Instructional Information

Professor:	Dr. Thomas Fisher
Office:	305B Upham Hall
Telephone:	(513) 529-2176
Email:	*fishert4@miamioh.edu* (best)
Class times:	MW 11:40-1:00 - Section A
	MW 4:25-5:45 - Section B
Class Locations:	SHD 134 - Section A
	UPH 209 - Section B
	No Food or Drink in the classrooms, there are too many computers around!
Office Hours:	MW 2:00 - 4:00 (dedicated for this class)
	TuTh 9:30 - 10:30 (general office hours) - Note: I am CDA so lots of *general* stuff pops up
	By appointment
Personal Website:	*https://tjfisher19.github.io/*
	and *Canvas* site
Graduate Assistant:	Lina Lee (*leel3@miamioh.edu*)
	Will attend most Section B classes
	Office: UPH 222C
	Office hours: TuTh 2:00 - 3:30
Undergraduate Associate:	Benjamin Schweitzer
	Will attend most Section A classes
	Available: B.E.S.T. library Stat Help desk
	Office hours: MW 1:30-4:00,
	Tu 12:30-2:30
	Th 10:00-2:00

Course Information

Bulletin Description: Communicating clearly, efficiently, and in a visually compelling manner using data displays. Identifying appropriate displays based on various data characteristics/complexity, audiences, and goals. Using software to produce data displays. Integrating narratives and data displays. Critiquing visualizations based on design principles, statistical characteristics, and narrative quality.

Prerequisites: *STA 261, 301, 368, 671, IMS 261, ISA 205, 225,* or permission of the instructor.
A willingness to work. Producing data visualizations requires coding on the computer. A tolerance for some coding frustrations will serve you well.

Learning Objectives:
- IDENTIFY appropriate visualization methods for different data characteristics, audiences, and goals.
- USE appropriate software tools to PRODUCE their own data visualizations.
- COMMUNICATE clearly, efficiently, and in a visually compelling manner with data visualizations.
- INTEGRATE narratives and data visualization.
- CRITIQUE static and interactive data visualizations based on design principles, statistical characteristics, and narrative quality.

Course threads: There are three main threads that are woven throughout the course:
- Statistics + Aesthetics
- Technology (i.e., coding)
- Narrative (i.e., story telling)

Course material as well as assignments will balance these threads. It is understood that students come in with differing levels of strength and experience in each of these threads. I will do our best to level the playing field in early lectures and tutorials. However, students should expect to engage in *self-directed learning* in areas they deem deficient. Faculty are more than willing to guide and coach them. It's worth noting that faculty are always learning as well.

Course materials

Class Materials: Notebook and <u>laptop computers</u>

Textbook: <u>R Graphics Cookbook</u>, by Chang [available through <u>lib.miamioh.edu</u>]
<u>Storytelling with Data</u>, by Knaflic [available through <u>lib.miamioh.edu</u>]

Software: R and RStudio will be the primary tools. We will also use spreadsheet software on occasion.

R can be downloaded from: <u>https://cran.r-project.org/</u>
RStudio can be downloaded from: <u>https://www.rstudio.com/</u>

RStudio is also available on computers on campus, through the Stat App Portal and an internal RStudio server.

Getting started with R and RStudio: <u>https://www.youtube.com/watch?v=lVKMsaWju8w&t=64s</u>

References: Data Visualization books
- *Fundamentals of Data Visualization* - Claus Wikle
- *Visualize This* - Nathan Yau
- *The Visual Display of Quantitative Information* - Edward Tufte
- *Graphics of Large Datasets* - Unwin, Theus and Hofmann
- *Show Me the Numbers* - Stephen Few
- *Beautiful Evidence* - Edward Tufte
- *Visualize Explorations* - Edward Tufte

Online platforms
- <u>Information Aesthetics</u> (infosthetics.com)
- <u>Flowing Data</u> (flowingdata.com)
- <u>visual complexity</u> (visualcomplexity.com/vc)
- <u>Data Is Beautiful Sub-Reddit</u> (reddit.com/r/dataisbeautiful)

- NY Times - Open. (http://open.blogs.nytimes.com)

R resources
- R Short Reference Card. (cran.r-project.org/doc/contrib/Short-refcard.pdf)
- R coding topic cheat sheets
- Datacamp (datacamp.com)
- swirl R coding tutor (swirlstats.com)
- Codeschool Try R (tryr.codeschool.com)
- Coding Style Guide (by Hadley) http://adv-r.had.co.nz/Style.html

Course Format

Readings and tutorials: Required readings and technology tutorials are to be done before the beginning of the next class. The reading schedule will be posted to the canvas site in advance of classes.

Classroom: The class periods will be an integration of lectures, demonstrations, studios/work time and discussion. Most classes will have at least one exercise or quiz designed to teach the technology/how to data visualization and to reinforce the conceptual material covered.

Homework: Throughout the semester there will be individually completed assignments that relate to material from course lectures.

Grades for homework assignments will be based upon the quality, technical accuracy, interpretation, aesthetics, reproducibility, documentation and other aspects of the submitted work.

Late assignments will not be accepted.

In class assignments: In class assignments, such as quizzes and small activities, will be given throughout the semester. Further, many activities will be interactive where you are expected to provide feedback on the

visual displays created by me and your classmates.

Midterm exam: A midterm exam will be given in roughly the 8th week of the semester (tentative date October 14). This exam will test your understanding of the fundamental design principles and ability to do basic technical aspects associated with visualization. Basically testing the first two course modules and some elements from module three.

