



Syllabus		
Unit No	Contents	Mapped CO
I	“What’s Vis, and Why Do It?”, Data Abstraction-Data Types, Dataset Types, Attribute Types, semantics, Task Abstraction- Why Analyze Tasks Abstractly? Who: Designer or User, Actions, Targets, Analysis: Four Levels for Validation -The Big Picture Why Validate? Four Levels of Design ,Angles of Attack, Threats and Validation Approaches, Validation Examples	CO1
II	Marks and Channels-The Big Picture Why Marks and Channels? Defining Marks and Channels, Using Marks and Channels, Channel Effectiveness, Relative vs. Absolute Judgments, Arrange Tables-The Big Picture Why Arrange? Classifying Arrangements by Keys and Values, Express: Quantitative Values, Separate, Order, and Align: Categorical Regions, Spatial Axis Orientation, Spatial Layout Density	CO2, CO3
III	Arrange Spatial Data The Big Picture Why Use Given?, Geometry, Scalar Fields: 1 Value, Vector Fields: Multiple Values, Tensor Fields: Many Values Arrange Networks and Trees The Big Picture Connection: Link Marks, Matrix Views, Costs and Benefits: Connection vs. Matrix, Containment: Hierarchy, Map Color and Other Channels The Big Picture, Color Theory, Color maps, Other Channels	CO1, CO3
IV	Manipulate View The Big Picture Why Change?, Change View over Time Select Elements, Navigate: Changing Viewpoint ,Navigate: Reducing Attributes, Facet into Multiple Views-The Big Picture Why Facet? Juxtapose and Coordinate Views, Partition into Views, Superimpose Layers, Reduce Items and Attributes The Big Picture Why Reduce?, Filter, Aggregate	CO2, CO3
V	Embed: Focus + Context The Big Picture Why Embed? ,Elide, Superimpose, Distort, Costs and Benefits: Distortion Analysis Case Studies Graph-Theoretic Scagnostics, VisDB, Hierarchical Clustering Explorer Pivot Graph ,Interring, Constellation	CO3, CO4

Learning Resources
<b>Text books</b>
1. Visualization Analysis & Design by Tamara Munzner (2014) (Links to an external site.) (ISBN 9781466508910)
<b>References</b>
<ol style="list-style-type: none"> <li>1. Interactive Data Visualization for the Web by Scott Murray 2nd Edition (2017)</li> <li>2. D3.js in Action by Elijah Meeks 2nd Edition (2017)</li> <li>3. Semiology of Graphics by Jacques Bertin (2010)</li> <li>4. The Grammar of Graphics by Leland Wilkinson</li> <li>5. ggplot2 Elegant Graphics for Data Analysis by Hadley Wickham</li> </ol>
<b>e-Resources and other Digital Material:</b>
1. <a href="https://medium.com/analytics-vidhya/how-to-learn-data-visualization-for-free-cf21ffe06b45">https://medium.com/analytics-vidhya/how-to-learn-data-visualization-for-free-cf21ffe06b45</a>