# Course Syllabus for SIADS 522: Information Visualization I

## Course Overview and Prerequisites

This course will introduce information visualization—visual representations of data through interactive systems. Specific focus will be on the role of visualization in understanding data and understanding how perception, cognition, and good design enhance visualization. The course will introduce APIs for visualization construction. Students will learn to construct and critique visualizations and visualization tools.

Students should have an understanding of the pandas library, which is covered in Data Manipulation, prior to this course.

## Instructor and Course Assistants

Instructor: Eytan Adar - eadar@umich.edu
Course Assistant: Anthony Whyte - arwhyte@umich.edu

## Communication Expectations

Contacting instructor and course assistant: Course channel in Slack
Email response time: 24 - 48 hours
Slack response time: 24 - 48 hours
Office hours: **TBD**

## Required Textbook

Visual Display of Quantitative Information. Edward. R. Tufte.
(https://www.amazon.com/Visual-Display-Quantitative-Information/dp/1930824130)

## Technology Requirements unique to this course

None

## Accessibility

Screen reader configuration for Jupyter Notebook Content

## Learning Outcomes

1. Enumerate the key reasons for creating and evaluating information visualizations
2. Be able to construct basic visualizations using Altair\
3. Be able to evaluate visualization designs on expressiveness/effectiveness by using cognitive/perceptual theories
4. Be able to critique and contrast different designs based on task frameworks (domain, abstract)
5. Be able to select appropriate encodings given data and task framework
6. Be able to define basic visualization types using Grammar of Graphics

## Course Schedule

This session **begins on Tuesday, October 1, 2019** and **ends on Monday, October 28, 2019.**

Weekly assignments will be **due on Mondays at 11:59 pm** (Ann Arbor, Michigan time).

Schedule of Weekly Office Hours via Zoom (time zone = Ann Arbor, Michigan):

- **TBD**

# Weekly Lecture Topics

## Week 1: Introduction to Information Visualization

- The Flavors of Visualization
- Related Concepts
- History of Visualization
- The Functions of Information Visualization (Record and Analyze)
- The Functions of Information Visualization (Communicate)
- The Block Model
- Key Topics

## Week 2: Data Models

- The Flavors of Data
- The Flavors of Data Organization
- Nominal, Ordinal and Quantitative
- Drawing Marks Through Encoding
- Expressiveness and Effectiveness I
- Expressiveness and Effectiveness II
- Automating Construction
- Implementing
- Grammar of Graphics

## Week 3: Perception and Cognition

- Shaping Visualization
- The Limits of Vision
- Three Stage Model
- Preattentive Processing
- Preattentive Processing in Action
- Detection and Estimation
- Detection and Estimation -- Implications
- Gestalt Psychology
- Gestalt Psychology in Action
- Multiple Encoding
- Change Blindness
- Color
- Context (Cultural and Otherwise)

## Week 4: Design

- Suggestions and When to Ignore Them
- Wicked Design
- Lie Factor
- Graphical Integrity (Lie Factor Part 2)
- Data-Ink Ratio
- Chart Junk

- Opinions, Small and Large
- Information Visualization Ethics

## Grading

| Course Assignments | Percentage of Final Grade |
|---|---|
| *Week 1 Assignments* | 25% |
| *Week 2 Assignments* | 25% |
| *Week 3 Assignments* | 25% |
| *Week 4 Assignments* | 25% |
| | 100% |

**Note: All assignments are required to earn credit for this course.**

## Letter Grades, Course Grades, and Late Submission Policy

Refer to the MADS Assignment Submission and Grading Policies section of the UMSI Student Handbook (access to Student Orientation course required).

## Academic Integrity / Code of Conduct

Refer to the Academic and Professional Integrity section of the UMSI Student Handbook (access to Student Orientation course required).

While we offer a number of discussion channels to support your work, if you are stuck you may not share or receive complete solutions to the assignments. We also encourage you to support your classmates, but again, without sharing completed code (pointing to resources, describing ideas in pseudo-code, etc. is fine).

## Accommodations

Refer to the Accommodations for Students with Disabilities section of the UMSI Student Handbook (access to the Student Orientation course required).

Use the Student Intake Form to begin the process of working with the University's Office of Services for Students with Disabilities.

## Help Desk(s): How to get Help

- Degree program questions or general help - umsimadshelp@umich.edu
- Coursera's Technical Support (24/7) - https://learner.coursera.help/

## Library Access

Refer to the U-M Library's information sheet on accessing library resources from off-campus. For more information regarding library support services, please refer to the U-M Library Resources section of the UMSI Student Handbook (access to the Student Orientation course required).

## Student Mental Health

Refer to the University's Resources for Stress and Mental Health website for a listing of resources for students.

## Student Services

Refer to the Introduction to UMSI Student Life section of the UMSI Student Handbook (access to the Student Orientation course required).