

# Syllabus

## *QBS 180: Data Visualization*

Fall 2020

Friday, TBD

Meeting room: TBD

Course Instructor: Ramesh Yapalparvi

### **Course description**

Biomedical and health data visualization is an important and necessary step of preliminary statistical analysis. "A picture is worth a thousand words" is the impetus of this course. This course will teach best practices for visualizing data, including exploratory statistics and effective communication of statistical analysis. Data visualization is a key component that all data scientists' needs to be fluent in. Students will become competent users of Tableau, R graphics and R-Shiny. Real-life biomedical and health related data will be used throughout the course.

### **Learning objectives**

- Competent users of creating various charts and animations in Tableau
- Provide best practices of creating dashboards using Tableau
- Gain knowledge in sharing visuals in tableau to various stakeholders

### **Instructors' e-mails**

ramesh.yapalparvi@dartmouth.edu

<b>Week</b>	<b>Lecture</b>	<b>Topic</b>	<b>Slide Title</b>
<b>Week 1</b>	<b>1</b>	Introduction to data visualization tools and Tableau. Installing Tableau and getting started	<b>Introduction</b>
<b>Week 2</b>	<b>2</b>	Introduction to charting in Tableau. Dual line charts, chart guidelines for: Box plots, Maps, Bubble charts, scatter plots, Donut chart, and heat maps	<b>Introduction</b>
<b>Week 3</b>	<b>3</b>	Exploring and Navigating Tableau Overview. Importing and downloading visualization in Tableau	<b>Data Sources - Tableau</b>
<b>Week 4</b>	<b>4</b>	Calculating and writing SQL type statements in Tableau. Quick and Custom calculations. Parameters and Filtering. Creating groups and sets.	<b>Filters and Groups</b>
<b>Week 5</b>	<b>5</b>	Introduction to dates. Date hierarchies, conversion from discrete to continuous dates	<b>Dates in Tableau</b>
<b>Week 6</b>	<b>6</b>	Rserve package-Integrating Tableau and R. Writing R code in Tableau	<b>Rserve</b>
<b>Week 7</b>	<b>7</b>	Creating dashboard and Storytelling with Tableau, KPIs	<b>Dashboards and KPIs</b>
<b>Week 8</b>	<b>8</b>	Best practices for dashboard design, design principles and hierarchies, actions, filters, and parameters.	<b>Best Practices</b>

<b>Week 9</b>	<b>9</b>	Introduction to R-Shiny and creating dashboards	<b>R-shiny</b>
<b>Week 10</b>	<b>10</b>	Presentations from students	<b>Project Presentations</b>

**Grades breakdown**

Exam I (midterm, take home exam) - 30%  
 Homework - 20% (assigned on Friday via canvas, due next Wednesday, submitted electronically).  
 Team Project (presented at the last class meeting) - 40%  
 Quizzes – 10%

**Where class fits in terms of Data Science, Type and Applications?**

Data Science		
Analytics	Algorithm	Inference
10	70	20
Course Type		
Theory	Methodology	Application
20	30	50
Application Area		
Application-driven	Specific	General
30	20	50

**Class Climate and Inclusivity:**

Everyone who meets the pre-requisites to take the class is welcome to take the course. A friendly learning environment will be fostered.

**Location and Time:**

TBD on Friday from TBD

**References:**

Daniel G. Murray. Tableau Your Data! Fast and Easy Visual Analysis with Tableau Software. John Wiley & Sons, 2016.

**Academic Honor:**

Academic integrity is at the core of our mission as mathematicians and educators, and we take it very seriously. We also believe in working and learning together.

Collaboration on homework is permitted and encouraged, but obviously it is a violation of the honor code for someone to provide the answers for you.

On written homework, you are encouraged to work together, and you may get help from others, but you must write up the answers yourself. If you are part of a group of students that produces an answer to a problem, you cannot then copy that group answer. You must write up the answer individually, in your own words.

On exams, you may not give or receive help from anyone.

**Religious Observation:**

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss appropriate accommodations.

**Student Accessibility and Accommodation:**

Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to see me privately as early in the term as possible. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office in Carson Hall 125 or by phone: 646-9900 or email: [Student.Accessibility.Services@Dartmouth.edu](mailto:Student.Accessibility.Services@Dartmouth.edu).

Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to me. As a first step, if you have questions

about whether you qualify to receive academic adjustments and services, you should contact the SAS office. All inquiries and discussions will remain confidential

**Software:**

This course required use of Tableau and R. Tableau is free for students and a license can be obtained <https://www.tableau.com/academic/students> (Links to an external site.)

The instructors are not responsible for any cost associated with software nor with any functionality issues with the software on your personal computers. **It is the sole responsibility of students to have functional software on their PC. Please refer to online resources or get help from research computing**