MSDS670_Syllabus

MSDS 670 - Visualization: Syllabus

Instructor Information

John Koenig [jkoenig002@regis.edu] is a data scientist and a data science instructor who lives in Washington, DC

Course Title

MSDS 670 - Data Visualization

Course Description

This course focuses on the core thinking, creative, and technical skills necessary for the student to build the foundation for a dynamic career as a data visualization expert. We will use Microsoft Excel and Matplotlib (Python Library) in order to teach the foundational data visualization skillset. Students will also build a rich portfolio of their data visualizations which they can share with colleagues and prospective employers.

Prerequisite Courses

MSDS 650

Course Outcomes

In this course, students will learn to:

- Understand basic principles of data visualization theory
- Understand data visualization techniques and best practices
- Learn how to clean and process data for your data visualizations
- Write custom code to create basic and advanced data visualizations
- Learn how to build a career as a data visualization professional
- Create impactful data visualizations that will be included in your personal portfolio website
- Understand the future of data visualization and how emerging technologies will change the way humans interact with their data

Differing Ability Levels

Each student comes to this with a different background and the students in this class come from the Data Science program and the Health Informatics program. I understand that some people are doing this with a computer science background and some people are new to coding.

If you are struggling with any of the assignments due to your lack of a technical foundation, please let me know and I can adjust the course to be more accessible to you

If you are one of those data scientists with a wild look in their eye 😳 and you desperately want a challenge, I can help you find something interesting to do, so please email me

Everyone else - just do your best and remember that your work will be better the more time that you put into it

Course Materials

Required Texts

- Edward Tufte, The Visual Display of Quantitative Information [Link]
  - There is no electronic version of this book, just hardback and paperback editions
  - Order this book as soon as you can so you can read it in Week 2
- Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals
  - Available online for free through O'Reilly (use your student email) [Link]

Course Content

- Slide decks, Videos, etc.
- Code Examples
- Course Datasets

Technology Tools

- Microsoft Excel (Office 365) - available through your school account
- Anaconda Data Science Distribution [Link]

Optional Materials

- Zen of Python PEP 20 (Python.org) [Link]
- Scientific Visualization: Python + Matplotlib [Link]
- Matplotlib Documentation [Link]
- Make sure you know Microsoft Excel basics

Weekly Assignments

The weekly workflow for student assignments will go as follows:

- Turn in your assignment before the end of Sunday night (this is not a hard deadline)
- Instructor will grade all student work that has been submitted on a weekly basis (usually on Monday or Tuesday)
- Complete your discussion post before the end of Sunday night (this is not a hard deadline)
  - I'll give you 100 as long as you make a discussion post each week, but please make some meaningful contributions here and discuss a bit with your classmates
  - If I miss entering your grade for the discussions and it's toward the end of the course, please email me and I will give you your credit

IMPORTANT - Due Dates

I would like to stress to you that this class is designed like an art class. I do not set hard deadlines for your assignments, except for at the end of the class because the course is over. **You don't need to send me an email if your turn in is late,** unless it's your final project. Just turn in your work when it is ready.

- **Just because you don't have due dates - don't let everything build up to the end of the course**
  - I am warning you, this is extremely time consuming work - do not fall behind

Regrades and Early Turn-In

Pie charts, donut charts, radial bar charts, and 3D plots are not allowed. If you submit one of these, I will have to give you a 70 on the project until you fix the plot

I am willing to regrade your project if you are willing to put work in to improve it (based on my feedback):

- You are allowed to resubmit your mid-term or final projects
- There is limited time for me to regrade final projects - so submit your revised project asap
- You can resubmit the smaller assignments if you want, but they have a low effect on your grade and they are supposed to be more like practice/homeworks

IMPORTANT - If you do something that I cannot abide by in your projects (it's usually a pie chart) - I will give you a low grade and I will specifically ask that you fix your submission and then I will regrade it.

You can turn in your final project early if you want me to look at it and let you know if there's any major issues. Then you would have slightly more time to fix it before the end of the course. **If you are going to turn your project in early, email me and get my attention** because very few people tend to do this and I need to make time to review your work

Projects

There are two projects for this course:

- Mid-Term Project (Individual)
  - Mid-Term Project Requirements
  - Target Turn in - 11:59 PM Sunday 06FEB2022
    - It's OK if you turn it in after this date but your work might not be included in the combined class feedback video that I will provide after the mid-term, but you can still watch the video obviously
- Final Project (Group or Individual)
  - Final Project Requirements
  - Target Turn in - 11:59 PM Sunday 06FMAR2022
    - **You have to turn your final project on time** so that I can grade all the projects and turn in the final course grades on time
    - You can turn in regrades up until this deadline too, please don't rush everything in at the end of the semester because you're missing the back and forth of turning things in and getting feedback

Course Assignments and Activities

Assignments for Online Course

Week	Readings / To-Do	Assignments + Projects
1 - Introduction to Data Visualization	Course Content and Videos	Assignment 1 - Review 50 Data Visualizations
2 - Data Visualization Theory	Course Content and Videos	Assignment 2 - Review 25 Data Dashboards
3 - Basic Data Visualization with MS Excel	Course Content and Videos	Assignment 3 - Clean a Dataset and Create 3 Visualizations in MS Excel
4 - Advanced Data Visualization with MS Excel	Course Content and Videos	Mid-Term Project - Individual Project (MS Excel)
5 - Matplotlib I	Course Content and Videos	Assignment 5 - (2 week assignment) Submit link to GitHub with your Matplotlib code

6 - Matplotlib II	Course Content and Videos Code Examples	Assignment 6 - (2 week assignment) Submit your slide deck with your Matplotlib visualizations
7 - Advanced Data Visualization	Course Content and Videos Code Examples	Assignment 7 - Clean a Dataset and Create 1 Advanced Data Visualization
8 - Data Visualization Future Tech	Course Content and Videos Reading / Review on future tech Future tech examples / demos	Final Project - Final Group/Individual Project

Student Evaluation Grid

Assignments	Weighted Percentage
Assignments [6]	30% of Total
Mid-Term Project - Individual (MS Excel or other)	24% of Total
Final Project - Group or Individual Project (Matplotlib or similar)	30% of Total
Discussion Participation [8]	16% of Total (2% each)
TOTAL	**100 %**

Academic Resources and Policies

Anderson College Policies

University Student Resources

OTHER INFORMATION

NOTE TO LEARNERS: On occasion, the course facilitator may, at his or her discretion, alter the Learning Activities shown in this Syllabus. The alteration of Learning Activities may not, in any way, change the Learner Outcomes or the grading scale for this course as contained in this syllabus. Examples of circumstances that could justify alterations in Learning Activities could include number of learners in the course; compelling current events; special facilitator experience or expertise; or unanticipated disruptions to class session schedule.