statistical summaries, plots, etc) 2. Detect contextual errors 3. Correct errors (with transformation rules, deductive correction and deterministic imputation)
	02/23	Transforming Data Using R (Achieving Consistent Data)	1. Describe different scenarios for missing data 2. Understand when it is appropriate to apply imputation techniques 3. Apply some basic imputation techniques for missing data (e.g., mean/median/mode, K-NN, etc)
06	02/28	Lab/Catch-Up	TBD
	03/02	**Exam 01: Extracting and Transforming Data**	

Phase II: Data Visualization

Week	Date	Topic	Learning Objectives
07	03/07	Fundamentals of Data Viz (Design Principles and Encoding)	1. Explain Graphical Excellence 2. Explain the theory of data graphics 3. Optimize visual encoding based on data types 4. Understand why color should be used sparingly and how to select appropriate colors (when color=must)
	03/09	Introduction to R, Tableau and Power BI as tools for visualizing data	1. Being able to use any of the software to visualize simple datasets
08	03/14	From Fundamentals to Practice (Charts used for Comparisons, Relationships, Distributions & Correlations)	1. Identify weaknesses & strengths of basic charts 2. Use appropriate charts based on objective 3. Avoid using pie charts (never use pie charts) 4. Avoid 3D graphs (unless VR changes their utility)
	03/16	From Fundamentals to Practice (Charts used for Timeseries Data)	1. Understand main goals behind visualizing time-series data 2. Construct appropriate charts for univariate and multivariate time-series
09	03/21	**Spring Break -- No Classes**	
	03/23		
10	03/28	From Fundamentals to Practice (Spatial & Spatiotemporal Charts)	1. Explain the different types of spatial plots 2. Select suitable spatial graphs for diff. scenarios 3. Understand how spatitemporal plots can help in storytelling (what makes BI special)
	03/30	From Fundamentals to Practice (Graphs for High Dimensional Data)	1. Describe what is high dimensional data. 2. Provide some examples for graphs used for high dimensional datasets. 3. Construct these graphs using software
11	04/04	Interactive Graphs for the Web	1. Describe different technologies that can be used for creating interactive graphs for the web (e.g., D3, plotly, etc). 2. Describe practical/technical factors that need to be considered in picking a specific tool.
	04/06	**Exam 02: Fundamentals of Data Visualization and its Applications**	

Phase III: Business Reporting and Data Mining

Week	Date	Topic	Learning Objectives
12	04/11	Visual Business Reports	1. Define a "business report" & its main functions 2. Understand the importance of the right KPIs 3. Automate traditional business reports 4. Dashboards as real-time business reporting tools
	04/13	An Introduction to Data Mining and Artificial Intelligence	1. Describe the goals & functions of data mining 2. Understand the statistical limits on data mining 3. Describe the data mining process
13	04/18	Frequent Item Sets and Association Rules	1. What is "frequent itemsets" & the application of this concept 2. Explain how and why "association rules" are constructed 3. Use R to populate both concepts
	04/20	Clustering	1. Describe the different steps of the k-means algorithm 2. Cluster using k-means (manually) 3. Cluster using k-means (software)
14	04/25	Data Mining Catch-Up and Advanced Topics	TBD
	04/27	**Exam III: Business Reporting and Data Mining**	
15	05/02	Putting it All Together and In-Class Project Support	
	05/04	In-Class Project Support	