Solo Project: Each student will each create a visualization that reveals a compelling story through a visual display that is aesthetically appropriate. The documentation and R code needs to be thorough, clean and efficient. The accompanying write-up must carry a coherent, accurate and data supported narrative.

Group Project: In lieu of a final exam, after individual project has been completed, groups will be formed to combine efforts towards an interactive visual display (i.e., a *dashboard*). The interactivity needs to add significant value beyond what could be accomplished in a static visualization. Group members will evaluate each other's contribution to the final product. Instructor and peers will evaluate displays during class presentations (during the finals time block).

Graduate Work: Graduate students taking the course have additional expectations and responsibilities. Specifically, they will be held to a higher standard on homework and assignments, on occasion there may be graduate-specific problems on assignments and quizzes and they will complete an additional individual project related to their graduate research.

Grading

Final Grades: At the conclusion of the semester, final grades will be compiled using:

STA 404 students

Source	Amounts
Homework	30%
In class	10%
Midterm	10%
Solo Project	25%
Group Project	25%
Total	**100%**

STA 504 students

Source	Amounts
Homework	30%
In class	10%
Midterm	10%
Solo Project	20%
Group Project	20%
Grad Project	10%
Total	**100%**

Grades will be assigned based on:

[98, 100)	A+	[92, 98)	A	[90, 92)	A-
[88, 90)	B+	[82, 88)	B	[80, 82)	B-
[78, 80)	C+	[72, 78)	C	[70, 72)	C-
[68, 70)	D+	[62, 68)	D	[60, 62)	D-
		[0, 60)	F		

Student Expectations

Attendance: As stated in the Student Handbook, you are expected to attend all scheduled class meetings. The attendance policy for this course is as follows: Up to two (2) absences will be tolerated without penalty (note 2 classes is missing a week of material). Three (3) unexcused absences will be

regarded as the final cut and the Registrar will be notified to drop the student from the course.The two absence allowance is provided for emergency and health related situations. It is the student's responsibility to provide information concerning all absences and you should speak to the instructor before missing a class. The determination of an excused (vs. unexcused) absence is up to the discretion of the instructor (doctor's written excuse for example). Please do not arrive late or leave early from class. Please see the student handbook for specifics on university policies.

Classroom Climate: Basics
- Attend class, be on time!
- Be respectful of your classmates and instructor
- Late assignments will not be accepted without prior approval

Classroom environment
- The course is designed to encourage active participation on the part of students.
- Classroom discussion and critiques are conducted in an atmosphere that encourages interaction and mutual respect.
- Be mindful of differences -- that is, we all come from a variety of experiences.

Teamwork
- You will be working in teams for the final project.
- Be responsible to each other.
- Accept full responsibility of your professional performance and the performance of your team.
- Each team will be asked to draft a social contract for their own expectations within the group.
- You will have the opportunity to evaluate your team members as they will have the opportunity to evaluate you.

Accommodations: Miami University is committed to providing equal opportunities for people with disabilities and is proactive in its efforts to comply with federal laws such as Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. 794 (Section 504), and the Americans with Disabilities Act of 1990, 42 U.S.C. 12131 (the ADA) to ensure access to academic programs and University life.

If you are a student with a disability and feel you may need a reasonable accommodation to fulfill the essential functions of this course, you are encouraged to contact Student Disability Services (SDS). SDS provides accommodations and services for students with a variety of disabilities, including physical, medical and psychiatric disabilities. You are encouraged to contact SDS to learn more about registration and procedures for requesting accommodations. email: SDS@miamioh.edu

Current SDS registered students should request accommodations according to [SDS procedure](). You are strongly encouraged to request and discuss your accommodations needs during the first 1-2 weeks of the semester.

Student Code of Conduct: Any violations of Academic Integrity within the Student Handbook will not be tolerated. This includes cheating, plagiarism, storing information in a calculator, sabotage of another's work and disrupting class. See the [Handbook]() for a complete listing of the student code of conduct. All violations will be handled in accordance with established procedures and policies concerning student academic responsibility. See the [Bulletin]() for additional details:
http://miamioh.edu/academics/bulletin/
http://www.miamioh.edu/handbook

Homework assignments are to be completed by each student individually. Discussion of assigned materials is permitted but students must submit their own work. Direct copying of text or code from a peer's assignment will not be tolerated.

Group projects will require only a single submission per group and students will be required to evaluate the contributions made by all group members to the final product. If your group members indicate that your effort was insufficient, then your project score will be adjusted accordingly.

Academic dishonesty has been an issue in this course in the past. The Department of Statistics takes the offense of plagiarism very seriously. All suspected cases will be prosecuted.

Important Dates

Day, Date	Event	Notes
Thur, Aug 29	Oxford Uptown Picnic	Music, free food
Mon, Sep 2	Labor Day	**NO CLASS**
Week of Sep 09-13	[Career Fair](#) & related events - Sep 11 & 12	Look for info on CADS events (Sep 5th & 9th)
Fri, Sep 13	Last day to drop with no grade	
Fri, Oct 11	Fall "break"	
Mon, Oct 14	Midterm Exam	*Subject to change*
Fri, Oct 18	Midterm grades available on banner	
Mon, Oct 28	Last day to drop with a W	
Thur-Sat, Nov 7-9	Dept. of [Statistics 10th anniversary conference](#)	Your time block on Friday is likely open, plan to attend!
Wed-Sun, Nov 27-Dec 1	Thanksgiving break	**NO CLASS Wed Nov 27**

Wed, Dec 11	Final Exam presentations
	  12:45-2:45 - Section A final presentations
	  3:00-5:00 - Section B final presentations	