Detailed Course Information: Data Visualization		
Sl. No.	**Data Type**	**Comments**
1	**Course Name**	**Efficient Communication through Data Visualization**
2	**Content Source**	Prof U Dinesh Kumar's book on Data Visualization
3	**Brief Description / Introduction of Course**	*Learn fundamentals of data visualization, its usage for getting insights from data and its framework that enable us to effectively communicate the findings to the decision maker.*
4	**Why do we need this course?**	*In the current world where everything is digitalized, there is so much of data which gets captured around us. So how do we comprehend this big data and extract valuable, actionable insights and explain this data effectively to stakeholders? |* *As the saying goes "A Picture is worth thousand words", Visualizations can help us make sense of the big data. A well-designed graphics are usually the simplest and most powerful in exploring and explaining insights from the Data.*
5	**Learning Outcomes**	• *Introduce data visualization both the principles and techniques.* • *Learn the value of visualization, specific techniques in information visualization and understand how to best leverage visualization methods.* • *Understand the importance of data visualization and the design & use of many visual components* • *Learn about visualization perception and effective visual encodings* • *Learn how to explore a given dataset and turn data into actionable information which would enable business decisions*
6	**Course Length**	*5 Modules **(5 weeks)***
7	**Estimated Effort**	*2-3 hours/module*

Module 1: Introduction to Visualization

Lecture	Video Name
Lecture 0	Welcome to Module-1

Lecture 1	What is data visualization?
Lecture 2	History of Visualization
Lecture 3	Why do we have to visualize data?
Lecture 4	How do we visualize? (Gestalt Principles)
Lecture 5	Principle 1: Figure and Ground
Lecture 6	Principle 2: Similarity
Lecture 7	Principle 3: Focal Point
Lecture 8	Principle 4: Continuity
Lecture 9	Principle 5: Proximity
Lecture 10	Principle 6: Common Region
Lecture 11	Principle 7: Closure
Lecture 12	Stages of visualizing data
Lecture 13	Usage of Visualization
Lecture 14	Usage of Visualization: Exploratory Analysis
Lecture 15	Usage of Visualization: Explanatory Analysis
Lecture 16	Types of Charts
Lecture 17	Chart Types: Comparison
Lecture 18	Chart Types: Distribution
Lecture 19	Chart Types: Composition
Lecture 20	Chart Types: Relationship
Lecture 21	Chart Selection Guide
Lecture 22	Common chart selection questions
Lecture 23	Stacked Vs Grouped bar chart
Lecture 24	Line Vs Area chart
Lecture 25	Hierarchical Data
Lecture 26	Combination Chart
Lecture 27	Mistakes to Avoid When Designing Data Visualizations
Key Terms	*Gesalt Principle, BigData, IoT, Digitalization, Euclidean Space, Outliers, Data Science*

Module 2: Designing Effectiveness - Visual Best Practices

Lecture	**Video Name**
Lecture 1	Importance of data visualization
Lecture 2	Data Types

Lecture 3	Effectiveness of visual encodings
Lecture 4	Effectiveness of visual encodings: Detection
Lecture 5	Effectiveness of visual encodings: Assembly
Lecture 6	Estimation
Lecture 7	Estimation: Color
Lecture 8	Estimation: Volume
Lecture 9	Estimation: Angle
Lecture 10	Estimation: Length
Lecture 11	Estimation: Position
Lecture 12	Edward Tufte's design principles
Lecture 13	Principle 1: Maximizing Data-Ink ratio
Lecture 14	Principle 2: Minimizing Chart Junk
Lecture 15	Principle 3: Minimizing Lie Factor
Lecture 16	Can Chart Junk be useful?
Key Terms	*Visual encodings, Quantitative data, Luminance, Graphical design principles*

Module 3: Visualization of Numerical Data

Lecture	**Video Name**
Lecture 1	Introduction
Lecture 2	Exploratory Analysis
Lecture 3	Univariate Analysis – How do we visualize single measure?
Lecture 4	Bar Chart
Lecture 5	Big Number
Lecture 6	Pie/Donut Chart
Lecture 7	Icon Array Chart
Lecture 8	Histogram
Lecture 9	Box and Whisker Chart
Lecture 10	Multivariate Analysis - Charts to visualize multiple measures
Lecture 11	Stacked Bar Chart
Lecture 12	Box Plot
Lecture 13	Boxen Plot
Lecture 14	Violin Plot
Lecture 15	Strip Plot
Lecture 16	Swarm Plot
Lecture 17	Scatter Plot
Lecture 18	Pair Plot
Lecture 19	Heat Map
Lecture 20	Parallel Coordinates Chart

Lecture 21	Line Chart
Lecture 22	Dual Axis Chart
Lecture 23	Modelling
Lecture 24	Modelling: Feature Selection
Lecture 25	Modelling: Hyper-parameters Tuning
Lecture 26	Model Evaluation
Lecture 27	Confusion Matrix
Lecture 28	Classification Report
Lecture 29	ROC_AUC Plot
Lecture 30	Visualization during Deployment
Lecture 31	Visualize Decision Tree
Lecture 32	Model Explainer
Lecture 33	Local Interpretation
Lecture 34	Global Interpretation
Lecture 35	Business Operation Dashboard
Key Terms	*Bias, Variance, Blackbox models, Likelihood, KPIs, Interactive dashboard*

Module 4: Visualization of Text Data

Lecture	Video Name
Lecture 1	Introduction
Lecture 2	Importance of Text Data Visualization
Lecture 3	Challenges of Text Data Visualization
Lecture 4	Various Forms of Text Data
Lecture 5	Text Data Pre-processing Pipeline
Lecture 6	Visualizing Text Data
Lecture 7	Word Cloud
Lecture 8	Bar Chart
Lecture 9	Word Tree
Lecture 10	Line Chart
Lecture 11	Joint Plot
Lecture 12	Histogram Plot
Lecture 13	Scatter text visualization
Lecture 14	Visualizing conversations
Lecture 15	Visualizing Timeline
Lecture 16	Visualizing People
Lecture 17	Visualizing Information Flow
Lecture 18	Visualizing Data Hierarchy
Lecture 19	Visualizing Networks

Lecture 20	Visualizing Content: Word Embedding
Lecture 21	Visualizing Content: Topic Modelling
Key Terms	*Text analytics, NLP, Bivariate graph, Cluster, Hypothesis, Dimensionality reduction*

Module 5: Misleading with Charts

Lecture	**Video Name**
Lecture 1	Introduction
Lecture 2	Pre-attentive processing of Visual Attributes
Lecture 3	Types of Misleading Charts
Lecture 4	Visualization for Decoration
Lecture 5	Axis Manipulation
Lecture 6	Cherry Picking Data
Lecture 7	Pie Chart Blunders
Lecture 8	Misuse of correlation and causation
Lecture 9	Simpson's Paradox
Lecture 10	Scaling
Lecture 11	Drill Down Bias
Lecture 12	Data Discrepancy
Lecture 13	Histogram Confuser
Lecture 14	Examples of Misleading Visualization
Key Terms	*Correlation, Causation, Inference, Misleading graph, Data distribution, Spurious trend, Sampling error*